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- 2006 Bachelor of Science in Nursing, Ewha Womans University, Seoul, South Korea

2. PROFESSIONAL LICENSE

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3. CLINICAL EXPERIENCE

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Project title: Nursing staffing and dementia training in relation to inappropriate antipsychotic medication use in nursing home residents with dementia

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University of Maryland School of Nursing, USA

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- 2017-2018 Project director: Responsible for assisting with grant proposal preparation, submitting IRB applications, designing online survey using the REDCap platform, assisting with data collection
3) Feasibility and Useability of an Intervention called the Electronic Cancer Survivorship Patient Engagement Toolkit (CaS-PET). Funded by Sigma Theta Tau Pi Chapter research grant (PI: Dr. Eun-Shim Nahm)
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- 2017-2018 4) Factors of academic success in traditional BSN students (PI: Dr. Nina Trocky) Graduate assistant: Data analysis using multilevel statistical modeling, preparing for a co-authored manuscript
- 2017 5) Function and Behavior Focused Care. Funded by National Institute for Aging (PI: Dr. Elizabeth Galik)
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- 2016-2017 6) Long-Term Care Training and Provider Regulations for Optimal Resident Outcomes. Funded by NCSBN (PI: Dr. Alison Trinkoff)
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6. PUBLICATIONS

Data-based articles:

- Trinkoff, A. M., **Yoon, J. M.**, Storr, C. L., Lerner, N. B., Yang, B. K., & Han, K. (2020). Comparing residential long-term care regulations between nursing homes and assisted living facilities. *Nursing Outlook*, 68(1), 114-122.
- Nahm, E. S., Son, H., & **Yoon, J. M.** (2020). Older adults' use of patient portals: Experiences, challenges, and suggestions shared through discussion board forums. *Geriatric Nursing*, 41(4), 387-393.
- Trinkoff, A. M., Lerner, N. B., Storr, C. L., Han, K., **Yoon, J. M.**, & Yang, B. K. (2019). Nurse availability and other facility characteristics in relation to assisted living care deficiencies. *Journal of Nursing Regulation*, 10(1), 21-27.
- Son, H., Hertsenber, L., La, I. S., **Yoon, J. M.**, Powell, K., Nahm, E.-S., Corbitt, N., McQuaige, M., Jaidar, N., & Rosenblatt, P. (2019). Use of health information technologies for cancer survivorship care: A comprehensive review of the literature. *Journal of Informatics Nursing*, 4(4), 6-18.
- Nahm, E. S., Miller, K., McQuaige, M., Corbitt, N., Jaidar, N., Rosenblatt, R., Zhu, S., Son, H., Hertsenber, L., La, I. S., **Yoon, J.**, & Powell, K. (2019). Testing the impact of cancer survivorship patient engagement Toolkit on selected health

outcomes of Survivors. *Oncology Nursing Forum*, 46(5), 572-584.

Yoon, J., Kim, M., & Shin, J. (2016). Confidence in delegation and leadership of registered nurses in long-term care hospitals. *Journal of Nursing Management*, 24(5), 676-685.

Seo, K., Kim, M., Lee, G., Park, J., & **Yoon, J.** (2013). The impact of acculturation and social support on mental health among Korean-American registered nurse. *Korean Journal of Adult Nursing*, 25(2), 157-169.

Kim, M., Park, J., Lee, K., & **Yoon, J.** (2013). The study on care worker's self-efficacy, job satisfaction and turnover intention at long-term and home care service centers. *Journal of Welfare for the Aged Institute*, 62, 361-382.

Manuscript in Submission

Yoon, J. M. Trinkoff, A. M., Galik, E., Storr, C., Brandt, N., Lerner, N. Nurse staffing and nursing home deficiency of care for inappropriate psychotropics use in residents with dementia. Submitted to *Journal of Nursing Scholarship*

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Mattingly, T. J., Trinkoff, A., Lydecker, A. D., Kim, J. J., **Yoon, J. M.**, Roghmann, M. C. Short-stay admissions associated with larger COVID-19 outbreaks in Maryland nursing homes. Submitted to *Journal of Applied Gerontology*

Manuscripts in Preparation

Yoon, J. M., Resnick, B., Galik, E., Trinkoff, A. M. Co-occurring behavioral and psychological symptoms of dementia. In preparation for submitting to *American Journal of Alzheimer's Disease & Other Dementias®*

Yoon, J. M., Trinkoff, A. M., Galik, E., Storr, C., Brandt, N., Lerner, N. Exploration of deficiency of care reports on inappropriate psychotropic medication use to control behavioral and psychological symptoms of dementia. In preparation for submitting to *Journal of the American Medical Directors Association*

Yoon, J. M., Trinkoff, A. M., Galik, E., Storr, C., Brandt, N., Lerner, N. Inappropriate psychotropics use in nursing homes in relation to dementia care training regulations. In preparation for submitting to *Journal of Applied Gerontology*

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Yoon, J. M., Trinkoff, A. M., Galik, E., Storr, C., & Lerner, N. (2020, April). State-level in-service dementia care training requirements and nursing home deficiencies of care for inappropriate psychotropics use. The Society of Post-Acute and Long-Term Care Medicine Annual Conference, USA

Lerner L, Trinkoff, A. M., Storr, C. L., Han, K., **Yoon, J.**, & Yang, B. K. (2018, November). Facility characteristics associated with care deficiencies in assisted living. GSA 2018 Annual Scientific Meeting, Boston, USA.

Yoon, J., Kim, M., & Shin, J. H. (2017, November) Confidence in Delegation and Leadership of Registered Nurses in Korean Long-Term Care Hospitals.

Washington Regional Nursing Research Consortium. The Catholic University of America, Washington DC, USA.

Poster:

- Yoon, J. M.,** Trinkoff, A. M., Galik, E., & Storr C. (2020, November). Dementia Care Training Regulations and Deficiencies of Care for Inappropriate Psychotropics Use in Nursing Homes. The Gerontological Society of America (GSA) 2020 Annual Scientific Meeting, USA.
- Yoon, J. M.,** Trinkoff, A. M., Galik, E., & Storr C. (2020, November). Nurse Staffing and Nursing Home Deficiency of Care for Inappropriate Psychotropics Use in Residents With Dementia. GSA 2020 Annual Scientific Meeting, USA.
- Yoon, J. M.,** Trinkoff, A. M., Galik, E., Storr, C., & Lerner, N. (2020, April). State-level in-service dementia care training requirements and nursing home deficiencies of care for inappropriate psychotropics use. The Society of Post-Acute and Long-Term Care Medicine Annual Conference, USA
- Yoon, J. M.,** Galik, E., Resnick, B., & Trinkoff, A. M. (2019, October). Composite Score of behavioral and psychological symptoms of dementia: A Tool for a Comprehensive Assessment of Multiple Symptoms. American Academy of Nursing's 2019 Transforming Health, Driving Policy Conference, Washington DC, USA
- Trinkoff, A. M., Storr, C. L., Selby, V., & **Yoon, J. M.** (2019, October). New RN survey: substance use prevalence, workplace and wellness factors in the context of the opioid epidemic and legalized marijuana. International Nurses Society on Addictions. Baltimore, USA.
- Yoon, J. M.,** Son, H., La, I. S., Hertsenberg, L., Kendall, P., Nahm, E. S., Corbitt, N., McQuaige, M., & Rosenblatt, P. (2019, March). Use of Health Information Technologies for Cancer Survivorship Care: A Comprehensive Review of Literature. 41st Annual Graduate Research Conference, University of Maryland, Baltimore, USA.
- Yoon, J.,** Galik, E., & Resnick, B. (2019, March). The Co-occurrence of multiple Behavioral and Psychological Symptoms of Dementia, Aging Research Symposium, University of Maryland, Baltimore, USA.
- Yoon, J.,** Galik, E., & Resnick, B. (2018, November). Factors Associated with a Composite Score of Behavioral and Psychological Symptoms of Dementia. GSA 2018 Annual Scientific Meeting, Boston, USA.
- Yoon, J.,** Kim, M., & Shin, J. H. (2018, March). Confidence in Delegation and Leadership of Registered Nurses in Korean Long-Term Care Hospitals. Southern Nursing Research Society 32nd Annual Conference, Atlanta, USA.

8. AWARDS & SCHOLARSHIP

- 2019 Resnick-Sollins Scholarship
Awarded to the outstanding graduate student with focus on gerontology
- 2018 Gerontological Society of America (GSA) Meeting Attendee Scholarship:
Awarded to the first-time attendee to the GSA meeting selected to present a poster or presentation
- 2018 Doctoral Student Organization Travel Award

- Awarded to the graduate student for a poster or podium presentation(s) at a peer-reviewed research conference
- 2016 Global Korean Nursing Foundation Award
Awarded to Korean PhD and/or DNP students studying in the US to support future Korean nursing leaders for the development of nursing and clinical sciences

9. TEACHING EXPERIENCE

- 2018-2020 University of Maryland School of Nursing, MD, USA:
Graduate teaching assistant, Graduate level,
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Other responsibilities included: Powerpoint and other learning material design. Provided student support and 1:1 instruction; assisted with Blackboard course design, selection of course materials (e.g., readings, other media), and grading.
- 2020 Guest lecture: Nursing 814, Design and Analysis for Non-Experimental Nursing Research, PhD level: Survey methods using REDCap
- 2018-2020 Guest lectures: Nursing 671 Epidemiologic Assessment Strategies, Graduate level: Cross-sectional studies; Cohort study designs; Case-control designs
- 2018-2020 Private tutor: Nursing 671 Epidemiologic Assessment Strategies, Graduate level: Assisted with preparing for mid-term and/or final examinations, and explaining materials and concepts for biostatistics, non-experimental study methods
- 2016 Konkuk University School of Nursing, Seoul, South Korea
Teaching assistant, Undergraduate levels,
1) Pediatric Nursing: Responsible for operating simulation labs, teaching basic nursing skills, grading
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10. UNIVERSITY SERVICE

- 2020-2021 A member of a campus social initiative "Crazy Stressed Asians", University of Maryland, US
Participated in meetings to share experiences of cultural conflicts and support Asian and Asian-American students to help them resolve cross-cultural differences
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Worked as a representative of "Lunch & Learn" to provide information sessions for PhD and DNP nursing students to enhance their learning and professional development

ABSTRACT

Title of Dissertation: Behavioral symptoms associated with dementia and inappropriate psychotropic medication use in U.S nursing homes

Jung Min Yoon, Doctor of Philosophy, 2021

Dissertation Directed by: Alison M. Trinkoff, ScD, MPH, RN, FAAN, Professor, Family and Community Health

Behavioral symptoms associated with dementia often occur concurrently.

Psychotropic medications are used to treat behavioral symptoms in nursing homes (NHs) despite limited efficacy and the risk of adverse effects. Psychotropics are considered an easier solution for behavioral symptoms with fewer nursing staff.

Inappropriate psychotropic medication use has been the focus of policy attention due to safety issues. A NH deficiency of care can be cited for inappropriate psychotropics use (F-758 tag). The purposes of this dissertation are to examine factors of co-occurring behavioral symptoms of dementia (Aim 1), the occurrence of F-758 tag citations in relation to nurse staffing (Aim 2) and to explore how NH deficiency citations describe inappropriate psychotropics use to manage behaviors (Aim 3). For aim 1, general linear mixed models were used to explore co-occurring behavior symptoms in relation to cognitive status, physical function and analgesics use among 336 NH older adults diagnosed with dementia. For aim 2, generalized linear mixed models estimated associations between the occurrence of F-758 tags and nurse staffing levels among 13,614 NHs from December 2017 to 2018. Aim 3 used a mixed-method study design that combined descriptive and content analysis of F-758 deficiency reports (n=444 NHs) during January to March 2018. Having multiple behavioral symptoms was negatively associated with better cognitive status and regular analgesics use ($p < .001$ and $p = .009$, respectively) (Aim 1). NHs with greater

hours per resident day for RNs (OR=0.54, 95% CI=0.44-0.67), certified nurse assistant (OR=0.87, 95% CI=0.77-0.99), total nurse staff (OR= 0.87, 95% CI= 0.79-0.96), and greater RN skill-mix (OR=0.10, 95% CI=0.04-0.26) had significantly lower odds of F-758 tags (Aim 2). Common reasons for inappropriate psychotropic medication use included failure to monitor behavioral symptoms (178 NHs), attempt gradual drug reduction (131 NHs) and maintain 14 day limits on PRN psychotropic medication orders (121 NHs) (Aim 3). Consideration of cognitive function and pain management are important for multiple behavioral symptoms (Aim 1). NHs need to have adequate nurse staffing levels to reduce inappropriate psychotropic medication use (Aim 2). Aim 3 analysis suggests areas for improvement, that could potentially reduce F-758 citations.

Behavioral symptoms associated with dementia and inappropriate psychotropic
medication use in U.S nursing homes

by
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List of Abbreviations

ADL: Activities of Daily Living

AIMS: Abnormal Involuntary Movement Scale

BI: Barthel Index

BPSD: Behavioral and Psychological Symptoms of Dementia

CASPER: Certification and Survey Provider Enhanced Reporting

CMAI: Cohen-Mansfield Agitation Inventory

CMS: Center for Medicare and Medicaid

CNA: Certified Nurse Assistant

CSDD: Cornell Scale for Depression in Dementia

FBFC-CI: Function and Behavior Focused Care for Cognitive Impaired

GDR: Gradual Drug Reduction

GLM: General Linear Mixed Model

GLMM: Generalized Linear Mixed Model

HPRD: Hours Per Resident Day

HRPO: Human Research Protections Office

ICC: Interclass correlation

IRB: Institutional Review Board

LPN: Licensed Practical Nurse

LVN: Licensed Vocational Nurse

MAR: Medication Administration Record

MDS: Minimum Data Set

MMSE: the Mini Mental State Examination

NH: Nursing Home

RCS: Resistiveness to Care Scale

RN: Registered Nurse

SCU: Special Care Unit

Chapter 1. Background

1.1 Introduction

People with dementia represent the largest proportion of all nursing home (NH) older adults, as nearly half of NH residents in the United States are diagnosed with Alzheimer's disease or other dementias (Harris-Kojetin et al., 2019). Of those diagnosed with dementia, 61 percent had moderate or severe cognitive impairment (Centers for Medicare & Medicaid Services, [CMS], 2015a). The average costs of care for NH services for dementia symptoms ranged from \$85,775 to \$97,455 per resident per year; this has increased around 3.8 percent annually over the past 5 years (Genworth. 2017a, b).

Nearly all individuals with dementia experience one or more behavioral symptoms during the course of their illness (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012; Lyketsos et al., 2011). Behavioral symptoms, often referred to as behavioral and psychological symptoms of dementia (BPSD), consist of challenging behaviors, disruptive behaviors, or neuropsychiatric symptoms, and can include distressing misperceptions, thought content and mood and associated behaviors (Kales, Gitlin, Lyketsos, & Detroit Expert Panel, 2014). Behavioral symptoms worsen cognitive and functional decline among individuals with dementia, increase their institutionalization, lower their quality of life, and increases the caregiver burden (Maust, Langa, Blow, & Kales, 2017; Tible, Riese, Savaskan, & von Gunten; 2017).

The occurrence of behavioral symptoms is associated with intrapersonal, interpersonal, and environmental factors. Intrapersonal factors refer to patient related factors such as demographics, medical comorbidities, pain, cognitive impairment and physical limitations (Kales et al., 2015; Kolanowski et al., 2017). Other than patient factors, behavioral symptoms are also related to caregiver and environmental factors

(Kales et al., 2015). Caregiver determinants refer to the quality of the relationship and interaction between the person with dementia and caregivers. Examples of inappropriate interactions include excessive use of verbal directions, lack of consideration of individual needs or preferences, providing care “for” rather than “with” residents, or talking and touching the resident too rapidly or excessively. Environmental triggers can include physical and psychosocial components of the environment such as noise level, over or under stimulation, or social isolation (Kolanowski et al., 2017).

Information on best practices to manage behavioral symptoms supports that non-pharmacological interventions should be used as a first line of care (American Geriatrics Society Beers Criteria, 2019). Principles of non-pharmacological management may include identifying underlying causes of behavioral symptoms such as boredom and pain, developing interventions tailored to resident’s preferences, developing comprehensive care plans in consideration of the person’s strengths and needs, creating a comfortable environment, and encouraging residents to participate in individualized activities and meaningful engagement (Burke, Stein-Parbury, Luscombe, & Chenoweth, 2016; Edvardsson & Innes, 2010; Tible et al., 2017). Some studies have demonstrated the efficacy of non-pharmacological interventions, including music, art or behavioral therapy, aromatherapy, reality orientation, tailored activities and physical exercise in decreasing some distressing behaviors without adverse effects. Thus, they should be considered as important treatments for optimal dementia care (Yang, Lin, Wu, Chiu, Wang, & Lin, 2015; Chen et al., 2014; Kales et al., 2015).

Psychotropic drugs include antidepressants, anti-anxiety agents, antipsychotics, anticonvulsants, and sedative/hypnotics, and are often considered a solution to

manage behavioral symptoms. However, many adverse effects of psychotropics have been reported such as sedation, cardiovascular effects, fatigue, falls, and increased mortality (Bangash et al., 2017; Kales et al., 2015; Steinberg & Lyketsos, 2012). Particularly, antipsychotics use for control of behavioral symptoms is of concern for policy makers and NH administrative personnel, due to safety issues, and has been the focus of policy attention. To address this concern, CMS initiated the National Partnership to Improve Dementia Care in Nursing Homes in 2012 to reduce unnecessary antipsychotic medication use in NHs by promoting person-centered care (CMS, 2012). Since this initiative, there has been a steady decline in antipsychotic medication use, with an average of 14% of NH residents now treated with antipsychotics nationally (CMS, 2020a).

Although regulatory requirements and educational materials are focused on the non-pharmacological management of behavioral symptoms, antipsychotics and other psychotropic drugs are used among more than two-thirds of older adults with dementia (Harrington, Carrillo, & Garfield, 2015; Maust, Kim, Chiang, & Kales, 2018) and less than 2% of NHs consistently implemented non-pharmacological approaches (Grabowski et al., 2014). Psychotropics were more likely to be prescribed to residents with dementia, especially for residents with severe behavioral symptoms, compared to those without dementia (Allers, Dörks, Schmiemann, & Hoffmann, 2017; Foebel et al., 2014; Kleijer et al., 2014; Maust et al., 2017).

1.2 Problem statements

Frequently occurring behavioral symptoms include apathy, agitation, aggression, wandering, socially and/or sexually inappropriate behaviors, sleep disturbances, and resistiveness to care, along with anxiety and depression (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012; Kales et al., 2015; Lyketsos et al., 2011). Almost all

people with dementia experience one or more behavioral symptoms during their illness and these symptoms often occur in combination and concurrently. Previous studies found that greater than two-thirds of NH residents with dementia had multiple clinically significant behavioral symptoms (Bergh & Selbæk, 2012; Selbæk et al., 2013).

Despite this high rate of multiple behavioral symptoms, most of the work exploring triggers and management of behavioral symptoms has focused on single symptoms (Choi et al., 2017). For example, agitation and aggression are frequently seen together and often triggered by many different factors, depending on the individual. The triggers might be similar or different for each behavior. Combining management approaches that address both agitation and aggression are needed to optimally manage multiple behavioral symptoms. Thus, it may be useful to study the impact of groups of symptoms on resident outcomes (Robert et al., 2005). Evaluation of co-occurring behavioral symptoms is an important first step to optimal management (Robert et al., 2005; van der Linde, Denning, Matthews, & Brayne, 2014) as many behaviors occur in one resident, as opposed to only a single behavior, which can add more challenges for NH direct care staff and may result in more reliance on psychotropic medications.

Direct care staff is one of the most important components for optimal dementia care, since they have close contact with persons with dementia and are often the first to notice behaviors, functioning, physical changes, signs of illness, pain, or other discomforts (Alzheimer's Association, 2017; Jansen et al., 2017). NH direct care staff consists of registered nurses (RNs), licensed practical/vocational nurses (LPNs/LVNs), certified nursing assistants (CNAs), unlicensed nurse aides, and medication aides/technicians, all of whom assist with physical care and/or activity programs,

though CNAs and aides provide most of the direct patient care (Gilster, Boltz, & Dalessandro, 2018; Graf, Cignacco, Zimmermann, & Zuniga, 2016). Nursing staff are responsible for observing and reporting any potential signs of underlying dementia and providing sufficient assistance for residents with dementia to meet their unmet needs (Alzheimer's Association, 2017; Jenkins, Keenan, & Ginesi, 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, 2018). CMS research recommended 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 than the CMS recommendation for minimal staffing levels (Harrington, Schnelle, McGregor, & Simmons, 2016; RTI international, 2018).

Inadequate nurse staffing is of concern in providing quality care for dementia. With fewer staff to care for residents, there may be greater reliance upon the use of psychotropic drugs, because consistent implementation of behavioral interventions may be considered too time-consuming and thus their potential benefits could be underestimated. Studies found that nurse staffing levels were inversely associated with antipsychotic or other psychotropic drug use (Cioltan et al., 2017; Lucas et al., 2014; Phillips, Birtley, Petroski, Siem, & Rantz, 2018; Zuidema et al., 2011). Greater psychotropics use was related to lower RN staffing and higher LPN staffing (Cioltan et al., 2017; Lucas et al, 2014).

Although staffing significantly influences dementia care, there is a lack of research on quality of care regarding inappropriate psychotropics use in relation to nurse staffing levels. Deficiencies of care occur when NHs fail to meet federal regulatory care standards (CMS, 2015b) and have been used as a measure to assess care quality in NHs (Harrington, Carrillo, Garfield, Musumeci, & Squires, 2018). They measure care components such as adequate staffing, assessing residents' functional status, and developing comprehensive care plans (Harrington et al., 2018). For this dissertation, NH deficiencies indicating inappropriate psychotropic drug use served as a proxy for poorer quality of care for behavioral symptoms.

Moreover, to date, there has been a lack of research that comprehensively explores what situations represent inappropriate psychotropics use when caring for older adults with dementia. Instead, most studies focused on the prevalence of deficiencies in relation to facility characteristics, staffing levels and policies across states using quantitative study methods (Harrington, Olney, Carrillo, & Kang, 2012; Lerner, Johantgen, Trinkoff, Storr, & Han, 2014; McDonald et al., 2013; Towsley et al., 2013; Wagner et al., 2013).

As discussed previously, there are some research gaps to be addressed for the dissertation. First, much is unknown about factors associated with occurrence of multiple behavioral symptoms. Examining co-occurring symptoms could assist with non-pharmacological management of behavioral symptoms in the most efficient and effective manner. Second, we do not know how nurse staffing levels are associated with quality of dementia care across US NHs in regard to the use of psychotropic drugs. With the increased care demands of NH residents with dementia, lower nurse staffing levels may lead to greater reliance upon psychotropic drug use to control behavioral symptoms. Third, there have been no studies to expansively explore

deficiency reports of inappropriate psychotropic medication use in NH residents with behavioral symptoms associated with dementia, such as rationale for the deficiency citations, psychotropics involved and behavioral symptoms. Since a new deficiency tag specifically indicating unnecessary psychotropics use was implemented in November 2017, it is necessary to explore some of the detail behind how it is being used.

1.3. Theoretical framework

This study was guided by Donabedian's structure-process-outcome quality of care model (Donabedian, 1972). The model heavily influenced the conceptualization of the proposed study, since it emphasizes the importance of the relationship between nursing staff and the facility (including training) to improve performance and quality of dementia care. 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 as all actions to provide healthcare for the patient (e.g., diagnosis, treatment, preventive care); and outcome as the result of care provided by the health practitioner (e.g., patient satisfaction with quality of care) (Donabedian, 1972). According to the model, (Donabedian, 1972) improvements in the structure of care should lead to improvements in clinical processes and patient care quality outcomes. With regard to this study, excessive workloads due to inadequate staffing combined with challenging resident behaviors could adversely affect their job performance and result in greater reliance on psychotropic drug use.

1.4 Research aims

The study aims were as follows:

Aim 1: To examine factors associated with co-occurrence of multiple behavioral symptoms of dementia in NH residents;

Aim 2: To examine deficiencies of care with regard to inappropriate psychotropic medication use in relation to NH staffing levels;

Aim 3: To explore full deficiency reports with regard to inappropriate psychotropic medication use, particularly to NH residents with dementia

1.5 Methodological approach

This section summarizes the methodology which was used to address the research aims. The study design, data source, sample, measures, analytical procedures, and human subject issues are described below.

1.5.1 Study design

For Aim 1, a cross-sectional secondary analysis was conducted using baseline data from the Function and Behavior Focused Care for Cognitive Impaired (FBFC-CI) intervention study (Galik et al., 2021). For Aim 2, a secondary data analysis of 2017-2018 CASPER (Certification and Survey Provider Enhanced Reporting) dataset was conducted using a cross-sectional design. For Aim 3, deficiency citations from CASPER and their inspection reports for the first three months from January to March 2018 was used to conduct the mixed methods study.

1.5.2 Sample

1.5.2.1 Aim 1: To examine factors associated with co-occurrence of multiple behavioral symptoms of dementia in NH residents

NH residents who were 55 years or older, able to speak English, and cognitively impaired (scored ≤ 15 on the Mini Mental State Examination) were eligible to participate in the study (Folstein, M., Folstein, S. E., McHugh, 1975). Residents receiving hospice or sub-acute rehabilitation were excluded. Residents, who were

unable to pass the Evaluation to Sign Consent were asked to sign an assent form and their legally authorized representative was contacted to consent to study participation (Resnick et al., 2007).

Among 1512 residents, 1014 were selected as meeting the inclusion criteria. Of these, 487 residents (or their representatives) consented to participate. Exclusions (151) were those who had >15 on the MMSE, or they died or withdrew prior to baseline data collection. A total of 336 participants were enrolled in the FBFC-CI study, from 12 NHs in Maryland.

1.5.2.2 Aim 2: To examine deficiencies of care with regard to inappropriate psychotropic medication use in relation to NH staffing levels

The sample size was calculated based on multi-level modeling (level 1: NHs, level 2: states) in which a two-step approach with a design effect was adopted to correct the clustering of NHs in each state (Snijders & Bosker, 2012). First, without consideration of clustering, a sample size of 128 NHs will be able to detect medium effect size of differences (Cohen's $d=.5$) with sufficient power ($P>.8$) (Maas & Hox, 2004). Then, to account for clustering, the design effect (approx. 55) was calculated based on interclass correlation (ICC) =0.18 among NHs within the same state, using 2014 CASPER data. The design effect indicates how much the sample size is to be adjusted because of nested sampling (Snijders & Bosker, 2012). The minimum sample size of 7,000 NHs for our proposed study was generated by multiplying the design effect (=55) by the sample size (=128). During December 1, 2017 to December 31, 2018, a total of 14,548 Medicare or Medicaid-certified NHs were surveyed and this sample size had sufficient power to detect medium effect sizes in consideration of non-independent clustering of NHs within the same state.

1.5.2.3 Aim 3: To explore full deficiency reports with regard to inappropriate

psychotropic medication use, particularly to NH residents with dementia

There were 3,526 NHs surveyed during the first quarter of 2018, of which 642 NHs received F-758 tags. The qualitative analyses were confined to NHs related care for residents with dementia (n=444). NHs were excluded if they had F-758 citations related to care for residents with no cognitive impairment (n=164) and/or for those who only had psychiatric disorders (e.g., bipolar disorder, schizophrenia) (n=34).

1.5.3 Data sources

1.5.3.1 Aim 1: To examine factors associated with co-occurrence of multiple behavioral symptoms of dementia in NH residents

This study used baseline data from the FBFC-CI study, an intervention focused on optimizing physical and functional activities while minimizing behavioral symptoms in residents (Galik, Resnick, Hammersla, & Brightwater, 2014). FBFC-CI was implemented by a research nurse, who worked in the treatment NHs 10 hours a week, for 14 months, to implement the intervention. The intervention included three components: 1- environmental and policy assessments; 2 education and training of nursing home staff; and 3- ongoing training and motivation of nursing home staff. The research nurse worked with a set of champions to help motivate nursing staff (RN, LPN, and CNAs) to provide the intervention.

Environment and policy assessments were done by the FBFC Research Nurse with unit champions. Education and Training consisted of addressing behavioral symptoms and functional disability in older adults with dementia by reviewing the definition and benefits of FBFC; describing how to assess cognitively impaired residents for underlying physical and cognitive capability and behavior; and how to motivate cognitively impaired residents to engage in functional and physical activities while minimizing behavioral resistance to care. Following the initial staff education,

the FBFC research nurse continued to mentor the nursing staff to incorporate FBFC-CI into routine resident care, for the remaining 12 months of the study. For NHs that served as control sites, FBFC Education Only (FBFC-ED) consisted of component 2, education of the nursing staff as was done in the treatment sites. For both intervention and control sites, data were collected at baseline and at 4 and 12 months.

1.5.3.2 Aim 2: To examine deficiencies of care with regard to inappropriate psychotropic medication use in relation to NH staffing levels

NH deficiency citations related to inappropriate antipsychotic medication use (F-758) were assessed using the 2017-2018 CASPER data. For all Medicare or Medicaid certified NHs across the country (approximately 15,600), CASPER provides information on “facility characteristics: facility size, ownership, location and presence of special care units, such as rehabilitation, dementia, dialysis, resident characteristics: proportion of residents certified to Medicare/Medicaid, proportion of residents with physical/psychological problems and other special care needs, and NH deficiency citations based on state surveyor evaluations of quality of care in the facilities” (Harrington et al., 2018).

1.5.3.3 Aim 3: To explore full deficiency reports with regard to inappropriate psychotropic medication use, particularly to NH residents with dementia

The 2018 CASPER data was used to collect F-758 tag deficiency citations from January to March and the inspection reports for the assigned deficiency were collected from CMS Nursing Home Compare and ProPublica. The inspection report provided information on psychotropic drugs involved and inappropriate use when caring for person(s) with dementia. ProPublica provided unredacted inspection reports for deficiency tags, as were obtained by ProPublica under the Freedom of Information Act (ProPublica, 2019), so that information on resident’s medical diagnoses and

involved psychotropic drug(s) were available.

1.5.4 Measures

1.5.4.1 Aim 1: To examine factors associated with co-occurrence of multiple behavioral symptoms of dementia in NH residents

1) Dependent variable: A composite behavior score was created to address commonly occurring behavioral symptoms, including agitation, aggression, apathy, wandering, sexually inappropriate behaviors, inappropriate disruptive vocalization, repetitive behavior, and resistiveness to care. Three different instruments were used to develop the composite measure, including the Cornell Scale for Depression in Dementia (CSDD), the Cohen-Mansfield Agitation Inventory (CMAI), and the Resistiveness to Care Scale (RCS).

The CSDD measures symptoms associated with depression in individuals with dementia. This includes 19 items, with previous studies providing evidence of reliability and validity (Alexopoulos et al., 1988; Kørner et al., 2006). The CMAI (14-items) assesses the frequency of agitation in individuals with cognitive impairment (Cohen-Mansfield, 1996; Miller, Snowdon, & Vanghan, 1995), with good evidence of the reliability and validity (Cohen-Mansfield, 1996; Miller et al., 1995). The RCS measures resistiveness to care and includes 13 behaviors that may occur during care interactions with staff, such as turning, pulling, and pushing away, hitting, or saying no to care opportunities (Mahoney et al., 1999). Prior testing has provided evidence of validity and reliability of the RCS (Mahoney et al., 1999; Galik et al., 2017).

To create a composite behavioral score, items related to each individual behavior component to be measured were selected from the CSDD (items #5, 6, 8), the CMAI (items #1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14) and the RCS (mean score of all items).

Table 1-1 shows the conceptual and operational definitions for each component of the

composite behavior score.

Table 1-1. Conceptual and operational definitions of components of composite behavioral scores

Components of composite BPSD	Conceptual definition	Operational definition	Code
Apathy	“Loss of or diminished motivation in at least two out of three domains — goal-directed behavior, cognitive activity or emotion — sufficient to cause significant impairment in everyday life” (Robert, Mulin, Mallea, & David, 2010, p. 271)	Sum of CSDD #6 (retardation) and CSDD #8 (loss of interest)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Agitation	“Excessive motor activity associated with a feeling of inner tension. The activity is usually non- productive and repetitious and consists of such behavior as inability to sit still, pacing, wringing of hands and pulling at clothes” (American Psychiatric Association, 1980)	CSDD #5 (agitation)	0: No evidence of the behavior 1: Evidence of the behavior
Aggressive behavior	“Any physical or verbal behavior that has the effect of harming or repelling others, and includes behaviors such as hitting, kicking, and screaming” (Kolanowski, 1995)	Sum of CMAI #2 (Hitting, Kicking, Pushing, Biting, Scratching, Aggressive spitting) and #3 (Grabbing onto people, Throwing things, Tearing things or destroying property)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors

Table 1-1. continued

Inappropriate or disruptive vocalization	“Verbal or vocal behaviors that are either repetitive, disruptive, or inappropriate to the circumstances in which they are manifested” (Cohen-Mansfield & Werner, 1994, p.73)	Sum of CMAI #1 (Cursing or verbal aggression), #9 (Constant request for attention or help), #11 (Complaining, Negativism, Refusal to follow directions), #12 (Strange noises), and #14 (Screaming)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Wandering	“A tendency to move about, either in a seemingly aimless or disoriented fashion, or in pursuit of an indefinable or unobtainable goal” (Snyder, Rupprecht, Pyrek, Brekhus, & Moss, 1978, p.272)	CMAI #5 (Pace, aimless wandering, Trying to get to a different place)	0: No evidence of the behavior 1: Evidence of the behavior
Repetitive behavior	“Doing or saying something over and over, such as repeating a word, question or activity, or undoing something that has just been finished” (Alzheimer’s Association, 2019)	Sum of CMAI #6 (General restlessness, Performing repetitious mannerisms, tapping, strange movements) and #10 (Repetitive sentences, calls, questions or words)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Sexually inappropriate behavior	“A sexual act (verbal or physical) which is unacceptable, inappropriate, disinhibited, or uncontrolled within the (social) context in which it is carried out” (van Hooren & Waterink, 2015)	Sum of CMAI #4 (Making verbal or physical sexual advances) and #7 (Inappropriate dress or disrobing)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Resistiveness to care	“The repertoire of behaviors with which persons with dementia withstand or oppose the efforts of a caregiver” (Mahoney et al., 1999, p. 28).	Sum of all RCS items	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors

To assess the reliability and validity of a composite behavior score, a Rasch analysis was conducted using the Winsteps statistical program. The item separation reliability and separation index were assessed to test the internal consistency of the composite behavior score. The Separation Index indicates how well the measure can separate items into more than two distinct groups on the basis of item difficulty (Kook & Varni, 2008). An acceptable value for item separation reliability is alpha coefficient of 0.70 or greater (Smith & Smith, 2004).

Validity testing was conducted to establish evidence that each item fit the data using the mean-square INFIT and OUTFIT statistics. INFIT and OUTFIT values was considered acceptable if it ranged from 0.4 to 1.6 (Smith & Smith, 2004). Values lower than 0.4 indicate that the item may be too predictable or redundant, whereas greater than 1.6 indicates that the item is less predictable than the model expects, so that it may be poorly constructed or defined (Linacre, 2004). Based on the Rasch analysis, there was strong evidence of internal consistency of the composite measure with an alpha coefficient of 0.97 and a Separation Index of 6.13. With regard to validity, the items all fit the model with INFIT and OUTFIT statistics ranging between .57 and 1.38.

2) Independent variables: included the severity of cognitive impairment, physical functional levels, and the evidence of analgesics use. The severity of cognitive impairment was measured using the Mini Mental State Examination (MMSE) (Folstein et al., 1975). This measurement ranges from 0-30, with lower scores indicating greater cognitive impairment. Folstein and colleagues (1975) provided evidence of acceptable test-retest reliability and adequate sensitivity and specificity in measuring cognitive function using the MMSE.

Physical function was assessed using the Barthel Index (BI) scores (Mahoney &

Barthel, 1965). The BI is a 14-item measurement that assesses an individual's ability to perform basic activities of daily living (ADLs). Scores range from 0-100, with higher scores indicating complete independence in performing ADLs. The reliability and validity of the BI was well-established when used for older adults with progressive neurological conditions, and/or when proxy respondents were asked to report the physical functions of dementia patients (Ranhoff, 1997; Nicholl et al., 2004).

The use of analgesics was a proxy indicator of pain management. It was assumed that pain was properly managed if there were records of regular use of analgesics (e.g., opioids and tramadol).

3) Covariates: These included age, gender, race, marital status, education levels, and the number of medical co-morbidities, based on chart abstracting.

1.5.4.2 Aim 2: To examine deficiencies of care with regard to inappropriate psychotropic medication use in relation to NH staffing levels

1) Dependent variable: Inappropriate psychotropic medication use was measured by the presence of F-758 deficiency tag(s) (State Operations Manual, 2017). Previous studies provided evidence of reliability and accuracy of deficiency measures in measuring quality of care in NHs (Lin, 2014; Harrington, Swan, & Carillo, 2007; Zhang et al., 2009).

2) Independent variables included nursing hours per resident day (HPRD) and skill-mix (National Quality Forum, 2016). HPRD was calculated by adding the total number of nursing staff working for a 24-hour period, divided by the number of NH residents for the same period. An average HPRD was calculated for each type of staff, RNs, LPNs, CNAs, nurse aide, certified medication aides, and total nursing staff. Skill-mix was assessed as the percentage of nursing hours worked by RNs divided by

the total nursing hours including RNs, LPNs, CNAs, nurse aides, and certified medication aides (National Quality Forum, 2016).

3) Covariates included NH resident and facility related characteristics. NH resident related characteristics included the proportion of residents with dementia, depression, psychiatric disorders, and behavioral healthcare needs. Facility related characteristics included facility size (total number of certified beds), geographic location (urban or rural based on CDC's classification [2017]), ownership, the presence of dementia special care units (SCUs), and proportion of residents certified for Medicare/Medicaid services.

Greater psychotropics use was related to urban location (Stevenson et al., 2010), larger facility size (Kleijer et al., 2014), for-profit facilities (Lester, Kohen, Stefanacci, & Feuerman, 2011; Lucas et al., 2014) and facilities with fewer Medicare residents and more Medicaid residents (Lucas et al., 2014; Stevenson et al., 2010). The presence of dementia SCUs may also affect inappropriate psychotropics use. SCU staff are often specially trained in care for dementia and other psychiatric disorders, thus residents are more likely to receive specialized care with behavioral management (Luo, Fang, Liao, Elliott, & Zhang, 2010). An admission to a NH with a SCU was associated with lower inappropriate antipsychotics use (Joyce, McGuire, Bartels, Mitchell, & Grabowski, 2018).

Table 1-2. Aim 2 variable definitions for estimating odds of receiving deficiency citations for inappropriate psychotropic medication use in relation to NH nurse staffing

Variables	Description
<u>Dependent variable</u> Evidence of F-758 deficiency citation	0=no evidence of citation 1=evidence of deficiency citation
<u>Independent variable</u> NH nurse staffing 1) Hours per resident day (HPRD) 2) Skill-mix	- Number of RN/LPN/CNA/nurse aide/certified medication aides working hours divided by the number of NH residents for 24 hours - Number of total nurse staff working hours by the number of NH residents for 24 hours The proportion of RN working hours divided by total nursing staff working hours including RNs, LPNs, CNAs, nurse aides, and certified medication aides
<u>Covariate variables</u> NH resident-related factors	- Number of residents diagnosed with dementia/depression/psychiatric disorders divided by the total number of NH residents, per facility - Number of residents with behavioral healthcare needs divided by the total number of NH residents
Facility-related factors - Facility size	0=Small (<50 beds) 1=Medium (50-99 beds) 2=Large (100-199 beds) 3=Extra-large (≥200 beds)
- NH Location	0=Small (non-core, micropolitan, and small-metro with < 250,000 residents) 1=Medium (medium-metro area with ≥ 250,000 to < 1 million residents) 2=Large (large fringe and large central cities with ≥ 1 million residents)
- Ownership	0= Not-For-Profit 1= Government 2= For-Profit
- Residents with Medicare/Medicaid services	Number of residents certified for Medicare or Medicaid services divided by the total number of NH residents
- Presence of SCU	0=No 1=Yes

1.5.4.3 Aim 3: To explore full deficiency reports with regard to inappropriate psychotropic medication use, among NH residents with dementia

1) F-758 deficiency tag: This tag (formerly F-329) is given when a facility does not meet the federally regulated care standard regarding psychotropic drug use, and was newly implemented in 2017. The previous F-329 tag mostly focused on inappropriate or unnecessary antipsychotic drug use, whereas F-758 deficiency tag includes all psychotropic drugs (antianxiety agents, antipsychotics, antidepressants, anticonvulsants, hypnotics) and other medications that can affect brain activities (State Operations Manual, 2017). According to federal law, NHs must ensure that “psychotropic medications are prescribed to treat a specific condition as indicated; residents with psychotropic medications must receive gradual dose reductions and appropriate non-pharmacological interventions, unless clinically contraindicated; PRN orders for psychotropic drugs are limited to 14 days, and the attending physician or prescribing practitioner documents rationale for extended PRN psychotropic medication order beyond 14 days” (State Operations Manual, 2017).

State surveyors assess the scope and severity for each deficiency for purposes of enforcement. The severity reflects the extent of harm to residents and has four levels, from no actual harm with potential for minimal harm, to no actual harm with a potential for more than minimal harm that is not immediate jeopardy, actual harm that is not immediate jeopardy, and immediate jeopardy to resident health or safety (CMS, 2020b). The scope of a deficiency reflects the number of affected residents and has three levels: isolated, pattern, or widespread (CMS, 2020b). Based upon the scope and severity, each deficiency citation is labeled “A” through to “L”, with A having the least severity and scope and L indicating the most severe deficiency (Castle, Wagner, Ferguson, & Handler, 2011).

1.5.5 Data analysis

For Aims 1 and 2, exploratory data analyses were conducted to check if the assumptions and missing data patterns were met for the specific statistical models for hypothesis testing. Continuous variables were range checked for whether all variables had reasonable values and if any outliers were found. Descriptive statistics (frequency and proportions for categorical, means and standard deviations for continuous variables) examined characteristics of dependent and independent variables, and covariates. Comparison analyses, such as chi-square and t-tests, were used to assess differences in proportion or means of each variable, to show the sample characteristics and any potential covariates prior to final statistical modeling.

For Aim 1, a general linear mixed model with residents nested within NHs was conducted to examine the contributions of physical functional status, cognitive level, and pain management to composite behavior scores, adjusted for age, race, education, marital status and number of medical co-morbidities. The interclass correlation (ICC) among all residents within each NH was assessed to decide whether NHs should be included as random effects. For Aim 2, the occurrence of F-758 was assessed in relation to nurse staffing levels and RN skill-mix using a generalized linear mixed model with binomial distribution (Meyers, Gamst, & Guarino, 2013). Prior to the analysis, the ICC among NHs within each state in the null model was examined to decide whether states should be included as random effects, to account for the correlated nature of NHs that are under the same regulations.

Mixed study methods were used for Aim 3. For the quantitative component, descriptive analysis was conducted to examine the frequency of involved psychotropic medications, scope and severity of F-758 deficiency citations, and the reasons for F-758 citations. Qualitative data analysis was conducted using content

analysis with an inductive coding approach (Krippendorff, 2003; Marks & Yardley, 2003; Pain, Chadwick, & Abba, 2008). This was guided by the question “what were the rationales for receiving F-758 deficiency tags?” to comprehensively explore the nature of the deficiency citations regarding inappropriate psychotropics use (Table 1-3).

Table 1-3. Guiding Questions to Explore F-758 Deficiency Statements

What was/were the rationale(s) for receiving the F-758 deficiency tag?

Prompts:

1) Were any rationales from the progress notes of a physician or a prescribing practitioner and/or psychiatrist’s evaluation described to justify the psychotropics prescription?

2) Were there any descriptions of the admission record, Minimum Data Set (MDS), or physician’s progress notes used to assess the resident’s behavioral symptoms and their underlying factors?

3) Were any care plans and/or behavioral interventions developed and provided prior to prescription of psychotropics for individuals with behavioral symptoms?

4) If the individual was prescribed psychotropics, were there any gradual drug reduction efforts, unless clinically contraindicated?

5) Were PRN orders for psychotropic drugs, particularly benzodiazepines or antipsychotics limited to 14 days without clinical indications? If not, were there any rationales for the extended order?

6) What were any other reasons for receiving the F-758 tag citation?

1.5.6 Protection of human subjects

For Aim 1, the FBFC-CI intervention study was approved by the UMB Institutional Review Board (IRB), and permission to use the baseline data was obtained from the Principal Investigator who directed the study (Dr. E. Galik, PI).

Aim 2 was classified as minimal risk in accordance with Federal Regulations 45

CFR 46.101.b (2), and did not involve human subjects, according to the Department of Health and Human Services Office for Protection from Research Risks Code of Federal Regulations. Psychological risk for this study was also minimal, as no individual NH direct care staff and facilities was identified.

Regarding Aim 3, all deficiency inspection reports are publicly available, and the reports reveal no identifiable resident information. However, the CMS deficiency report provided detailed NH information, including the facility identification number, name, address, zip code and location. Thus, to conduct this study, the proposal was submitted to the Human research protections office (HRPO/IRB) and received their approval.

1.6 Significance

Cognitive and behavioral health is a significant concern for NH residents and care providers. Nearly half of NH residents had Alzheimer's disease or other dementias (2019) and most individuals with dementia are susceptible to a number of behavioral symptoms. Greater emphasis should be placed on improving the quality of NH care for residents with dementia. With greater severity in dementia-related symptoms among residents, nursing care becomes more complicated. This is particularly apparent when caring for residents who have one or multiple number of behavioral symptoms, since it is one of the most challenging aspects of dementia care (Alzheimer's Association, 2013; Lyketsos et al., 2011; Harris-Kojetin et al., 2019). A variety of non-pharmacological, person-centered approaches should be used to successfully manage a wide range of behavioral symptoms.

Antipsychotics and other psychotropic drugs are often used as a solution to manage behavioral symptoms. While these drugs can be used when behaviors become severe or resistant to non-pharmacological interventions (Dyer, Harrison, Laver,

Whitehead, & Crotty, 2018), they have only small to moderate efficacy for many behavioral symptoms and can cause adverse effects such as extrapyramidal symptoms, somnolence, dehydration, falls, stroke and mortality (Chiu, Bero, Hessel, Lexchin, & Harrington, 2015; Bangash et al., 2017; Harrison et al., 2018). With the increased care demands of NH residents with dementia, and due to lower nurse staffing levels, there may be greater reliance on the use of antipsychotics or other psychotropic drugs to manage behavioral symptoms. This is because it may be more challenging to comprehensively assess unmet needs, monitor behavioral symptoms, and implement non-pharmacological interventions, especially with limited staffing. Inappropriate psychotropic drug use negatively influences safety and quality of life in NH residents with dementia.

In November 2017, the new deficiency tag (F-758) specific to “unnecessary psychotropic medication use/PRN” was implemented that could have a significant impact on medication use, since this promotes more stringent enforcement for improper/unnecessary psychotropics use. A focus on inappropriate use is intended to discourage NH staff from using psychotropics as a first-line treatment for behavioral symptoms, without trying non-pharmacological interventions (Simonson, 2018). The newly implemented deficiency tag covers all psychotropic drugs including antipsychotics, anti-anxiety agents, antidepressants, anticonvulsants, and hypnotics. For the use of psychotropic drugs, NHs must clearly assess and document resident's symptoms, the psychotropic medication use is limited to 14 days, and multiple non-pharmacological approaches must attempt to discontinue the psychotropic medication (Simonson, 2018).

This study aimed to identify factors related to multiple behavioral symptoms in residents with severe to moderate dementia, examine deficiencies of care for

inappropriate psychotropics use in relation to NH staffing levels, and explore reasons for inappropriate psychotropics use deficiencies for older adults with dementia. Examining factors associated with clustering of behavioral symptoms may help guide NH staff toward appropriate non-pharmacological interventions to manage these symptoms in the most efficient manner. The study on deficiency citations for inappropriate psychotropics use in relation to nurse may support the importance of having adequate nursing staffing levels across all NHs to effectively manage behavioral symptoms. Exploring deficiency narratives can provide in-depth information about inappropriate psychotropic medication use, and what concerns should be addressed to minimize such drug use. This could include when these medications are used without comprehensive behavioral symptoms assessments, without providing effective non-pharmacological interventions, or failing to attempt a gradual drug reduction.

1.7. Introduction of the three manuscripts

This dissertation includes three manuscripts, which were developed based on the three study aims of the dissertation project, as Chapters 2, 3, and 4.

The Aim 1 manuscript (Chapter 2) examined factors of co-occurrence of multiple behavioral symptoms of dementia. For the study, a composite behavior score was created to describe the co-occurrence of multiple behavioral symptoms among NH residents with moderate to severe dementia and explore factors of co-occurring behavioral symptoms in relation to physical function level, severity of cognitive impairment and the use of analgesics for pain control. Examining co-occurring symptoms could assist with non-pharmacological management of behavioral symptoms associated with dementia.

The Aim 2 manuscript (Chapter 3) examined deficiency citations for inappropriate psychotropic medication use across U.S NHs in relation to nurse staffing levels. This study can highlight the importance of having adequate nurse staffing levels to facilitate the implementation of non-pharmacological interventions and reduce unnecessary use of psychotropic medications.

The Aim 3 manuscript (Chapter 4) comprehensively explored deficiency narratives in regard to unnecessary psychotropics use deficiencies when caring for older adults with behavioral symptoms of dementia (Aim 3). This study provided in-depth information for healthcare providers to try to minimize inappropriate/unnecessary psychotropics use.

Chapter 2. Co-occurring behavioral and psychological symptoms of dementia

(Aim1)

2.1 Introduction

Nearly half of nursing home (NH) residents have Alzheimer's disease or other dementias, over 60% of which also have moderate to severe cognitive impairment (Harris-Kojetin et al., 2019; Selbæk, Engedal, & Bergh, 2013). Behavioral symptoms, often referred to as behavioral and psychological symptoms of dementia (BPSD), challenging behaviors, disruptive behaviors, or neuropsychiatric symptoms, are major components of dementia in these populations (Kales, Gitlin, Lyketsos, & Detroit Expert Panel on Assessment Management of Neuropsychiatric Symptoms of Dementia, 2014). Behavioral symptoms refer to a variety of distressing perceptions, thought content, mood, and behaviors (Kales et al., 2014) and can include apathy, aggression, agitation, sexually or socially inappropriate behaviors, sleep disturbances, and resistiveness to care (Kales, Gitlin, & Lyketos, 2015).

NH caregivers for residents with dementia are expected to respond to a wide range of behavioral symptoms, that may reflect resident distress and also present care challenges. For example, residents might be resistive to instructions and/or respond to care with physical behaviors such as slapping, squeezing, or hitting (Morgan et al., 2011; Volicer, 2012). Exposure to these behaviors can create physical and emotional burden for caregivers (Holst & Skär, 2017; Tak, Sweeney, Alterman, Baron, & Calvert, 2010; van Duinen-van den Ijssel et al., 2017) and increase time and effort needed to provide quality care. (Schmidt, Dichter, Palm, & Hasselhorn, 2012; Zwijsen et al., 2014).

There are many factors that have been shown to be related to behavioral

symptoms. These include demographics, medical comorbidities, pain, cognitive impairment and physical limitations (Kales et al., 2015). Behavioral symptoms of dementia are more likely to occur in those who are younger (Helvik et al., 2016; Mukherjee et al., 2017; Shiota et al., 2016), male (Proitsi et al., 2011), unmarried (Nagata et al., 2016), and have less education (Apostolova et al., 2014; Nagata et al., 2016). Caucasian individuals showed a higher prevalence of apathy and anxiety compared to individuals of color (Apostolova et al., 2014), whereas the co-occurrence of agitation, aggression and resistiveness to care was significantly higher among Black and Hispanic individuals (Choi et al., 2017). The presence of comorbidities, such as hypertension and stroke, was associated with symptoms of apathy, anxiety, and agitation (Kandiah et al., 2014; Ting, Hao, Chia, Tan, & Hameed, 2016).

Cognitive and physical function is associated with the occurrence of behavioral symptoms. The frequency and severity of behavioral symptoms varies, with those in moderate to early stages of severe dementia most likely to have behavioral symptoms. Studies found that the occurrence of behavioral symptoms, such as agitation, aggression, apathy, inappropriate vocalization and wandering, was associated with greater severity of cognitive impairment (Beck et al., 2011; Choi et al., 2017; Lee, Algate, & McConnell, 2014; Mukherjee et al., 2017; Proitsi et al., 2011; Rozum, Cooley, Vernon, Matyi, & Tschanz, 2019; Veldwijk-Rouwenhorst et al., 2020). Likewise, a decline in physical function can increase the occurrence of behavioral symptoms. Individuals with lower functional ability were noted to have more apathy, agitation, eating and sleep disturbances, and resistiveness to care (Shiota et al., 2016; Helvik et al., 2016; Mukherjee et al., 2017; Nagata et al., 2016).

About half of older adults with dementia in NHs experienced pain (van Kooten, Smalbrugge, van der Wouden, Stek, & Hertogh, 2017), pain is also an important

determinant of behavioral symptoms. Untreated pain was associated with apathy, socially inappropriate behavior, resistiveness to care, aggression, and agitation (Ishii, Streim, & Saliba, 2010; Tosato et al., 2012; Nowak et al., 2018). Studies showed that individuals on opioids had lower occurrence of behavioral symptoms, with no evidence of excessive sedation (Habiger, Flo, Achterberg, & Husebo, 2016; Hendriks, Smalbrugge, Hertogh, & van der Steen, 2014; Husebo, Ballard, Cohen-Mansfield, Seifert, & Aarsland, 2014; Klapwijk, Caljouw, van Soest-Poortvliet, van der Steen, & Achterberg, 2014).

Behavioral symptoms often occur in combination and can include many different symptoms concurrently. For example, an individual with dementia may wander, become physically aggressive and resist care during routine care interactions. Previous studies found that most NH residents with dementia (68-84%) have multiple clinically significant behavioral symptoms (Bergh & Selbæk, 2012; Selbæk et al., 2013). Despite the high prevalence of multiple behavioral symptoms in this population, most studies exploring triggers and management have focused on single symptoms, such as agitation or aggression (Choi, Budhathoki, & Gitlin, 2017). Although studying an individual symptom enables a detailed study of the symptom and an in-depth exploration of triggering factors, this singular focus can miss identifying triggers for multiple behaviors. For example, agitation and aggression are frequently seen together and can be triggered by many different factors, depending on the individual. Combining management approaches that address these behaviors are needed for efficient and effective care. Evaluation of co-occurring behavioral symptoms is an important first step to optimal symptom management (van der Linde, Denning, Matthews, & Brayne, 2014).

In this study, a composite behavior score was developed to optimally measure

multiple behavioral symptoms, using specific items from the Cornell Scale for Depression in Dementia (CSDD) (Alexopoulos et al., 1988), the Cohen-Mansfield Agitation Inventory (CMAI) (Cohen-Mansfield et al., 1989) and the Resistiveness to Care Scale (RCS) (Mahoney et al., 1999). Items were selected from these measurements that addressed the most relevant symptoms among individuals with moderate to severe cognitive impairment such as agitation, aggression, apathy, wandering, sexually inappropriate behaviors, inappropriate vocalization, repetitive behavior, and resistiveness to care. The composite behavior measure includes the symptoms that are most responsive to non-pharmacological behavioral care approaches (American Geriatrics Society Beers Criteria, 2019).

The purpose of this study was to 1) describe the co-occurrence of multiple behavioral symptoms using a composite behavior measure among a group of NH residents with moderate to severe dementia; and 2) to test factors that influence multiple behavioral symptoms among these individuals. Specifically, it was hypothesized that lower levels of physical function, higher severity of cognitive impairment and having no prescription analgesics use (i.e., being at risk for having pain) would be associated with greater occurrence of multiple behaviors.

2.2 Methods

2.2.1 Sample

This was a cross-sectional secondary analysis using baseline data from the Function and Behavior Focused Care for Cognitive Impaired (FBFC-CI) intervention study (Galik et al., 2021). The FBFC-CI study was reviewed and approved by a university based Institutional Review Board. The data were collected from 12 NHs in Maryland with approximately 20 to 40 residents recruited from each setting.

Residents who were 55 years or older, able to speak English, diagnosed with dementia and moderate to severe cognitive impairment [scores ≤ 15 on the Mini Mental State Examination (MMSE)] were eligible to participate in this study (Folstein, M., Folstein, S. E., McHugh, 1975). Residents receiving hospice or sub-acute rehabilitation care were excluded. Residents were evaluated for their ability to provide consent using the Evaluation to Sign Consent (Resnick et al., 2007), a 5-item measure that assured the individual understood the research study and processes. If the individual did not pass the evaluation, he or she was asked to sign an assent form and their legally authorized representative was contacted as a proxy to consent to study participation.

A total of 1512 residents were evaluated, of which 1014 were eligible, and 487 residents (or their representatives) consented to participate. Of the 487 residents, 151 were ineligible to participate, either because they scored >15 on the MMSE, or they died or withdrew prior to baseline data collection. A total of 336 residents were enrolled in the study.

2.2.2 Measures

2.2.2.1 Dependent variable

Composite behavior score: As described previously, a composite behavior score was developed from three different instruments, the Cornell Scale for Depression in Dementia (CSDD), Cohen-Mansfield Agitation Inventory (CMAI) and Resistiveness to Care Scale (RCS). The composite behavior score measure developed included the CSDD items 5, 6, and 8, the CMAI items 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 14 and all the items on the RCS (mean score of all items). Table 2-1 shows how each behavior was measured. For example, apathy was determined to be present if there was evidence of retardation (CSDD item #6) and/or loss of interest (CSDD item #8) with

each symptom coded as present or not. A composite behavior score was calculated as the sum of symptoms with possible scores ranging from 0 to 8.

Table 2-1. Components of composite behavior score and operational definitions

Component	Operational definition	Variable Coding
Apathy	Combination of CSDD #6 (retardation) and CSDD #8 (loss of interest)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Agitation	CSDD #5 (agitation)	0: No evidence of the behavior 1: Evidence of the behavior
Aggressive behavior	Combination of CMAI #2 (hitting, kicking, pushing, biting, scratching, aggressive spitting) and #3 (grabbing onto people, throwing things, tearing things or destroying property)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Inappropriate vocalization	Combination of CMAI #1 (cursing or verbal aggression), #9 (constant request for attention or help), #11 (complaining, negativism, refusal to follow directions), #12 (strange noises), and #14 (screaming)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Wandering	CMAI #5 (pace, aimless wandering, trying to get to a different place)	0: No evidence of the behavior 1: Evidence of the behavior
Repetitive behavior	Combination of CMAI #6 (general restlessness, performing repetitious mannerisms, tapping, strange movements) and #10 (repetitive sentences, calls, questions or words)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Sexually inappropriate behavior	Combination of CMAI #4 (making verbal or physical sexual advances) and #7 (inappropriate dress or disrobing)	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors
Resistiveness to care	All 13 RCS items	0: No evidence of any of the behaviors 1: Evidence of any of the behaviors

The CSDD includes 19 items that measure symptoms associated with depression in persons with dementia. Alexopoulos and colleagues (1988) reported high interrater

reliability ($k_w = 0.67$), internal consistency (coefficient alpha: 0.84), and sensitivity for the CSDD. The CMAI has 14 items and assesses the frequency of agitation in individuals with cognitive impairment (Cohen-Mansfield et al., 1989) with interrater reliability ($r=0.82$) and exact agreement ($r=0.93$) for a one point discrepancy (Cohen-Mansfield, 1991). Validity was based on factor analysis and evidence that the items fit the construct of agitation. The RCS measures resistiveness to care during care interactions with staff (Mahoney et al., 1999). Internal consistency ranged from 0.82 to 0.97, indicating good to excellent consistency, and construct validity was supported by factor analysis (Mahoney et al., 1999). A Rasch analysis was conducted to assess the reliability and validity of the composite behavior score. There was evidence of internal consistency of the composite behavior score with a Separation Index of 6.13 and an alpha coefficient of 0.97. With regard to validity, the items all fit the model with INFIT and OUTFIT statistics ranging between 0.57 and 1.38 (Smith & Smith, 2004). Mapping of the items showed that the concept of a composite behavior score was well distributed, although 55 individuals with very low or no evidence of behavioral symptoms could not be well differentiated (unpublished data).

2.2.2.2 Independent variables: These variables included severity of cognitive impairment, physical function, and pain management. Cognitive status was based on the MMSE (Folstein et al., 1975), a 30-point questionnaire to measure cognitive impairment in older adults. Prior testing supported the test-retest reliability (kappas of 0.80-0.95) with acceptable sensitivity and specificity (Folstein et al., 1975). Physical function was measured using the Barthel Index, a 14-item measurement of functional ability in performing basic activities of daily living with higher scores indicating greater independence in self-care and mobility (Mahoney & Barthel, 1965). The reliability and validity of the Barthel Index was based on significant agreement

between its observations of functioning, and the clinical symptom data collected by non-professional nursing assistants (weighted kappa >0.40) (Ranhoff, 1997). The level of agreement was particularly strong for dressing, chair-to-bed transfer, ambulation, bathing, paresis and edema (weighted kappa >0.75) (Ranhoff, 1997). Evidence of prescription analgesic use was obtained from medical records and medications included opioids and tramadol (Fisher et al., 2002).

2.2.2.3 Covariates: These included age, gender, race, marital status, education levels, and the number of medical comorbidities (e.g., cardiovascular disease, diabetes), and were obtained from residents' medical records.

2.2.3 Data analysis

Descriptive statistics were used to assess the frequency and percentage for categorical variables and the mean and standard deviation for continuous variables. Since the data were collected by two-level random sampling, a general linear mixed model (GLM) with residents nested within their NHs was conducted to examine the association among physical function, cognitive level, analgesics use and composite behavior scores. The intraclass correlation (ICC) among residents within each NH in the null model was assessed to decide whether to include NHs as random effects. The application of GLM was appropriate as the ICC between residents within the same NH was 7.02%, greater than 1% (Garson, 2013). To assess the explained variance accounted for in the outcome, pseudo R-squared was calculated as derived by Garson (2013). All p-values were two-sided, significant associations were defined as $p < .05$, and all covariates were included in the models.

2.3 Results

2.3.1 Characteristics of study participants

As shown in Table 2-2, the study participants included 94 (28%) men and 242 (72%) women, with an average age of 84.6 years. More than half of the participants were white (59%). Roughly 30% of study participants were married (n=92), and with less than a high school education (n=110). Participants had a median of 3 medical comorbidities. The median MMSE score was 8, indicating that overall participants had severe cognitive impairment. The median Barthel index score was 39, which indicated that most participants were dependent with regard to activities of daily living. One quarter of the participants (24.7%) were prescribed an opioid and/or tramadol for pain management.

The most commonly occurring symptom was inappropriate vocalization (63.7%), followed by repetitive behaviors (36.1%) and agitation (35.9%). The most frequently occurring symptom combinations were inappropriate vocalization and repetitive behavior (7.7%), inappropriate vocalization and apathy (5.7%), and inappropriate vocalizations, agitation, and apathy (5.1%). The composite behavior score ranged from 0 to 8 and the median behavioral symptoms score was 2 (mean score: 2.53). Two-thirds of participants had two or more behavioral symptoms.

Table 2-2. Descriptive characteristics of participating nursing home residents with dementia who had moderate to severe cognitive impairment (N=336)

	n (%)	Range	Mean \pm SD ^a	Median	Interquartile range
Age		56-104	84.63 \pm 10.08		
Gender					
Male	94 (28.0)				
Female	242 (72.0)				
Race					
White	199 (59.2)				
Black or Asian	137 (40.8)				
Marital Status					
Unmarried	243 (72.5)				
Married	92 (27.5)				
Education					
< High school	110 (37.8)				
\geq High school	181 (62.2)				
Number of co-morbidities		0-8		3	2
MMSE ^b total score		0-15		8	9
Barthel index score		0-99		39	43
Analgesics use					
Yes	83 (24.7)				
No	253 (75.3)				
Apathy					
Yes	89 (26.8)				
No	243 (73.2)				
Agitation					
Yes	120 (35.9)				
No	214 (64.1)				
Inappropriate vocalization					
Yes	214 (63.7)				
No	122 (36.3)				
Aggressive behavior					
Yes	92 (27.5)				
No	243 (72.5)				
Wandering					
Yes	74 (22.0)				
No	262 (78.0)				
Repetitive behavior					
Yes	121 (36.1)				
No	214 (63.9)				

Table 2-2 continued

Sexually inappropriate behavior					
Yes	51 (15.2)				
No	284 (84.8)				
Resistiveness to care					
Yes	82 (24.7)				
No	250 (75.3)				
Composite behavior score		0-8	2.53±1.88	2	3
0	55 (17.0)				
1	54 (16.7)				
2	60 (18.6)				
3	58 (18.0)				
4	44 (13.6)				
5	27 (8.4)				
6	18 (5.6)				
7	6 (1.9)				
8	1 (0.3)				

2.3.2 Associations between cognitive status, physical function, analgesics use and the composite behavior score

Cognitive status and use of analgesics were significantly associated with the composite behavior score, when controlling for demographics and the number of medical co-morbidities (Table 2-3). Those with greater cognitive impairment were more likely to have multiple symptoms, such that every point decrease in MMSE was associated with an increase of 0.097 in the composite behavior score ($p < .001$; 95% CI = -0.143, -0.052). In addition, prescription analgesics use was significantly inversely associated with co-occurrence of multiple behavior symptoms: participants on analgesic pain regimens were more likely to have a lower composite behavior score by 0.655 ($p = .009$; 95% CI = 0.163, 1.146), compared to those who were not treated. The covariates along with cognitive status and analgesics use explained 14.9% of the variance in composite behavior score.

Table 2-3. General linear mixed model to examine the contributions of cognitive status^a, physical function^b and analgesics use to composite behavior scores in nursing home residents with dementia who had moderate to severe cognitive impairment (N=336)

	Estimate	Std. Error	T	Sig.	95% Confidence Interval	
					Lower	Upper
Intercept	2.653	1.051	2.524	.012	.583	4.722
Age	-.006	.012	-.493	.622	-.029	.017
Race=White	.323	.238	1.356	.176	-.146	.793
Gender=Male	-.476	.263	-1.811	.071	-.994	.042
Education=<high school	.209	.224	.934	.351	-.232	.651
Marital status=Unmarried	.132	.255	.520	.604	-.369	.633
MMSE	-.097	.023	-4.199	<.001***	-.143	-.052
Analgesics use=No	.655	.250	2.623	.009**	.163	1.146
Number of comorbidities	.017	.068	.250	.803	-.118	.152
Barthel Index	.005	.004	1.260	.209	-.003	.013

Notes

a: Cognitive status measured using the Mini-mental state exam (MMSE) (Folstein et al., 1975)

b: Physical function measured using Barthel Index (Mahoney & Barthel, 1965)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

2.4 Discussion

In this analysis, two-thirds of sampled residents with dementia had two or more behavioral symptoms, with inappropriate vocalization, repetitive behaviors and agitation the most commonly occurring behaviors. These symptoms often occur as a consequences of neurodegenerative diseases, and previous studies reported prevalence rates of vocalization (11-40%), repetitive behaviors (30-90%), agitation (18-87%) among individuals with dementia (Beck et al., 2011; Cipriani et al., 2013; van der Linde et al., 2016; von Gunten et al., 2008; Veldwijk-Rouwenhorst et al., 2020). Disruptive vocalizations, repetitive behaviors, and agitation also have been associated with intrapersonal conditions (i.e. damage to orbitofrontal, dorsolateral prefrontal, or

corticostriatal structures, physical discomfort, stress, fear) and with interpersonal, environmental (i.e. physical environment, caregiver behaviors) factors (Cipriani et al., 2013; Gerritsen, van Beek, & Woods, 2019; Kale et al., 2015; Reeve et al., 2017; Veldwijk-Rouwenhorst et al., 2020). Thus, caregivers need to provide interventions to address multifactorial determinants of behavioral symptoms and prevent their co-occurrence.

While behavioral symptoms are nearly universal in dementia, our finding that greater cognitive impairment was associated with a higher composite behavior score is consistent with prior research (Choi et al., 2017; Mukherjee et al., 2017; Rozum et al., 2019). Severe cognitive impairment leads to greater challenges experienced by interaction with the physical and interpersonal environment (Kales et al., 2015). Thus, a person with dementia may be trying to express frustration or communicate a need that is expressed by a behavioral symptom (Cipriani et al., 2013; Reeve et al., 2017; Rozum et al., 2019; Veldwijk-Rouwenhorst et al., 2020). Those with cognitive impairment have increased likelihood of misunderstanding what staff are saying and of misinterpreting the caregiver's actions (Kale et al., 2015; Dooley, Bailey, & McCabe, 2015). Symptoms like aggressive behavior and resistiveness to care are often associated with communication difficulties (Holst & Skär, 2017; Volicer, 2012). To manage a wide range of behavioral symptoms, caregivers should be helped to optimally provide care tailored to the person's cognitive function and be aware of techniques to facilitate communication with the cognitively susceptible person. This can minimize stressors for the resident and enhance the caregiver's effectiveness.

The study findings indicated that regular use of analgesic medications for pain management was associated with a decreased occurrence of multiple behavioral symptoms. Prior research has also shown that pain treatment with prescription

analgesics has resulted in decreased verbal or physical agitation, aggression, apathy, and restlessness (Habiger et al., 2016; Husebo et al., 2014). However, it is possible that the medications, when given to these residents resulted in sedation, and thus they were less likely to exhibit behavioral symptoms such as aggression or resistiveness to care. Future research is needed to continue to examine the benefits and risks of analgesic medications among NH residents.

In contrast to prior research (Shiota et al., 2016; Helvik et al., 2016; Mukherjee et al., 2017; Nagata et al., 2016), in this sample there was no significant relationship between physical functioning and the composite behavioral score. This may be due to the homogeneity of the sample, as all of the participants were physically dependent in care.

Overall, cognitive status and management of pain along with demographic covariates, explained 15% of the variance in behavioral symptoms. Other factors that may influence behavioral symptoms but were not included in this study are caregiver and environmental factors (Kales et al., 2015). Caregiver factors refer to the quality of the relationship and interaction with the person living with dementia. Ineffective communication and lack of mutual, meaningful interactions between residents and staff can exacerbate behaviors among patients with dementia (Dooley et al., 2015; Gerritsen, van Beek, & Woods, 2019). Environmental triggers can include physical and psychosocial components of the environment such as noise level, over- or under-stimulation, or social isolation. Excessive environmental demands, from background noise, along with unnecessary restrictions on individuals, or from changes in routines, also can trigger challenging behaviors (Calkins, 2018; Kales et al., 2015). Future research needs to examine the occurrence of behavioral symptoms in relation to caregiver and environmental determinants along with other intrapersonal factors.

Strength and limitations

This study was limited in that it was a secondary data analysis of baseline data from the FBFC-CI, which had specific inclusion and exclusion criteria. Thus, while the findings cannot be generalized to all NH residents, it is reasonable to consider these findings as informative for populations with dementia who have moderate to severe cognitive impairment. The lack of pain experienced by residents was assumed based on the use of pharmacologic interventions. Future research should evaluate pain in these individuals to more accurately consider the relationship between pain and behavioral symptoms. Physical function assessments were based on verbal report by the nursing assistant working with the resident on the testing day and could therefore be biased. Some staff may have been more familiar with certain residents than others, and this could have influenced the symptom reports.

2.5 Conclusion

This study examined the co-occurrence of multiple behavioral symptoms using a composite behavior score and considered the factors that influence evidence of a multiple behavioral symptoms. A comprehensive assessment of behavioral symptoms and understanding of the factors that influence the co-occurrence of behaviors may help caregivers provide more efficient and effective interventions that will decrease multiple behaviors. More research is needed to improve the understanding of multiple behavioral symptoms and to develop interventions to address them.

Chapter 3.

Nurse staffing and nursing home deficiency of care for inappropriate psychotropics use in residents with dementia (Aim 2)

3.1 Introduction

Behavioral symptoms of dementia are highly prevalent in nursing home (NH) residents as people with dementia represented the largest proportion of all NH older adults (Harris-Kojetin et al., 2019; Kales, Gitlin, Lyketsos, & Detroit Expert Panel on Assessment and Management of Neuropsychiatric Symptoms of Dementia, 2014). Behavioral symptoms (also known as behavioral and psychological symptoms of dementia (BPSD) or neuropsychiatric symptoms) can include agitation, aggression, apathy, depression, wandering, socially inappropriate behavior, sleep disturbances, and resistiveness to care (Kales, Gitlin, & Lyketsos, 2015). These symptoms can present a significant challenge in dementia care (van Duinen-van den Ijssel et al., 2017; Zwijsen et al., 2014).

Psychotropic drugs, including antipsychotic, antidepressant, antianxiety, anticonvulsant and hypnotics, are often prescribed for controlling behavioral symptoms; however, they lack efficacy for many behavioral symptoms (Dyer et al., 2018). The use of antipsychotics has been of concerns for many policy makers and NH administrative personnel because of the increased risk of adverse events. Efforts begun in 2012 by the Center for Medicare and Medicaid Services (CMS) National Partnership to Improve Dementia Care in Nursing Homes have helped reduce antipsychotic medication usage to an average of 14.1% of NH residents (CMS, 2012, 2020). Yet, due to challenges related to the consistent implementation of non-pharmacological interventions for behavioral symptoms and lack of knowledge about

their risks some NHs continue to inappropriately use antipsychotic and other psychotropic drugs (Maust, Kim, Chiang, & Kales, 2018; Grabowski et al., 2014).

The Alzheimer's Association reported (2017) the interplay between behavioral symptom management and staffing. Nurse staff consists of registered nurses (RNs), licensed practical/vocational nurses (LPNs/LVNs), certified nursing assistants (CNAs), nurse aides, and medication aides/technicians. Lower nurse staffing has been related to increased verbal or physical aggression by residents with dementia (Cassie, 2012; Shin & Hyun, 2015). This is concerning as NHs are often understaffed and face challenges in recruiting and retaining sufficient skilled nursing staff. Compared to acute care settings, NH positions have higher workloads, lower salaries, and higher turnover rates (Banaszak-Holl, Castle, Lin, Srivastava, & Spreitzer, 2015; Kayyali, 2014; Harrington et al., 2020).

Inadequate nurse staffing levels have a negative impact on the quality of dementia care. Lower nurse staffing is also associated with greater antipsychotic and/or other psychotropic drug use (Cioltan et al., 2017; Lucas et al., 2014; Phillips, Birtley, Petroski, Siem, & Rantz, 2018; Shin, J. H., & Shin, I. S, 2019; Zuidema et al., 2011). The impact of staffing on psychotropic use is not surprising, because it is more challenging to address individualized care for a person with dementia when understaffed (Gilster, Boltz, & Dalessandro, 2018; Harrington et al., 2020). Despite this concern, there is lack of research on quality of dementia care regarding inappropriate psychotropic drug use in relation to nurse staffing across U.S NHs.

Deficiency of care measures from CMS are used to assess NH care quality at the national level (Harrington, Carrillo, Garfield, Musumeci, & Squires, 2018). These deficiency citations indicate a failure to meet federal regulatory standards. In this study we used NH deficiency citations for inappropriate psychotropic use to manage

behavioral symptoms as a proxy for poorer quality of dementia care, and to explore their presence in relation to nurse staffing measures. A focus on inappropriate use is intended to discourage NH staff from using psychotropics as a treatment for behavioral symptoms without first trying non-pharmacological interventions (Simonson, 2018). We hypothesized that lower nurse staffing levels and RN skill-mix would be associated with greater odds of a NH having been cited for inappropriate psychotropics use.

3.2 Methods

3.2.1 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=14,548 NHs). CASPER is a facility-level database updated annually by the CMS (Harrington et al., 2018). CASPER contains information on facility characteristics (type of certification, bed capacity, type of ownership, geographical location and presence of special care units), resident characteristics (proportion of Medicare/Medicaid recipients, proportion of residents with physical/ psychological problems or other special care needs), and 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, 2021).

3.2.2 Sample: During the 13-month period, 2,809 NHs received a F-758 deficiency citation (total of 2,850 F-758 tags), indicating inappropriate psychotropics use, among

14,548 NHs. A total of 13,614 NHs were involved in quantitative analysis because NHs with F-758 citations related to residents who had no cognitive impairment (n=804) and/or psychiatric disorders (e.g., bipolar disorder, schizophrenia) (n=130) were excluded. We holistically investigated the 934 NHs to avoid potential selection bias resulted from inappropriate facility exclusion. Almost all NHs had individuals with dementia and were involved in nursing care for dementia. The excluded NHs may provide appropriate care for those with dementia because the F tags did not mention anybody with dementia, or they may be potentially at high risk for inappropriate psychotropics use among those with dementia because they were already involved in inappropriate psychotropics use for other residents. We examined the analysis findings with and without the 934 facilities and found that the results were similar. Thus, we focused our analysis to facilities with F-758 citations specifically indicating inappropriate psychotropics use for residents with Alzheimer's disease or other dementias (n=1,875).

3.2.3 Measures

3.2.3.1 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 (State Operations Manual, 2017). 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, anticonvulsants, and hypnotics (State Operations Manual, 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 (for benzodiazepines and antipsychotics) should not be beyond 14 days without clinical indications from the prescribing physician or practitioner (State Operations Manual, 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).

3.2.3.2 Independent variables: NHs are required to electronically submit direct care staffing information based on payroll (CMS, 2019) 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, and certified medication 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, certified medication 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, nurse aides, certified medication 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).

3.2.3.3 Covariates: 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, 2015a). 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 $\geq 250,000$ 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.

NH resident-related characteristics included the proportion of residents with dementia, depression, psychiatric disorders, and/or behavioral healthcare needs due to mental illnesses. These variables were created by dividing the number of residents with dementia, depression, psychiatric disorders, and/or behavioral healthcare needs by the total number of NH residents, respectively.

3.2.4 Data analysis: 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 relationship between the occurrence of F-758 citations among those with dementia and nurse staffing levels 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. NHs were nested within states, because they are affected by the same regulations for the state in which they are located. The ICC as 15.8% indicated to use GLMM models to account for the clustering within state (Garson, 2013). Facility (facility size, geographic location, type of ownership and the presence of dementia special care units) and resident-related characteristics (the proportion of residents with dementia, depression, psychiatric disorders, or behavioral healthcare needs and the proportion of residents with Medicare or Medicaid) were included in adjusted regression analyses.

3.3 Results

Overall, 13.8% of NHs received a citation for inappropriate use of psychotropic medications among their residents with Alzheimer's disease or other dementias (Table 3-1). The average total nursing HPRD was 3.61 ± 0.91 and the average of RN skill-mix was 0.12 ± 0.08 . About half of NHs were large or very large bed size ($n=6,659$, 48.9%), 40.4% ($n=5,484$) were in urban areas with >1 million residents, and about two-thirds of facilities ($n=9,514$, 69.9%) were for-profit. About 14% of NHs ($n=1,912$) had dementia SCUs. Overall, an average of 45% of NH residents were diagnosed with

Alzheimer's disease or other dementias and about one-fifth of NH residents had behavioral healthcare needs due to dementia and/or psychiatric disorders.

Table 3-1. Descriptive Characteristics for NHs across states in 2018 and by F-758 tag for a person with dementia presence (N=13,614)

Variable	Total (n=13,614)	No F-758 tags (n=11739, 86.2%)	Yes F-758 tags (n=1875, 13.8%)	X ² or t	p value
Hours per resident day (M±SD):					
Registered nurse	0.46±0.47	0.47±0.50	0.41±0.29	7.989	<.001
Licensed practical nurse	0.81±0.36	0.81±0.36	0.80±0.32	2.063	.039
Certified nursing assistant	2.20±0.56	2.20±0.57	2.16±0.51	3.607	<.001
Nurse aide	0.03±0.09	0.03±0.09	0.04±0.11	-3.614	<.001
Certified medication aide	0.10±0.21	0.10±0.22	0.10±0.21	-0.360	.719
Total all nursing staff	3.61±0.91	3.62±0.94	3.51±0.70	6.291	<.001
RN skill-mix	0.12±0.08	0.12±0.08	0.11±0.07	4.500	<.001
Facility size (%)				9.596	.022
Small	1700 (12.5)	1505 (12.8)	195 (10.4)		
Medium	5255 (38.6)	4500 (38.3)	755 (40.3)		
Large	5937 (43.6)	5107 (43.5)	830 (44.3)		
Very large	722 (5.3)	628 (5.3)	95 (5.1)		
Geographic location (%)				3.262	.196
Small	5285 (38.9)	4546 (38.9)	739 (39.4)		
Medium	2803 (20.6)	2445 (20.9)	358 (19.1)		
Large	5484 (40.3)	4707 (40.2)	777 (41.5)		
Type of ownership				3.414	.181
For profit	9514 (69.9)	8184 (69.7)	1330 (70.9)		
Government	911 (6.7)	776 (6.6)	135 (7.2)		
Non for profit	3188 (23.4)	2778 (23.7)	410 (21.9)		
Dementia SCU				7.661	.006
No	11702 (86.0)	10129 (86.6)	1573 (13.4)		
Yes	1912 (14.0)	1610 (84.2)	302 (15.8)		
Proportion of residents with:					
Dementia	0.45±0.18	0.45±0.16	0.46±0.16	-2.302	.021
Depression	0.33±0.19	0.37±0.24	0.39±0.23	-3.635	<.001
Psychiatric disorders	0.37±0.24	0.33±0.19	0.34±0.18	-3.218	.001
Behavioral symptoms	0.21±0.19	0.21±0.19	0.23±0.19	-3.453	.001
Medicare	0.14±0.14	0.14±0.15	0.12±0.12	5.390	<.001
Medicaid	0.59±0.25	0.58±0.25	0.61±0.22	-4.807	<.001

Table 3-1 also shows comparison of variables between NHs with and without F-758 deficiency tags. Compared to NHs with F-758 citations, facilities without F-758 citations had significantly greater means of nursing hours per resident day for RN, LPN, CNA, total staff, and RN proportion. There was a lower percentage of small facilities in NHs with F-758 tags ($X^2=9.596$, $p=.022$). There was a greater percentage of having dementia SCUs within NHs with F-758 citations (16.1%) compared to facilities without the deficiency tags (13.7%) ($X^2=7.661$, $p=.006$). NHs with citations had significantly higher proportions of residents with dementia, depression, psychiatric disorders, or behavioral healthcare needs, 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 ($p=.007$).

Table 3-2 shows unadjusted and adjusted odds ratios of receiving F-758 tags in relation to nurse staffing levels accounting for nesting NHs within each state. According to the unadjusted regression model, receiving F-758 tags was associated with having lower nursing hours per resident day (HPRD) for RNs (OR=0.48, 95% CI=0.41-0.56), CNAs (OR=0.82, 95% CI=0.73-0.92), total nurse staff (OR=0.82, 95% CI=0.76-0.87), and lower RN skill-mix (OR=0.05, 95% CI=0.02-0.10) compared to those nursing homes that did not. Adjusted regression models also showed similar findings. There was a significant lower odds of receiving F-758 citations in NHs with higher nursing staff HPRD, controlling for facility and resident-related characteristics: every increase in RN HPRD decreased the odds of receiving F-758 tags by 46% (OR=0.54, 95% CI=0.44-0.67) and every increase in CNA HPRD and total nursing staff HPRD decreased the odds by 13% (OR=0.87, 95% CI=0.77-0.99; OR=0.87, 95% CI=0.79-0.96, respectively). NHs with greater RN skill-mix also were significantly

associated with lower odds of F-758 citations; every increase in RN proportion decreased the odds of receiving F-758 tags by 90% (OR=0.10, 95% CI=0.04-0.26).

Table 3-2. Odds ratio estimates of receiving F-758 tags in relation to nurse staffing in residents with dementia*

Variables	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio** (95% CI)
Registered Nurse HPRD***	0.48 (0.41, 0.56)	0.54 (0.44, 0.67)
Licensed Practical Nurse HPRD	0.99 (0.83, 1.20)	1.14 (0.93, 1.40)
Certified Nursing Assistant HPRD	0.82 (0.73, 0.92)	0.87 (0.77, 0.99)
Nurse aide HPRD	1.59 (0.89, 2.86)	1.36 (0.75, 2.47)
Certified Medication Aide	0.99 (0.72, 1.38)	0.97 (0.70, 1.35)
Total nursing staff HPRD	0.82 (0.76, 0.87)	0.87 (0.79, 0.96)
RN Skill-mix	0.05 (0.02, 0.10)	0.10 (0.04, 0.26)

* Both unadjusted and adjusted odds ratios were obtained from GLMM models accounting for state clustering.

**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

3.4 Discussion

Our findings indicated that NHs have a greater likelihood of receiving F-758 deficiency tags if they have lower RN staffing levels. Previous studies found greater reliance on antipsychotic and/or other psychotropic drug use in relation to lower RN staffing levels (Cioltan et al., 2017; Lucas et al., 2014; Phillips et al., 2018; Shin, J. H., & Shin, I. S, 2019; Zuidema et al., 2011). Phillips and colleagues (2018) found that having RN staffing levels above the CMS recommendation for minimum levels (0.75 hours) lowered the odds of psychotropic medication use. RNs have more educational preparation and training in 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. Higher RN hours may allow more time

to explore underlying causes of challenging behaviors and develop comprehensive care plans to minimize behavior symptoms in residents with dementia. Inadequate RN staffing can adversely affect their job performance due to excessive workload, which may result in greater psychotropic drug use.

Our study findings indicated that a higher RN skill-mix was also significantly associated with having lower odds of receiving a F-758 citation. The RN staffing portion, along with their number per patient, is also important for dementia care. Higher RN staffing mix was more related to quality of care than total nurse staffing levels (Harrington et al., 2016). RNs may have better knowledge on behavioral symptoms and non-pharmacological interventions and may be more aware of serious outcomes of inappropriate psychotropic drug use. RNs play a critical role in providing quality of care, preventing adverse events, and improving patient outcomes, since they provide care that requires higher levels of decision making, critical thinking, and clinical judgment (Vogelsmeier et al., 2015, 2017).

Our study found that greater LPN staffing levels had no significant associations with the occurrence of F-758 deficiency citations. In contrast, studies found that higher LPN staffing levels were related to the greater prescription of psychotropics (Lucas et al., 2014; Cioltan et al., 2017). LPNs in long-term care settings are often supervised by RNs and the role of LPNs in many long-term care settings tend to focus more on completing necessary care tasks such as medication administration, treatments and documentation, whereas the RNs approach health in a holistic manner and are accountable for overseeing and evaluating overall nursing care outcomes (Vogelsmeier, Scott-Cawiezell, & Pepper, 2011). This different scope of practice may lead to different attitude towards medication administration practices, including psychotropics use for behavioral symptom management.

NHs with greater CNA staffing levels had a significant lower odds of receiving F-758 tags, which concurred with prior observational research finding (Lucas et al., 2014). CNAs affect quality of lives in persons with dementia as they assist with most aspects of physical care. CNAs are often the first to notice abnormal physical changes (Jansen et al., 2017), and their observation can provide basis for developing non-pharmacological interventions to address unmet needs. For example, CNAs played a key role in recognizing and managing pain (Liu, 2013; Jansen et al., 2017) and the pain management should be included in non-pharmacological interventions to prevent and manage behavioral symptoms. NHs require adequate CNA staffing levels to promote implementation of non-pharmacological interventions. With fewer staff to care for residents, it is more challenging to consistently implement behavioral interventions (Schnelle & Simmons, 2016).

Limitations

The study used a cross-sectional design and causality between variables cannot be inferred from this study. The cross-sectional component limited in determining the temporal order of relationships between NH staffing levels and the occurrence of inappropriate psychotropics use.

This study finding was also limited in fully understanding inappropriate psychotropic drug use, since the data lacked 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, history of comorbid psychiatric disorders, and dementia severity stage (Eggermon, De Vries, & Scherder, 2009; Kim, Chaing, & Kales, 2011; Larrayadieu et al., 2011; Lucas et al., 2014). Also, CASPER lacks information on staff characteristics that may be

potentially related to quality of dementia care, such as staff's burnout and distress levels (Cooper et al., 2016; Feast et al., 2017) and quality of relationship when caring for the person with dementia (Dooley, Bailey, & McCabe, 2015; Gerritsen, van Beek, & Woods, 2019). Successful caregiving is not merely dependent on the length of time for caring, rather it is also related to caregiver's attitude and interaction style with individuals with dementia (Gräske, Schmidt and Wolf-Ostermann, 2019).

3.5 Conclusion

This study delineated the importance of nurse staffing to provide optimal quality of care for NH residents with dementia. The study suggested the need for higher RN and CNA 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 nurse staffing levels to facilitate implementation of non-pharmacological interventions and reduce unnecessary use of psychotropic drugs. 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.

Chapter 4.

Exploration of deficiency of care reports on inappropriate psychotropic medication use related to care for behavioral symptoms of dementia (Aim 3)

4.1 Introduction

Nearly half of nursing home (NH) residents in the United States have dementia, almost 90% of whom exhibit behavioral symptoms (Harris-Kojetin et al., 2019; Kales, Gitlin, Lyketsos, & Detroit Expert Panel on Assessment and Management of Neuropsychiatric Symptoms of Dementia, 2014). Psychotropic medications, such as antipsychotics, anti-anxiety agents, antidepressants, anticonvulsants, and hypnotics are often used to manage behavioral symptoms in NHs despite only small to moderate efficacy (Chiu, Bero, Hessel, Lexchin, & Harrington, 2015; Dyer et al., 2018). However, best practices indicate that non-pharmacological interventions should be used as a first-line management for behavioral symptoms (American Geriatrics Society Beers Criteria, 2019) and psychotropic drugs are recommended when behaviors become severe or resistant to non-pharmacological interventions (Dyer et al., 2018). Concerns have been raised about psychotropics use due to medication safety issues such as fall-related injuries, delirium, cerebrovascular events, or death (Bangash et al., 2017; Harrison et al., 2018).

To reduce inappropriate psychotropics use, especially antipsychotic drugs, the Centers for Medicare and Medicaid (CMS) initiated the National Partnership to Improve Dementia Care in Nursing Homes in 2012 (CMS, 2012). This has led to a steady decline in such use, with the average prevalence of current antipsychotics use in NH residents at 14% (CMS, 2020a). Yet, psychotropics use remains in about 70% of older adults with dementia (Maust, Kim, Chiang, & Kales, 2018). Behavioral

symptoms associated with dementia were commonly cited as a reason for psychotropics use (Bonner et al., 2015).

Deficiency of care citations are given when a NH fails to meet federally required care standards, during inspection by state survey teams. The F-758 (formerly F-329) deficiency tag indicates inappropriate or unnecessary psychotropic medication use has occurred. The F-758 deficiency tag was newly implemented in 2017 (State Operations Manual, 2017). Previously, CMS mainly focused on antipsychotics use but the term “psychotropic medications” for the F-758 deficiency tag includes antipsychotics, antidepressants, anti-anxiety agents, hypnotics, and “any drug that affects brain activities associated with the mental process and behavior.” (State Operations Manual, 2017). Antidepressants, anti-anxiety agents, and hypnotics are often used as alternatives to antipsychotics to control behavioral symptoms, however, some of these alternatives (e.g. valproic acid) can be even more dangerous than antipsychotics due to side effects and lack of efficacy (Kales, Gitlin, & Lyketsos, 2015).

Deficiency citations represent an assessment of NH quality of care (Castle & Ferguson, 2010; Harrington et al., 2018). Many quantitative studies have examined the prevalence of deficiencies in relation to facility characteristics, staffing levels and policies across states (Harrington et al., 2012; Lerner, Johantgen, Trinkoff, Storr, & Han, 2014; McDonald et al., 2013; Towsley et al., 2013; Wagner et al., 2013). However, to date, little work has been done to explore the nature of deficiencies of care. The purpose of this study was to investigate how the F-758 deficiency described the inappropriate psychotropic medication use. In this study, F-758 deficiency citations served as an indicator of poorer quality of dementia care. By exploring the detailed narrative accompanying the deficiency citation using a qualitative approach, additional details about these citations were identified.

4.2 Methods

4.2.1 Research design

The study used a mixed-method study design combining descriptive and content analysis of F-758 deficiency reports across US NHs during the first quarter of 2018 (January to March).

4.2.2 Data source

The 2018 CASPER (Certification and Survey Provider Enhanced Reporting) data were used to collect F-758 tag deficiency citations. The inspection reports for the F-758 deficiency tag were available from CMS Nursing Home Compare and ProPublica. Nursing Home Compare provides health inspection reports for every Medicare and Medicaid certified NH across the U.S. The inspection report contains information on the rationale for the assigned deficiency citation (Nursing Home Compare, 2019). ProPublica also provided NH inspection reports for health deficiencies and included the unredacted inspection reports, as obtained by ProPublica under the Freedom of Information Act (ProPublica, 2019). Nursing Home Compare and ProPublica list all health deficiencies from the most recent inspection.

These inspection reports contained information on reasons for receiving the deficiency tag, the psychotropic medications and behavioral symptoms that were involved, Minimum Data Set (MDS) assessment, clinical record review, Medication Administration Record (MAR) documentation, surveyors' interviews with NH staff, and any adverse consequences that occurred following the inappropriate psychotropic medication use.

4.2.3 Sample

There were 3,526 NHs surveyed during the first quarter of 2018, of which 642 NHs received F-758 tags. The quantitative and qualitative analyses were confined to

NHs related care for residents with dementia (n=444).

4.2.4 Data analysis

1) Quantitative component

Descriptive analyses were also conducted to examine the frequency of involved psychotropic medications, scope and severity of F-758 deficiency citations, and the reasons for F-758 citations. Scope and severity are used to assess the extent of potential harm for each deficiency citation: A code of A indicates the least severe and most isolated situation for a deficiency citation up to L, that represents the most severe (resulting in widespread immediate jeopardy to resident health or safety) and widespread situations (CMS, 2020b). As scope and severity of deficiency citations directly measure resident safety (Castle, Wagner, Ferguson, & Handler, 2011), examining scope and severity of F-758 citations may be important for further understanding resident safety issues in regard to inappropriate psychotropics use among residents with dementia.

2) Qualitative component

Data analysis was conducted using content analysis suggested by Krippendorff (2003) with an inductive coding approach (e.g., generating themes/categories) (Marks & Yardley, 2003; Pain, Chadwick, & Abba, 2008). Each deficiency report was broken down into units. Units are words, phrases, or sentences that describe a single idea. The first analysis was *in vivo* coding to place emphasis on the actual words or terms used by NH surveyors/inspectors and adopt them as codes (Manning, 2017). The process of clustering was based on similar meanings and concepts. The analysis was guided by the question “what were the rationales for receiving F-758 deficiency tags?” as shown in Table 4-1, to explore the nature of the deficiency citation. The software Nvivo 12 (QSR International, Melbourne, Australia, 2012) was used to conduct qualitative

analysis.

Table 4-1. Guide questions to explore F-758 deficiency statements

<p>What was/were the rationale(s) for receiving the F-758 deficiency tag?</p> <p><u>Prompts:</u></p> <ol style="list-style-type: none">1) Were any rationales from progress notes of a physician or a prescribing practitioner and/or psychiatrist's evaluation described to justify the psychotropics prescription?2) Were there any descriptions of the admission record, MDS, or physician's progress notes to assess the resident's behavioral symptoms and their underlying factors?3) Were any care plans and/or behavioral interventions developed and provided prior to prescription of psychotropics for individuals with behavioral symptoms?4) If the individual was prescribed psychotropics, were there any gradual drug reduction efforts, unless clinically contraindicated?5) Were PRN orders for psychotropic drugs, particularly benzodiazepine or antipsychotics, limited to 14 days without clinical indications? If not, were there any rationales for the extended order?6) What were any other reasons for receiving the F-758 tag citation?

The primary author collected all data and thoroughly re-read deficiency reports. Initial codes were generated for 50 reports, and ten reports were randomly selected to be reviewed by the first reviewer. The first reviewer helped define reasons for F-758 deficiency citation. The primary author completed coding for all other reports following the initial coding check and ten reports were randomly selected and reviewed by the second reviewer. The first and second reviewers had experience conducting and publishing qualitative studies and examined the credibility of codes and coding process. The first reviewer, an expert in geriatric nursing care, and the second reviewer, an expert in nursing home quality of care, served as sources of

expert validation (Sandelowski, 1998). To ensure reliability and consistency, after initial coding, 5% of deficiency reports were randomly selected and re-reviewed to ensure the codes remained consistent between the initial and second assessment. Then the degree of correlation between the two assessments was calculated for an overall reliability assessment. This process was continued until greater than 95% agreement was reached. Revisions were conducted until all comments were addressed.

4.2.5 Definition of reasons for receiving F-758 citations: Definitions are provided to clarify the CMS regulations and terminologies related to F-758 citations prior to presenting the reasons for F-758 tag citation evaluated during the quantitative analysis (Table 4-2).

Table 4-2. Definition of reasons for receiving F-758 citations

Reason for F-758 deficiency citation	Definition
1. Identifying or monitoring behavioral symptoms	Psychotropic drug use should be based upon a comprehensive assessment of the resident's behavioral symptoms.
2. Gradual Dose Reduction (GDR)	Facilities should ensure that residents with psychotropic drug(s) for behavioral symptoms related to dementia receive a GDR attempt if behavioral symptoms can be managed using a lower dose. The exception would be if the reduction is clinically contraindicated, such as reoccurrence or deterioration of the target behavior symptom(s) (State Operations Manual, 2017).
3. 14-day limitation on PRN order of psychotropic drug(s)	Facilities should ensure 14-day limitation on PRN psychotropic drug orders (benzodiazepines and antipsychotics) unless clinically contradicted. Psychotropic orders may be extended beyond 14 days if the physician or prescribing practitioner approves prolonged use of psychotropic drugs with a specific clinical indication (State Operations Manual, 2017).
4. Non-pharmacologic interventions	Unless contraindicated, the facility should implement non-pharmacological interventions prior to initiating or continuing psychotropic drug use (State Operations Manual, 2017).
5. Adequate diagnosis for the use of psychotropic drug(s)	The facility should ensure that residents have an approved diagnosis for the use of psychotropic drug(s). Psychotropic drugs are used to manage the dementia-related behavior(s) that present significant distress to the resident or others or a danger to the resident or others (State Operations Manual, 2017).
6. Monitoring for adverse consequences	The facility must monitor potential adverse consequences of a psychotropic drug to determine the efficacy. Adverse consequences include anticholinergic effects, cardiovascular signs, metabolic symptoms, and neurologic symptoms (State Operations Manual, 2017). The AIMS (Guy, 1976) is used to assess dyskinesia and should be completed within 72 hours of an increase in antipsychotic medication and then every 3–6 months while taking antipsychotic medication.
7. A specific indication/ diagnosis for psychotropics use	Facilities should identify and document a specific indication for psychotropics use based upon resident's condition and the clinical indication should be consistent with clinical standards of practice (State Operations Manual, 2017).
8. Other reasons	Other reasons included no informed/signed consent prior to psychotropics use, failure of baseline assessment prior to psychotropics use, administration of multiple medications under the same pharmacological class or category (duplicate therapy), no education on psychotropics for the resident, the resident's family, and/or representative, and improper psychotropics administration.

4.3 Results

4.3.1 Quantitative analysis

Among psychotropics drugs, antipsychotics were those most involved with F-758 tag citations, as shown in Table 4-3. Roughly two-thirds of NHs (n= 300, 67.6%) received D level F-758 tags, meaning isolated/minimal harm or potential for actual harm. There were only three NHs (0.7%) with citations greater than G level (resulting in actual harm). Reasons for receiving F-758 tag citations were coded into 12 reasons. The most common reason for F-758 citation was failure to identify and/or monitor behavioral symptoms (178 NHs), followed by failure to attempt gradual drug reduction (GDR) (131 NHs) and to maintain 14-day limitations on PRN psychotropic orders (121 NHs). Nearly half of the NHs (45.2%) received F-758 tags with more than two reasons. The three most common combinations were failure to identify/monitor behavior symptoms and to attempt medication dose reduction (6.32%), failure to identify/monitor behavior symptoms and implement non-pharmacological interventions (5.96%), and failure to identify/monitor behavior symptoms and provide a specific indication/diagnosis (5.96%).

Table 4-3. Summary of involved psychotropic medications, scope and severity grade, and reasons for F-758 tag citations for the first quarter of 2018 (N=444)

F-758 summary	Number of NHs (%)
Psychotropic medication category involved	
Antipsychotic (e.g., Seroquel, Risperidone, Haloperidol)	311
Antianxiety (e.g., Lorazepam, Alprazolam)	179
Antidepressant (e.g., Escitalopram, Trazodone)	123
Anticonvulsant (e.g., Valproic acid)	21
Hypnotics (e.g., Zolpidem)	5
Scope and severity of citation	
D (Isolated/Minimal harm or potential for actual harm)	300 (67.6)
E (Pattern/Minimal harm or potential for actual harm)	140 (31.5)
F (Widespread/Minimal harm or potential for actual harm)	1 (0.2)
G (Isolated/Actual harm)	2 (0.5)
J (Isolated/Immediate Jeopardy)	1 (0.2)
Reasons for F-758 tag citation: failure to:	
identify and/or monitor behavioral symptoms	178
attempt gradual drug reduction (GDR)	131
maintain 14 days limitation on PRN psychotropic orders	121
provide non-pharmacological interventions	92
ensure an adequate diagnosis for the use of psychotropic drug(s)	76
monitor adverse consequences	74
provide a specific indication/diagnosis	71
Other reasons	
No informed/signed consent prior to psychotropics use	8
Failure of baseline assessment prior to psychotropics use	8
Duplicate therapy	5
Improper psychotropics administration	3
No education on psychotropics for the resident, their family, and/or representative	3
Number of reasons given per citation	
1	243 (54.8)
2	117 (26.4)
3	58 (13.1)
4	20 (4.5)
5	6 (1.4)

4.3.2 Qualitative analysis: was used to develop detailed information regarding the reasons for F-758 tag citations. Reasons for F-758 tag citation were evaluated during the qualitative analysis. The analysis was to explore how the deficiency tag indicated inappropriate psychotropics use in individuals with dementia.

1. Did not identify and/or monitor behavioral symptoms

These indicated that the NH did not provide any supporting documents

indicating that the target behavioral symptoms were identified, or complete any specific behavioral tracking/monitoring forms to assess frequency, duration, or severity, or investigated any underlying causes of behaviors prior to prescribing or increasing psychotropic medications.

Examples: “This assessment does not identify specific targeted behaviors for inability to sleep, or aggression and paranoia, and documents potential causes of behavior as Dementia.”

“Review of the medical record revealed no evidence of any type of daily documentation related to behavior monitoring tracking for the use of [antipsychotic].”

2. Gradual drug reduction (GDR) not attempted

Some facilities prescribed prolonged psychotropics without a GDR attempt because they did not monitor the target behavioral symptoms, implement a GDR attempt as a physician’s order, or a clinician refused to accept a GDR recommendation without a specific clinical rationale. Another example occurred when risks versus benefits of the psychotropic(s) were not assessed to determine the appropriateness of psychotropics use. In others, the resident’s family or legal guardians refused a GDR attempt due to their concerns about the resident’s behaviors worsening following the drug reduction.

Example: “Provider indicated the facility does not always document resident behaviors in the chart. There was no attempt for a GDR for the [antipsychotic drug] or [antidepressant] and no documented reasons why the resident should still remain on those medications.”

“Interview with provider revealed that the family has not wanted resident to be discontinued from [antianxiety drug]. The daughter is mostly concerned with keeping resident on [antianxiety drug]”

3. Did not maintain 14-day limitation on PRN psychotropic order

Some facilities prescribed PRN psychotropics longer than 14 days without clinical rationale or without stating an intended duration for the extended PRN order timeframe. Those facilities did not monitor the target behavioral symptom(s), re-evaluate the risk/benefits of the psychotropic(s), address pharmacist's recommendations on stop date of 14 days, or monitor irregularities regarding the PRN psychotropics prescription.

Example: "Review of the medication [antianxiety drug] order showed x mg ordered PO twice per day prn. There was no evidence the medication was ordered for less than 14 days... There was no method to determine which behaviors were being monitored for each medication."

4. Did not provide non-pharmacological interventions

Some facilities did not have documented evidence of provision of non-pharmacological interventions that could help decrease the target behavior(s) prior to initiating or continuing psychotropics use. Those facilities that only provided limited documentation that non-pharmacological interventions were provided and re-evaluated for their effectiveness prior to the psychotropics administration.

Example: "Review of the electronic and paper charts revealed no evidence that non-pharmacological (interventions) were attempted prior to the administration of [antianxiety drug] on.... Nurse Interview verified no documented evidence of non-pharmacological interventions prior to administration of the [antianxiety drug] on..."

5. Lack of an adequate indication to support psychotropics use

Some facilities failed to ensure that the resident had adequate indications for the use of psychotropic drug(s). Psychotropics were used to address dementia-related behaviors but facilities did not provide supporting evidence that the target the

behavioral symptom(s) presented significant distress and/or danger to self or others, or no specific behavioral symptoms that had affected the resident's safety and quality of life were documented to justify the use of the psychotropic drug(s).

Example: "Further review of medical records failed to reveal any documentation that the resident was in imminent danger to self or others prior to the invasive administration of IM [antianxiety drug]. The Director of Nursing (DON) acknowledged that refusing food or medication did not warrant an injection."

6. Lack of monitoring for adverse consequences of a psychotropic drug

There was lack of supporting documentation that the resident was monitored for adverse effects associated with psychotropic drugs with black box warnings to determine the efficacy of the psychotropic(s). For example, they did not monitor laboratory results, recognize adverse effects related to psychotropics use, include order to monitor side effects, or complete the Abnormal Involuntary Movement Scale (AIMS) in a timely manner.

Example: "A license practical nurse offered the resident a drink of water after the resident stated, my mouth is dry... The provider stated they thought the resident just had a dry mouth and never really thought of it as lip smacking or tongue thrusting."
"There was no AIMS (Abnormal Involuntary Movement Scale) assessment documented in the chart for the past x months. The provider, indicated an AIMS assessment should be completed at least every six months."

7. Lack of a specific diagnosis or indication

A special indication or diagnosis for psychotropics use was not provided without identifying the resident's target behavior(s), providing non-pharmacological interventions, or conducting psychiatric assessment and/or evaluation for the need of psychotropics use.

Example: *“The Physician's Order shows [antipsychotic drug] x milligrams daily. The order contains no information regarding why the medication is given. Facility could not provide any psychiatric evaluation for the resident and none was found in the record.”*

8. Other reasons

Some facilities failed to obtain consent for the use of psychotropic drug(s) and ensure the drug was administered by appropriate processes.

Example: *“There was no documented verbal or written consent for use of [antipsychotic drug] with explanation to the resident's representative of the drug's Black Box Warning to call attention to serious or life-threatening risks.”*

The F-758 tag was cited because there was no baseline assessment completed prior to psychotropics use to establish side effect monitoring.

Example: *“There was no baseline AIMS (Abnormal Involuntary Movement Scale) performed prior to the administration of the [antipsychotic].”*

In some facilities, residents received unnecessary psychotropic drug(s), since two psychotropic drugs under the same category were administered for one behavior (duplicate therapy).

Example: *“After reviewing resident's clinical records stated, [antianxiety drug] and [antianxiety drug] were duplication of therapy and the physician needed to provide clinical rationale for routine use of the two antianxiety medications together.”*

Education on psychotropics use was not provided for the resident's family or representative.

Example: *“The facility could not provide documentation which the resident, resident's family member or representative had been instructed of the side effects including the risks and benefits of [antipsychotic drug].”*

Improper psychotropics administration refers to incorrect dose or time interval to administer the psychotropic drug prescription.

Example: “Per the DON, Resident had been experiencing more signs and symptoms of depression, and the resident had been seen by psychiatric services. Per the DON, the dosage of [antidepressant] had been started but (previous) dosage of ... had not been discontinued. The DON stated that this had been a medication error.”

4.4 Discussion

Over two-thirds of NHs with F-758 deficiency citations were related to care for residents with dementia, of which nearly half of the NHs were given multiple reasons for the deficiency tag. Lack of identifying and/or monitoring behavioral symptoms was the most common reason for F-758 tag citation. This indicates the importance of accurate, comprehensive assessment and monitoring for behavioral symptoms to avoid unnecessary psychotropics use. Some healthcare staff may view some of these behavioral symptoms as “normal” and, they become accustomed to dealing with them and then stop documenting the ongoing presence of the behavioral symptoms. Healthcare workers, especially nursing staff, should be trained to conduct and document comprehensive behavioral assessments that includes type, frequency, severity, pattern, and duration of the symptoms (Loi, Westphal, Ames, & Lautenschlager, 2015).

When behavioral symptoms are identified, their underlying causes should be explored. According to the data analysis, some facilities described behavioral symptoms, but the documentation lacked details on their triggering factors as well as nursing care plans or non-pharmacological interventions. Non-pharmacological approaches and treatment plans can be developed and implemented following comprehensive investigation of behavioral symptoms and their determinant factors.

Walsh et al. (2018) pointed out that a better understanding of causes and nature of behavioral symptoms facilitated appropriate psychotropic prescribing behaviors. The progression of dementia results in severe cognitive impairment, and these deficits in turn may lead to greater challenges experienced by the physical environment (e.g., unfamiliar environments, changes in routines, and excessive or insufficient stimuli) and social environment (e.g., ineffective communication or interaction between a caregiver and a patient) (Kales et al., 2015). Understanding of the mechanism of behavioral symptoms can reduce reliance upon psychotropics drugs or delay their use until symptoms are successfully managed using non-pharmacologic interventions.

Reasons for F-758 tags, such as failure to provide non-pharmacological interventions, ensure an adequate indication to support psychotropics use, or provide a specific diagnosis, may indicate healthcare staff's inattention to concerns of limited efficacy and safety issues of psychotropic drugs. This finding was supported by previous studies, reporting that healthcare staff believed that a psychotropic drug serves as an easy solution for managing behavioral symptoms in a busy schedule and is more effective than non-pharmacological interventions (Almutairi, Masters, & Donyai, 2018; Resnick et al., 2018; Smeets et al., 2014). When prescribing psychotropic drugs, healthcare staff should critically consider a specific indication and determine whether the symptom presents a distress or danger to self or others and may or may not respond to a psychotropic drug. Psychotropics can be used to manage psychosis, physical aggression, anxiety and depression (Kales, Lyketsos, Miller, & Ballard, 2019; Kales et al., 2015; Maher et al., 2011), whereas these drugs can be ineffective to some symptoms, such as resistiveness to care, pacing and exit-seeking, wandering (Birtley, 2016; Centre for Effective Practice, 2016).

Education should be provided for healthcare staff to enhance their awareness of

side effects and limited efficacy of psychotropic drugs and thereby reduce reliance on pharmacologic therapy. Studies reported effectiveness of staff training in reducing psychotropics use (Thompson-Coon et al., 2014; Walsh et al., 2018). The training should include the assessment of behavioral symptoms, guidelines for psychotropics use, and dementia care using non-pharmacological interventions. Along with education, ongoing coaching, mentoring and motivating are needed to change staff's attitude and promote to use behavioral or environmental approaches, which may in turn lead to reduce psychotropics use (Resnick et al., 2018).

Cooperation between NH staff and healthcare professionals is important in reducing inappropriate psychotropics use. This is particularly the case when a physician or a prescribing practitioner addresses other healthcare professional's recommendations regarding GDR attempts and/or 14-day limitation for PRN psychotropics order. According to the data analysis, a physician or a prescribing practitioner declined to attempt GDR or limit PRN order 14 days without specific indications. Previous studies found that effective cooperation between healthcare professionals as an important factor for appropriate psychotropics prescription (Harrison et al., 2019; Sawan et al., 2016; Smeets et al., 2014). Nursing staff are responsible for monitoring behavioral symptoms and notifying adverse effects to physicians, so that they can consider discontinuing the use of psychotropics. Ongoing discussion on the severity of behavioral symptoms and decision-making on treatment options should be continued between healthcare professionals.

Some F-758 tags were related to failure of GDR attempt due to families' opposition to reduce or discontinue psychotropics use. Previous research also reported family members' concerns about aggravation of behavioral symptoms following reducing or discontinuing psychotropics use (Plakiotis, Bell, Jeon, Pond, & O'Connor,

2015). They may be unaware of alternative options to psychotropics and may not believe benefits of reducing or discontinuing the drug in managing behavioral symptoms (Jansen et al., 2016). Ongoing education for the person with dementia and families is needed to inform the benefits of non-pharmacological interventions and proper psychotropics use.

Limitation

There were some limitations in this study. The content of deficiency reports varied across facilities. Some reports fully described surveyor's interviews with the NH staff and healthcare professionals, resident's mental status or behaviors at the time of survey, medication administration records and medical progress notes, whereas others only described the reasons for deficiency citations and omitted the supporting evidence. Also, there were some limitations in fully understanding the circumstances of inappropriate psychotropics use. Deficiency narratives did not provide information related to psychotropics use, such as healthcare staff perspectives regarding caring for behavioral symptoms and psychotropics use, staff interactions with the person with dementia, or work environment factors (e.g., managerial support for NH staff and behavioral interventions) (Harrison et al., 2019; Sawan, Jeon, & Chen, 2018; Smeets et al, 2014). Along with exploring F-758 reasons, interviewing NH staff and healthcare professionals to assess their attitudes towards psychotropics use and interactions with residents with behavioral symptoms may be recommended to provide additional information regarding inappropriate psychotropics use.

4.5 Conclusion

This study explored deficiency of care citations regarding inappropriate psychotropics using mixed methods and discussed issues that need to be addressed for

reducing unnecessary psychotropics use for individuals with dementia. Main important reasons for assigning these citations included failure to monitor behavioral symptoms, attempt gradual drug reduction, and implement non-pharmacological interventions. Psychotropics may potentially result in serious consequences for older adults with dementia, therefore their use should be minimized. Careful, thorough assessment of behavioral symptoms, use of nonpharmacological interventions, and close monitoring of side effects may help reduce the use of psychotropics and thereby prevent potential deleterious effects. Ongoing training and improved cooperation between NH staff, healthcare professionals, residents and families are needed for optimal outcomes from proper psychotropics use in older adults living with dementia.

Chapter 5. Discussion

5.1 Summary of findings

This project comprehensively explored behavioral symptoms of dementia and inappropriate psychotropics use across NHs using cross-sectional study designs and mixed method intervention study baseline data among NH residents and U.S nursing home large datasets.

The main study findings are:

- Aim 1: About two-thirds of study participants (n=214, 66.7%) concurrently exhibited two or more behavioral symptoms. The most commonly occurring symptom was inappropriate vocalization (63.7%), followed by repetitive behaviors (36.1%) and agitation (35.9%). The most frequently occurring symptom combinations were inappropriate vocalization and repetitive behavior (7.7%), inappropriate vocalization and apathy (5.7%), and inappropriate vocalizations, agitation, and apathy (5.1%).

Better cognition ($p < .001$; 95% CI=-0.14, -0.05) and regular use of pain medications ($p = .009$; 95% CI=0.16, 1.15) were related to lower composite behavior scores.

- Aim 2: There were 1,875 NHs with F-758 tags indicating inappropriate psychotropics use for NH residents with dementia. NHs with greater HPRD for RNs (OR=0.54, 95% CI=0.44-0.67), certified nurse assistants (OR=0.87, 95% CI=0.77-0.99) and total nurse staff (OR= 0.87, 95% CI= 0.79-0.96) were significantly associated with the lower occurrence of F-758 tags. NHs with greater RN skill-mix had significantly lower odds of receiving F-758 tags (OR=0.10, 95% CI=0.04-0.26).

- Aim 3: Antipsychotics were those most involved with F-758 tag citations among psychotropic drugs. The most common reason for F-758 citation was failure to identify and/or monitor behavioral symptoms (178 NHs), followed by failure to

attempt gradual drug reduction (GDR) (131 NHs), maintain 14-day limitations on PRN psychotropic orders (121 NHs) and implement non-pharmacological interventions prior to psychotropics use (92 NHs). Nearly half of the NHs (45.2%) received F-758 tags with more than two reasons. The three most common combinations were failure to identify/monitor behavior symptoms and to attempt medication dose reduction (6.32%), failure to identify/monitor behavior symptoms and implement non-pharmacological interventions (5.96%), and failure to identify/monitor behavior symptoms and provide a specific indication/diagnosis (5.96%).

5.2 Discussion of Findings

5.2.1 Multiple behavioral symptoms of dementia

In this study, two-thirds of participants with dementia had two or more behavioral symptoms. The occurrence of multiple behavioral symptoms was supported by previous studies as they found that nearly half of individuals with dementia had at least 4 different behavioral symptoms simultaneously (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012; Mukherjee et al., 2017). The most commonly occurring behaviors in study participants included inappropriate vocalization, repetitive behaviors and agitation, and many previous literatures reported a high prevalence of the symptoms among individuals with advanced stage of dementia (Beck et al., 2011; Cipriani et al., 2013; van der Linde et al., 2016; von Gunten et al., 2008; Veldwijk-Rouwenhorst et al., 2020).

The occurrence of greater number of behavioral symptoms was associated with greater severity of cognitive impairment, which was consistent with previous research findings (Brodaty, Connors, Xu, Woodward, & Ames, 2015; Choi et al; 2017;

Mukherjee et al., 2017; Rozum, Cooley, Vernon, Matyi, & Tschanz, 2019). The progression of dementia results in severe cognitive impairment, exhibited by difficulty in organizing or executing activities, new learning, problem-solving, and aphasia (Gitlin et al., 2016). These deficits in turn may lead to greater challenges experienced by the physical environment (e.g., unfamiliar environments, changes in routines, and excessive or insufficient stimuli) and social environment (e.g., ineffective communication or interaction between a caregiver and a patient) (Kales et al., 2015) and may cause greater number of behavioral symptoms such as agitation, aggression and apathy (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012).

Pain management using analgesics was negatively associated with the occurrence of multiple behavioral symptoms and greater focus should be on the pain control for managing multiple behavioral symptoms. The study finding was supported by previous research, the use of analgesics was effective in reducing a wide range of behavioral symptoms (Habiger et al., 2016; Husebo et al., 2014; Tampi, Hassell, Joshi, & Tampi, 2017). However, among analgesics, there has been increasing concern about risks associated with opioid use due to adverse effects (Gazelka, Leal, Lapid, & Rummans, 2020). For example, more than half of NH older adults with advanced dementia exhibited adverse events such as sedation, somnolence following the use of buprenorphine for pain control (Erdal et al., 2018). Thus, further research should be conducted to examine the impact of the opioid use on safety of older adults with dementia and the proper dose of opioid for this population.

5.2.2 Inappropriate psychotropics use in relation to nurse staffing

The study found that greater RN staffing as well as RN skill-mix were associated with lower odds of receiving deficiency tags regarding inappropriate psychotropic drug use, which was supported by previous study findings on associations between

greater reliance on psychotropic drugs and lower RN staffing levels (Cioltan et al., 2017; Lucas et al., 2014; Phillips et al., 2018; Shin, J. H., & Shin, I. S., 2019; Zuidema et al., 2011). Greater RN staffing mix is related to the occurrence of lower number of behavioral symptoms and better quality of dementia care (Harrington et al., 2016). Adequate RN staffing was a key to successfully manage behavioral symptoms through non-pharmacological interventions (Crystal, Jarrín, Rosenthal, Hermida, & Angell, 2020). Compared to other nursing personnel, RNs may be more aware that psychotropic medications should be used only for those with behaviors resistant to non-pharmacological interventions, which may lead to decline in unnecessary use of psychotropics. Studies found that RNs are more concerned about quality of care and safety issues and mostly responsible for monitoring patient's overall safety issues in NHs (Bedin, Droz- Mendelzweig, & Chappuis, 2012; Vogelsmeier et al., 2017).

The study found that greater nurse staffing for CNAs and total nursing staff was associated with lower odds of receiving deficiency citations for inappropriate psychotropic medication use. Lucas et al. (2014) also reported lower psychotropic drug use in relation to greater CNA staffing levels. CNAs account for the largest proportion among the nursing staff, and significantly affect quality of care and quality of life in NH older adults due to their role in providing the most direct care for patients. Adequate CNA staffing levels serve as a basis for successful implementation of non-pharmacological interventions because they are responsible for noticing and addressing discomfort and identifying any changes in an older adult's status (Jansen et al., 2017). Inadequate nurse staffing negatively affects provision of quality of care and served as a barrier to successful implementation of non-pharmacological approaches (Ellis et al., 2015; Jutkowitz et al., 2016; Schnelle & Simmons, 2016).

Understanding the nursing staffing characteristics affecting unnecessary psychotropics use can help inform policies and research. Policy and management interventions are needed to ensure adequate nursing staffing for NHs to provide safe and high quality of dementia care. Nursing staffing characteristics discussed in this study could help support state-level policies that would result in reduced use of psychotropics and adverse health outcomes associated with their use for individuals with dementia.

5.2.3 Deficiency citations on inappropriate psychotropics use

Lack of monitoring for behavioral symptoms and/or their underlying causes was the most common reason for inappropriate psychotropic drug use deficiency citations, and it also affected other reasons such as failure to attempt gradual drug reduction and maintain 14-day limitations on PRN psychotropic orders. This indicates the importance of accurate, comprehensive assessment and monitoring for behavioral symptoms to avoid unnecessary psychotropics use. Walsh et al. (2018) also highlighted a holistic assessment of behavioral symptoms to minimize unnecessary use of psychotropic drugs. It is also important to explore underlying causes of behavioral symptoms to develop optimal non-pharmacological interventions. Along with brain circuitry disruptions, behavioral symptoms are triggered by intrapersonal, interpersonal, and environmental factors, so interventions to manage behavioral symptoms should embrace those factors (Kales et al., 2015). Psychotropic drugs should not be prescribed for behavioral symptoms without comprehensive assessment of symptoms and their underlying causes, and effectiveness of non-pharmacological interventions should be reviewed prior to psychotropic drug use (Declercq et al., 2013; Reus et al., 2016).

Inappropriate psychotropics use such as failure of gradual drug reduction (GDR) attempts, 14-day limitation for PRN psychotropics order occurred when a physician or a prescribing practitioner declined to take up suggestions or recommendations from other healthcare professionals without specific indications. Previous research finding demonstrated that ineffective teamwork within health professionals served as triggering factors of inappropriate psychotropics use (Sawan, Jeon, Fois, & Chen, 2016) especially when physicians lack skills to implement non-pharmacological interventions (Jennings et al., 2018). Effective teamwork through communication and cooperation should be established to promote the proper use of psychotropic drug use. Healthcare professionals should be actively involved in decision-making on individualized treatment plans including appropriate nonpharmacological and pharmacological interventions (Walsh et al., 2018).

Some reasons for inappropriate psychotropics use were related to failure of implementing non-pharmacological interventions prior to the use of psychotropic drugs. This finding can be supported by previous research on healthcare professionals' views on psychotropic drug use for behavioral symptom management. Psychotropics were preferred due to the perception that these medications were more effective than non-pharmacological interventions (Cohen-Mansfield, Thein, Marx, & Dakheel-Ali, 2012; Kerns, Winter, Winter, Kerns, & Etz, 2018). Psychotropic medication use was related to care workers' feeling powerless toward behavioral symptoms and lack of knowledge on non-pharmacological interventions (Bonner et al., 2015; Resnick et al., 2018; Smeets et al., 2014). Healthcare providers for people living with dementia need education/training as to how to recognize behavioral symptoms, their determinant factors, and strategies to manage them. Ongoing education and training for healthcare providers is important to reduce inappropriate psychotropics use (Thompson-Coon et

al., 2014; Walsh et al., 2018). Staff training that highlights understanding of unmet needs of persons with dementia, application of person-centered care principles and non-pharmacological interventions are recommended (Fazio, Pace, Flinner, & Kallmyer, 2018; Glister, Boltz, & Dalessandro, 2018).

5.3 Limitations

All studies were conducted by secondary data analysis, and the utilization of this existing data can be convenient for researchers with limited time and resources. However, there are things to take into consideration. The secondary data user is not usually the same as the data collector, and the researcher often does not know exactly how the data was collected and how well the data collection was done (Cheng & Phillips, 2014). Thus, careful examination of all variables is required to ensure the accuracy and validity of the study findings (Cheng & Phillips, 2014). For example, Aim 1 study used the baseline data from the FBFC-CI study and this study researcher was not directly involved in the data collection such as the assessment of pain and physical function among participants. Aim 2 study requires the comprehensive understanding of the data-specific terms, such as deficiency of care tags and facility or resident related variables in the CASPER dataset. For Aim 3, the quality of deficiency narrative content was dependent upon the surveyor's assessment at the time of survey. Some reports fully described surveyor's interviews along with medication administration records and medical progress notes, whereas others only described the reasons for deficiency citations with lack of supporting evidence.

Also, some variables of interest are not available when using the secondary data, so there may be limitations in fully addressing the researcher's specific research question (Cheng & Phillips, 2014). For example, for Aim 1, the FBFC-CI baseline

data lacks additional social and environmental factors that serve as determinants of the exhibition of multiple behavioral symptoms (e.g., the quality of communication and interaction between the person with dementia and caregivers, and physical and psychosocial environmental characteristics). For Aim 2, CASPER does not provide residents' individual factors (e.g., age, dementia severity, history of co-morbid psychiatric disorders) and staff characteristics (e.g., staff distress levels, quality of relationship with individuals with dementia) that could be related to quality of dementia care and/or higher psychotropic drug use. Regarding Aim 3, deficiency narratives lack details on healthcare staff perspectives regarding psychotropics use, staff interaction with the person with dementia, that could limitation full understanding of the circumstances of inappropriate psychotropics use.

5.4 Implications

5.4.1 Implications for clinical practice

5.4.1.1 Management for multiple behavioral symptoms

For care for those with multiple behavioral symptoms, nursing staff education should include provision of behavioral interventions tailored to a resident's cognitive function levels. To minimize stressors experienced by individuals with severe dementia and thereby prevent development of behaviors, nurse staff should be helped to optimally provide care to these residents. Examples of appropriate activities for those with moderate to severe impairment could include repetitive actions (e.g., washing dishes, sorting beads or cards), sensory type activities (e.g., listening to music, watching videos), and encouraging self-care at the optimal level of activity (Function Focused Care, 2013; Gitlin et al., 2016). Whereas nursing staff should avoid behaviors that may lead to overstimulation as these can cause stress and burden

in cognitively impaired residents. For example, avoiding confrontation, close physical contact, over explanation or excessive discussion, along with complex or multiple commands at one time can limit behavioral symptoms (Kales et al., 2015; Function Focused Behavior, 2013).

Pain management using proper use of analgesics is an important intervention to address multiple behavioral symptoms of dementia. Those in pain with dementia are less likely to receive proper pain control because of their difficulty with verbally expressing their pain. It is therefore important to provide training for nursing staff to improve skills to accurately assess pain in these residents. Training on the proper use of analgesics, especially opioids, safety and monitoring could help nursing staff to facilitate optimal pain control while minimizing risks of adverse effects. Health care providers may be reluctant to prescribe opioids to older adults with dementia due to the greater risk of opioid-related adverse events such as sedation, delirium, and falls (American Geriatrics Society Panel on Pharmacological Management of Persistent Pain in Older Persons, 2009). However, the use of low doses of opioids for pain control can improve functional independence and quality of life among older adults (Edelman & Hemmert, 2019). It is important to examine the use of opioids among older adults with dementia to identify potential unmet care needs.

As the etiology of a wide range of behavioral symptoms is multifactorial, such as psychological, social and biological factors, it is recommended to provide multicomponent nursing interventions to maximize the effectiveness of care for multiple behavioral symptoms. Interventions embracing multiple behavioral symptoms may be time efficient for nursing staff and they could enable provision of holistic person-centered care with consideration of person's strengths, functions and preferences. For example, social contact and/or structured activity interventions may

be more effective for agitation, whereas aggression and resistiveness to care may be best managed using function focused care approaches and effective communication techniques (Choi et al., 2017; Function Focused Care, 2013). Thus, an intervention embracing social contact, structured activities, function focused care, and communication techniques could manage agitation, aggression and resistiveness to care in the most effective and efficient manner. Three main mechanisms have been recommended to manage multiple behavioral symptoms, including: (1) establishing caring environments (physical and social); (2) providing staff with skill development and training for managing behavioral symptoms; and (3) using individualized person-centered care approaches tailored to resident symptoms. (Caspar et al., 2018).

5.4.1.2 Proper use of psychotropic drugs

Comprehensive monitoring for behavior symptoms and investigating their underlying causes is important in developing person-centered non-pharmacological interventions and minimizing inappropriate/unnecessary use of psychotropic drugs. Benefits and adverse effects should be discussed with patients, family members, and healthcare professionals prior to the use of psychotropic drugs, and the drug should be initiated at the lowest dose (Masopust, Protopopová, Vališ, Pavelek, & Klímová, 2018; Reus et al., 2016). Adverse effects, such as extrapyramidal symptoms and sedation, should be regularly assessed because older patients have decreased renal clearance and are more vulnerable to adverse effects. Thus, frequent assessment of behaviors and adverse effects is needed to make appropriate dose adjustments and prevent potential harms (Reeves et al., 2017). If behaviors improve or are not responsive to the drug, the prescriber should consider dose reduction or discontinuation of the drug (Reus et al., 2016).

Although the use of psychotropic drugs should be minimized, they can serve an important role in managing some behavioral symptoms (Masopust et al., 2018; Reus et al., 2016). Antipsychotic and other psychotropic drugs can be used to treat behavioral symptoms when symptoms are no longer responsive to non-pharmacological interventions or present a danger to self and/or others (Dyer et al., 2018; Reus et al., 2016). However, some prescribers are reluctant to prescribe psychotropic drugs due to concerns of safety issues (Walsh et al., 2018). Discontinuation of psychotropics, without replacement of nonpharmacologic interventions, can have a harmful impact on residents' behavioral symptoms and quality of life (Ballard et al., 2017). Thus, comprehensive behavior monitoring and documentation, and regular review on therapeutic and/or adverse effects should be conducted to ensure appropriate use of both pharmacologic and nonpharmacologic interventions (Kales et al., 2014; Reeves et al., 2017; Reus et al., 2016).

5.4.2 Implications for policies

Nursing shortages can lead to difficulty implementing non-pharmacological interventions and may result in greater reliance on psychotropics to control behavioral symptoms. A consistent and stable workforce served as a key to provide person-centered care and non-pharmacological interventions (Long, Azios, & Richings, 2019; Schnelle & Simmons, 2016).

NH administrators and policymakers should focus on maintaining adequate nurse staffing levels for optimal quality of dementia care. NHs often have inadequate nurse staffing due to higher turnover rates and lack experienced, qualified nurses compared to acute care settings (Harrington et al., 2016, 2020), which can impede the implementation of person-centered care interventions and have negative impact on patient outcomes. Particularly, many NHs have lack of RN nurse staffing levels (Geng,

Stevenson, & Grabowski, 2019; Harrington et al., 2016) and greater focus should be on recruiting and retaining skilled RNs to create a competent dementia care workforce. RNs heavily impact quality of NH care as they play a key role in evaluating overall nursing care outcomes, supervising assistive nursing personnel, and developing quality improvement programs (Vogelsmeier, Scott-Cawiezell, & Pepper, 2011; Vogelsmeier et al., 2015, 2017).

Given lower skilled nurse staffing in NHs, policymakers and NH administrators should pay attention to provide comprehensive dementia training for new staff and ongoing education for all nurse staff. As the number of persons with cognitive impairment along with multiple comorbidities is increasing in NHs, there will be a greater need for providing comprehensive, ongoing dementia training for care workforce. Orientation education motivated new employees to enhance their understanding of dementia and attitudes to individuals with dementia (Talbot & Brewer, 2016), and was beneficial to supportive environment and staff retention (Gao et al., 2015; National Nursing Home Quality Improvement Campaign, 2016). Continuing education should be provided for care workers to help them obtain up-to-date clinical knowledge and practices in the care of those with dementia (Justice in Aging, 2015).

5.4.3 Implications for further research

Studying co-occurring symptoms is important as multiple symptoms associated with dementia may occur in one resident, as opposed to only a single symptom, adding to the challenges for direct care workers. Ongoing research is needed to continue to evaluate other factors that influence the presentation of multiple behaviors among older adults with dementia. There has been a lack of research on caregiver and environmental determinants (Kolanowski et al., 2017) and further research is needed

to explore those factors, such as caregivers' communication and interaction with a person with cognitive impairment, the presence of over/under stimulation, or any changes in daily care routines. Also, there is a need for studies on behavioral approaches embracing patient, caregiver, and environmental factors to address multiple behaviors. For caring for co-occurring behavioral symptoms, multicomponent behavioral interventions with a combination of intrapersonal, interpersonal, and environmental determinants need to be developed to target multiple risk factors simultaneously (Caspar et al., 2018). To obtain a causal inference, there is a need for well-characterized longitudinal studies to explore the impact of multicomponent interventions on prevention and/or management of co-occurring behavioral symptoms.

Insufficient staffing has long been a concern in most NHs as it negatively impacts quality of care and quality of life for residents. There are federally required minimal nurse staffing levels for RNs and LPNs in NHs. However, there is no minimum staffing requirement for CNAs (Harrington et al., 2016), although they are tasked with providing basic care to residents with dementia on a daily basis. CNAs are involved in person-centered care, such as addressing the person's unmet needs and bringing his/her uniqueness on caring; thus, they provide vital information in developing interdisciplinary care planning (Long, Azios, & Richings, 2019). More research needs to be conducted to determine appropriate nurse staffing levels, including CNAs, to optimally meet residents' complex care needs, and the minimum staffing levels should be based on resident acuity (Harrington et al., 2020). Also, further study is necessary to determine strategies to promote recruiting and retaining a skilled nursing workforce as NHs often have insufficient nurse staffing levels due to higher turnover. Training, positive work environments, empowerment, appreciation,

support programs, teamwork and caring were cited as key drivers of staff retention (Glister, Boltz, & Dalessandro, 2018).

Along with studies on staffing levels, further research can be proposed to explore nurse staff's interaction and attitudes towards persons with behavioral symptoms. This may lead to a better understanding of how nursing staff interact with a person with cognitive impairment and contribute to better quality of dementia care. Dementia care was highly influenced by caregivers' communication and relationship when caring for the person with dementia (Dooley et al., 2015; Kales et al., 2015; Gerritsen, van Beek, & Woods, 2019).

Nursing staff heavily influence prescribing of psychotropic drugs in long-term care settings, indicating that further research need to focus on developing staff training for proper non-pharmacological and pharmacological intervention use. Dementia training improved nurses' positive approach and attitude to dementia (Barbosa, Nolan, Sousa, & Figueiredo, 2017; Islam, Baker, Huxley, Russell, & Dennis, 2017), and was effective to reduce inappropriate psychotropic drug prescription (Thompson-Coon et al., 2014; Walsh et al., 2018). Staff training that includes understanding a person with dementia as a holistic being, improving knowledge on the cause and nature of behavioral symptoms, and developing individualized care plans in consideration of the person's unique needs and preferences may become an effective nonpharmacological intervention to reduce inappropriate psychotropics use. For proper psychotropics use, education interventions should include comprehensive monitoring for behavioral symptoms, ongoing communication and cooperation between healthcare professionals, and adverse effects and limited efficacy of psychotropic drugs. Further longitudinal research to explore the efficacy of dementia education and training on behavior management and psychotropics use is required.

5.5 Summary

This research comprehensively explored co-occurring behavioral symptoms, inappropriate psychotropic drug use across NHs in relation to nurse staffing levels, and deficiency reports regarding inappropriate psychotropic medication use using a mixed method. The co-occurrence of multiple behavioral symptoms was negatively associated with better cognitive function and pain management. Inappropriate psychotropics use was associated with lower nurse staffing levels especially registered nurse, certified nursing assistant and total nursing staff. Common reasons for inappropriate psychotropics use were lack of comprehensively monitor behavioral symptoms, failure of gradual drug reduction attempt, and failure of implementation of non-pharmacological interventions. Some limitations of our study should be noted due to lack of data on potentially important covariates in fully addressing the research questions. Despite the limitations, this study can contribute to enhancing our knowledge on nursing interventions for multiple behavioral symptoms among individuals with moderate to severe cognitive impairment, importance of adequate nurse staffing levels for high quality of dementia care, and areas for improvement in reducing inappropriate psychotropic drug use. Further studies need to be conducted to develop multicomponent interventions to address a wide range of challenging behaviors in the most efficient manner. Policy and NH organizational efforts for maintaining adequate nurse staffing levels are needed. Further education interventions are recommended for implementation of proper nonpharmacological and pharmacological interventions in clinical settings.

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