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Research Article

Promoting Inpatient Mobility in a Canadian Healthcare Setting: Impacts, Outcomes and Lessons Learned from the Implementation of a Multidisciplinary Early Mobility Program

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Abstract

Introduction: Inpatient mobility has garnered increasing attention due to its significant impacts on patient outcomes, with immobility during hospitalization linked to various complications. This study explores the implementation and outcomes of a multidisciplinary early mobility program within the Vitalité Health Network, located in New Brunswick, Canada. **Methods:** The study was conducted in two phases. Phase 1 focused on the early implementation of the inpatient mobility program, involving patient and healthcare professional feedback, and assessing changes in patient mobility and satisfaction. Phase 2 expanded the evaluation to include a larger patient cohort and sought to assess the sustainability of exercise behaviors and mobility improvements over time (seven days and 30 days after patient discharge). **Results:** The program demonstrated high patient satisfaction and notable improvements in autonomy scores, with an average increase of 17.5% thorough phase 1 and 2 (AM-PAC Basic Mobility Inpatient Short Form, 6 Clicks). Analysis also revealed sustained enhancements in patients' exercise habits post-discharge (seven days and 30 days), indicating the program's potential in promoting medium to long-term health behavior changes.

Conclusion: These findings highlight the value of early mobility programs in improving both inpatient autonomy and patient exercise habits post-discharge. Our study also underscores the necessity of using a strategic and multidisciplinary approach when implementing this kind of intervention within a healthcare setting.

Keywords: Early mobility program; Health evaluation, Health intervention; Inpatient autonomy; Exercise behaviors; Autonomy scores

Introduction

The promotion of inpatient mobility, also known as patient mobilization, has garnered increasing attention due to its significant impacts on patient outcomes [1-7]. Immobility during hospital stays, a common occurrence in modern-day healthcare, has been consistently associated with detrimental health effects. The lack of mobility during hospitalization puts the patient at higher risk for various physical complications, such as deep vein thrombosis and muscle atrophy, and patient immobility can also lead to extended hospital stays and increased mortality rates [8-10]. Conversely, proactive patient mobilization can help facilitate the recovery process, diminish the likelihood of hospital-acquired complications, and shorten the duration of hospitalization [10-13].

A growing body of literature underscores the necessity of integrating patient mobilization into standard care procedures [12]. For instance, studies have highlighted the role of early mobilization in improving physical function outcomes in Intensive Care Units (ICUs) and in reducing the length of ICU and hospital stays [13]. Similarly, the importance of mobilization in preventing hospital-acquired conditions, such as pressure ulcers and pneumonia, has been well documented [14].

Despite the clear benefits of early mobilization among patients, its implementation in healthcare settings varies greatly, often lacking uniformity and consistency [12]. This variability in practice can be attributed to various factors, such as differing levels of staff training, resource availability, and institutional policies [13]. This disparity in patient mobilization practice underscores the need for a comprehensive exploration of early mobilization protocols and their efficacy.

Early mobilization programs in a healthcare context are characterized by the patient's engagement in physical activities that yield physiological benefits [15]. These activities range from basic movements, such as sitting up at the bedside, standing adjacent to the bed, or rising to a standing position, to more complex ones, like moving from the bed to a chair, or walking relatively short distances, either with assistance or independently. This spectrum of activities, tailored to each patient's level of ability, plays a pivotal role in enhancing recovery and improving overall health.

This study delves deeper into the current practices of patient mobilization by exploring the experiences and level of satisfaction of both patients and health professionals, by highlighting the challenges and obstacles encountered in implementing mobilization strategies, and by examining other, indirect outcomes stemming from such practices. It does so by focusing on the implementation of a structured early mobilization strategy within the Vitalité Health Network (VHN), a publicly funded, regional health authority located in New Brunswick, Canada.

The program, which was launched in June 2021, was designed to enhance mobility, patient satisfaction, and overall health outcomes for hospitalized individuals. It involved a set of standard procedures to assess patients and assist them in moving around, along with personalized exercises. These exercises were customized for each patient based on their individual needs and physical capabilities. Kinesiologists were recruited and received specialized training to assess and implement the new mobility evaluation protocol. Frequent evaluations were carried out to track patient progress and adjust mobilization strategies as needed. Initially implemented in one of the VHN's four geographic zones, the early mobility program was gradually extended to the health network's three other zones. In all, five hospitals – a university hospital centre, three regional hospitals and one community hospital – participated in implementing the new program.

This study endeavors to provide a detailed examination of patient mobilization practices within a specific healthcare setting, offering insights that could inform policy and practice, and contribute to the establishment of a robust mobilization culture throughout our healthcare organization. Through this research, we aim to bridge the gap between theory and practice, offering actionable recommendations for healthcare providers and policymakers who are confronted with and seeking evidence-based solutions to the various challenges posed by patient immobility.

Methods

The evaluative research was conducted through two phases as described below:

Phase 1: Early implementation

The phase 1 was initiated in April 2022 upon completion of a ten-month implementation period for the patient mobilization strategy. A total of 167 individuals were invited to participate in the study (Table 1). This recruitment occurred between April 12th, 2022, and September 22nd, 2022. The research team recruited patients randomly during the study period, thus ensuring that the selected group included representatives from all four zones of the health network and reflected the variety of patient characteristics and health needs across different areas within the VHN. Health professionals working within each of the VHN's four zones were invited to participate in the study via email. All those who accepted the invitation were included in the research.

This first phase sought to evaluate patient and healthcare professional experiences and level of satisfaction with the implemented mobilization strategy. This involved gathering and assessing feedback from kinesiologists, managers, nurses,

physiotherapists, and physicians. Additionally, it included collecting patients' demographic information, such as age, gender, hospital of admission, and level of education. Clinical and administrative data were also collected, including the patients' mobilization levels, both before and after kinesiologist intervention, as well as the incidence of falls among the patients. The Activity Measure for Post-Acute Care (AM-PAC®) (inpatient basic mobility), a tool developed by Boston University, was used to assess patient autonomy at two different times: before the exercise interventions, and during the final assessment conducted by the kinesiologist prior to the patient's discharge [7]. In the analysis, the Wilcoxon test for paired samples was utilized to assess changes in patient autonomy. To explore autonomy differences between genders, the Mann-Whitney test was applied.

Participants	N
Patients	100
Nurses	27
Physiotherapists	18
Kinesiologists	9
Managers	7
Physicians	6
Total	**167**

Table 1: Participants recruited for the early implementation evaluation phase (all four VHN zones), April 2022-September 2022.

Questionnaires were administered to assess patient and care provider satisfaction, as well as identify barriers to the mobilization strategy. These questionnaires (supplements 1 and 2) were designed according to the Theoretical Domains Framework (TDF) [16], thus providing a comprehensive structure to capture various dimensions of satisfaction and potential obstacles within the implementation process. The TDF is a comprehensive tool used in implementing and evaluating behavior change interventions in healthcare. It integrates theories from psychology and organizational behavior to understand the barriers and facilitators to change. This approach ensured a thorough understanding of both the outcomes and the challenges of the mobilization strategy.

Phase 2: Advanced implementation

During the phase 2, data collection occurred at three distinct times following the initial implementation: June 2023, September 2023, and December 2023. 293 new patients were recruited in this new phase. The key variables analyzed included the levels of patient autonomy before and during the final assessment conducted by the kinesiologist and the frequency of falls among the study participants. The same clinical variables initially gathered in Phase 1 (mobilization and falls) were also included in this second phase to enhance the quantitative analysis. To strengthen our analysis, we consolidated data from the two phases, incorporating 100 patients from phase 1 and 293 patients from phase 2, thereby analyzing mobility autonomy in a comprehensive cohort of 393 patients.

This integration of data across different time points aimed to provide a more comprehensive and robust evaluation of the intervention's impact over time. In the analysis, the Wilcoxon test for paired samples was utilized to assess changes in patient autonomy. To explore autonomy differences between genders, the Mann-Whitney test was applied.

Additionally, during this phase of the study, we evaluated the patients' inclination to continue with the exercises recommended by the kinesiologist after their discharge. Prior to admission, we surveyed the 549 patients on their exercise habits before receiving the kinesiologist's intervention in the hospital.

To determine the level exercise participation post discharge, we followed up with the patients via telephone one week and one month after they left the hospital to determine whether they had maintained the exercise participation. The chi-square (χ^2) test was used to examine the association between the intervention and changes in exercise behavior among participants. The test was applied to compare the frequency of exercise engagement before the intervention with frequencies observed at one week and one month following the intervention.

Ethical Considerations

The project received approval from the Research Ethics Board of the Vitalité Health Network (file no. 101528).

Results

Phase 1: Patient Participants

Table 2 shows the general profile of patient participants. The mean age of participants was 72 years (± 11.6). We excluded missing data for each variable to ensure the integrity of our analysis (sex: 4; education level:12; hospital facilities: 1; type of hospital admission: 2; fall:1; age range:1).

Category	Dr. Georges-L.-Dumont University Hospital Centre	Edmundston Regional Hospital	Campbellton Regional Hospital	Chaleur Regional Hospital
Sex - Male	15 (62.5%)	14 (58.3%)	8 (36.4%)	11 (42.3%)
Sex - Female	9 (37.5%)	10 (41.7%)	14 (63.6%)	15 (57.7%)
Type of admission - Emergency	15 (62.5%)	9 (37.5%)	4 (16.0%)	3 (12.0%)
Type of admission - Elective	9 (37.5%)	15 (62.5%)	21 (84.0%)	22 (88.0%)
Educational level - Less than high school	8 (34.8%)	10 (45.5%)	10 (50.0%)	7 (30.4%)
Educational level - High school diploma	4 (17.4%)	3 (13.6%)	4 (20.0%)	11 (47.8%)
Educational level - Post-secondary certification or diploma	11 (47.8%)	9 (40.9%)	6 (30.0%)	5 (21.7%)
Fall - Yes	1 (4.2%)	1 (4.2%)	2 (8.0%)	1 (3.8%)
Fall - No	23 (95.8%)	23 (95.8%)	23 (92.0%)	25 (96.2%)
Age range - 41-62	5 (20.8%)	8 (33.3%)	8 (32.0%)	11 (42.3%)
Age range - 63-75	7 (29.2%)	8 (33.3%)	6 (24.0%)	6 (23.1%)
Age range - 76-80	6 (25.0%)	4 (16.7%)	5 (20.0%)	6 (23.1%)
Age range - 81+	6 (25.0%)	11 (16.7%)	8 (32.0%)	3 (11.5%)

Table 2: General profile of patient participants recruited for the early implementation evaluation phase (all four VHN zones), April 2022-September 2022.

Regarding the mobilization strategy, most patients (97%) were satisfied with the kinesiologists and felt safe during the exercises. The same percentage of patients perceived the exercises to be critical to their recovery. Additionally, an average improvement of 10.78% in AM PAC Basic Mobility Inpatient Short Form (6-clicks) score was recorded among patients ($p < .001$) following the exercises when compared to the first evaluation and the last evaluation before discharge.

Professional Participants

All kinesiologists involved in implementing the strategy expressed satisfaction with the clinical assessment tools for patients (AM-PAC tool) and felt that they had the necessary resources for clinical practice. A vast majority of physiotherapists (88.9%) believed in the potential benefits of the new mobility strategy. Additionally, all managers viewed the cost-benefit analysis of the new mobilization strategy positively, while 100% of the nurses and physicians considered the exercises to be safe for patients.

Phase 2

393 patients were included in this phase, with an average age of 71 years (±13). Of these, 56.4% were male and 43.6% were female. At the initial evaluation (T0), the average patients' mobility score was 18.7, which increased to an average of 21.9 during the final assessment conducted by the kinesiologist (T1). This indicates an average improvement in the mobility score of approximately 17.5% from T0 to T1 ($p<0.001$).

There was no significant difference ($p=0.574$) by comparing men and women. Finally, 4.6% of patients experienced a falling episode not related to the exercise sessions.

Additionally, an analysis was carried out on patient exercise habits one week and one month after their discharge from the hospital. Both were compared to their baseline level of their exercise habits before the kinesiologist-led intervention. In our analysis, we observed a noteworthy shift in exercise behavior among the participants who were not engaging in physical activity prior to the intervention. The chi-square (χ^2) analysis revealed statistically significant changes in exercise behaviors among participants, both one week and one month following the hospital discharge. Notably, among initially inactive individuals, 34.68% were exercising one week after the discharge, with this figure rising to 58.06% after one month. Table 3 summarizes the findings from our follow-up with patients regarding their post-discharge exercise routines.

Assessment Timing	Number of patient responses	Behavior improvement	P-value
Before vs. One- Week after	542 (07 missing)	34.7% of inactive patients were exercising one week after discharge	<0.001
Before vs. One- Month after	406 (143 missing)	58.5% of inactive patients were exercising one month after discharge	<0.001

Table 3: Patient exercise habits at one week and one month after hospital discharge.

Discussion

Several studies underscore that inpatient mobility health programs can be intricate, with numerous contextual factors significantly influencing their success, including the beliefs of professionals, the environmental context, as well as the quality of training and communication [17,18]. Our findings indicate that patients exhibited a high level of satisfaction when interacting with kinesiologists and with the proposed intervention seeking to improve their autonomy. Furthermore, most professionals expressed satisfaction with the intervention and confidence in its potential benefits for patients. This latter perception is crucial for the successful implementation and integration of a new program, as has been documented in the field of implementation science [19].

The substantial increase in mobility scores, quantified at approximately 17.5% from baseline to the end of the follow-up period provides evidence of the tangible benefits that targeted mobilization programs can provide. Furthermore, the absence of a gender difference between mobility scores supports the notion that both male and female patients can experience improvements in their mobility. Our results compare favorably to other similar studies that have reported improvements in physical function and activity levels following targeted interventions [9,20,21].

Additionally, it is essential to recognize the significant change in exercise behaviors observed following the intervention. Notably, there was a marked shift from inactivity to activity among participants, with 34.7% of inactive patients exercising one-week post-intervention and 58% after one month. These results are not only statistically significant but also reflect the practical impact of the intervention in encouraging physical activity.

Although it was not a subject of this study, some studies have shown a reduction in readmission rates among patients participating in early mobilization programs during their hospital stay [20,22]. However, the mechanisms behind these benefits are not entirely clear. To our knowledge, this is the first time a study has demonstrated that such programs can positively influence participant behavior up to 30 days post-discharge, which could be a contributing factor to reduced readmission rates.

One week after the intervention, the change in exercise behavior suggests an immediate impact, likely driven by increased awareness or motivation among participants. This immediate effect is crucial, as early changes in behavior can set the foundation for longer-term habits. One month after the intervention, the continued significance in behavior change not only highlights the intervention's lasting impact, but also suggests that participants were able to maintain and possibly further integrate exercise into their daily routines. This sustained change is particularly promising for reducing sedentary lifestyles and promoting physical activity as a cornerstone of chronic disease management and overall well-being.

Lessons Learned and Recommendations

In expanding our reflections on the program's implementation, we gleaned several critical insights. For example, tailoring the introduction of the kinesiologist's role specifically to the context of the VHN was key to enhancing the program's implementation. Also, effective patient autonomy assessment requires the right tools, with AM-PAC standing out for its utility in our context. Notably, overcoming resistance is a challenge, often rooted in miscommunication about the program's goals and the novel professional role introduced. Comprehensive change management and thorough preparation of all staff are essential to ease this transition and foster acceptance.

Further recommendations emphasize a strategic approach: clear, multifaceted communication strategies are essential to elucidate the kinesiologist's role, distinguishing it from other health professions and ensuring understanding and proper use of the AM-PAC assessment tool. Engaging with a broad spectrum of healthcare professionals to discuss and refine the tool's application is crucial, ensuring its integration into the multidisciplinary care model and enhancing its utility for monitoring patient progress. These strategies aim to cement the kinesiologist's role within the healthcare team, optimizing patient care and autonomy outcomes.

Limitations

While the initial results of our study are encouraging, it's important to consider some limitations that could influence the interpretation and applicability of our findings. First, the analysis we conducted was able to identify associations rather than pinpoint direct causes and effects. To firmly establish causality, future investigations would benefit from employing control groups and randomization techniques.

Additionally, the specific characteristics of our study's participants and setting might limit how widely our results can be applied, which suggests that the effectiveness of the intervention could vary in different groups or environments. Another concern is our reliance on participants' self-reported exercise habits, which might not always accurately reflect their actual activity levels. Future studies could improve on this by using objective methods to track physical activity, like wearable fitness devices.

Lastly, while we observed notable improvements in exercise behavior shortly after the intervention, the persistence of these changes over time remains uncertain. Longer-term studies are needed to assess whether the positive effects we identified can be sustained. Addressing these considerations in subsequent research will help refine our understanding of how best to encourage and maintain healthy exercise habits. In addition to the limitations previously mentioned, our study did not explore the role of caregivers, such as family members, and their influence on enhancing patient mobility.

Conclusion

This study, conducted within the Vitalité Health Network, sheds light on the intricacies of developing and implementing inpatient mobility health programs. It underscores the significant role of kinesiologist interventions in enhancing patient autonomy and satisfaction. Key findings highlight the potential of these programs in improving patient autonomy, suggesting a broader applicability and potential for replication across similar healthcare settings. Future research should focus on refining these interventions, exploring the balance between professional expertise and patient needs, and further investigating the factors contributing to the observed improvements in patient mobility. This direction promises not only to enhance our understanding of this kind of initiative, but also to contribute to the ongoing efforts in improving patient care within health organizations.

Conflict of Interest

The authors stated that they have no conflicts of interest.

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