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Participant Motivation and Experience in a Prospective Study of 24-Hour Movement During Pregnancy

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Article

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Abstract

Background

Understanding participant perspectives about participation in research on health behaviors during pregnancy is important for optimizing recruitment, engagement, and retention. Although prior research has examined the feasibility of studying health behaviors during pregnancy using wearable devices and self-report measures, less is known about participant motivations and experiences with study procedures. We examined participant-reported motivations and feedback from a longitudinal study assessing physical activity, sedentary behavior, and sleep during pregnancy using wearable devices, sleep diaries, and self-report measures.

Methods

Participants with pre-pregnancy overweight or obesity enrolled in the 24MOVE prospective cohort study completed assessments at three timepoints during pregnancy. After completing all study activities, participants were invited to complete a feedback survey assessing motivations for participation and experiences with recruitment and informed consent materials, study procedures, wearable device use, and data collection activities. Open-ended responses were reviewed by three co-authors to identify recurring themes in participant motivations and feedback. Quantitative responses were summarized using frequencies and percentages.

Results

Among 305 participants enrolled in the study, 180 (59%) completed the feedback survey. Three primary themes emerged from open-ended responses: altruistic motivations, including contributing to research and improving outcomes for pregnant individuals; incentive-driven motivations, including financial compensation; and personal motivations, including interest in tracking health, physical activity, and sleep during pregnancy. Most participants reported that recruitment and informed consent materials prepared them for participation (94.4%) and that instructions for wearing the device were easy to understand and follow (98.9%). Previous-night sleep questions were generally perceived as easy to respond to (95.0%), whereas device comfort received more mixed feedback, particularly during nighttime wear. Participants identified diet and activity recall surveys as the most burdensome study activities and suggested app-based or real-time data collection, shorter surveys, and improvements in device comfort.

Conclusions

Participants were motivated by a combination of altruistic, personal, and financial factors. Although study procedures were generally well received, device comfort and survey burden were important areas

for improvement. Incorporating participant-informed strategies, including more comfortable wearable devices and streamlined, technology-enabled data collection methods, may improve participant experience and support recruitment, engagement, and retention in pregnancy research.

Background

Research on 24-hour movement behaviors, including physical activity, sedentary time, and sleep, has expanded in recent years, particularly in relation to maternal and fetal health outcomes (1–4). However, successful implementation of such studies depends not only on methodological rigor but also on participant engagement. Pregnancy presents unique challenges for research participation, including physical discomfort, time constraints, and competing priorities (5–8). Historically, pregnant people have also been underrepresented or excluded from research because of concerns about potential risks to the fetus and the historical classification of pregnancy as a “vulnerable” state. More recent guidance emphasizes the ethical and scientific importance of including pregnant people in research and recommends that they be presumed eligible for participation rather than excluded by default (9, 10).

Despite these challenges, many studies report high levels of participation and compliance, suggesting that participants are motivated to contribute to research (11–13). Understanding these motivations and participants’ experiences with study procedures and activities can inform the design of future studies, improving recruitment, adherence, and data quality.

Few studies have systematically explored participant perspectives on research participation during pregnancy, including motivations and experiences with both device-based and self-report data collection methods. This report examines motivations and feedback from participants in a longitudinal study of 24-hour movement behaviors during pregnancy. The goal is to identify key drivers of participation and areas for improvement in study design, particularly related to wearable devices and self-report data collection methods, to support recruitment, engagement, and retention in future pregnancy research.

Methods

Study Design and Participants

Participants with pre-pregnancy overweight or obesity were enrolled in the 24MOVE prospective cohort study, which assessed 24-hour movement behaviors during pregnancy using device-based and self-reported measures (3). After eligibility was confirmed, participants completed the informed consent process electronically through REDCap. Participants reviewed the consent and HIPAA authorization documents and could contact the study team by phone or email with questions before providing consent. Participants indicated their consent by selecting “Yes” at the end of the consent form, after which they were emailed copies of the consent and HIPAA authorization documents and could access the baseline survey.

Participants completed study assessments at three timepoints: early pregnancy (10 weeks 0 days to 12 weeks 6 days), mid pregnancy (20 weeks 0 days to 22 weeks 6 days), and late pregnancy (33 weeks 0 days to 35 weeks 6 days). At each timepoint, participants wore an ActiGraph CentrePoint Insight watch (Ametris, Pensacola FL; 5.01 x 3.46 x 1.05 cm) on the nondominant wrist continuously for 24 hours per day for 7 consecutive days and completed daily sleep diaries, dietary recalls using the Automated Self-Administered 24-Hour Dietary Assessment Tool (ASA24), and activity recalls using the Activities Completed over Time in 24 Hours (ACT24) instrument (14, 15). The activity recall asked participants to report how they spent the previous day by selecting activities and providing details such as the timing and duration of each activity, while the dietary recall asked participants to report all foods and beverages consumed during the previous day, including meal or snack timing, location, and amounts consumed.

At 35 weeks gestation, after completing the final timepoint of study data collection, individuals were invited to complete a feedback survey assessing motivations for enrollment and participant experiences.

Participants received a $75 gift card at each study timepoint after completing the study surveys and returning the accelerometer, an additional $25 gift card for completing the time-use and diet surveys, and a $20 gift card after completing the feedback survey.

Measures

Motivation for participation:

Participants responded to an open-ended question about their reasons for participating in the research study. Responses were qualitatively reviewed to identify recurring themes in participant motivations.

Study experience:

Participants responded to several closed-ended questions about study experiences. Response options were Yes/No for questions assessing whether recruitment and informed consent materials prepared participants for the study, whether watch-wearing instructions were easy to understand and follow, whether participants experienced technical issues with the watch, whether the watch was comfortable to wear during the day and at night, and whether sleep survey questions were easy to respond to. Participants also reported on whether they liked wearing the watch using Yes/No/Neutral response options. Open-ended feedback was collected regarding the watch, sleep surveys, overall study experience, and questions or uncertainties related to physical activity, sleep, and pregnancy.

Analysis

Qualitative responses from open ended questions were reviewed by three co-authors (ER, AA, SEB) to identify recurring themes in motivations and feedback. Quantitative survey responses were summarized

with frequency and percent.

Results

180 participants (59% of participants enrolled in the study) completed the feedback survey. Participant characteristics by feedback survey completion status are presented in Table 1.

Table 1. Characteristics of Participants Who Completed and Did Not Complete the Feedback Survey

Characteristic	Completed feedback survey (N = 180[1])	Did not complete feedback survey (N = 125[1])
Maternal age	32.7 (4.3)	32.4 (5.4)
Missing	3	3
Race/ethnicity		
Asian	32 (18.4%)	20 (17.2%)
Black	11 (6.3%)	15 (12.9%)
Hispanic	47 (27%)	31 (26.7%)
Multiracial	5 (2.9%)	3 (2.6%)
Native American	1 (0.6%)	1 (0.9%)
White	78 (44.8%)	46 (39.7%)
Missing	6	9
Maternal education		
≤ 12th grade or GED equivalent	11 (6.3%)	15 (12.8%)
Trade/technical school or 1-3 years of college	39 (22.2%)	21 (17.9%)
4-5 years of college or more	126 (71.6%)	80 (68.4%)
I don't know	0 (0%)	0 (0%)
I do not wish to answer	0 (0%)	1 (0.9%)
Missing	4	8
Household income		
$149,999 or less per year	96 (56.1%)	71 (62.3%)
$150,000 or greater per year	70 (40.9%)	42 (36.8%)
I don't know	0 (0%)	0 (0%)
I do not wish to answer	5 (2.9%)	1 (0.9%)
Missing	9	11
Maternal employment status		
Employed full time and currently working	121 (68.8%)	86 (73.5%)
Employed part time and currently working	23 (13.1%)	15 (12.8%)

Homemaker/stay at home parent or on maternity or family leave from work	21 (11.9%)	9 (7.7%)
Other	1 (0.6%)	1 (0.9%)
Student	2 (1.1%)	2 (1.7%)
Unemployed	8 (4.5%)	4 (3.4%)
Missing	4	8
Marital status		
Married/civil union or living with a partner	161 (92%)	94 (81.7%)
Not married or living with a partner	14 (8%)	21 (18.3%)
Missing	5	10
Number of children in home at time of pregnancy		
0	70 (41.2%)	53 (44.5%)
1	76 (44.7%)	45 (37.8%)
2 or more	24 (14.1%)	21 (17.6%)
Missing	10	6
[1] Mean (SD); n (%)		

Mean maternal age and the proportion of Hispanic participants were similar between participants who completed the feedback survey and those who did not. Among participants with available data, survey completers included a higher proportion of White participants (44.8% vs. 39.7%) and a lower proportion of Black participants (6.3% vs. 12.9%) than those who did not complete the feedback survey. Survey completers were also more likely to be married or living with a partner (92% vs. 81.7%). Household income distributions were broadly similar, although survey completers were more likely to report household incomes of $150,000 or greater (40.9% vs. 36.8%). Employment status, maternal education, and the number of children in the home were generally similar between groups.

Participant Motivations

Three primary themes emerged from qualitative analysis of participant motivations:

1. **Altruistic motivations**
   92 participants (51.1%) expressed altruistic motivations, including a desire to contribute to research, advance scientific knowledge, provide data, or improve health outcomes for pregnant

individuals. Some participants also referenced gaps in research, particularly the underrepresentation of Black and Latina individuals.

2. **Compensation-driven motivations**
   Financial compensation, in the form of gift cards, was a strong motivator. For some participants, compensation was the primary reason for participation; for others, they served as an additional benefit rather than the main driver.
3. **Personal motivations**
   Participants frequently reported interest in tracking their own health, including physical activity and sleep patterns during pregnancy. Some viewed participation as an opportunity for increased self-awareness or accountability.

These motivations often co-occurred, with participants citing both altruistic and personal reasons alongside financial compensation.

Feedback on recruitment and informed consent

Most participants reported feeling adequately informed about what participation in this study entailed based on recruitment and consent materials (Table 2). Specifically, 94.4% reported that the recruitment and informed consent documents prepared them for participation, 98.9% reported that instructions for wearing the device were easy to follow, and 95.0% reported that previous-night sleep questions were easy to respond to. These findings indicate that most participants found the recruitment, informed consent, device-wearing instructions, and sleep questions easy to understand or respond to.

Device Experience

Device wearability emerged as a key area of mixed feedback. While many participants reported that the device was acceptable, a notable proportion experienced discomfort, particularly during sleep (30.6%), with prolonged wear or due to large device size or bulkiness.

Qualitative responses highlighted that the physical design of the device influenced both comfort and willingness to comply with wear protocols. Some participants suggested that smaller or less intrusive devices would improve the experience.

Survey Burden

Participants consistently identified dietary and activity recall surveys as the most burdensome components of the study. Common concerns included time required to complete surveys, difficulty recalling activities or food intake accurately, and perceived complexity of survey questions. In contrast, sleep diaries were generally perceived as less burdensome and easier to complete.

Suggestions for Improvement

Participants provided several actionable recommendations in responses to open-ended survey questions:

- Use mobile apps or real-time logging for activity and dietary intake instead of retrospective recall
- Improve survey labeling to make different surveys easier to tell apart, make instructions easier to follow, and reduce survey length
- Improve device comfort and design
- Provide clearer expectations regarding time commitment

These suggestions reflect a broader desire for convenience, efficiency, and reduced burden.

Table 2. Quantitative Summary of Participant Feedback on Study Procedures

Question	Yes, n (%)	No, n (%)	Neutral, n (%)	Missing, n (%)
Recruitment and informed consent materials prepared participants for the study	170 (94.4%)	9 (5.0%)	—	1 (0.6%)
Instructions for wearing the device were easy to understand and follow	178 (98.9%)	1 (0.6%)	—	1 (0.6%)
Previous-night sleep questions were easy to respond to	171 (95.0%)	7 (3.9%)	—	2 (1.1%)
Watch was comfortable to wear during the day	148 (82.2%)	30 (16.7%)	—	2 (1.1%)
Watch was comfortable to wear at night	124 (68.9%)	55 (30.6%)	—	1 (0.6%)
Liked wearing the watch	34 (18.9%)	36 (20.0%)	110 (61.1%)	—
Experienced technical issues with the watch	7 (3.9%)	172 (95.6%)	—	1 (0.6%)

Discussion

This report highlights the importance of understanding participant perspectives in studies of 24-hour movement during pregnancy. The findings demonstrate that participants are motivated by a combination of altruism, personal interest, and financial compensation, consistent with prior studies of pregnant women's motivations for research participation (12, 16).

While most study procedures were favorably rated, specific components, particularly device comfort and survey burden, presented challenges. These barriers have direct implications for participant adherence

and data quality (3, 7, 17). For example, discomfort during sleep may reduce compliance with nighttime wear, while lengthy recall surveys may introduce measurement error due to incomplete or inaccurate responses.

Participant suggestions for app-based or real-time data collection indicate a potential direction for future research. Integrating technology that reduces recall burden and enhances usability may improve both participant experience and data accuracy. Similarly, advances in wearable device design, such as smaller device sizes and improved comfort, could mitigate one of the primary concerns identified in this study.

Notably, sleep diaries were viewed favorably, in contrast to diet surveys that participants described as more time-consuming and challenging. This finding reinforces the importance of minimizing participant burden, particularly in populations with competing demands such as pregnant individuals.

Finally, the prominence of altruistic motivations suggests that emphasizing the broader impact of research may enhance recruitment (12). However, financial compensation remains an important component, particularly for sustaining engagement over time.

Together, these findings provide practical, participant-informed recommendations for designing pregnancy studies that optimize both participant experience and data quality while minimizing burden.

Strengths and Limitations

This study has several strengths. The use of both quantitative and qualitative feedback provided a comprehensive assessment of participants' experiences. The feedback survey evaluated multiple aspects of the study experience, including recruitment and informed consent, study procedures, device use, and data collection activities, allowing participants to identify both strengths and areas for improvement. The inclusion of open-ended responses also provided additional context regarding participant motivations, preferences, and experiences that may not have been captured through quantitative measures.

There are also several limitations that should be considered. Because eligibility was restricted to individuals with pre-pregnancy overweight or obesity, findings may not generalize to pregnant individuals with lower pre-pregnancy BMI. Feedback was obtained only from participants who completed the study and answered the feedback survey, which may overrepresent more engaged participants and limit the generalizability of findings to the broader population of pregnant individuals, particularly among individuals with differing socioeconomic characteristics or access to technology. Responses may have been subject to social desirability bias; however, the range of feedback received, including areas identified for improvement, suggests that this bias may have been minimal.

Conclusions

Participants in a 24-hour movement study during pregnancy were motivated by a combination of altruistic, personal, and financial factors. While study procedures were generally well-received, device comfort and survey burden were key areas for improvement.

Future studies should prioritize participant-centered design, including more comfortable wearable devices and streamlined, technology-enabled data collection methods. Addressing these factors may strengthen recruitment, engagement, retention, and overall study success.

Abbreviations

24MOVE: 24-Hour Movement Study

BMI: Body mass index

IRB: Institutional Review Board

NICHD: Eunice Kennedy Shriver National Institute of Child Health and Human Development

NIH: National Institutes of Health

Declarations

Ethics approval and consent to participate

The 24MOVE study was approved by the Kaiser Permanente Northern California Institutional Review Board (IRB #**1998165**). All participants provided informed consent prior to participation. All methods were performed in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because the open-ended participant responses may contain information that could potentially identify individual participants. De-identified data may be available from the corresponding author upon reasonable request, subject to applicable institutional and ethical restrictions.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

ER conceived and developed the manuscript, conducted the literature review, conducted the qualitative analysis, interpreted the findings, and drafted the manuscript. AA conducted the qualitative and quantitative analyses and contributed to interpretation of the findings and revision of the manuscript. SEB provided study leadership and supervision, conducted the qualitative analysis, contributed to interpretation of the findings, and critically reviewed and revised the manuscript. BRH, RM, and MMH contributed to interpretation of the findings and critically reviewed and revised the manuscript. All authors read and approved the final manuscript.

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