JAMDA 26 (2025) 105381

JAMDA

journal homepage: www.jamda.com

Research Letters

Mitigating Deconditioning in Nursing Homes: A Feasibility and Acceptability Study of the PUSH Tool (Promoting the Autonomy through Exercise in Nursing Home)

Normal aging is associated with functional decline,[1] which is exacerbated by sedentary lifestyles, a behavior prevalent among older adults and especially for those in nursing homes (NHs).[2] More than 30% of NH residents report a decrease in physical activity since their admission[3] and sedentary behavior in NHs exceeds 10 h/d.[4] However, practicing regular physical activity has significant benefits for NH residents (eg, improving physical performance, improving quality of life, preventing falls).[5] However, intrinsic and extrinsic barriers (eg, perceived health status, lack of motivation, environmental constraints) exist.[6] The lack of specific recommendations or pragmatic interventions for this population seems be another important barrier. Previous studies show that pragmatic tools that integrate physical activity programs tailored to the functional capacity of older adult (eg, the preventing loss of autonomy by treatment post-hospitalization[7] tool) are potential solutions to prevent the physical decline observed with advancing age. However, existing tools are not specific to the NH populations. It is also important to recognize the important role of external motivation in promoting physical activity in NH residents.[8] To address these challenges, the implementation of a pragmatic tool [Promoting the aUtonomy Through exerciSe in Nursing Home (PUSH)] is proposed, with the aim of assessing its feasibility and acceptability in NHs, while investigating the impact of external motivation. The hypotheses are as follows: (1) the implementation of the PUSH tool will be perceived as feasible and acceptable by NH residents, and (2) integrating external motivation into the program, through personalized support, will enhance the adherence of NH residents to the PUSH program.

Methods

Study Design

To do this, a feasibility and acceptability pilot study was carried out in 3 NHs in the province of Liège, Belgium.

Sample

Participants who met the inclusion criteria [≥65 years of age; not in end-of-life care, as determined by the physician; able to perform physical activity safely, as assessed by the health care team (in a standing, sitting, or lying position); and able to give voluntary and informed consent to participate in the research project and the 1-month physical activity program] were recruited using a convenience sampling method.

Intervention

A decisional tree, including validated physical tests for muscle strength balance and muscle endurance, was used to establish individual score abilities. More specifically, for ambulatory individuals, the decision tree consists of 3 validated tests to assess physical ability: (1) the 30-second chair-stand test; (2) a balance test with feet together, semitandem and tandem (balance test from the short physical performance battery test); and 3) a 4-m comfortable walking speed test (walking test from the short physical performance battery test).[9-11] The decision tree specific to bedridden or wheelchair-bound individuals includes 6 tests: (1) maintaining balance in a seated position on a chair without armrests; (2) maintaining balance in a seated position on a chair without armrests, using arms as levers, during imposed positions (hands on knees/hands crossed at shoulders/arms extended horizontally in front/arms extended horizontally in front with a 2-kg weight in hands); (3) picking up an object from the ground while seated on a chair without armrests; (4) alternately placing feet on an object 8 cm high placed on the ground in front of the participant while sitting on a chair without armrests; (5) 2 half-chair stands with support on armrests until elbows are in full extension; and (6) a comfortable wheelchair propulsion speed test over 10 m can be performed. Based on this score, the PUSH tool assigns tailor-made exercise programs to NH residents with or without a wheelchair. Each PUSH exercise program includes 2 daily exercises focused on muscle strengthening and balance and personalized walking or wheelchair distances. For each exercise, it is recommended to perform 1 to 2 sets of 10 to 12 repetitions, depending on the program. Participants were randomized into 2 PUSH modality groups: those who received external motivation (PUSH-EM) twice a week to complete the exercises (ie, a physiotherapist visited the participants to encourage them to continue their program) and those who did not (PUSH-NEM).

Funding: Dr Buckinx is supported by the “Fonds National pour la Recherche Scientifique” (FNRS, chargée de recherches), and has received a grant from the “Fondation Léon Frédéricq” for this research.

https://doi.org/10.1016/j.jamda.2024.105381

Table 1
Acceptability and Feasibility of the PUSH Program

Variables	PUSH-EM Group (n = 27)	PUSH-NEM Group (n = 28)	*P* Value
Feasibility			
Adherence			
Number of included participants/number of eligible participants (%)	27/72 (37.5)	28/72 (38.9)	.91
Number of completed sessions/number of prescribed sessions (%)	36.4/56 (65)	35.4/56 (63.2)	.82
Satisfaction			
Not satisfied at all with the program	2 (8.3)	2 (7.5)	.17
Somewhat satisfied with the program	3 (12.5)	8 (29.6)	
Satisfied with the program	12 (50)	6 (22.2)	
Highly satisfied with the exercise program	7 (29.2)	11 (40.7)	
Acceptability			
SUS, /100 [median (quartiles)]	77.5 (66.9-83.1)	77.5 (63.8-82.5)	.75
Difficulty			
The perceived difficulty during the execution of the program's exercises is nonexistent	12 (50)	9 (33.3)	.19
The perceived difficulty during the execution of the program's exercises is slight	4 (16.7)	12 (44.5)	
The perceived difficulty during the execution of the program's exercises is moderate	6 (25)	4 (14.8)	
The perceived difficulty during the execution of the program's exercises is extreme	2 (8.3)	2 (7.4)	

Values are number (%) or as otherwise indicated.

Measurements

In addition to sociodemographic characteristics, 2 indicators (adherence rate and satisfaction using a 4-point Likert scale) and 2 proxies [perceived difficulty using a 4-point Likert scale and usability using the validated System Usability Scale (SUS) questionnaire] were assessed to evaluate feasibility and acceptability. The expected values were >80% for adherence and satisfaction, 68 of 100 for SUS and <40% for difficulty.[12,13]

Statistical Analysis

Statistical analysis involved testing data distributions, expressing quantitative variables as means ± SDs and qualitative variables as percentages. Independent *t* tests and χ^2 tests were used to compare groups, with statistical significance set at $P < .05$. All calculations were performed using R statistical packages (Revolution Analytics).

Results

Population

Of the 75 eligible residents within the institutions, 55 participants (PUSH-EM: n = 27 vs PUSH-NEM: n = 28), aged 84.9 ± 7.5 years with 70.9% women and a Mini Mental State Examination score of 27 of 30 points were enrolled (recruitment rate: 73.3%). Almost 13% of the participants (12.7%) do not need any technical assistance to walk. Of the included participants, 8 residents dropped out (dropout rate: 14.5%). More specifically, 4 individuals refused to continue and 4 were hospitalized.

Feasibility

The adherence rate was similar between the 2 groups, as evidenced by comparable numbers of patients enrolled (PUSH-EM: 37.5% vs PUSH-NEM: 38.9%; $P = .91$) and sessions completed (PUSH-EM: 62% vs PUSH-NEM: 63.2%; $P = .82$). However, the ratio of sessions completed to sessions prescribed was below the expected threshold of 80% in both groups. Self-reported satisfaction with the PUSH program also showed no significant difference between groups (PUSH-EM: 91.7% vs. PUSH-NEM: 92.5%; $P = .17$) (Table 1).

Acceptability

The groups were also similar (SUS questionnaire: PUSH-EM: median (/100): 77.5 and quatiles: 66.9-83.1 vs PUSH-NEM: median (/100): 77.5 and quartiles: 63.8-82.5; $P = .75$; perceived difficulty: PUSH-EM: 33.3% vs PUSH-NEM: 22.2%; $P = .19$) (Table 1).

Discussion

The feasibility and acceptability study of the PUSH tool in NHs revealed important insights into the challenges of implementing tailored exercise programs. Although adherence rates were below the expected threshold of 80%, the PUSH tool was generally considered acceptable and feasible, independent of external motivation. Adherence rates in our study aligned with existing literature, which reported rates between 60% and 97% for similar interventions.[14-16] Interestingly, although external motivation is often cited as a factor influencing adherence,[17] our findings did not support this, indicating the need to explore other factors (eg, individual preferences, perceived benefits, social support, environmental influences) within NHs.

Recruitment challenges were also evident, with a consistent rate (~40%) similar to previous studies, underscoring the need for innovative strategies to enhance participation.[13,18-24] Satisfaction levels exceeded 80%, suggesting that improving participant satisfaction could enhance adherence rates.

In terms of feasibility, perceived difficulty remained <40% in both groups, indicating that participants did not find the PUSH program overly challenging. This finding is consistent with previous research showing the feasibility of physical activity programs in NHs.[13] Furthermore, the usability score exceeded the threshold of 68, indicating that participants found the program accessible and easy to use, which suggests its effective integration into routine practice.[25]

Potential limitations of the study include the small sample size and the geographic focus on the province of Liège, Belgium. Future research should involve larger, more diverse populations to ensure generalizability. Additionally, the study duration may not have been sufficient to capture changes in adherence, usability, satisfaction, and difficulty over time. Long-term studies assessing the impact of the PUSH program on physical function, quality of life, and autonomy would provide valuable insights into its effectiveness. Finally, the statistical analyses were conducted without blinding, which may influence the interpretation of the results.

Conclusions

Our study suggests that the PUSH tool could be considered as acceptable and feasible in NH settings, despite slightly lower than expected adherence rates (80%). Future research should focus on evaluating the factors facilitating the long-term adherence of the PUSH program among NH residents. In addition, larger-scale implementation studies are needed to further evaluate the effectiveness of the PUSH tool in promoting autonomy and improving the overall well-being of institutionalized older adults.

Disclosures

The authors declare no conflicts of interest.

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