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Article

Activity Tracking Behavior and Engagement in Regular Physical Activity Among Older Adults and Care Partners

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Abstract

Background: Activity trackers support physical activity, yet evidence on their effectiveness among older adults and care partners is limited. This study assesses the relationship between activity-tracking frequency and engagement in regular physical activity among older adults and care partners. Methods: For this cross-sectional study, 615 older adults and care partners completed online surveys assessing the frequency of activity tracking (predictor) and the regularity in physical activity engagement (outcome). Using multivariable logistic regression, we assessed the association between the predictors and the outcome across the entire population and separately among older adults (n=310) and care partners (n=305), adjusting for sociodemographic, mobility, and health-related covariates. We reported the adjusted odds ratio (aOR) and 95% confidence intervals (CI). Results: Older adult (OA) and care partner (CP) respondents were predominantly female (OA: 57%, CP: 53%) and non-Hispanic White (OA: 51%, CP: 43%). Across the entire population, frequent tracking of physical activity was associated with a 2.4-fold increase in the odds of engaging in regular physical activity (aOR: 2.40; 95% CI: 1.45 – 3.96). Older adults who frequently track their physical activity were 2.5 times more likely to engage in regular physical activity (aOR: 2.47; 95% CI: 1.08–5.64). Care partners who occasionally tracked their physical activity were 3.5 times more likely to engage in regular physical activity (aOR: 3.54; 95% CI: 1.54 – 8.11). Conclusion: Physical activity tracking is associated with greater physical activity engagement among older adults and care partners. Physical activity trackers can therefore serve as low-cost interventions to improve physical activity behavior.

Keywords: physical activity; activity tracking; older adults; care partners; exercise

1. Introduction

Regular physical activity is a critical determinant of healthy aging [1,2], promoting mobility [3,4], cardiovascular function [5,6], cognitive health [7,8], and overall quality of life in older adults [9–12]. Despite these substantial benefits [13–15], fewer than one in four older adults in the United States [16] meet recommended physical activity guidelines, with participation declining further in the presence of chronic disease, mobility limitations, or advancing age [17,18]. Lack of regular physical activity often extends to care partners, defined as family members or friends who provide physical, emotional, or logistical support to an older adult [19], who may face similar or even heightened barriers to maintaining regular activity [20–22]. Time constraints, caregiving responsibilities, stress, and competing daily demands can limit opportunities for both older adults and their care partners to engage in consistent physical activity [20–24].

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As interest grows in practical approaches to increase physical activity, digital activity trackers, including smartphones, pedometers, and wearable devices, have emerged as widely accessible tools that encourage self-monitoring and behavior change [25,26]. These devices provide real-time feedback, reinforce progress, promote awareness of daily movement, and facilitate long-term adherence to physical activity [26]. For older adults and care partners, who often navigate fluctuating schedules and complex health-related demands, activity tracking may offer a simple and adaptable strategy to support consistent engagement in physical activity [27,28].

Existing research indicates that older adults adopt wearable activity trackers at lower rates than younger populations [29–31]. Randomized trials have demonstrated short-term increases in daily step counts and moderate-to-vigorous physical activity among older adults using activity trackers [32–43]. While some observational studies have examined associations between wearable use and activity levels among older adults [44–46], the evidence base characterizing the naturally occurring frequency of wearable use and its relationship to regular physical activity behavior in real-world settings remains limited. Care partners are rarely examined as a distinct group in these experimental and observational studies [47,48], despite their distinct caregiving demands and the potential for wearable activity trackers to influence their physical activity.

The aim of this study, therefore, is to evaluate the association between frequency of activity tracking and engagement in regular physical activity among older adults and care partners. We hypothesized that more frequent tracking would be associated with higher odds of engaging in regular physical activity, with potentially distinct patterns between older adults and care partners. Understanding how tracking behaviors relate to physical activity engagement can inform low-cost, scalable strategies to promote health and mobility in aging populations and their support networks.

2. Materials and Methods

Study Design and Setting

We conducted a cross-sectional online survey study to examine the relationship between activity-tracking behaviors and engagement in regular physical activity among older adults and care partners. The survey was administered as part of the pilot and survey validation of the Activity Tracking, Care Partner Co-Participation, Text Reminders, Instructional Education, Virtual Physical Therapy, and Exercise (ACTIVE) project.

Participant Recruitment

Participants were recruited nationwide through ResearchMatch, a National Institutes of Health–supported volunteer registry that connects researchers with individuals interested in participating in health studies [49]. Recruitment messages were distributed to eligible platform members, and individuals who responded were directed to an electronic consent form and the study survey. Data were collected and stored using Research Electronic Data Capture (REDCap), a secure, web-based platform for research data management [50].

Eligibility Criteria

Two groups were eligible for participation: older adults and care partners. Older adults were eligible if they were aged 65 years or older, could read English, and had internet access to complete the online survey. Care partners were eligible if they were aged 18 years or older, provided ongoing unpaid support to an older adult, and met the same language and internet-access requirements. Individuals providing paid or formal caregiving services and respondents who indicated substantial difficulty completing an online survey due to cognitive limitations were excluded.

Outcome Measure

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The primary outcome was engagement in regular physical activity. Respondents were asked, "In the past week, how many days did you engage in physical activity, such as walking or light exercise?" Response was measured on an ordinal scale: 0 days, 1-2 days, 3-4 days, 5 or more days. We defined regular physical activity as engagement in physical activity for 3 or more days per week, consistent with the World Health Organization guidelines [51].

Primary Predictor Variable

The main predictor was frequency of activity tracking. Participants were asked how often they track their physical activity using any tool (e.g., smartphone application, pedometer, wearable device). Response was measured using a five-item ordinal scale: never, rarely, sometimes, often, always. We defined frequency of activity tracking as either rarely ("never" or "rare"), occasionally ("sometimes"), or frequently ("often" or "always").

Potential Confounders

We selected sociodemographic, mobility, and health characteristics as potential confounders of the association between frequency of activity tracking and regular physical activity, based on prior literature [47,52–56]. Sociodemographic characteristics included age, sex, race and ethnicity, educational attainment, marital status, and living situation (living alone versus with others). Mobility-related factors included a history of a fall in the past year and functional limitations. For the mobility characteristic, respondents were asked whether they had fallen in the past 12 months (yes or no) and whether they had any health conditions that limit their ability to be physically active (yes or no). Health characteristics included the Charlson Comorbidity Index and the Clinical Frailty Scale score. The Charlson comorbidity index is a measure of the comorbidities and a predictor of 10-year mortality, computed from 16 chronic diseases [57,58]. The score is a weighted sum of the 16 chronic diseases, ranging from 0 to 24 [59,60]. We measured the Charlson comorbidity index as a continuous variable. The Clinical Frailty Scale, a measure of frailty, is a 9-item scale (Cronbach alpha: 0.76 – 0.91) that assesses an individual's vulnerability to stressors [61–63]. We defined the Clinical Frailty Scale score as a three-level categorical variable – fit (scores 1 – 3), vulnerable (score of 4), and frail (score of 5 – 9), consistent with prior studies [64,65].

Missing Data

A total of 698 persons initiated the survey, and 615 (88.1%) provided complete responses. We performed listwise deletion on these 83 respondents because missingness was not at random [66].

Statistical Analysis

We reported the frequency distributions of all categorical variables. Continuous variables were summarized using means and standard deviations or medians and interquartile ranges, depending on their distribution. Bivariate associations between participant characteristics and engagement in regular physical activity were examined using chi-square tests, independent sample T-test, and Mann-Whitney U test as appropriate. To evaluate the association between activity-tracking behavior and engagement in regular physical activity, we first assessed variance inflation factors and correlation coefficients among the covariates, ensuring that no covariate exhibits a correlation greater than 0.3 and that the model's variance inflation factor does not exceed 3.0 [67,68]. All the variables in the model met these criteria. Next, we performed a multivariable logistic regression for three analytic groups: the combined sample of older adults and care partners (N=615), older adults only (n=310), and care partners only (n=305). We reported the adjusted odds ratios (aORs) with corresponding 95% confidence intervals. All analyses were performed using Stata version 16 [69].

Ethical Considerations

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This study was approved by the New York University Langone Health Institutional Review Board (IRB# i25-00450). All study participants provided electronic informed consent before access to the survey. Study procedures adhered to institutional and federal ethical guidelines for research involving human participants.

3. Results

The mean age was 52.8 years (SD 19.0) for the overall sample, 70.1 years (SD 4.3) for older adults, and 35.3 years (SD 10.1) for care partners. Overall, 55.0% of participants were female (older adults 57.1%, care partners 52.8%). By race/ethnicity, 42.9% were non-Hispanic White (older adults 50.7%, care partners 35.1%), 30.6% non-Hispanic Black (older adults 31.6%, care partners 29.5%), 20.7% Hispanic (older adults 11.3%, care partners 30.2%), and 5.8% other races (older adults 6.5%, care partners 5.3%).

Regular physical activity was significantly associated with several demographic and social factors. Participants with regular activity were younger, more likely to be male, and less likely to be Non-Hispanic White. Participants living with others were more likely to engage in regular activity than those living alone. Participant status was strongly associated with physical activity: older adults were significantly more likely to report regular activity than care partners.

Several covariates were independently associated with activity. Across models, race and ethnicity demonstrated consistent associations, with Non-Hispanic Black, Hispanic, and Other racial groups generally exhibiting lower odds of regular physical activity compared with Non-Hispanic White participants. Among care partners, male sex was associated with lower activity. Insurance type was significant in the older adult model, and prior-year falls were associated with higher activity levels among care partners. Frailty was inversely associated with regular activity among older adults.

After adjusting for demographic, social, mobility-related, and health characteristics, activity-tracking frequency remained independently associated with regular physical activity, with different patterns observed across analytic groups. In the combined population, both occasional and frequent tracking were associated with higher odds of regular activity compared with rare tracking (occasional aOR = 2.18; 95% CI: 1.19 – 4.01; frequent aOR = 2.40; 95% CI: 1.45 – 3.96). Among older adults, frequent physical activity tracking was associated with a 2.5-fold increase in the odds of engaging in regular physical activity (aOR = 2.47; 95% CI: 1.08 – 5.64), whereas occasional physical activity tracking was not significantly associated with increased odds of regular physical activity. Among care partners, occasional physical activity tracking was associated with 3.5-fold increased odds of regular physical activity (aOR = 3.54; 95% CI: 1.54 – 8.11), while frequent physical activity tracking was associated with a 2-foldincreased odds regular physical activity (aOR = 1.99; 95% CI: 0.98 – 4.02), although this association was marginally insignificant (p = 0.05).

Table 1. Sociodemographic, mobility, and health characteristics of the study population (N=615), including older adults (n=310) and care partners (n=305).

Variables	All Population	Older Adults	Care Partners
Sociodemographic Characteristics			
Age (Mean, SD)	52.8 (19.0)	70.1 (4.3)	35.3 (10.1)
Sex			
Male	277 (45.0)	133 (42.9)	144 (47.2)
Female	338 (55.0)	177 (57.1)	161 (52.8)
Race/Ethnicity			
Non-Hispanic White	264 (42.9)	157 (50.7)	107 (35.1)
Non-Hispanic Black	188 (30.6)	98 (31.6)	90 (29.5)
Hispanic	127 (20.7)	35 (11.3)	92 (30.2)
Other Races	36 (5.8)	20 (6.5)	16 (5.3)
Highest Educational Degree			
High School Diploma	117 (19.0)	53 (17.1)	64 (21.0)

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College Degree	277 (45.1)	107 (34.5)	170 (55.7)
Graduate Degree	221 (35.9)	150 (48.4)	71 (23.3)
Marital Status			
Married	453 (73.7)	214 (69.0)	239 (78.4)
Never Married	49 (8.0)	14 (4.5)	35 (11.5)
Widow/Separated/Divorced	113 (18.4)	82 (26.5)	31 (10.1)
Living Situation			
Living alone	310 (50.4)	248 (80.0)	62 (20.3)
Living with others	305 (49.6)	62 (20.0)	243 (79.7)
Mobility Characteristics			
Fall in the last year			
Yes	479 (77.9)	234 (75.5)	245 (80.3)
No	136 (22.1)	76 (24.5)	60 (19.7)
Functional Limitations			
Yes	51 (8.3)	42 (13.5)	9 (3.0)
No	564 (91.7)	268 (86.5)	296 (97.0)
Health Characteristics			
Charlson Comorbidity Score			
Median, IQR	0.0 (0.0 – 0.0)	0.0 (0.0 – 1.0)	0.0 (0.0 – 0.0)
Clinical Frailty Scale			
Fit	559 (90.9)	276 (89.0)	283 (92.8)
Vulnerable	18 (2.9)	12 (3.9)	6 (2.0)
Frail	38 (6.2)	22 (7.1)	16 (5.2)
Predictor and Outcome Measures			
Activity Tracking Behavior			
Rarely	151 (24.5)	82 (26.5)	69 (22.6)
Occasional	100 (16.3)	36 (11.6)	64 (21.0)
Frequently	364 (59.2)	192 (61.9)	172 (56.4)
Physical Activity Engagement			
Irregular	184 (29.9)	67 (21.6)	117 (38.4)
Regular	431 (70.1)	243 (78.4)	188 (61.6)

Table 2. Bivariate association between engagement in physical activity and activity tracking behavior, sociodemographic, mobility, and health characteristics among the study population.

Variables	Physical Activity Engagement		p-value
	Regular (n=431)	Irregular (184)	
Sociodemographic Characteristics			
Participant Status			
Older Adult	67 (36.4)	243 (56.4)	<0.001
Care Partner	117 (63.6)	188 (43.6)	
Age (Mean, SD)	47.5 (18.7)	55.1 (18.8)	<0.001
Sex			
Male	99 (53.8)	178 (41.3)	0.004
Female	85 (46.2)	253 (58.7)	
Race/Ethnicity			
Non-Hispanic White	45 (24.5)	219 (50.8)	<0.001
Non-Hispanic Black	75 (40.7)	113 (26.2)	
Hispanic	45 (24.5)	82 (19.0)	
Other Races	19 (10.3)	17 (4.0)	
Highest Educational Degree			
High School Diploma	40 (21.7)	77 (17.8)	0.335

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College Degree	85b (46.2)	192 (44.6)	
Graduate Degree	59 (32.1)	162 (37.6)	
Marital Status			
Married	143 (77.7)	310 (71.9)	0.324
Never Married	12 (6.5)	37 (8.6)	
Widow/Separated/Divorced	29 (15.8)	84 (19.5)	
Living Situation			
Living alone	76 (41.3)	234 (54.3)	0.003
Living with others	108 (58.7)	197 (45.7)	
Mobility Characteristics			
Fall in the last year			
Yes	151 (82.1)	328 (76.1)	0.103
No	33 (17.9)	103 (23.9)	
Functional Limitations			
Yes	172 (93.5)	392 (91.0)	0.298
No	12 (6.5)	39 (9.0)	
Health Characteristics			
Charlson Comorbidity Score			
Median (IQR)	0.0 (0.0 – 0.0)	0.0 (0.0 – 0.0)	0.880
Clinical Frailty Scale			
Fit	163 (88.5)	396 (91.9)	0.385
Vulnerable	6 (3.3)	12 (2.8)	
Frail	15 (8.2)	23 (5.3)	
Predictor Measure			
Activity Tracking Behavior			
Rarely	54 (29.4)	97 (22.5)	0.190
Occasional	29 (15.7)	71 (16.5)	
Frequently	101 (54.9)	263 (61.0)	

Table 3. Multivariable logistic regression result of the association between engagement in physical activity and activity tracking behavior among the study population and separately among older adults and care partners.

Variables	**Physical Activity Engagement (Adjusted Odds Ratio (95% CI))**		
	All Population	**Older Adults**	**Care Partners**
Activity Tracking Behavior			
Rarely	Ref	Ref	Ref
Occasional	**2.18 (1.19 – 4.01)**	0.86 (0.32 – 2.28)	**3.54 (1.54 – 8.11)**
Frequently	**2.40 (1.45 – 3.96)**	**2.47 (1.08 – 5.64)**	1.99 (0.98 – 4.02)
Demographic Characteristics			
Age	**1.02 (1.01 – 1.03)**	1.03 (0.95 – 1.12)	0.99 (0.96 – 1.02)
Sex			
Male	0.71 (0.48 – 1.04)	1.46 (0.78 – 2.73)	0.50 (0.29 – 0.87)
Female	Ref	Ref	Ref
Race/Ethnicity			
Non-Hispanic White	Ref	Ref	Ref
Non-Hispanic Black	**0.29 (0.17 – 0.49)**	**0.37 (0.15 – 0.94)**	**0.15 (0.07 – 0.34)**
Hispanic	**0.56 (0.31 – 0.99)**	0.50 (0.16 – 1.53)	0.50 (0.23 – 1.08)
Other Races	**0.19 (0.09 – 0.42)**	**0.13 (0.04 – 0.41)**	**0.20 (0.06 – 0.67)**
Highest Educational Degree			
High School Diploma	Ref	Ref	Ref
College Degree	1.43 (0.82 – 2.48)	1.68 (0.67 – 4.23)	1.91 (0.86 – 4.26)

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Graduate Degree	1.37 (0.74 – 2.57)	1.50 (0.61 – 3.67)	1.59 (0.59 – 4.34)
Marital Status			
Married	Ref	Ref	Ref
Never Married	2.08 (0.91 – 4.76)	0.61 (0.13 – 2.79)	2.85 (0.91 – 8.88)
Widow/Separated/Divorced	0.98 (0.55 – 1.73)	0.96 (0.40 – 2.27)	1.23 (0.46 – 3.31)
Living Situation			
Living alone	0.77 (0.48 – 1.23)	0.95 (0.37 – 2.41)	1.13 (0.57 – 2.27)
Living with others	Ref	Ref	Ref
Fall in the last year			
Yes	1.43 (0.84 – 2.42)	1.07 (0.50 – 2.31)	**2.68 (1.14 – 6.34)**
No	Ref	Ref	Ref
Functional Limitations			
Yes	0.79 (0.35 – 1.76)	1.10 (0.42 – 2.88)	0.57 (0.10 – 3.14)
No	Ref	Ref	Ref
Charlson Comorbidity Score	1.00 (0.81 – 1.25)	0.79 (0.59 – 1.05)	1.11 (0.79 – 1.57)
Clinical Frailty Scale			
Fit	Ref	Ref	Ref
Vulnerable	0.59 (0.19 – 1.81)	0.41 (0.10 – 1.68)	0.95 (0.12 – 7.52)
Frail	0.56 (0.26 – 1.24)	0.36 (0.11 – 1.14)	1.07 (0.28 – 4.11)

Significant relationship in bold.

4. Discussion

In this cross-sectional study of 615 older adults and care partners, we found that more frequent activity tracking was associated with significantly greater engagement in regular physical activity. Specifically, older adults who frequently tracked their activity were more likely to engage in regular physical activity, whereas those who tracked occasionally did not show a similar effect. Among care partners, occasional tracking—rather than frequent tracking—was significantly associated with regular physical activity, with frequent tracking approaching statistical significance.

Activity tracking has been consistently linked to higher physical activity levels through mechanisms rooted in self-regulation and behavior-change theories [71–74]. Self-monitoring increases awareness of daily movement, strengthens accountability, and enables individuals to set and evaluate progress toward personalized goals [75–77]. Prior studies have shown that tracking reinforces positive feedback loops that motivate continued activity and can reduce sedentary time [73,78]. For older adults in particular, tracking may provide a compensatory structure that supports habit formation and offers real-time validation of effort [27,79]. Among care partners, activity tracking may also serve as a self-care tool, providing a structured way to maintain health behaviors amid caregiving responsibilities [22,47].

We report that older adults who frequently tracked their activity had substantially higher odds of engaging in regular physical activity, consistent with earlier studies [80,81]. A plausible explanation may be that older adults who track frequently may have integrated activity tracking into their daily routines, using feedback to maintain accountability and motivation [27,82,83]. Yet, older adults' adoption and continued use of physical activity trackers may be influenced by personal and social factors, as well as smartphone quality. Jin et al [82] reported factors that inform activity self-tracking behavior, including self-efficacy, technology affinity, device quality and design, perceived ease of use, perceived usefulness, perceived device value, social influence, and financial incentive. Hence, interventions aimed at improving physical activity through the use of physical activity trackers should be designed to minimize user burden, leverage intuitive and reliable technologies, and incorporate behavioral and social supports, such as goal setting, feedback, and caregiver or peer involvement, to promote sustained engagement and maximize potential benefits among older adults.

In contrast to older adults, care partners who occasionally tracked their physical activity had higher odds of engaging in regular physical activity. Although care partners who frequently tracked

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also showed higher odds of activity engagement, this association did not reach statistical significance. A possible explanation for the observed difference among care partners who occasionally and frequently track their physical activity may relate to the burden of caregiving they provide. Care partners often juggle multiple responsibilities, including work, caregiving, and household tasks [84–86], leaving less time for structured self-monitoring. Occasional tracking of physical activity may therefore represent a practical strategy for care partners with competing demands [87], in which tracking is used selectively to support motivation or goal setting without requiring sustained daily attention. In contrast, frequent physical activity tracking among care partners may reflect habitual self-monitoring behavior that persists despite time constraints and competing caregiving demands [86,88], such that high tracking frequency does not necessarily translate into greater opportunities to engage in physical activity.

Our findings have several implications for practice, program development, and future research. Activity tracking is a low-cost, accessible tool that may support regular physical activity among both older adults and care partners [27,81,83]. Hence, interventions aimed at increasing physical activity should use activity tracking as a supportive tool, recognizing that older adults and care partners may differ in how frequently or consistently they track their activity. Programs should emphasize achieving recommended weekly exercise goals [89,90], rather than strict adherence to daily tracking, so that tracking supports meaningful improvements in physical activity. In addition, providers should encourage coordinated and mutually reinforcing physical activity tracking behaviors between older adults and their care partners to strengthen motivation and promote shared participation in physical activity. At the community and organizational levels, senior centers, caregiving programs, and health-promotion initiatives could integrate easy-to-use physical activity-tracking devices into existing wellness activities and chronic disease management. Policy initiatives that expand access to digital activity-tracking devices through insurance coverage, community-based aging services, or fall-prevention programs may increase device adoption and reduce sedentary behavior. Finally, these results underscore the need for further research examining longitudinal patterns of activity tracking, dyadic influences on health behaviors, and the mechanisms through which tracking frequency affects physical activity among older adults and care partners.

This study has several limitations. First, its cross-sectional design precludes causal inference. Second, the observed association between physical activity tracking and engagement in regular physical activity may be bidirectional, as individuals who are already more active may be more likely to track their activity. Third, physical activity and tracking behaviors were self-reported, which may introduce recall or social desirability bias [91,92]. Fourth, our study participants were recruited online, which may overrepresent individuals with higher digital literacy or greater interest in health research, potentially limiting generalizability to the larger population of older adults and care partners. Finally, although we controlled for sociodemographic and health characteristics, unmeasured factors, such as broader social networks, environmental supports, or access to caregiving resources, may influence physical activity engagement or activity tracking behaviors. Despite these limitations, this study is among the few to examine both US older adults' and care partners' activity tracking and physical activity behaviors, providing insights into how tracking frequency relates to engagement in physical activities within this population. Our findings highlight practical, low-cost strategies that promote physical activity and provide information to inform interventions, programs, and policies aimed at improving physical activity among older adults and care partners.

5. Conclusions

Activity tracking is a low-cost, accessible tool that may support regular physical activity among both older adults and their care partners. Our study demonstrates that tracking frequency is associated with higher physical activity engagement, though patterns differ slightly between older adults and care partners. Interventions, programs, and policies that seek to improve physical activity

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among older adults and care partners can therefore leverage activity trackers while focusing on achieving recommended weekly exercise goals rather than strict daily adherence.

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Data Availability Statement: The original data presented in the study are openly available in FigShare at 10.6084/m9.figshare.30929594.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

ACTIVE	Activity Tracking, Care Partner Co-Participation, Text Reminders, Instructional Education, Virtual Physical Therapy, and Exercise
REDCap	Research Electronic Data Capture

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