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ORIGINAL RESEARCH

Objective Measures of Physical Activity in Rural Communities: Factors Associated With a Valid Wear and Lessons Learned

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Background: Compared with urban/suburban counterparts, rural communities experience lower rates of physical activity (PA) and higher rates of chronic disease. Promoting PA is important for disease prevention but requires reliable and valid measurement of PA. However, little is known about effectively collecting objective PA data in rural communities. Using data from a cluster randomized trial (*Heartland Moves*), which aims to increase PA in rural Missouri, this study explored factors associated with successful objective PA data collection and presents lessons learned. **Methods:** Baseline survey and accelerometry data were collected through Heartland Moves (n = 368) from August 2019 to February 2021, in southeast Missouri. Chi-square and logistic regression analyses were used to explore factors (demographics, subjective PA, and SMS reminders) associated with valid wear of PA devices. **Results:** Overall, 77% had valid wears. Participants who were not married (odds ratio [OR] 0.48, 95% confidence interval [CI], 0.30–0.79) and those living alone (OR 0.49, 95% CI, 0.30–0.81) were less likely to have valid wears. Participants who met PA guidelines (OR 1.69, 95% CI, 1.03–2.75) or received SMS reminders (OR 3.25; 95% CI, 1.97–5.38) were more likely to have valid wears. **Conclusions:** Results are supported by lessons learned, including importance of communication (SMS reminders), accessing hard-to-reach groups (living alone), and need to adapt during data collection.

Keywords: measurement, data collection, process, accelerometry

A significant body of research has found physical activity (PA) to be beneficial in the prevention and treatment of myriad chronic diseases, as well as for overall well-being and mental health.[1–3] The relationship between PA and health is especially important for rural communities, where micropolitan rural areas have the lowest rate of PA among any other subgroup,[4] and rates of chronic disease are higher than in urban and suburban populations.[4–8] The development and testing of interventions to promote PA in rural communities for chronic disease prevention requires reliable and valid measurement of PA; however, little is known about effectively collecting objective PA data in rural communities.

The PA measurement is important for understanding the relationship between PA and health, testing effective interventions and policies for promoting PA, and identifying which populations are most in need of these PA promoting policies. PA measurement provides an understanding of what types (ie, aerobic, muscle strengthening); domains (ie, leisure time, travel); and dose (ie, frequency, duration, intensity) of PA will result in improved health outcomes for various populations.[1] These PA measures inform recommendations for beneficial levels of PA (eg, 2018 Physical Activity Guidelines), which have substantial implications for PA research, policy, and practice.[1,9–12] Measuring PA outcomes or effectiveness of PA interventions also guides PA policy development.[13] PA measures are also used for surveillance and monitoring to provide valuable information about which populations have low levels of PA and may benefit most from policies promoting PA.[1,9]

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Researchers generally measure PA in 2 ways—subjectively, through self-report (surveys, in-person interviews, and telephone interviews) and objectively, with devices worn by participants. Self-report can provide information about PA type and domain, as well as barriers and facilitators to being active. Self-report also has utility as a source for large-scale PA surveillance (eg, Behavioral Risk Factor Surveillance Survey, National Health Information Survey). Although a valuable source of PA data, subjective measures are often prone to issues with recall bias and social desirability bias, systematically leading to overestimation of PA dose.[14,15] This is of particular concern, since dose (frequency, duration, and intensity) is strongly associated with health outcomes.[1,16] Objective measures of PA, which record PA in real time through devices worn on the body, provide more accurate data on frequency and time spent being physically active.[17,18] These devices can also be paired with global positioning system (GPS) devices to provide information about where PA is happening. While self-report is useful and should be a part of PA measurement, objective measurement through devices can offer a more reliable and valid measure of PA, as it might relate to health outcomes.

Although vital to PA measurement, obtaining objective measures of PA can be challenging. Studies have explored barriers and facilitators to collecting objective PA data from devices including the role of health behaviors,[19,20] sociodemographic characteristics (eg, age, race, gender, ethnicity),[20–22] and body mass index. While this research provides insight into the challenges for objective PA data collection, little is known about the unique barriers and facilitators to collecting objective PA data from devices in rural communities, and more specifically, data collection for intervention studies conducted in rural populations.

Understanding objective PA data collection is an important gap to address since rural communities may face challenges associated with geographic distance and building community trust.[23] Geographic distances can limit in-person contact, requiring the mailing of devices and reliance on phone and text message for communication. Although some large-scale surveillance studies also mail devices, the reliance on phone and text message communication in the context of a rural intervention study may make it more difficult to overcome community mistrust of researchers. This distance may also make adapting to unforeseen or unknown barriers more difficult and connecting with harder to reach subpopulations (ie, older, less educated) much more challenging than for in-person data collection. Challenges around objective PA data collecting in rural communities not only has implications for promoting PA but also can make testing PA interventions less efficient. Mailing out devices is costly and time consuming, making it critical each device mailed to a participant has the highest likelihood of coming back with valid wear time.[24]

Therefore, the aims of this study were to use data from a group randomized controlled trial (*Heartland Moves*), which aims to increase PA in rural southeast Missouri,[25] to explore factors associated with successful objective PA data collection and to compliment these results with a presentation of lessons learned during the data collection process.

Methods

Participants and Procedures

This study represents the baseline findings from *Heartland Moves*, a large PA intervention aimed at increasing PA among rural participants.[25] Adult participants (ie, 18 years of age or older) were recruited from 14 rural communities in southeastern Missouri via address-based sampling, word-of-mouth, and at in-person community events. Rurality was operationally defined as a Rural-Urban Continuum Code (RUCC) of 4 or greater.[26] It is important to note, one community added on later due to lack of survey response had a RUCC of 3; however, it was paired with a community of a similar demographic makeup (ie, population size, poverty rate, minority population), and a RUCC of 4. Participants who consented to being in the Heartland Moves study completed a telephone survey to collect baseline data. At the end of the survey, participants were recruited to wear accelerometer (ActiGraph, GT3x+, Pensacola, FL) and GPS devices (QSTARZ BT-Q1000XT) for 1 week. Research staff called all participants who reported interest in wearing devices to explain the procedures and obtain consent for device wear. If the participant was still interested and gave consent, they were sent the devices via the US Postal Service with instructions. Participants were also asked if they would like to receive a short message service (ie, text message, SMS) reminders during their week of wear. Upon completion of wearing the devices, participants were offered a $25 incentive. On average, the cost of mailing devices to one participant was $60, with each time devices are sent out lasting on average between 15 and 20 days.

A total of 1241 participants were surveyed in the catchment area, with 718 participants expressing interest in wearing the devices. When contacted by research staff, 181 could not be reached, 5 were not eligible (due to not living in the area any longer), 118 declined to participate, 414 agreed to participate; however, of those who agreed to participate, 44 people sent the devices back without wearing them, and 2 devices were lost in the mail. See Figure 1 for a flow diagram of participants. The

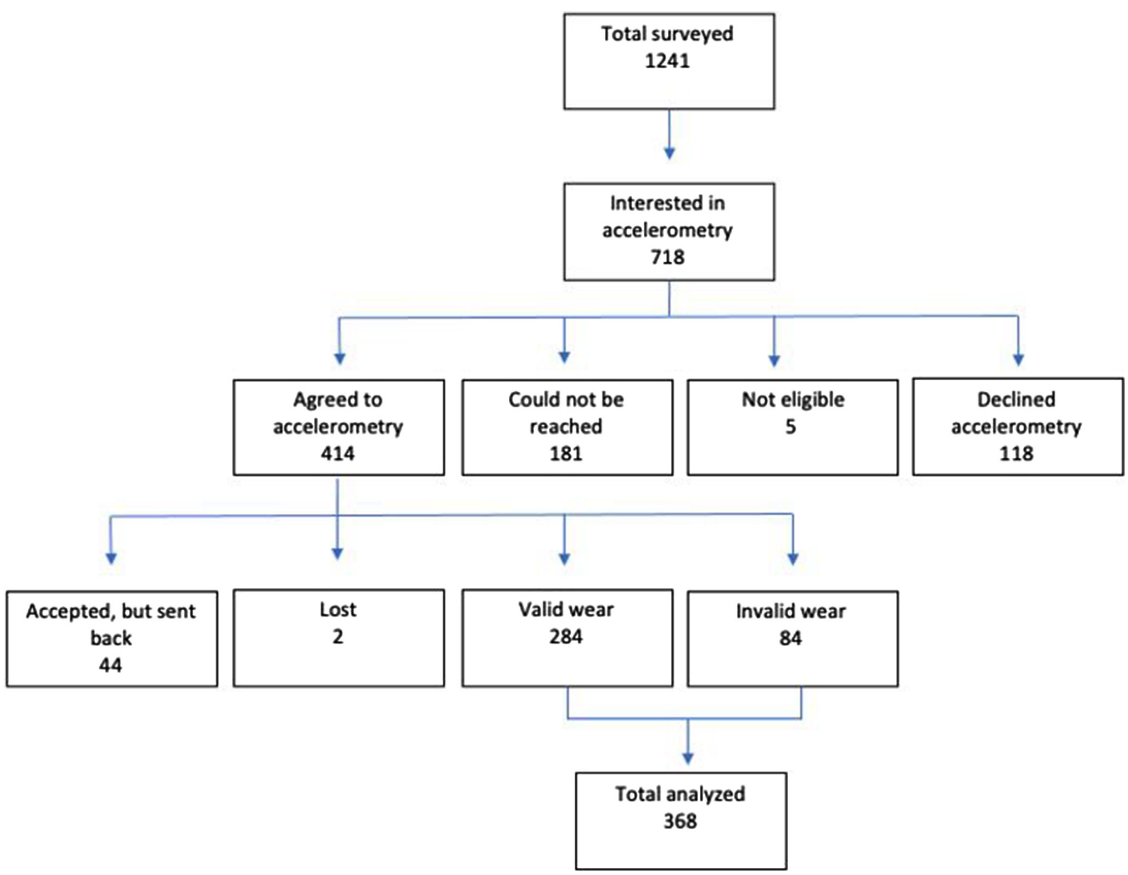

Figure 1 — Flow diagram of accelerometry data collection.

institutional review board at Washington University in St. Louis (IRB number 201809089) approved all procedures.

Measures

Individual Factors. Data on individual factors were obtained through a telephone survey administered during baseline data collection of the *Heartland Moves* study. Given the exploratory nature or this analysis, individual factors were chosen based on what was available through the telephone survey, could potentially be associated with valid wears, or was previously assessed in studies focused on other populations.[19–22,24,27–29] Participants were asked about their age (18–34 y, 35–65 y, and more than 65 y); race (White, Black or American Indian Alaska Native, or multiracial); gender (male and female); marital status (married or member of an unmarried couple, divorced, widowed, separated, or never married); living situation (with relatives or nonrelatives, alone); educational attainment (less than high school or high school, some college or Associates degree, Bachelor's degree or higher); annual household income (less than or equal to $35,000, $35,001–$75,000, $75,001–$100,000, more than $100,000); and employment type (employed and not employed).

The PA was measured in 2 ways. First, participants were asked to report whether they currently exercised (yes and no) utilizing the RM 1-FM Physical Activity Stages of Change–Questionnaire.[30] For this variable, the term "physical activity" was replaced with "exercise" in response to cognitive response testing conducted in our study population. Second, weekly minutes of moderate and vigorous PA were calculated using the Global Physical Activity Questionnaire.[31] The Global Physical Activity Questionnaire asks about PA dose (ie, frequency, duration, intensity) as well as domain (ie, work, recreational, commute) for a more comprehensive measure of PA. A dichotomous variable was then created based on whether participants met aerobic PA guidelines (ie, 150 min of moderate intensity and/or 75 min of vigorous activity per week).[32]

The SMS measure was dichotomous (did or did not receive SMS reminders during their week of wear). Receiving SMS reminders to wear the accelerometer and GPS devices was optional for participants. When participants were contacted to go over instructions for wearing devices, they were offered the option to receive daily SMS reminders to wear the devices and charge the GPS device. For example, one reminder read "Good morning! Please remember to wear the device belt with both devices all day until bedtime and charge the black GPS device at night."

The COVID-19 pandemic occurred during the end of baseline data collection. Therefore, a measure on whether data collection occurred prepandemic or during the pandemic was included to explore whether the COVID-19 pandemic had an effect on participants obtaining valid wear times. Participants who wore devices prior to March 11, 2020 were considered to have wear time prior to the COVID-19 pandemic, while participants who wore devices after March 11, 2020 were considered to have wear time during the COVID-19 pandemic.

Valid Wear Time. Successful objective data collection for each participant was based on a threshold for valid wear time, which was informed by best practices for objective PA data collection.[33] Both accelerometer and GPS devices were worn together on a belt. Accelerometer and GPS data were collected for most of baseline data collection with a daily threshold of 10 hours. However, due to the low number of valid wears, the research team made the decision to reduce the minimum wear to 8 hours per day based upon the data collected (eg, common wear time, sample characteristics) to that point in time, and other literature utilizing an 8-hour threshold.[34,35] Accelerometer data were downloaded with 1-second epoch levels into ActiLife software (Actigraph Corporation, Pensacola, FL) using Troiano 2007 parameters.[15] Nonwear time was defined as a run of zeros for 60 minutes. Participants were considered to have a valid wear time if the time worn met the threshold criteria of 8 hours per day, for at least 3 days. Valid wear time was measured as a dichotomous variable (yes, the time worn met the threshold criteria and no, the time worn did not meet the threshold criteria).

Statistical Analysis

Frequencies and percentages were calculated for valid wear, and all individual and COVID-19 factors. Chi-square tests and logistic regressions were used to explore associations between individual factors (age, race, gender, marital status, living situation, education, income, employment, exercise, meeting PA guidelines, and SMS reminders), and data collection during COVID-19 with valid wear time. Assumptions of sample size were met for chi-square analyses and of multicollinearity for logistic regressions. All data analysis was conducted using SPSS (version 25; IBM Corp Armonk, NY).[36]

Results

Sample Characteristics

The analytic sample consisted of 368 participants who wore the accelerometer and GPS devices. (Table 1). Of those participants, 284 (77%) had a valid wear time and 84 (23%) did not. Among the 284 who attained a valid wear, 23% objectively met PA guidelines. Around half of participants were between the ages of 35 and 65 years old (57%), married or part of an unmarried couple (59%), and employed (52%). Most were White (87%), female (73%), and living with relatives or nonrelatives (67%). Around 24% of participants had an educational attainment of a high school diploma or less and 25% of participants had an annual household income less than $35,000. Most participants reported exercising (69%), and based on a self-report measure of PA (Global Physical Activity Questionnaire), 60% met PA guidelines. In terms of communication, 67% of participants opted to receive SMS reminders. Considering the impact of the COVID-19 pandemic on data collection, most of the participants wore devices prior to the pandemic (82%).

Correlates

We found significant associations for the demographic predictors of marital status, $\chi^2 = 8.47$; $P = .004$, living situation, $\chi^2 = 7.90$; $P = .005$, and meeting PA guidelines, $\chi^2 = 4.39$; $P = .04$. Compared with participants who were married or part of an unmarried couple, participants who were divorced, widowed, separated, or never married had 48% lesser odds of having a valid wear time (odds ratio [OR] = 0.48; 95% confidence interval [CI], 0.30–0.79) (Table 2). Regarding living situation, participants who lived alone had 49% lesser odds of having a valid wear time than participants who lived with relatives or nonrelatives (OR 0.49; 95% CI, 0.30–0.81). For PA, participants who met PA guidelines had 1.69 times greater odds of having a valid wear time than participants who did not meet PA guidelines (OR 1.69; 95% CI, 1.03–2.75). We also found significant associations with the study design predictor of receiving SMS reminders, $\chi^2 = 22.27$; $P < .001$. Participants who received SMS reminders had 3.25 times greater odds of having a valid wear time, than participants who did not receive SMS reminders (OR = 3.25; 95% CI, 1.97–5.38).

Table 1 Frequencies of Individual and COVID-19 Factors by Accelerometer Valid Wear Time Among Rural Participants in the Heartland Moves Study

	Total (N = 368)[a]	Valid wear time (n = 284, 77.2%)[b]	Nonvalid wear time (n = 84, 22.8%)[b]
Individual factors			
Age, n (%)			
18–34 y	51 (13.8)	38 (74.5)	13 (25.5)
35–65 y	209 (56.8)	166 (79.4)	42 (20.1)
Greater than 65 y	109 (29.6)	80 (73.4)	29 (26.6)
Race, n (%)			
White	319 (86.9)	248 (78.0)	71 (22.3)
Black, American Indian, and Alaska Native, multiracial	49 (13.1)	36 (73.5)	13 (26.5)
Gender, n (%)			
Female	267 (72.6)	206 (77.2)	61 (22.8)
Male	101 (27.4)	78 (77.2)	23 (22.8)
Marital status, n (%)			
Married, member of an unmarried couple	217 (58.7)	179 (82.5)	38 (17.5)
Divorced, widowed, separated, never married	153 (41.3)	105 (64.7)	46 (35.3)
Living situation, n (%)			
With relatives or nonrelatives	248 (67.4)	202 (81.5)	46 (18.5)
Alone	120 (32.6)	82 (68.3)	38 (31.7)
Education, n (%)			
Less than high school, high school/GED	88 (23.9)	64 (72.7)	24 (27.2)
Some college/vocational, associates degree	129 (35.1)	95 (73.6)	34 (26.4)
Bachelor’s degree or higher	151 (41.0)	125 (82.8)	26 (17.2)
Income, n (%)			
Less than or equal to $35,000	133 (24.7)	95 (71.4)	38 (28.6)
$35,001–$75,000	112 (33.6)	90 (80.4)	22 (19.6)
$75,001–$100,000	49 (14.7)	40 (81.6)	9 (18.4)
Greater than $100,000	37 (11.1)	30 (81.1)	7 (18.9)
Employment, n (%)			
Employed	189 (51.5)	146 (77.2)	43 (22.8)
Not employed	178 (48.5)	138 (77.5)	40 (22.5)
Currently exercise, n (%)			
Yes	254 (68.6)	196 (77.8)	56 (22.2)
No	116 (31.4)	88 (75.9)	28 (24.1)
Meets physical activity guidelines,[c] n (%)			
Meets guidelines	220 (59.8)	177 (80.8)	42 (19.2)
Does not meet guidelines	148 (40.2)	105 (71.4)	42 (28.6)
SMS reminders			
Received SMS	245 (66.6)	207 (84.5)	38 (15.5)
Did not receive SMS	123 (33.4)	77 (62.6)	46 (37.4)
COVID-19			
Before or during COVID-19, n (%)			
Before COVID-19	305 (82.4)	230 (75.9)	73 (24.1)
During COVID-19	65 (17.6)	54 (83.1)	11 (16.9)

[a]Percentages in this column are based on entire sample (column). [b]Percentages in this column are based on category (row). [c]Measured using the Global Physical Activity Questionnaire.

Discussion

This study explored factors associated with successful objective PA data collection in rural communities and lessons learned during this process. At the end of baseline data collection, 77% of participants who wore devices had a valid wear time. Given wear time criteria varies by study, it is difficult to interpret whether 77% is higher, lower, or average for valid wears obtained through objective PA data

Table 2 Analysis of Individual and COVID-19 Factors With Accelerometer Valid Wear Time Among Rural Participants in the Heartland Moves Study (N = 368)

	Valid wear[a]	
	OR[b]	95% CI
Individual factors		
Age, y		
Reference: 18–34	—	—
35–65	1.35	0.66–2.76
Greater than 65	0.94	0.44–2.02
Race		
Reference: White	—	—
Black, American Indian and Alaska Native, multiracial	0.82	0.41–1.67
Gender		
Reference: male	—	—
Female	1.00	0.58–1.72
Marital status[c]		
Reference: married, member of unmarried couple	—	—
Divorced, widowed, separated, never married	**0.48******	**0.30–0.79**
Living situation[c]		
Reference: with relatives or nonrelatives	—	—
Alone	**0.49****	**0.30–0.81**
Education		
Reference: less than high school, high school/GED	—	—
Some college/vocational, associates degree	1.05	0.57–1.93
Bachelor's degree or higher	1.80	0.96–3.39
Income		
Reference: less than or equal to $35,000	—	—
$35,001–$75,000	1.64	0.90–3.00
$75,001–$100,000	1.78	0.79–4.02
Greater than $100,000	1.71	0.69–4.24
Employment		
Reference: employed	—	—
Not employed	1.02	0.62–1.66
Currently exercise		
Reference: no	—	—
Yes	1.11	0.66–1.87
Meets PA guidelines[c]		
Reference: no	—	—
Yes	**1.69***	**1.03–2.75**
SMS reminders[c]		
Reference: no	—	—
Yes	**3.25****	**1.97–5.38**
COVID-19 factor		
Reference: before or during COVID-19	—	—
During COVID-19	1.56	0.77–3.14

Abbreviations: CI, confidence interval; OR, odds ratio; PA, physical activity.
[a]Valid wear—time worn met the threshold criteria of 8 hours per day for at least 3 days. [b]ORs are unadjusted. [c]Significant association from chi-squared analyses ($P < .05$).
Statistical Significance at the *$P < .05$, **$P < .01$ level.

collection. Using similar wear time criteria, Evenson et al[27] assessed accelerometer data collection in a cohort of US Hispanic adults and obtained around the same percentage of valid wears (78%). Although not in a rural community, this study also collected objective data in a hard-to-reach group, supporting the 78% of valid wears as a strong comparison for our study. Other studies using accelerometers in adult populations had similar rates of valid wears for 4 or more days of wear time, ranging from 70% to 95%.[19,21,22,24]

Some of our findings around correlates of valid wear time are in line with these previous studies. Similar to our results for married participants or those living with others, previous studies found participants who were married or partnered were more likely to have a valid wear time.[20,27] In regard to health behaviors, a study conducted by Loprinzi et al[20] also found participants with lower levels of self-reported PA were less likely to have valid wear times. In contrast to our findings, other studies have found differences in valid wear by race/ethnicity,[20] age,[20,22,28,29] gender,[27] income,[27] and education.[20] These differences in our findings regarding demographic correlates for valid wear may be due to the populations sampled, sample size, or variations in valid wear criteria. It may also reflect potential differences for data collection within some rural populations. In this sample, most participants were white, which may also influence the results. More research will be needed to explore the relationship between valid wears and sociodemographic factors and whether they are meaningful correlates in rural settings.

Based on our findings, we present 3 important considerations—importance of communication, strategies for hard-to-reach groups, and importance of adapting during data collection for conducting data collection in rural communities. These areas of importance are informed both by the data analyzed in this paper and experiences of the research team during data collection.

Importance of Communication. One of the most important considerations during data collection was the importance of communication. Best practices for objective PA data collection highlight the importance of communication, but we found this is likely to be even more important in rural communities, when geographic distances often necessitate data collection through mailing of devices, limiting communication to phone calls and text messages. With the inability to meet for in-person instruction on device wear, it is imperative to maintain contact to promptly address questions about device wear and to keep participants engaged and motivated. In this study, we found participants who elected to have SMS reminders were 3 times more likely to attain the minimum wear time. While the typical recommendation for communication is telephone calls, when there are over 100 devices in the field, it can be difficult to make frequent calls.[37] There are myriad benefits of using text messaging as reminders: (1) ease of use for the sender, messages can be sent to multiple participants quickly; (2) ease of use by the addressee, the message can be read by the addressee on their own time; and (3) addressing concerns, a call can be arranged if issues arise. There may still be people without cellular phones in which text messaging would not be feasible; however, cell phones are becoming ubiquitous among urban and rural residents alike.[38] One potential way to increase participants receiving text message reminders is to make receiving text messages the default. Based on research from behavioral economics and nudge theory, there is strong evidence that people are more likely to stick with the default option rather than opt out.[39] This nudge and explaining the importance of text message reminders to participants and reason for the default option may increase acceptance of text message reminders.[40] Given our findings, use of text messages for communication can improve the chances of collecting valid data in rural communities where in-person contact is limited.

Strategies for Hard-to-Reach Groups. Another important consideration is finding strategies for successful data collection within hard-to-reach groups (eg, living alone, less physically active). This consideration comes from a few important observations from our study about potentially harder to reach groups within rural communities. First, participants who lived with a support person/group (eg, married, lives with others) were more likely to have a valid wear time than those who lived alone or did not have a partner. Roughly 30% of our participants lived alone and around 40% were not married or living with a partner. Through communication with participants, we learned those who often spoke to their friends/family about the devices and their participation in the study, tended to feel more involved, which perhaps held them more accountable to wearing the devices. Given these findings, we suggest a strategy of engaging participant social support for device wear. For example, when sending out devices, determine if the potential participant has a support group or person to help with adherence to the protocol. Second, we found participants meeting PA guidelines via subjective measures were more likely to attain a valid wear of the devices. It might also be the case that participants who are more active, may be more invested or interested in the PA device data and thus more likely to wear the devices. Our research team did not plan to send out feedback on PA to each participant; however, many participants reached out to determine how well they did. We would recommend this as a strategy to others to be prepared to receive inquiries regarding participant PA and have a standard practice by which to report PA back (eg, comparing output to PA guidelines). Reporting PA following device wear may motivate participants to meet the wear time threshold for a valid wear, especially those who are less physically active but should be balanced with the potential bias introduced through the Hawthorne effect.

Adaptation During Data Collection. Finally, being able to adapt during data collection is key, especially since little research has been done around best practices for data collection in rural communities. This was particularly important for determining the appropriate time required for a valid wear, which has not formally been tested within rural communities, though studies in other vulnerable populations (ie, Latinas) have used similar wear time when also collecting objective data.[41,42] During data collection, a low number of valid wear's necessitated a reevaluation of our valid wear measurement. While our research team was hopeful to get a minimum of 10 hours of valid wear, the participants were wearing both an accelerometer and GPS device; therefore, we followed common practice to use lower thresholds to attain a valid wear.[41,42] Participants were still required to attain at least 3 valid days per week. We first adjusted the nonwear time from 60-minute run of zeros to 120 minutes, which did not increase wear time. Our research team then decided to decrease the minimum wear time from 10 hours per day to 8 hours per day, which resulted in increased valid wears. We learned rural adults may be less likely to wear the device for extended periods during the day; therefore, it may be prudent to reduce the wear time for rural adults. We also learned that many older adults are extremely sedentary, whereby they may have worn the devices for well over 12 hours; however, if they spend most of their time not moving (eg, sitting in a chair for an extended period, napping) the reduced wear time requirement seemed to help attain a valid wear.

We had to adapt data collection during the COVID-19 pandemic. While not a consideration unique to rural communities, we relied heavily on the research team's local community health coordinator and community collaborators to assess local response and experience of COVID-19, and when and how best to continue data collection. Most of baseline data was collected prior to the spread of COVID-19 and associated restrictions in the participating rural communities. While we did not find this impacted valid wear times in this study, we temporarily halted data collection, resent devices which had been in the field when restrictions took place, and during initial phone calls for device instruction, created an open dialoge to assess participant concern and comfort level with device wear during the pandemic.

Limitations

While our study offers valuable insights into characteristics among rural communities associated with valid accelerometry wear time, there are a few limitations worth noting. First, we were only able to assess characteristics captured within the baseline survey for the *Heartland Moves* project. As such, we were unable to explore other factors, which may be pertinent to participants in rural communities successfully wearing accelerometer devices. For example, we did not look at information like occupation. Second, we asked participants to wear both an accelerometer and GPS device during data collection and were unable to assess if or how the addition of the GPS device impacted valid wears. Third, while we were able to explore objective PA data collection in rural communities, it is important to note that the rural population is not homogenous. As such, our findings may be limited in their generalizability to all rural populations in the United States. In addition, one of the communities in the sample had a RUCC of 3, which does not meet the operationalized definition of rurality. However, this community was paired with a community of similar demographic make-up and RUCC of 4. Fourth, we did not explore correlates of whether participants agreed to wear devices and if there were significant differences between these 2 groups of participants. Due to this, our findings are limited to understanding successful objective PA data collection among participants who agree to wear devices. Despite these limitations, our study does offer unique insight into factors associated with valid wear time in rural communities. This is particularly important given lower levels of PA in rural communities and thus a need for more research into ways to promote PA. Furthermore, our study analyzed accelerometry and demographic data from many participants and across multiple rural communities, lending support to generalizability of our findings.

Conclusions

Our study explored characteristics among rural participants which were predictive of a valid accelerometry wear time and presented lessons learned during the data collection process. Our findings highlight 3 important areas of consideration (importance of communication, strategies for hard-to-reach groups, and importance of adapting during data collection) for data collection in rural communities. These considerations are a foundation for future research to measure PA levels and assess PA intervention for rural populations more effectively. Given the low levels of PA in rural communities and high rates of chronic disease associated with inactivity,[4–7] this is imperative. Future studies should continue to explore factors relevant for successful objective PA data collection in underserved populations such as in rural communities. While we have identified some important considerations and strategies for successful data collection, more needs to be understood about ways researchers can best facilitate valid accelerometry wear.

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