

New Model of Care: Nurse Practitioner providing care to home care patients and the influence
on polypharmacy

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Introduction

The first introduction of nurse practitioners (NPs) as primary care providers occurred in the United States of America in the 1960s¹. Ontario was the first province to incorporate NPs into the long term care settings in 2000² while Manitoba introduced NPs into long term care in 2007³. In September 2016, the Northern Health Region assigned a NP to be the primary care provider to the 65 long term care patients in Flin Flon. This was implemented due to sufficient evidence suggesting that the use of a NP in long term care as the primary care giver positively impacted health care outcomes for those patients. This included reduced emergency transfers^{4,3} and reduced hospital admissions⁵ as they are able to more effectively manage and monitor chronic conditions in long term care settings. Other studies highly suggest the use of a NP in long term care settings improves pain management⁶ and decreases polypharmacy³.

As the population of seniors in Manitoba is expected to increase by 43% over the next 20 years⁷, the health care needs of Manitobans is evolving. Currently, provincial governments are expanding home care resources to allow the aging population to remain at home for as long as possible^{7,8}. This is creating a unique environment where patients who would have previously required placement in long term care facilities for their personal and medical needs are now living independently in the community. Therefore, there are more individuals living with chronic and complex medical conditions in the community. This calls to question whether those patients living in community would benefit from a NP as their primary care provider as do long term care patients.

This curiosity is what lead the Northern Health Region to assign the same NP to both the long term care and home care patients in Flin Flon in September 2017. This new and innovative care model had not been implemented anywhere else in Manitoba or Canada, making it the first site to have a NP providing care to both long term care and home care patients.

A previous report from the Winnipeg Health Region's implementation of a full-time nurse practitioner in a nursing home defined polypharmacy as a medication count of 9 or more medications³. However, an alternative definition is the use of more medications than are medically necessary⁹. Unfortunately, there is no consensus on the definition of polypharmacy, making the measurement of polypharmacy to be difficult.

Polypharmacy has many known negative consequences on both the patients and health care system. This includes an increased risk of adverse drug interactions, medication non-adherence, reduced functional capacity and overall greater health care costs⁹. Therefore, polypharmacy is an feasible and measurable outcome to examine the influence of the new NP position on the home care patients in Flin Flon.

Methods

Data was collected from 25 randomly chosen patients enrolled in home care services and who listed the NP as their primary care provider from September 25, 2017 to July 16, 2018. Accuro, the electronic charting system used for outpatient medical records, was the source of data collection. Population statistics were collected including age and the date of the first encounter with the NP, along with number of encounters with the NP.

To address the change in medications for each patient, an extensive review of their medications and encounter notes were compiled into a list which provided the data on the medications patients were on prior to seeing the NP and how the NP influenced their current medications. Polypharmacy was defined as 9 or more medications in those aged 65 and older.

These medications were then categorized based on the Anatomical Therapeutic Chemical (ATC) classification index to aid in identifying a trend in the deprescribing and prescribing practices of the NP. All medications located on the ATC index were included in the medication review, including vitamins and supplements. Prescriptions not included were lubricating eye drops and medical supplies (ex. spacer, stockings, diabetic supplies) or prescriptions that have not been renewed in the past 6 months (exceptions to some aerosols for obstructive lungs diseases).

Results

Demographics and Accessibility

Based on the sample population, the mean age of the sample was 83 years (SD, 11.2 years). The mean duration of which the NP was their primary care provider was 6.36 months (2.4). The average number of in office encounter, phone calls and home visits were 3.76 (2.3), 1.48 (2.4), 0.48 (1.0) respectively. The total number of encounters was 143 with a mean number of encounters was 5.72 (3.9) (Table 1).

| Demographics | |
|------------------------------------|------------|
| Population size | 63 |
| Sample size | 25 |
| Age, mean (SD), y | 83 (11.2) |
| Accessibility | |
| Total months in position | 10 |
| Months with NP, mean (SD) | 6.36 (2.4) |
| Total encounters | 143 |
| Encounters, mean (SD), # | 5.72 (3.9) |
| In office encounters, mean (SD), # | 3.76 (2.3) |
| Phone encounters, mean (SD), # | 1.48 (2.4) |
| Home visits, mean (SD), # | 0.48 (1.0) |

Polypharmacy

Using 9 or more medication as the definition of polypharmacy, 13 patients met the polypharmacy threshold prior to the NP as their primary care provider. Currently, there are only 11 patients who meet the polypharmacy threshold of 9 or more medications under the care of the NP (Figure 1).

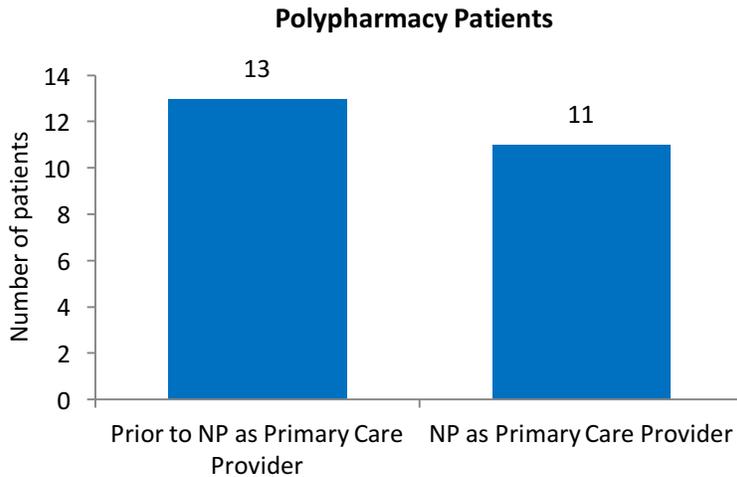


Figure 1. Number of patients who met the polypharmacy criteria before and after the NP as their primary care provider.

To further investigate the prescribing and deprescribing of medications, the number of medication prescribed or deprescribed was recorded. If there was no change in the number of medication, it was further noted whether or not medications were altered but it resulted in the same number of medications. These results demonstrated 2 patients experienced deprescribing of two medications, 1 patient experienced deprescribing of one medication 11 of the patients experienced no change in their medications, 3 patients experienced an alteration of medication but the amount remained the same, 5 patients were prescribed one additional medication, 1 patient was prescribed 2 additional medications and 1 patient was prescribed 3 additional medications (Figure 2).

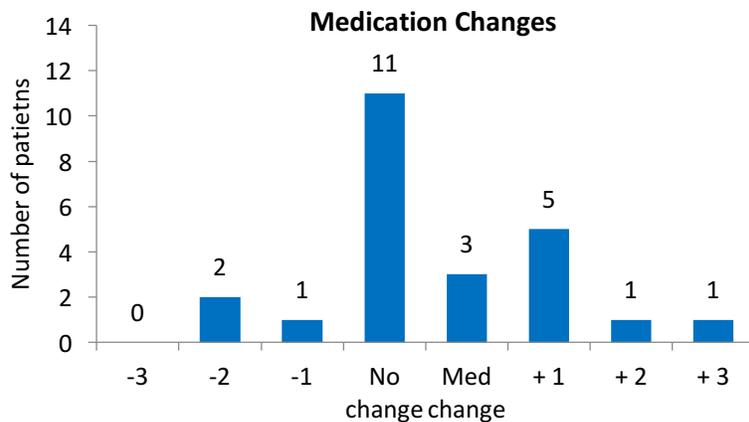


Figure 2. Distribution of medication changes under the care of NP.

As previous studies have suggested that NPs has a positive influence on pain management, the medication changes were further categorized based on the classes of drugs. The most common drugs deprescribed were drugs for obstructive airway diseases, calcium channel blockers and drugs used in diabetes. The most common drugs prescribed were analgesics and anti-inflammatory and antirheumatic products (Table 2).

| Table 2. ATC Index categorization of medication alterations | | |
|---|--------------|------------|
| | Deprescribed | Prescribed |
| Respiratory system | | |
| Drugs for obstructive airway diseases | 2 | 1 |
| Cardiovascular system | | |
| Agents acting on the renin-angio system | 1 | 0 |
| Beta-blockers | 0 | 1 |
| Calcium channel blockers | 2 | 0 |
| Diuretics | 0 | 1 |
| Blood and blood forming organs | | |
| Antithrombotics | 1 | 1 |
| Alimentary tract and metabolism | | |
| Drugs for constipation | 0 | 1 |
| Drugs used in diabetes | 2 | 1 |
| Mineral supplements | 1 | 2 |
| Dermatologicals | | |
| Corticosteroids | 0 | 1 |
| Nervous system | | |
| Analgesics | 1 | 3 |
| Hypnotics and sedatives | 0 | 1 |
| Musculo-skeletal system | | |
| Anti-inflammatory & antirheumatic products | 0 | 4 |
| Drugs for treatment of bone disease | 1 | 0 |

Discussion/Limitations

There is sufficient evidence suggesting the use of NPs in long term care facilities can decrease polypharmacy, which can be defined as a person on 9 or more medications over the age of 65 years old. Therefore, to address whether or not the new model of care in Flin Flon has had a positive influence on both the patients and health care system, it is appropriate to look at polypharmacy among the NP's home care patients.

Firstly, when addressing whether or not the NP was accessible to their patients, the average months of which patients were under the care of the NP was 6.36 months (2.4 months). This must be stated as medication alterations may not occur immediately in a

Secondly, comparing the number of patients who met the criteria for polypharmacy before and after being under the care of the NP decreased from 13 to 11 patients (Figure 1). This follows previous data suggesting that NP working in long term care and with complex medical conditions can decrease polypharmacy³. As previously stated, the definition of polypharmacy is not agreed upon nor is a universally excepted concrete number. Therefore, if one were to examine the more commonly accepted definition of polypharmacy, the use of more medications than are medically necessary, one would have to do an extensive review of each patient's entire medical record.

When examining the number of medication changes patients experienced (Figure 2), 11 patients did not have any medication adjustments, the next largest portion of patients (5) received one additional prescription. These results did not follow the trend that there was a decrease in polypharmacy (Figure 1).

This lead to further investigation of the types of medications that were being prescribed and deprescribed. The categories of drugs being deprescribed were respiratory system, cardiovascular system and alimentary tract and metabolism. The categories of drugs being prescribed were nervous system and musculo-skeletal system. Furthermore, analgesics and anti-inflammatory and antirheumatic products were noticeably prescribed more often than other medications. These categories of medications are both used in pain management. These results suggest that pain medications are being prescribed, possibly resulting in more adequate pain management. These results are parallel to a previous study suggesting pain management is better controlled in similar populations under the care of NPs⁵.

One major limitation this review/report encountered was the lack of continuity of medical records when patients presented to the emergency department and/or where admitted to the hospital. As the ER utilizes a different electronic charting system and the hospital uses paper charting, it did not allow this review to be as comprehensive as it could have been. This barrier to access of information highlighted the need for not only provincial wide electronic medical records but also interprovincial cooperation to ensure the best and most efficient health care for patients.

Another limitation to this review was the lack of medication reviews that occurred when patients are transferred from clinician to clinician and/or lack of features on the present on Accuro (present electronic charting system). This lead to excessive and time consuming review of patient encounter notes to identify medication changes and possible out of date medication lists.

Conclusion

The implementation of a NP in long term care facilities is not a novel model of care as there is sufficient evidence suggesting improved health outcomes, especially decreased emergency visits, reduced hospital admissions and decreased polypharmacy. This calls to question whether a NP would be the appropriate primary care provider to home care patients living in the community. Using polypharmacy, defined as currently on 9 or more medications over the age of 65, as a measure of health outcomes, a medication review on 25 community patients was conducted. This showed a minor decrease in number of patients who fall into the category of polypharmacy. When further investigating the medication alternations initiated by the NP, majority of patients experienced no changes, while the next largest proportion of patients experienced an addition of a medication. As previous studies suggested that pain management is improved when under the care of a NP, the medication alternations were classified by the ATC classification. These results showed the class of medications that were prescribed the most were anti-inflammatory and antirheumatic products, possibly suggesting an improvement in pain management. Therefore, one might propose there is improvement in the health outcomes of these community patients, but without more data and a more comprehensive patient chart review, this conclusion is not definitive.

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