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The effect of nurse case coordination on management of chronic conditions

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ABSTRACT   A clinical decision report using:

Ishani A, Greer N, Taylor BC, et al. Effect of nurse case management compared with usual care on controlling cardiovascular risk factors in patients with diabetes: a randomized controlled trial. *Diabetes Care.* 2011;34(8):1689-1694. https://doi.org/10.2337/dc10-2121

for a patient requiring care coordination for management of hypertension, diabetes, and hyperlipidemia.

Keywords: *nurse case management, diabetes, hypertension, care coordination, medication adherence*

Clinical-Social Context

Charlotte Rogers (pseudonym) is a 73-year-old woman with a past medical history of hypertension, type 2 diabetes mellitus, hyperlipidemia, and dementia. She presented to a general medicine clinic for chronic care evaluation, assisted by her daughter. Ms. Rogers lives alone and receives assistance from her family as she has difficulty with driving and completing certain daily tasks. However, she appeared confident with the management of her care and stated that she took her medications and monitored her blood pressure and glucose daily. Unfortunately, the daughter disagreed, expressing concern regarding her mother's ability to correctly take her medications and with the overall management of her health.

Upon further evaluation, Ms. Rogers endorsed rare episodes of forgetting medication and difficulty with daily blood pressure and glucose monitoring. As Ms. Rogers lives alone, the management of her medications was often dependent on daily visits from family members. Review of objective data drew concern that lapses in medication were more frequent than indicated by Ms. Rogers. The last HbA1c of 10.6 suggested persistently elevated glucose levels. At this visit, the patient's blood pressure was noted to be 155/86, causing concern for inappropriate blood pressure regulation as well. Her cholesterol was well controlled with medication, with an LDL last recorded at 99 mg/dL.

Ms. Rogers is medically managed with daily Amlodipine 10mg, hydrochlorothiazide 25mg, Losartan 100mg, Simvastatin 20mg, and Lantus Insulin 30 Units daily. During medication reconciliation, Ms. Rogers appeared familiar with where she stores her medications, but not the names or functions of each. Furthermore, her daughter expressed concern that her mother was incorrectly utilizing previously prescribed short acting insulin in addition to the current Lantus regimen. Ms. Rogers denied any symptoms or episodes of hypoglycemia, however the daughter feared that she was at increased risk for such adverse effects.

Her daughter verified that she had now removed all short acting insulin vials from her mother's refrigerator to prevent further confusion. After discussion with the daughter, there was shared sentiment that additional

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oversight regarding Ms. Rogers' healthcare was necessary to ensure safety in a home-dwelling eldercare situation. The patient was adamantly against moving in with her daughter or to a nursing home. Thus, to assist with medication adherence and frequent monitoring of blood pressure and glucose, the option of nurse case management was discussed.

Clinical Question

Can nurse case management improve health outcomes in individuals with multiple, chronic, medication-controlled diagnoses such as diabetes and hypertension?

Research Article

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Description of Related Literature

Initial review of the topic was conducted through UpToDate. Google Scholar was subsequently utilized for a broad literature search, applying the search terms of "nurse case management" and "medication adherence." This resulted in 825 articles, many of which were unrelated to our patient's primary diagnoses of diabetes, hypertension, and hyperlipidemia. Thus, a database structure for the query was preferred. PubMed was searched with the following key terms "Case Management," "Hypertension," "Diabetes," and "Hyperlipidemia," resulting in 146 articles. Abstracts were reviewed for further background information. Of the results, four were based on randomized control trials that measured the benefit of using case management. These studies were reviewed in detail, with the paper by Ishani et al. being chosen for further analysis due to its relationship to all three chronic conditions experienced by our patient. The remaining three studies are described here as well.

The 2004 study from Krein et al. looked at 246 veterans with diabetes. This study focused on case management interventions over a course of 18 months and studied the impacts on health outcomes, patient satisfaction, and resource utilization. Interventions included appointment scheduling, monitoring of objective data, and support for lifestyle changes. Comparison case-patients continued with routine care from their primary care providers. Results indicated a favorable result on patient satisfaction but did not reveal benefits to outcomes or resource utilization. Ultimately, this study was not chosen for further analysis due to limitations with follow-up; "at one site over 70% of attempted telephone contacts were unsuccessful."[1]

In 2013 Willard-Grace et al. published a prospective clinical trial that planned to follow 441 patients through health coaching. It hoped to elicit the opportunities and barriers for implementation of such models.[2] Control patients were to continue with care at their usual clinic. It was not chosen for further analysis due to its use of medical assistants as health coaches, rather than a traditional nurse case management program as available at our institution.

A study published in JAMA Cardiology in 2019 by Machline-Carrion et al. examined 1,619 patients and measured the impact of a quality improvement intervention which included case management, direct feedback, and education materials. Control-case patients were to continue with routine practice. The study was not chosen for further analysis due to its focus on cardiovascular risk only. This being said, Machline-Carrion et al. determined that the quality improvement intervention did offer an increased utilization of evidence-based therapies.[3]

There are other clinical trials using alternative care coordination models. For example, the trial by Chouinard et al. hoped to use a two-pronged approach through family medicine group nurse care coordinators and self-management support groups to improve the health of patients with chronic conditions.[6] Control participants were to continue with normal care for six months, before becoming eligible for the same intervention measures. The trial enrolled 247 patients, demonstrating reduced psychological distress and increased sense of security for patients with the intervention.[7] However, this study used a broader inclusion criterion with some

patients not having diabetes, hypertension, or hyperlipidemia. Thus, it was deemed non-specific enough to apply to Ms. Rogers and was not selected for further analysis in this report.

The 2011 study by Ishani et al. was chosen for review here. Following a randomized control trial structure, this study made it possible to elucidate the impact of nurse case management on hypertension, diabetes, and hyperlipidemia. Of the 556 patients in this study, those in the control group were instructed to continue self-managing their health alongside their primary care physicians. The intervention group received support from a nurse case manager in the form of lifestyle modification goals, personal action plans, home blood pressure monitors, medication education, and frequent check-ins. As the case managers were nurses with formal clinical education, there was opportunity for medication adjustment as well.[4] Given the direct correlation of the chronic conditions involved in the study and the emphasis on nurse-driven care coordination, the paper by Ishani et al. was chosen as it related well with the needs of our patient.

As per the Strength of Recommendation Taxonomy (SORT) criteria, the evidence for Nurse Case Management for patients with multiple chronic diseases demonstrates a B-level recommendation based on conflicting outcomes and difficulty comparing different case management programs.[5]

Critical Appraisal

The study by Ishani et al. is a randomized control trial of diabetic patients with an HbA1c > 9.0% and concomitant comorbid conditions of hypertension (BP>140/90 mmHg) and hyperlipidemia (LDL>100 mg/dL), similar to our patient. This study, registered with clinicaltrials.gov, was unblinded and took place at the Minneapolis VA Health Care System (MVAHCS).

Invitations for the study were extended to 3,392 individuals as identified by a MVAHCS registry of diabetes patients, thus limiting concern for participation bias. Those selected met at least one of the inclusion criteria for HbA1c, LDL, or BP. Given the wide inclusion criteria, there was less concern for selection bias. BP was measured via a standardized method with a 5-minute resting period and averaged three readings. Exclusion criteria included life expectancies of <1-year, severe mental health conditions, active substance abuse, pregnancy planning, residing in assisted living facilities, or inability to give consent.

This study followed 556 individuals over 12 months. They were randomized to intervention versus control groups with 278 in each category. All patients received education information regarding their diagnosis, medications, and dietary choices. The intervention group received a home BP monitor and developed goals and plans with nurse case managers with regular follow-up every 2 weeks. Subsequent follow-up was adjusted based on the patient's ability to achieve their goals. Those in the control group continued to manage their chronic conditions with their primary care providers as before, with no intervention from nurse case management.

The outcome measurements included clinical goals such as BP (<130/80 mmHg), LDL (<100 mg/dL), and HbA1c (<8.0%). The difference in absolute values of these health measures was also collected. The study achieved adequate power, as a minimum sample size of 440 patients was required to achieve 80% power with $\alpha=0.05$, using a two-sided t-test. An intention to treat analysis was followed. In regard to detection bias, blinding was not possible after randomization due to the intervention requiring scheduling with nurse case management. In relation to attrition bias, the final visit was completed in person by 431 patients, resulting in a 77.5% follow-up rate. Thus, as per the Strength of Recommendation Taxonomy (SORT) criteria, the study by Ishani et al. would qualify as Level 2 Evidence.[5]

The intervention group was found to have greater success with achieving all three clinical goals as compared to the control group (21.9% vs. 10.1%, p<0.01). The odds ratio of individuals from the intervention group achieving all three clinical goals as compared to the control group was 2.1 (95% CI 1.4-3.2). A similar effect was also noticed in relation to the individual treatment goals of BP (45.0% vs. 25.5%, p<0.01) and HbA1c (73.7% vs. 65.8%, p=0.01). The effect on LDL was not statistically significant (57.6% vs. 55.4%, p=0.61).

In regard to absolute reduction of individual risk factors, the intervention group recorded larger improvements. Forty and a half percent of the intervention group patients began with an HbA1c>9.0% and finished with the goal HbA1c<8.0% at the end of 1 year, as compared to 24.6% of the control group, p=0.047. Of those with elevated LDL, a greater number of intervention members (40.9%) achieved the goal of LDL<100 mg/dL compared to the control group (27.7%), p=0.02. For blood pressure, 40.6% of patients in the intervention group with elevated BP achieved the goal BP after 1 year, compared to 15.9% in the control group, p<0.01. This study

boasted a larger effect size as compared to previous trials, potentially due to the utilization of nurse case management versus other medical assistants. A unique benefit is the ability to change medications directly, as determined by the nurse and physician teams.

Limitations of this study included issues with interpreting inclusion criteria of individuals, which resulted in 19 individuals being incorrectly randomized. However, patients were preserved in these groups to maintain an intention to treat analysis with a sensitivity analysis demonstrating no change in results. The patient population lacked diversity as it was conducted at a VA Hospital. Although medication adherence and lifestyle changes were enforced at all nurse case management interactions, no data was formally collected relating to these points specifically. Additionally, because the study was unblinded, the is a substantial risk of the Hawthorne effect explaining the results.

Clinical Application

As our patient was interested in care coordination for hypertension, diabetes, and hyperlipidemia specifically, we felt that this study applied well to Ms. Rogers. There was a nurse case management program available at our facility, which allowed for a similar intervention protocol to be applied. Although Ishani et al. did not specifically study women and patients with dementia, it was determined that the protocol could be applied to our patient as well. It is important to note that although our patient was previously diagnosed with dementia, she was not found to lack decision making capacity. Prior studies have also demonstrated that patients with dementia do not inherently lack decision making capacity.[8] Thus, our patient did not meet exclusion criteria of this study.

Our patient, Ms. Rogers, was struggling to control her chronic hypertension and diabetes. She also had a past medical history of hyperlipidemia. Our patient's daughter voiced concerns regarding management of health outcomes and medication. The paper by Ishani et al. demonstrated strong internal validity for the positive effect of nurse case management on health outcomes in patients with multiple, chronic, medication-controlled diagnoses such as hypertension and diabetes. As per the study from Campbell et al. there was a benefit of human interventions versus nonhuman reminders.[9] Thus, as Ms. Rogers lived alone and required additional supervision, we felt that nurse case management was an appropriate addition to the management plan for her.

These findings were shared with Ms. Rogers and her daughter. They appeared amenable to starting in the nurse case management program. The patient was informed of the addition of nurse appointments and the necessity for compliance with follow-up. The program available at our institution allowed for virtual and home visits, thus making it feasible for Ms. Rogers to attend despite having difficulty with driving herself. Given this flexibility, there was greater confidence in the external validity of this paper. Both Ms. Rogers and her daughter appeared comfortable with this treatment plan.

New Knowledge Related to Clinical Decision Science

Management of chronic conditions is often time consuming and complex for patients. Better health outcomes related to medication adherence and management of comorbidities will not be achieved by simply repeating medical advice in a traditional clinical care setting. The Clinical Decision Science illustrated by this report shows that we decided to change the social context of care to achieve these desperately needed outcomes. Ms. Rogers was motivated to maintain her health, however wished to keep her independence while doing so. As the population ages, Clinical Decision Science will have to increasing explore changing the context of care. The type of clinical decision making that our team explored while developing a treatment plan for our patient demonstrates that this is achievable. We believe that additional oversight and coordination with nurse case management will be beneficial for Ms. Rogers and aligned with her goals to maintain independence. We hope that this approach will benefit other patients with multiple chronic conditions seeking additional support.

Conflict Of Interest Statement

The author declares no conflicts of interest.

References

1. Krein SL, Klamerus ML, Vijan S, et al. Case management for patients with poorly controlled diabetes: a randomized trial. *Am J Med*. 2004;116(11):732-739. https://doi.org/10.1016/j.amjmed.2003.11.028

2. Willard-Grace R, DeVore D, Chen EH, Hessler D, Bodenheimer T, Thom DH. The effectiveness of medical assistant health coaching for low-income patients with uncontrolled diabetes, hypertension, and hyperlipidemia: protocol for a randomized controlled trial and baseline characteristics of the study population. *BMC Fam Pract*. 2013;14:27. https://doi.org/10.1186/1471-2296-14-27

3. Machline-Carrion MJ, Soares RM, Damiani LP, et al. Effect of a Multifaceted Quality Improvement Intervention on the Prescription of Evidence-Based Treatment in Patients at High Cardiovascular Risk in Brazil: The BRIDGE Cardiovascular Prevention Cluster Randomized Clinical Trial. *JAMA Cardiol.* 2019;4(5):408-417. https://doi.org/10.1001/jamacardio.2019.0649

4. Ishani A, Greer N, Taylor BC, et al. Effect of nurse case management compared with usual care on controlling cardiovascular risk factors in patients with diabetes: a randomized controlled trial. *Diabetes Care*. 2011;34(8):1689-1694. https://doi.org/10.2337/dc10-2121

5. Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *J. Am. Board Fam. Med*. 2004;17(1):59-67. https://doi.org/10.3122/jabfm.17.1.59

6. Chouinard MC, Hudon C, Dubois MF, et al. Case management and self-management support for frequent users with chronic disease in primary care: a pragmatic randomized controlled trial. *BMC Health Serv Res.* 2013;13(1):49. https://doi.org/10.1186/1472-6963-13-49

7. Hudon C, Chouinard MC, Dubois MF, et al. Case Management in Primary Care for Frequent Users of Health Care Services: A Mixed Methods Study. *Ann Fam Med*. 2018;16(3):232-239. https://doi.org/10.1370/afm.2233

8. Hegde S, Ellajosyula R. Capacity issues and decision-making in dementia. *Ann Indian Acad Neurol*. 2016;19(5):34-39. https://doi.org/10.4103/0972-2327.192890

9. Campbell NL, Boustani MA, Skopelja EN, Gao S, Unverzagt FW, Murray MD. Medication adherence in older adults with cognitive impairment: a systematic evidence-based review. *Am J Geriatr Pharmacother*. 2012;10(3):165-177. https://doi.org/10.1016/j.amjopharm.2012.04.004