

## Research Article

# Impact of Medication Assistant Use on Nursing Home Staffing Levels and Inspection Results

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**Received:** August 21, 2020; **Accepted:** September 10, 2020; **Published:** September 17, 2020

**Abstract**

**Objectives:** The purpose of this case study is to describe inspection outcomes 1-2 years after the addition of Medication Assistants (MAs) and the reduction of Licensed Practical Nurses (LPNs) to the staffing model in one rural eastern Washington nursing home.

**Design:** This research uses a case study design.

**Setting:** One rural eastern Washington nursing home.

**Methods:** Nursing home data was obtained from the following national databases Data. Medicare.gov Nursing home compare, Payroll Based Journal (PBJ), and data.cms.gov. In particular, we obtained all of the staffing hour data from the Payroll Based Journal repository. We conducted a one-way repeated measures ANOVA test on all four quarterly cycles of LPN, Registered Nurse (RN), Certified Nursing Assistant (CNA) and MA hours.

**Results:** The number of LPNs scheduled to administer medications slowly declined while the number of MAs increased. Unfortunately, the number of inspection deficiencies (citations) more than doubled from 2017 to 2019. In addition, two of the 2018 deficiencies resulted in monetary fines.

**Discussion:** We conjectured that the addition of MAs to the staffing model combined with the reduction of LPNs may lead to more inspection deficiencies (citations) and monetary penalties. Even though not generalizable, this conjecture appears to be true for this nursing home, for this time period.

**Conclusions and Implications:** The health and safety of nursing home residents should be the prime objective when implementing or changing a staffing model. Regrettably, this is not always true. Cost savings is important in this healthcare setting due to limited funds and rising costs, but not at the detriment of the resident.

**Keywords:** Staffing model; Nursing home; Medication assistant; Quality of care; Nurse shortage

## Introduction

In response to an ongoing shortage of licensed nurses in Nursing Homes (NHs), some NHs are choosing to add Medication Assistants (MAs) to their staffing models. Although not ideal, without adequate numbers of licensed nurses it is difficult to ensure timely administration of medications. In 2015, 36 states had granted permission for medication assistants or aides to administer medications in nursing homes [1]. Washington State granted this permission in 2013. In Washington State, medication assistants are nursing assistants with at least 1000 hours of work experience that have completed an approved medication assistant training program and passed the written State required competency exam [2]. Medication assistants have been shown to be a safe and effective alternative to routine medication administration in nursing homes [3-6].

The use of medication assistants or aides in nursing homes has long been a topic in the literature. In 1966, Eleanor Post wait Green (Consulting Editor for Geriatric Nursing) wrote about her experiences working in a nursing home and her shock at finding

nursing aides giving medications [7]. After calling the local Board of Health to report an apparent lack of ethics, Ms. Green discovered that nurse aides had been giving medications at that nursing home for more than 5 years. She cited a shortage of licensed nurses as one of the main reasons for nursing aides to give medications. The staffing situation in nursing homes has not changed much over the years in that there continues to be a shortage of nurses choosing to work in nursing homes [8-10].

Even with the use of medication assistants, providing safe care remains a challenge for many nursing homes. In a 2007 study [3], medication errors and level of staff credentials were examined during 39 medication administrations in five Midwestern nursing homes. The researchers found no significant difference in medication errors based on level of credential. Further, even though RNs experienced more interruptions during medication administration, these interruptions had no apparent impact on medication errors when wrong time errors were excluded [4-5].

In a similar multi-state study, medication error rates were again

not significantly different based on staff credentials. These two multi-state studies led the impetus to further exploration and study of the medication assistant role and its impact on safety and quality of care.

Walsh, Lane and Troyer [6] undertook a 2004 to 2010 study of eight southeastern nursing homes to explore the impact of medication assistants on skilled nursing quality, staffing levels, inspection deficiencies and Nursing Home Quality Initiative (NHQI) health outcome measures. The researchers found that in states that allowed MAs without a significant reduction of RN or LPN use, the use of MAs decreased the probability of getting an inspection deficiency related to medication administration. The researchers did caution that if facilities chose “to trim their costs by decreasing RN and LPN staffing levels”, this may lead to reduced quality outcomes (p. 976).

In a recent quality improvement initiative [11], an eastern Washington nursing home successfully added medication assistants to its new staffing model for routine medication administration. Quality outcome measures such as medication error rates and the number of resident falls per month improved post implementation without costing the nursing home significantly more money in staff salaries. In fact, the newly implemented staffing model included the addition of one person to the staffing model during the day and evening shifts. At this nursing home, no nurses (Registered Nurses [RNs] or Licensed Practical Nurses [LPNs]) lost their jobs with the addition of medication assistants to the staffing model. These findings were encouraging but one must wonder if long-term outcomes would differ if the medication assistants replaced licensed nurses, specifically LPNs.

## Methods

### Design

The following case study describes inspection outcomes 1-2 years after the addition of medication assistants and reduction of LPNs to the staffing model in one rural eastern Washington nursing home.

### Setting

In June 2017, Nursing Home A (NHA) a 54-bed skilled nursing facility, added MAs to its staffing model while choosing to not fill four vacant LPN positions citing its inability to recruit LPNs due to its rural location. Of note, the added MAs were Certified Nursing Assistants (CNAs) from the targeted nursing home. They were selected by facility management to undergo the specialized training and then work as MAs. This practice led to un-filled CNA positions within the facility during 2017.

## Data Collection and Analyses

This case study used nursing home data obtained from the following national databases Data.Medicare.gov Nursing home compare, Payroll Based Journal (PBJ), and data.cms.gov. In particular, we obtained all of the staffing hour data from the Payroll Based Journal repository. We had access to LPN hours, RN hours, CNA hours, and MA hours for four quarterly cycles in 2017 and 2018, and 2 cycles in 2019. Therefore, we conducted a one-way repeated measures ANOVA test on all four processes in the three years. This data was available per respondent in the various quarters, which allowed us to run a repeated measure ANOVA on the data. Institutional Review Board (IRB) approval was not obtained because no human subjects

were involved in this study.

The one-way repeated measures ANOVA test is an appropriate test to use here, because it allows us to track changes in mean scores across time. We ran two separate repeated measures ANOVAs for the years 2017 and 2018. We could not do that for the 2019 data because we only had access to two cycles of data. A t-test was run for the 2019 data. We ran all of the analyses on IBM’s SPSS software package, version 25.

We first tested whether our data violated the assumption of sphericity or not. We ran the Mauchly’s test of sphericity for all of the data from the three years. For the data that did violate this assumption, we used the Greenhouse-Geisser test to interpret findings. Following this, we ran a post-hoc analysis with a Bonferroni adjustment to compare between the various annual cycles.

Nursing home inspection results for NHA were obtained from data.medicare.gov Nursing home compare and data.cms.gov for the years 2017, 2018 and 2019. Both web sites offer publicly available inspection data for all Medicare/Medicaid licensed nursing homes in the United States. Inspection findings will be described descriptively.

## Results

NHA is a not-for-profit, 54-bed skilled nursing facility located in rural eastern Washington. In June 2017, NHA started adding MA’s to its staffing model while choosing to not fill four vacant LPN positions or any future vacant LPN positions citing its inability to recruit LPN’s due to its rural location. Therefore, we focused on examining staffing hour data from 2017 to 2019. Overall, our results indicated medium to high effect sizes (based on the various partial eta squared values) for all years from 2017 to 2019. All of the F-values and partial eta squared values are provided in Table 1.

### 2017 data

A one-way repeated measures ANOVA was conducted to see if there were any significant differences in RN hours, LPN hours, CNA hours and MA hours over the course of a 1-year time period. The assumption of sphericity was violated, as assessed by Mauchly’s test of sphericity for all four variables (p<0.001). Therefore, a Greenhouse-Geisser correction was applied ( $\epsilon_{RN}=0.89$ ,  $\epsilon_{LPN}=0.93$ ,  $\epsilon_{CNA}=0.94$ , and  $\epsilon_{MA}=0.62$ ).

There were significant changes in the various staffing hours over time - this was true for all four categories (i.e. RN, LPN, CNA, and MA) (Figure 1). All four categories of staffing hours were statistically significant at the different time points.

RN hours significantly increased from quarter 1 to quarter 3 (9.37 hours, p<0.01) and from quarter 1 to quarter 4 (8.1 hours, p<0.01). Similarly, RN hours significantly increased from quarter 2 to quarter 3 (7.18 hours, p<0.01) and from quarter 2 to quarter 4 (5.89 hours,

**Table 1:** F-Values and partial  $\eta^2$  values.

	2017	partial $\eta^2$	2018	partial $\eta^2$
RN Hrs	F(1,89) = 3192.25	0.97	F(1,89) = 4658.29	0.98
LPN Hrs	F(1,89) = 2375.92	0.96	F(1,89) = 1297.85	0.93
CNA Hrs	F(1,89) = 16408.65	0.99	F(1,89) = 40876.16	0.99
MA Hrs	F(1,89) = 24.74	0.22	F(1,89) = 2368.18	0.96



Figure 1: 2017 staffing data.

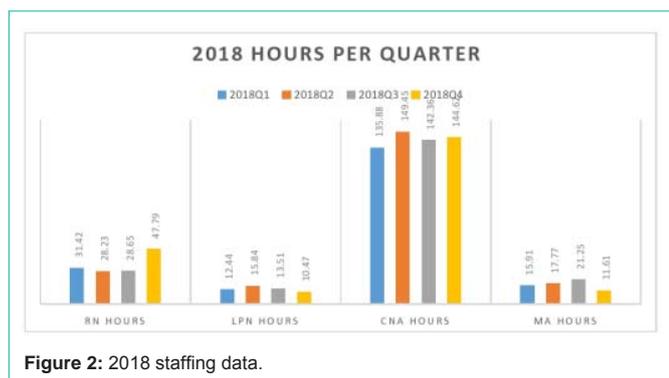


Figure 2: 2018 staffing data.

p<0.01). LPN hours significantly decreased from quarter 1 to quarter 3 (8.75 hours, p<0.01) and from quarter 1 to quarter 4 (14.29 hours, p<0.01). There was a significant decrease from quarter 2 to quarter 3 (5.91 hours, p<0.01) as well as from quarter 3 to quarter 4 (5.41 hours, p<0.01).

CNA hours also significantly decreased from quarter 1 to quarter 3 (11.12 hours, p<0.01) and from quarter 1 to quarter 4 (16.08 hours, p<0.01). There also were significant decreases from quarter 2 to quarter 3 (8.37 hours, p<0.01) and from quarter 2 to quarter 4 (13.33 hours, p<0.01). Finally, MA hours also significantly decreased from their implementation in quarter 1 to quarter 3 (1.26 hours, p<0.01), and from quarter 1 to quarter 4 (1.45 hours, p<0.01).

**2018 Data**

Another one-way repeated measures ANOVA was conducted to see if there were any significant differences in RN hours, LPN hours, CNA hours and MA hours over the course of a 1-year time period. The assumption of sphericity was violated, as assessed by Mauchly’s test of sphericity for all four variables (p<0.001). Therefore, a Greenhouse-Geisser correction was applied ( $\epsilon_{RN}=0.79$ ,  $\epsilon_{LPN}=0.89$ ,  $\epsilon_{CNA}=0.97$ , and  $\epsilon_{MA}=0.87$ ).

There were significant changes in the various staffing hours over time - this was true for all four categories (i.e. RN, LPN, CNA, and MA) (Figure 2). RN hours significantly decreased from quarter 1 to quarter 2 (3.24 hours, p<0.05) and significantly increased from quarter 1 to quarter 4 (16.2 hours, p<0.01) and from quarter 2 to quarter 4 (19.4 hours, p<0.01). LPN hours significantly increased from quarter 1 to quarter 2 (3.4 hours, p<0.01) and significantly decreased from quarter 2 to quarter 4 (5.23 hours, p<0.01) and quarter 3 to quarter 4 (2.83 hours, p<0.01).



Figure 3: Combined Staffing data.

CNA hours also significantly increased from quarter 1 to quarter 2 (13.45 hours, p<0.01) and from quarter 1 to quarter 3 (6.57 hours, p<0.01), and from quarter 1 to quarter 4 (8.86 hours, p<0.01). However, there was a significant decrease from quarter 2 to quarter 3 (6.94 hours, p<0.01). Finally, MA hours also significantly increased from quarter 1 to quarter 3 (5.48 hours, p<0.01), but decreased from quarter 1 to quarter 4 (4.12 hours, p<0.01). Similarly, MA hours significantly increased from quarter 2 to quarter 3 (3.68 hours, p<0.01), but significantly decreased from quarter 2 to quarter 4 (6.01 hours, p<0.01). There was also a significant decrease from quarter 3 to quarter 4 (9.69 hours, p<0.01).

**2019 Data**

We only had data that was available for the first two quarters of 2019, so instead of conducting repeated measures ANOVA, we conducted a paired-sample t-test. We found significant differences between quarter 1 and quarter 2 for all four variables. RN hours significantly reduced by 13.78 hours (p<0.01), while LPN hours significantly reduced by 3.16 hours (p<0.01). However, CNA hours significantly increased by 3.75 hours (p<0.01), and MA hours significantly increased by 5.95 hours (p<0.01).

**Combining data from 2017 to 2019**

We ran the repeated measures ANOVA over this period in order to see how the data looked like over these two years. Since, we only have data for the first two quarters of 2019, the exact data trend can only be estimated. However, it does appear that for the most part, the data trend follows the pattern from 2017 and 2018. Figure 3 illustrates this data. As one can see from the visual representation, MA hours are generally on an upward trajectory, as can be seen from the data trends. They go from 1.45 hours in the first quarter of 2017 to 16.64 hours in the second quarter of 2019. LPN hours seem to be on a downward trajectory, as they go from 30.16 hours in the first quarter of 2017 to 4.05 hours in the second quarter of 2019. RN hours seem to be on a somewhat different trajectory. They initially increase, and then drop significantly. On the whole, it appears to be on a generally downward trajectory (Even though one could erroneously assume that they’re increasing by seeing the increase from 31.48 hours in the first quarter of 2017 to 37.55 hours in the second quarter of 2019), while CNA hours seem to be on a generally upward trajectory (139.31 hours in the first quarter of 2017 to 149.96 hours in the second quarter of 2019).

**Inspection results from 2017 to 2019**

MA’s were added to the staffing model in NHA June 2017.

**Table 2:** Inspection results 2017 to 2019.

Timeframe	Nursing Home A	National Average
Cycle 1:		
Most recent inspection and complaint citations past 12 months:	16	8
Annual Health Inspection: 03/08/2019		
Complaint Investigations: 03/08/2019		
12/19/2018		
10/17/2018		
Cycle 2:		
2 <sup>nd</sup> most recent standard inspection results and complaint citations 13-24 months:	19	7.6
Annual Health Inspection: 05/10/2018 (\$ penalty)		
Complaint Investigations: 09/08/2017 (\$ penalty)		
Cycle 3: (Pre-Medication Assistant)		
3 <sup>rd</sup> most recent standard inspection results and complaint citations 25-36 months:	7	7.6
Annual Health Inspection: 05/25/2017		
Complaint Investigations: 03/13/2017		

**Note:** Data compiled from Data.Medicare.gov; Medicare.gov/Nursing home compare.

Inspection results are depicted in Table 2. Cycle 3 (25-36 months ago) data was from the 05252017 annual inspection and 03132017 complaint investigation. 7 deficiencies (citations) were recorded for this pre-MA time period in the following categories Freedom from abuse, neglect, and exploitation (1), Quality of life and care (1), Nursing and physician services (1), Resident rights (1), and Pharmacy service (3). Of note, this is comparable to the national average of 7.6 deficiencies for this same time.

During cycle 2 (13-24 months ago), a total of 19 deficiencies were recorded in the following categories Freedom from abuse, neglect, and exploitation (1), Quality of life and care (8), Resident assessment and care planning (3), Resident rights (1), Pharmacy services (2), Environmental (3), and Administration (1). This is more than double the national average of 7.6 deficiencies for this time. The annual inspection on 05102018 resulted in a monetary fine of \$8,775 because of one resident who developed a pressure ulcer. An additional monetary fine (\$5,000) was levied related to a complaint investigation on 09082017 for staff not monitoring a resident's blood sugar. Both examples could be related to inadequate supervision of care by a licensed nurse.

During the most recent cycle (Cycle 1 past 12 months), a total of 16 deficiencies were reported from the annual inspection (03082019) and 3 complaint investigations (03082019, 12192018, 10172018) in the following categories: Freedom from abuse, neglect, and exploitation (1), Quality of life and care (2), Resident assessment and care planning (6), Nursing and physician services (1), Resident rights (1), Nutrition and dietary (1), Pharmacy (3), and Environmental (1). This number is double in comparison to the national average of 8 deficiencies for this same time period.

## Discussion

In this study, we conjectured that the addition of MAs to the staffing model combined with the reduction of LPNs might lead to more inspection deficiencies (citations) and monetary penalties. Even though not generalizable, this conjecture may be true for this

nursing home, for this time. Specifically, MA hours generally were on an upward trajectory from their addition to the staffing model in June 2017, while LPN hours were on a downward trajectory. CNA hours gradually declined in 2017 possibly because these were employees who underwent MA training and switched roles. It took the NH some time to replace these experienced workers. The replacements were undoubtedly not as skilled with work processes within this targeted nursing home, thus affecting resident specific outcome measures.

The number of inspection deficiencies (citations) for NHA more than doubled from 2017 to 2019. The two deficiency categories most impacted over time were Quality of Life, Care, Resident Assessment, and Care Planning. Both of these categories are specific to resident care. In addition, two of the 2018 deficiencies resulted in monetary fines.

As described earlier [11], another eastern Washington nursing home successfully added medication assistants to its new staffing model for routine medication administration. In fact, quality outcome measures improved after adding MAs to the staffing model. At this nursing home, no nurses (RNs or LPNs) lost their jobs with the addition of medication assistants to the staffing model. The differences may lie in the structure of the new staffing model. The new staffing model implemented by this nursing home included the addition of one person to the overall staffing model during the day and evening shifts.

As described by Walsh et al., [6], medication administration by Medication Aides (MAs) can be a safe alternative in nursing homes. In their analyses of data from eight southwestern nursing homes from 2004 to 2010, MA use decreased the probability of a pharmacy related citation during annual inspections. Unlike NHA, these nursing homes did not reduce the numbers of LPNs within their staffing models.

The addition of MAs to the staffing model is not without challenges. In a 2015 study [12], 218 nursing staff (RNs, LPNs and nursing assistants) were queried about their beliefs and understanding of medication assistant use in nursing homes. Not surprising, the

relatively few LPNs surveyed (n=19) were the least in favor of MAs, possibly fearing job loss with the addition of MAs to the staffing mix at their facilities. Our results suggest that perhaps LPNs were right to fear that negative consequence.

## Limitations

Even though findings from this case study are not generalizable to other nursing homes, the study can serve as an exemplar for other nursing homes considering a staffing change with differing levels of personnel. Further, findings from this case study may be the result of larger systemic issues not explored or considered during this analysis. Any change in structure (staffing model or mix) can affect system processes and thus influence outcome measures.

## Implications and Conclusions

So, it does appear that the LPNs who were worried about the addition of MAs had a legitimate reason to be so, since the LPN hours were the ones that were primarily affected. Our results for this one nursing home reveal that perhaps RNs should also be a trifle bit worried, since their hours too appear to be reducing gradually. CNAs however appear to be relatively unaffected by the addition of MAs to the staffing model, indeed, their hours went up significantly.

One implication that suggests itself here is that cost savings accrued by hiring MAs in lieu of LPNs may have unintended consequences. For one, it may end up causing LPNs to voluntarily turnover, and look for employment elsewhere. Additionally, it could end up hampering morale of other staff, including RNs. In short, this could well portend a vicious self-fulfilling prophecy, wherein nursing homes hire more MAs because they feel that they are unable to hire LPNs, and LPNs refuse to join nursing homes because they feel that MAs will replace them.

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