OXFORD UNIVERSITY PRESS | Journal of Gerontology: Medical Sciences

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Journal:	*Journal of Gerontology: Medical Sciences*
Manuscript ID	Draft
Manuscript Type:	Research Practice
Date Submitted by the Author:	n/a
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Keywords:	Frailty, Physical Activity, Hospital Related
Alternate Keyword:	Geriatric practice

Maintenance of **A**utonomy **T**hrough exercise **C**are during **H**ospitalization using the MATCH tool**:** A feasibility study in older adults.

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Main text word count: 3829/3800 words.

Number of data elements (n=5): 4 tables.

ABSTRACT

Background: Physical activity (PA) could countered iatrogenic functional decline during hospitalization. However, PA is poorly integrated into usual care. Thus, we aimed to assess the feasibility, acceptability and effects of implementing a systematic, prescribed, specific and unsupervised daily adapted PA training (MATCH) in older hospitalized patients and more specifically fallers.

Methods: Of 37 eligible patients hospitalized (>65yrs) in geriatric unit, 26 consented to participate and were randomized into two groups: MATCH (n=13) or Control (n=13). MATCH participants received one of the five PA programs (3 exercises; 3 times/day) according to the mobility score obtained using a decisional tree. Feasibility was assessed through adherence, prescription and feedback rates and acceptability using System Usability & Likert scales. Physical performance (balance, gait and walking parameters, muscle strength, muscular capacity) was assessed at admission and discharge. Length of stay and rehabilitation care were also recorded.

Results: Intervention adherence was 83.3%. Participants trained in average twice per day. All participants were enjoyed and 80% satisfied**.** MATCH implementation occurred within three days. Physician feedback was provided in 90% of cases. Ninety percent of healthcare professionals found MATCH to be adequate. MATCH-group improved more for the sit-to-stand test than controls. During hospitalization, only MATCH-fallers increased their physical performance. MATCH seems to reduce the length of stay and rehabilitation treatment during hospitalization.

Conclusion: As MATCH seems feasible, acceptable, safe (no falls occurred even if unsupervised) and cost-effective, it should be integrated into usual care. Further studies implementing MATCH are needed to confirm our promising results.

Key words: Frailty, geriatric practice, physical activity, hospital, mobility.

INTRODUCTION

People age 65 and over represent 19% of the population (1) but account for 51% of hospital bed occupancy (2). Hospitalization is associated with a sedentary lifestyle (3), which exacerbates functional decline (muscle mass: -3%, muscle strength: -8%, physical performance:-12 to -7%;(4)), also called iatrogenic decline. Hospitalization also reduces activities of daily living (ADL; (5)) and increases the risk of falls (+14% to +34%; (6)) among older adults. These declines lead to increased use of healthcare services and readmissions to short and long-term services, which overall increase both mortality and costs to the public health system (7,8). Thus, addressing this vicious cycle is important as the population of older adults worldwide is rising dramatically.

Physical activity appears to be the obvious solution to counteract this vicious cycle (9), especially if it is prescribed in the first few days (10) of hospitalization. A meta-analysis concluded that 50% of the included studies (n=15) observed an improvement in physical performance at hospital discharge among older adults, who had been prescribed exercise during their hospital stay (11). Another meta-analysis reported that patients, who had received exercise interventions, improved their walking ability and shortened the length of their hospital stay compared to the control group (12). In addition, a recent randomized controlled trial suggests that implementing an in-hospital intervention, including individualized and supervised (by rehabilitation professional) moderate-intensity resistance, balance and walking exercises (two 20-minute daily sessions), statistically and clinically improved functional capacities (SPPB; (13)) and muscle function (power and strength; (14)). Another study, which implemented simple supervised exercises (walking, sit-to-stand) during weekdays, highlighted that only 10% of participants decreased their

ADL levels (15,16). Finally, we recently demonstrated that implementing simple unsupervised exercises in a short geriatric unit was not only feasible and acceptable (17), but also an efficient way to improve a patient's functional capacity, increase non-sedentary physical activity and reduce the burden on healthcare (i.e. length of stay and discharge orientation (18)). Thus, implementing adapted physical activity interventions during hospitalization may be a solution to prevent or reduce functional decline and should be integrated into care.

However, to achieve these goals, some barriers should be addressed to explain why physical activity is not fully integrated into hospital usual care. First, intervention implementation depends on the rehabilitation professional preconceived ideas (i.e. ageism) and capacity (number of patient/work load). Some reasons limit the implementation of exercise programs into usual care as: 1) the training requires specialized professional or materials; 2) the frequency or duration of training is too high in hospital setting; 3) the procedures are not adapted (based on the patient's profile) or systematic and, 4) the supervision (supervised or non-supervised, individual or group class; gym or hospital room equipment) or type (tai chi, resistance, interactive games, etc.) are very heterogeneous. For these reasons, and surely many others, it is crucial that unsupervised individualized physical activity using no specialized material be implemented and integrated into clinical practice.

This is why the MATCH (**M**aintenance of **A**utonomy **T**hrough exercise **C**are during **H**ospitalization) tool was developed using a co-construction approach and updates from three previous studies (17-19) to help health professionals improve patient care.

Thus, the aim of this pilot study is to assess the feasibility and acceptability of implementing MATCH, a systematic, prescribed, specific, adapted, without specialized material and unsupervised daily physical activity training in a geriatric unit. The second objective is to explore the potential benefits of MATCH on functional capacities in hospitalized older patients and more specifically in patients, who have experienced falls.

METHODS

Study design and participants:

This interventional pragmatic pilot study was performed at Montreal in geriatric unit (ethic number: CER VN 19-20-15). Eligible and consenting patients admitted to the geriatric unit during 5 months (end March 2020) were included and randomized aleatory into two groups: usual care + MATCH (MATCH) *vs*. usual care (CONTROL). Inclusion criteria were: (1) age >65years; (2) Mini-Mental State Examination score ≥18/30; (3) medically able to take part in a physical activity program; (4) ability to return home at discharge; (5) speak/understand French or English.

MATCH tool:

MATCH included five different physical activity programs ranked using five colour-levels. These levels were related to the mobility score obtained through the decisional tree. The decisional tree was based on the results of three tests: ***1)*** 30-second chair test, ***2)*** side-by-side and semi-tandem balance, and ***3)*** 4-meter walking speed. These three tests were chosen because they are commonly used in geriatric practice, already been scientifically validated (20), simple to perform and do not require any specific materials or highly qualify staff. The score obtained from the first two tests were used to prescribe the adapted physical activity program using the colour-levels. The third test determined walking speed.

Each colour-level included two specific and adapted exercises and a walking activity, except for the red program, which included only two exercises, as the patients are very frail with very limited mobility. All programs were created to improve balance, mobility and muscular function. All programs are meant to be executed unsupervised, without additional materials, in a seated or standing position. The session (i.e., exercise + walk) duration is set from 15-35 minutes, depending on the patient's mobility level. Participants were asked to perform each session three times per day, with or without a caregiver or healthcare professional, even though our target was set to at least two sessions per day.

MATCH implementation procedures:

During the study period, a physician assessed eligibility and obtained consent from all patients admitted to a geriatric unit within 24–48 hours (or post delirium). Thereafter, patients included were evaluated using the decisional tree by a rehabilitation professional within 48–72 hours, and allocated aleatory to MATCH or CONTROL. The same day or the next one, the physician prescribed the MATCH program and the rehabilitation professional taught the prescribed exercises during one session. Finally, during his usual and daily visit, the physician interviewed the patient about his exercise adherence and provided feedback to the patient according to his answer.

Measure procedures:

For the purpose of this research, the following data were assessed. First, during a face-to face interview or using medical records, a physician collected clinical data to characterize the population (age, gender, height (cm), weight (kg), exclusion of delirium, diagnosis at admission, Mini-Mental State Examination (MMSE), Mini-Nutritional Assessment (MNA), Geriatric Depression Scale (GDS-4), number of medications, length of stay, discharge orientation (i.e. type and needs of service)). Second, a rehabilitation professional performed a physical assessment at admission and discharge, which included balance (bipodal balance: SPPB and dynamic and static balance: Berg), gait parameters (3-m Timed Up and Go test (TUG) and 4-m walking speed (SPPB)), muscular capacity

(30-second chair test), muscle strength (handgrip strength) and functional autonomy (Functional Autonomy Measurement System (SMAF) questionnaire). The research team also administered a face-to-face questionnaire with the patient to assess mobility (Life-Space Assessment (LSA)) before hospitalization.

Measures:

The tests used to capture the physical performance are validated and specific to older adults (see reference (18,19) for more details). Briefly:

1) Acceptability measures (main outcome):

Patient and health professional acceptability was evaluated using the System Usability Scale (SUS) questionnaire (21) and Likert scales on satisfaction and enjoyment (19).

The SUS questionnaire included 10 questions with scores of 0 (not satisfied) to 100 (very satisfied); 21). Likert scales of enjoyment and satisfaction, administrated to the patients and health professionals, included four categories from "strongly disagree" to "strongly agree".

2) Feasibility measures (main outcome):

Feasibility was evaluated using the ratio between the number of patients evaluated by the physician and the number of patients eligible to participate in the project. In addition, adherence to the physical activity program was assessed using the ratio between the numbers of sessions performed and the number of recommended sessions. The expected adherence level was set at 66% or two sessions per day.

3) Functional and physical performance (secondary outcome)

Functional autonomy was assessed using the validated SMAF questionnaire (22), which captures ADL (ADL; n=7) and Instrumental ADL (IADL; n= 8) capacities. For ADL or IADL, a patient with a score close to 0 is independent, whereas a patient with a score between -21 and -24 will be very dependent.

Balance was obtained using two validated tests: the Berg Balance Scale (BBS; (23)) and SPPB balance test (20). The BBS assesses the standing static and dynamic balance of older adults using 14 tasks with scores from 0 to 4. A score of 56 (highest score) represents very good balance.

A tandem and semi-tandem test from the SPPB balance test was also performed, where the participant was required to maintain the position for 10 seconds (more time = better balance).

Gait parameters were estimated through the validated 3-meters “Timed Up and Go” test. Completing the test in over 30 seconds indicates limited mobility and an increased risk of falls (24).

Normal walking speed was estimated using the validated “4-meter walking test”. A finish time above 1.2 m/s indicates very good walking speed, whereas less than 0.8 m/s indicates high risk of disability (25).

Muscular capacity was measured using the validated 30-second chair test (26). This test is very well known to estimate muscle power.

Muscle strength was measured using the Jamar©plus+. Participants were seated and three trials were performed per hand alternately. The best trial was recorded. Grip strength > 32kg for men and 20kg for women indicates good grip strength (27).

Statistical Analyses

Quantitative data were expressed as Means±SD or Medians(Minimum-Maximum), whereas qualitative data were expressed as range or percentage. As assumption of normal distribution was not met for all variables, between- (Mann Whitney) and within-group (Wilcoxon) nonparametric tests were run for continuous variables and Fisher exact test for categorical variables. Results were reported as "clinically significant" if the improvement has health impact. $P<0.05$ is considered as significant (SPSS v25.0).

RESULTS

Participants

A total of 76 patients were admitted to geriatric unit but only 37 were considered eligible. Among these, 26 accepted to take part in the study and were allocated as follows: 13 in the MATCH-group and 13 in the control-group. One participant in each group drop-out during hospitalization/at the beginning of the intervention (one due to the deterioration of his physical condition (Parkinson's disease) and the other due to anxiety). Table 1 describes baseline characteristics in both groups.

Healthcare impact of MATCH implementation

The MATCH-group received significantly (p=0.020) less formal rehabilitation treatment during hospitalization (12.4± 10.7%) than the control-group (31.1±18.3%). The same applies for MATCH-group participants with a history of falls, who also received less rehabilitation treatment (13.0±14.7%) than the fallers in the control-group (26.7 ±12.1%), but this result is non-significant (p=0.18). The estimated rehabilitation cost is three times higher for the control-group compared to the MATCH-group ($363± 273 vs 106±86; p=0.021) (Table 2). Regarding the impact of the implementation of MATCH, the MATCH group's length of stay was (22.5d (14 - 47)) shortened by two days compared to usual care (control group: 24.5d (9 – 51)), but this result was not statistically significant (p=0.71). There was a greater difference in the length of stay in participants with a history of falls, as the fallers in the MATCH-group (23.0d (14.0 – 47.0) reduced their stay by 11 days compared to those in the control-group (34.0d (11.0 – 51.0)).

Thus, the estimated cost of hospitalization is clinically but not statistically higher for the control-group (all: $45 325 (16 650 – 94 350) vs $41 625 (25 900 – 86 950) or fallers: $62 900 (20 350 – 94 350) vs $42 550 (25 900 – 86 950)) than the MATCH group.

Feasibility of MATCH implementation

An average of two working days (min-max:0–4.0) were needed for the physicians to assess participant eligibility and for rehabilitation professional to evaluate physical and functional capacity. Moreover, one additional day was needed for the physician's prescription (min-max:2.0–4.0). On average, the MATCH program was taught the same day than the prescription (min-max:2.0–5.0). Thus, patients' MATCH levels were attributed as follows: red (0%), yellow (8.3%), orange (8.3%), green (66.7%) and blue (16.7%). The prescription for the walking program was: 15 minutes/day in 25%, 30 minutes/day in 16.7%, 45 minutes/day in 50% and 60 minutes/day in 8.3% of cases.

Participation in the MATCH program covered 83.3% (min-max:50.0-89.4) of the total length of stay. Regarding adherence, patients included in the MATCH-group performed in average two sessions of exercises per day. More specifically, exercise 1 was performed at least once per day throughout the hospitalization by 9/12 participants and at least twice per day by 7/12 participants. Exercise 2 was performed at least once per day throughout the hospitalization by 8/12 participants and at least twice per day by 6/12 participants. The walking portion was performed at least once per day throughout the hospitalization by 10/12 participants and at least twice per day by 7/12 participants. Finally, the physician provided feedback 90% of the time (number of feedback provided/number of feedback possible; min-max:33.3–100).

Acceptability of MATCH implementation

The program prescribed was considered adequate by 90% of the rehabilitation professional. The patients were satisfied (36%) or very satisfied (55%) and enjoyed (36%) or very much enjoyed (64%) the MATCH program. In addition, based on the SUS questionnaire, 83% of patients reported that the MATCH program was a very satisfying care tool.

Efficacy of MATCH implementation

As shown in Table 3, activity of daily living (SMAF-ADL: -1.21±1.05 *vs* -0.60±0.97; p=0.026), Berg balance scale (45.73±5.78 *vs* 48.45±4.59; p=0.007), Timed Up and Go (23.87±11.63 *vs* 18.55±9.06; p=0.004), walking speed TUG (0.31±0.14 *vs* 0.39±0.17; p=0.006) and sit-to-stand 5X (24.09±10.54 *vs* 18.32±4.79; p=0.016) improved significantly, whereas muscular capacity (30STS: 6.92±3.23 *vs* 8.12±2.36; p=0.056) tended to increase between admission and discharge in the MATCH-group. However, SPPB scores improved clinically since the MATCH-group gained more than one point (6.17±2.44 *vs* 7.25±2.70).

In the control-group, activity of daily living (SMAF-ADL: -1.21±1.72 *vs* -0.50±1.17; p=0.020), SPPB score (5.33±2.77 *vs* 6.42±2.94; p=0.008), Berg balance scale (41.00±14.00 *vs* 43.89±12.60; p=0.021), Timed Up and Go (24.22±9.07 *vs* 19.32±6.45; p=0.037) improved between admission and discharge. Furthermore, SPPB scores improved clinically since the control-group gained more than one point.

More importantly, we observed a superiority effect of the MATCH-group compared to usual care (control-group) on the sit-to stand-test, which was repeated five times (p = 0.040).

As shown in Table 4, Berg balance scale (44.80±5.85 *vs* 48.20±4.87; p=0.039) and Timed Up and Go (25.62±13.49 *vs* 18.92±10.05; p=0.046) improved significantly whereas walking speed TUG (0.30±0.15 *vs* 0.40±0.20; p=0.075) tended to increase between admission and discharge in fallers in the MATCH-group. However, SPPB scores improved clinically since the MATCH-group gained more than one point (6.50±1.87 *vs* 7.50±1.84). No difference was observed between admission and discharge for fallers in the control-group.

DISCUSSION

The main purpose of this pilot study was to assess the feasibility and acceptability of implementing MATCH, and explore the potential benefits on functional capacities in hospitalized older patients, and more specifically in those having experienced falls before the hospitalization.

First, we showed that the time needed from admission to MATCH prescription was only two working days. Participants were able to begin their physical activity programs the following day. Even if this tool is adapted from our previous study, we were able to reduce the physical intervention delay from five to three days (17). Therefore, adding a decisional tree to prescribe specific physical activity interventions appears to accelerate patient mobility. This result is important as promoting mobility promptly helps avoid iatrogenic decline in patients (10). In fact, Hauer et al. reported that two days between two PA programs (immediately or delayed) lead to one additional point on the SPPB test, which is considered clinically significant for older adults (20). However, little information exists on this aspect in literature. Furthermore, adherence to the MATCH tool was on average two sessions per day, which is more than in our SPRINT study, where participants performed an average of one session per day (17). Thus, our patients exercised by themselves an average of 30 minutes/day and reached the weekly exercise recommendation (American College Sport Medecine: >180minutes/week). These differences may be explained by three aspects of the MATCH tool: first, patients could practice independently as the exercises were unsupervised but adapted, and did not require additional human resources, which are often very limited in hospitals. Second, the exercises do not require specialized equipment or rooms. Third, the exercises were prescribed like medication by the physician, who followed-up during his/her usual daily visit. Our results are in accordance with previous studies, which observed that adherence is high during an exercise intervention (28). However, this aspect is not reported in the unsupervised and pragmatic intervention study included in this systematic review (11) and hence, findings cannot be compared. Thus we believe that this point strengths the implementation of our MATCH tool as a usual care in geriatric unit. Finally, the MATCH tool was also deemed acceptable by patients and healthcare professionals. Indeed, 83.8% of participants report that they were satisfied with the MATCH tool; of these 90% were satisfied or very satisfied with the exercises prescribed and 100% enjoyed or enjoyed them a lot. A study reported that enjoyment and motivation were higher for people who completed their exercises using instruction leaflets (internal) than those using exergames (external) during 10 days of hospitalization (28). The type of motivation (external *vs*. internal), which is an important element in acceptability and adherence to a PA practice, could explain this difference (29). Thus, interventions using intrinsic motivation (self-determination) as a key element should be considered for exercise tool implementation.

In addition, we also observed that implementing MATCH had an impact on care during hospitalization. First, patients who received the MATCH intervention had fewer rehabilitation treatments (2 in all sample or 7 in fallers) than the control-group during hospitalization, even if the patients were in similar condition at admission. This significant difference in number of treatment could be due to natural human bias and explain the lack of differences between MATCH-group and control-group which both improved functional capacities. Finally, even if we add the cost of MATCH implementation ($366 for 20 days of hospitalization for all steps), these patients have a lower care cost than the control-group. Furthermore, the MATCH-group stayed in geriatric unit less than control group (~2days in all sample; ~11days in fallers). Therefore, based on the average hospitalization cost in geriatric unit (i.e $1.850/ day (30)) and on the MATCH implementation cost, our results seem to show that integrating the MATCH tool into usual care is cost-effective, as estimated hospitalization costs drop by $3.600 and $20.200/patient for all participants and fallers respectively, compared to the control group. This observation is important since hospitalization for falls in older adults costs $30,000 more than other types of hospitalizations (31). Nevertheless, the result was non-significant, which may be due to the small sample size, as our pilot study was designed to evaluate the feasibility rather than the impact of the intervention. In their meta-analysis, Cortes et al. showed a significant decrease in the length of stay following a PA intervention (12). However, other studies did not report this finding (13,32). Thus, further studies are needed on the implementation of this pragmatic PA intervention.

Finally, both groups improved significantly physical and functional performances. Only sit-to-stand ability (five repetitions) improved significantly more in the MATCH-group compared to the control-group. These findings are in line with other studies, which showed that implementing a PA intervention during hospitalization improved physical performance (11-14,32). However, the absence of other differences may be due to lack of power (small sample size) or the number of rehabilitation treatments (human bias/study design). Furthermore, we also observed that in fallers, even if they haven't the same amount of rehab treatments (control>MATCH), only MATCH group improved physical and functional parameters between admission and discharge. No fall was reported (data not shown) in the MATCH group even if it was unsupervised. Thus, this result could be important for professionals involved in geriatric care, as 50% of older adults over age 80 will fall, and 30% of them will be re-hospitalized for a fall within three months (6).

In conclusion, MATCH seems feasible, acceptable and safe for patients and healthcare teams. In addition, MATCH seems generalizable (pragmatic co-creation design) and could generate savings for healthcare systems to improve geriatric practice. Further studies implementing MATCH in a larger sample of patients admitted in several geriatric unit to confirm that MATCH could be considered as a pragmatic tool and integrated into usual care to counteract iatrogenic decline in older adults.

ACKNOWLEDGEMENTs:

We thank the professional team of the geriatric unit involved in this project and the participants. We also thank Ms Abdelkadher and Mr Delagrave who assisted the team.

FUNDING SUPPORT & CONFLICT OF INTEREST:

This project was funded by CAREC-CRIUGM. Aubertin-Leheudre and Buckinx are supported by the Fonds de recherche du Québec Santé. No conflict of interest.

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TABLES:

Table 1: Comparison of baseline characteristics between MATCH and control groups

Variables	**MATCH-group (n=12)**	**Control-group (n=12)**	**P-value**
Age (years)	83.5 (68.6 - 88.6)	80.3 (68.3 – 88.4)	0.12
Women (n; (%))	8 (66.7)	8 (66.7)	1.00
Caucasian (n; (%))	11 (91.7)	10 (83.3)	0.90
Civil status (in couple, n ;(%))	5 (41.7)	5 (41.7)	1.00
Number of medications (n)	12 (6 – 16)	15 (2 – 24)	0.026
Mini-Mental State Examination (/30)	28.5 (22 – 30)	28.0 (20 – 30)	0.46
Geriatric Depression Scale - 4 (/4)	1.5 (0 – 4.0)	1.5 (0 – 3.0)	0,46
Body mass index (kg/m²)	27.7 (17.5 – 34.3)	31.7 (21.3 – 51.2)	0.12
Mini Nutritional Assessment (/14)	10.0 (7.0 – 14.0)	11.5 (7.0 – 14.0)	0.46
SMAF-ADL score (/-21)	-1.25 (-3.0 – 0.0)	-1.0 (-6.0 – 0.0)	0.53
SMAF-IADL score (/-24)	-6.75 (-20.0 – 0.0)	-8.0 (-14.0 – 0.0)	0.73
Walking speed (m/s)	0.65 (0.26 – 1.12)	0.60 (0.25 – 1.13)	0.86
Falls within 3 months prior hospitalization (yes, n; (%))	6 (50.0)	6 (50.0)	1.00
Numbers of falls (n)	2.5 (1 – 15)	1.5 (1 – 4)	0.46
Diagnoses (%) :			n.a
- Nervous system	2 (16.7)	3 (25.0)	
- Mental or behavioral disorders	6 (50.0)	2 (16.7)	
- Musculoskeletal system	0 (0.0)	2 (16.7)	
- Others	4 (33.3)	5 (41.7)	

<u>*Legend:*</u> P-values obtained using non-parametric t-test (Mann-Withney) and Fisher Test (dichotomic variable). SMAF-ADL: Functional Autonomy Measurement System-Activity of Daily Living; SMAF-IADL: Functional Autonomy Measurement System-Instrumental Activity of Daily Living Data presented as % or median (min-max); $p<0.05$ significant (SPSS 25.0). n.a = non applicable

Table 2: Impact of MATCH implantation on health care practice

Variables	**MATCH-group**	**Control-group**	**P-value**
Care during hospitalization			
Rehabilitation treatment (n/patient)	2.13 ± 1.73	7.27 ± 5.48	**0.012***
Rehabilitation treatment in fallers (n/patient)	2.33 ± 2.52	7.33 ± 4.41	0.12
Relative rehabilitation treatment (number/hospitalization day; (%))	12.4 ± 10.7	31.1 ± 18.3	**0.020***
Relative rehabilitation treatment in fallers (number/hospitalization day; (%))	13.0 ± 14.7	26.7±12.1	0.18
Estimated Rehabilitation cost ($/patient)	106.2 ± 86.3	363.6 ± 273.9	**0.021***
Estimated Rehabilitation cost in fallers ($/patient)	116.6 ± 125.8	366.6 ± 220.61	0.12
Hospitalization length of stay and estimate cost			
Length of stay (days)	22.5 (14.0 – 47.0)	24.5 (9.0 – 51.0)	0.71
Estimated Hospitalization cost ($/patient)	41 625 (25 900 – 86 950)	45 325 (16 650 – 94 350)	0.71
Length of stay in fallers (days)	23.0 (14.0 – 47.0)	34.0 (11.0 – 51.0)	0.19
Estimated Hospitalization cost in fallers ($/patient)	42 550 (25 900 – 86 950)	62 900 (20 350 – 94 350)	0.19

Legend: Data are presented as median (min-max) or mean ± standard deviation; *p<0.05 significant (SPSS 25.0). P-values obtained using non-parametric t-test (Mann-Whitney). The Canadian daily cost of hospitalization is $1.850 based on (30). The average cost of rehabilitation in geriatric unit is $50/treatment according to Régie de l'Assurance Maladie du Québec (RAMQ).

Table 3: Impact of MATCH implementation on physical and functional parameters

Variables	MATCH-group			Control-group			P-value between groups on changes
	Admission	**Discharge**	**p-value**	**Admission**	**Discharge**	**p-value**	
Body composition							
Body mass index (kg/m^2)	26.05±4.73	26.32±4.21	0.37	31.61±7.98	31.63±7.86	0.64	0.36
ADL and IADL							
SMAF-ADL (X/-21)	-1.21±1.05	-0.60±0.97	**0.026***	-1.21±1.72	-0.50±1.17	**0.020***	0.76
SMAF-IADL (X/-24)	-8.62±7.29	-7.10±5.75	0.38	-6.95±4.39	-6.39±4.11	0.10	0.59
Functional capacities							
SPPB score (X/12)	6.17±2.44	7.25±2.70	0.09#	5.33±2.77	6.42±2.94	**0.008*#**	0.98
Berg Balance scale (X/56)	45.73±5.78	48.45±4.59	**0.007***	41±14	43.89±12.60	**0.021***	0.94
Timed Up and Go (seconds)	23.87±11.63	18.55±9.06	**0.004***	24.22±9.07	19.32±6.45	**0.037***	0.58
Walking speed TUG (m/s)	0.31±0.14	0.39±0.17	**0.006***	0.28±0.10	0.35±0.15	*0.05+*	0.54
Usual gait speed, 4mW (m/s)	0.66±0.26	0.72±0.27	0.239	0.63±0.22	0.71±0.19	*0.07+*	0.91
30-STS (n)	6.92±3.23	8.12±2.36	*0.056+*	7.04±3.80	8.42±4.19	0.21	0.86
5x-STS (seconds)	24.09±10.54	18.32±4.79	**0.016***	19.78±7.41	18.84±5.64	0.20	**0.040***
Handgrip strength (kg)	21.86±4.85	22.11±4.04	0.81	19.49±8.16	20.10±8.21	0.59	0.89

Legend: SMAF-ADL: Functional Autonomy Measurement System-Activity of Daily Living; SMAF-IADL: Functional Autonomy Measurement System-Instrumental Activity of Daily Living; SPPB: Short Physical Performance Battery; 30-STS: 30 second Sit-to-Stand; 5x-STS: 5 times Sit-to-Stand. Data presented as mean ± standard deviation; *p<0.05 significant (SPSS 25.0); +p<0.075 tendency; #clinically significant.
p values obtained using nonparametric paired t-test (Wilcoxon) and t-test (Mann-Whitney). Change=discharge-admission (data not shown).

Table 4: Effect of MATCH implementation or not (control-group) on physical & functional parameters: according to fall history

Variables	Fallers in MATCH-group			Fallers in control-group			P-value between groups on changes
	Admission	Discharge	p-value	Admission	Discharge	p-value	
Body composition							
Body mass index (kg/m^2)	24.79±5.12	25.45±4.57	**0.043***	35.84±8.38	35.62±8.22	0.35	**0.037***
ADL and IADL							
SMAF-ADL (X/-21)	-1.17±1.03	-0.25±0.50	0.10	-1.75±2.27	-1.17±2.02	0.10	0.71
SMAF-IADL (X/-24)	-10.75±9.16	-8.12±7.82	0.14	-7.17±3.11	-4.63±4.31	0.11	0.56
Functional capacities							
SPPB score (X/12)	6.50±1.87	7.50±1.84	$0.34^{\#}$	4.67±2.34	5.50±2.74	0.09	0.62
Berg Balance scale (X/56)	44.80±5.85	48.20±4.87	**0.039***	42.80±13.24	45.80±9.28	0.14	0.67
Timed Up and Go (seconds)	25.62±13.49	18.92±10.05	**0.046***	21.76±9.34	19.73±7.58	0.29	0.15
Walking speed TUG (m/s)	0.30±0.15	0.40±0.20	0.075^{+}	0.31±0.12	0.35±0.16	0.46	0.20
Usual gait speed, 4mW (m/s)	0.68±0.27	0.71±0.28	0.92	0.64±0.17	0.69±0.17	0.6	0.52
30-STS (n)	7.67±2.50	8.75±2.32	0.10	6.08±3.17	7.50±5.20	0.49	0.75
5x-STS (seconds)	21.05±6.41	17.05±4.32	0.12	21.62±7.68	20.89±5.22	0.89	0.47
Handgrip strength (kg)	23.08±6.76	22.50±5.53	0.46	18.03±7.45	19.10±5.52	0.46	0.42

Legend: SMAF-ADL: Functional Autonomy Measurement System-Activity of Daily Living; SMAF-IADL: Functional Autonomy Measurement System-Instrumental Activity of Daily Living; SPPB: Short Physical Performance Battery; 30-STS: 30 second Sit-to-Stand; 5x-STS: 5 times Sit-to-Stand. Data presented as mean ± standard deviation; *$p<0.05$ significant (SPSS 25.0); $^{+}p<0.075$ tendency; $^{\#}$clinically significant.
p values obtained using nonparametric paired t-test (Wilcoxon) and t-test (Mann-Whitney). Change=discharge-admission (data not shown).