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# The process associated with motivation of a home-based Wii Fit exercise program among sedentary African American women with systemic lupus erythematosus

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# Abstract

**Objective**—To explore the process associated with the motivation for playing Wii Fit among patients with systemic lupus erythematosus (SLE).

**Methods**—Individual in-depth semi-structured telephone interviews were conducted with 14 sedentary African American women with SLE to explore their experiences and reflect on their motivation for playing Wii Fit after completing a 10-week home-based Wii Fit exercise program. Interviews were audio-recorded, transcribed verbatim, and analyzed using the constant comparative method to identify categories related to participants' motivation. Three authors independently sorted, organized and coded transcript text into categories, then combined the categories into themes and subthemes.

**Results**—In addition to the two themes (Ethical principal of keeping a commitment, and Don't want to let anyone down) generic to home-based exercise trials, we identified five themes (Enjoyment, Health Benefits, Sense of Accomplishment, Convenience, and Personalized) that revealed why the participants were motivated to play the Wii Fit. Enjoyment had three subthemes: Interactive, Challenging, and Competitive with an embedded social element. However, several participants commented they were not able to do many activities, master certain games, or figure out how to play some; as a result, they were bored with the limited selection of activities that they could do.

**Conclusions**—The motivational elements of the Wii Fit may contribute to improved exercise motivation and adherence in select sedentary African American women with SLE. Results provide

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a better understanding on the important elements to incorporate in the development of sustainable home-based exercise programs with interactive health video games for this population.

#### Keywords

Exergames; Exercise adherence; Qualitative study

#### Introduction

Physical exercise has been shown to have multiple benefits including significant reduction in fatigue levels, weight loss, and improvement in sleep quality, physical fitness, and quality of life for people with systemic lupus erythematosus (SLE).<sup>1,2</sup> However, only about one-third of those with SLE met physical activity goals of exercising 150 min/week or having energy expenditure of 1400 kcal/week.<sup>3</sup> In addition to the usual response of lack of time, people with SLE cited inclement weather, lack of access to desirable exercise facilities, lack of motivation, and SLE disease-related factors (such as fatigue, joint pain and stiffness, and flare up) as the major barriers to exercise.<sup>3</sup>

The incorporation of exergames such as Wii Fit into home-based exercise programs for people with SLE is believed to serve as a strategy that may help reduce or eliminate the exercise barriers cited in the literature,<sup>3</sup> and sustain motivation and adherence to exercise.<sup>4</sup>

Yuen and associates conducted a pilot study to evaluate the effectiveness of a home-based exercise program using the Wii Fit in patients with SLE.<sup>5</sup> Fifteen sedentary African American women with SLE who experienced moderate to severe fatigue participated in the program three days a week for 30 min each over a 10-week period. After two weeks of weekly supervised home exercise, the research coordinator conducted weekly telephone monitoring sessions alternating with an in-home visit every three weeks for the rest of the study. Outcome measures were collected at baseline, and post Wii Fit program. The key findings were participants' fatigue severity, body weight and waist circumference significantly reduced at the completion of the program.

Since few studies investigated the subjective experiences of patients with chronic conditions when playing health video games as a form of home exercise (i.e., exergames), the purpose of this study was to explore the experience of sedentary African American women with SLE who took part in a home-based Wii Fit program through in-depth exit interviews. Findings from qualitative analysis of the interview data may provide crucial information that can be used to refine future exercise programs using Wii Fit, as well as other exergames, and to develop better sustainable home-based exercise programs with exergames.

### Methods

#### **Participants**

Fourteen of the 15 sedentary African American women with SLE who completed the 10week Wii Fit program participated in the exit interview.<sup>5</sup> Study participants were recruited through the Medical University of South Carolina Lupus Clinic facilitated by the longitudinal observational SLE Clinic Database and SLE in Gullah Health (SLEIGH) Database.<sup>6</sup> To be eligible for participation in the study, the following inclusion criteria had to be met: 1) female 18 years of age; 2) self-identification as African American; 3) diagnosed with SLE and fulfilled at least 4 of the revised American College of Rheumatology classification criteria for SLE<sup>7</sup>; 4) ambulatory; 5) experience fatigue for the last 3 months or longer as indicated by at least a rating of 4 (moderate fatigue) on a Fatigue Visual Analogue Scale of 0–10, with 10 being the most fatigue<sup>8</sup>; 6) sedentary (exercise <3

times per week for 30 min in the past 6 months); 7) functionally literate (i.e., able to read and follow exercise directions in English); and 8) had permission from their physician to participate in the study.

The exclusion criteria were: 1) cognitive dysfunction as indicated by a score <24 in the Mini-Mental State Exam (MMSE)<sup>9</sup>; 2) anemia (with a hemoglobin <8 g/dL); 3) poor control of metabolic diseases; or other concurrent systemic health problems (e.g., infections, malnutrition), which are known to contribute to increased fatigue levels; 4) known electrolyte abnormalities; 5) documented psychiatric diagnosis of any major Axis I psychiatric disorder, such as melancholia; 6) severe visual and/or hearing impairment that cannot be corrected using assistive devices; 7) significant functional impairments due to heart disease, arrhythmias, chronic pulmonary disease, or conditions such as avascular necrosis of the hip or knee, or severe arthritis of 3 or more weight-bearing joints that prevent exercising; or 8) systolic blood pressure >200 mm Hg or diastolic blood pressure >115 mm Hg.

Table 1 shows the characteristics of the participants. The Institutional Review Board of the Medical University of South Carolina approved the study.

#### Procedures

Individual telephone interviews were conducted at the end of the 10-week Wii Fit program. An interview guide, containing pre-determined open-ended questions, was developed from a literature review and approved by the research team. Core questions from the interview guide are shown in Table 2. The interviewer (HLB) had experience in conducting interviews with African American women with SLE. At the time of the interviews, the interviewer was blinded to the results of participants' assessment results, including adherence to the program.

The interviews began with general, open-ended questions about participants' overall impression of the Wii Fit program, and concluded with more focused questions about aspects such as the impact of this Wii Fit program experience on their health and fatigue (funnel approach).<sup>10</sup> In order to maintain consistency across interviews, the order of questions outlined in the interview guide and sequence to facilitate discussion was followed. Depending on the flow of interaction in individual interviews, flexibility in question order or probes was used.

In addition, the interview explored issues related to Wii Fit experience (such as perceived difficulties/barriers, and satisfaction) and suggestions for improvement. The core of the interview lasted an average of 15 min (range from 8 to 22 min). The interviews were audio-recorded with participants' consent, and transcribed verbatim for analysis. Each participant was assigned a code number for data entry, with no identifying information included in the transcript. A research associate independently cross checked all transcripts against the audio recordings for accuracy.

#### Thematic content analysis

Three investigators (HKY, HLB, and LKV) used the following steps to analyze the content of the transcripts. One investigator (LKV) was not involved in the original trial. The three investigators independently read all transcripts several times to gain an overall impression of the content, and to formulate tentative ideas. Initial codes were manually assigned to phrases and sentences; they were closely associated with the original text in order to maintain the participants' meaning. Using an ongoing process of comparing text segments across transcripts, the investigators sought similar or repeated ideas through the constant comparative method; further codes were added as new topics emerged.<sup>12,13</sup> Continuing

constant comparison across transcripts, the investigators further refined the coding, then organized them by content similarity. Codes expressing related concepts were grouped together to create categories, then collapsed into themes and subthemes.<sup>14</sup>

To enhance credibility of analysis, all three investigators reviewed each other's data interpretation and theme categorization, and compared and contrasted their findings. When there were disagreements, the three investigators reviewed transcripts, then discussed and resolved disagreements. Several rounds of discussion were used to develop categories and clear themes that described participants' experience toward playing Wii Fit. Data triangulation was achieved by comparing the accounts provided by participants with field notes from the research coordinator during regular home visits and telephone monitoring.

# Results

Since the majority of the participants either never had an exercise schedule or exercised sporadically, they had to establish or re-establish a routine (i.e., to find a time) to play the Wii Fit. At the beginning, most found it difficult and challenging. Some had to make a conscientious effort and a variety of times to fit the Wii Fit exercise schedule (i.e., 3 times a week for about 30 min each) into their daily routine. They "forced" themselves to play the Wii Fit instead of doing sedentary alternatives. One participant (P15) acknowledged, "Well at first, I really didn't have a pattern. But then I begin to form a pattern with the Wii exercise] on a regular basis." The majority of participants found engagement in physical activities difficult at the beginning due to fatigue and sore muscles and joints. It became easier and the soreness went away after a few sessions. As one participant commented "… because I never used to do any exercise and I guess it caused more soreness to my joints when I first started but as I continued to do it I noticed all that went away." (P2)

Participants found the instructions easy to understand, and none of the participants complained it was a hassle to set up the Wii Fit to exercise. However, several participants commented that they were not able to do a lot of the activities; master certain games, or even figure out how to play some; as a result, they were bored with the limited selection of activities that they could do.

#### Study themes

Based on the analysis of interview transcripts related to the motivation associated with the home-based Wii Fit program among these participants, we identified two sets of themes. One set is unique to the current study and the other is generic to home-based exercise clinical trials. The main themes and subthemes emerged from the data are presented in Table 3 with specific quotations from participants for illustration.

# Discussion

Results of this qualitative investigation yielded valuable insights into elements (i.e., themes and subthemes) associated with motivation for participation in a home-based Wii Fit exercise program among sedentary African American women with SLE who experienced moderate to severe level of fatigue. Participants described how Wii Fit motivated them to play the games (i.e., exercise) which were largely subsumed under the five major themes in Table 3: Enjoyment, Health Benefits, Sense of Accomplishment, Convenience, and Personalized. The interactive nature of the Wii Fit, challenging nature of the games, and the competitive feature with social element made playing Wii Fit games enjoyable and fun. The sense of accomplishment through achievement of health goals (such as Wii Fit designated fitness age, increased strength, stamina, endurance as in walking farther without getting

tired, less fatigue with more energy, reduced breathlessness with activity, sleeping better, weight loss, and decreased joint pain and stiffness) reinforced the participants to continue playing the games. With improvement in physical function, participants were then able be more active and accomplish more daily tasks. Participants also indicated that the immediate feedback in the form of (graphic) progress on weight, amount of calories burned, and duration of exercise, and goal setting from the Wii Fit served as a motivator for them to continue exercise. The convenience (including the portability) of Wii Fit also implied that participants had more autonomy and control of their time to exercise and exercise duration, and were able to better integrate exercise schedule into their daily routine. Finally, the capability of Wii Fit for provision of personalized and individually adjusted training and coaching made it easier for the participants to implement the Wii Fit program.

Enjoyment was the most prevalent theme; every participant stated that Wii Fit was captivating enough to compel them to play. Participants reported that they lost track of time and were immersed while playing Wii Fit, resulting in playing for a longer duration. Consistent with numerous studies,<sup>15–17</sup> enjoyment reported by participants in this study is an important element in determining motivation and adherence to exercise. For example, one study found African American young women enjoyed the competition and camaraderie aspects of exercise.<sup>18</sup> Interactivity and immersion have also been reported to be key elements that motivate people to play exergames.<sup>19</sup>

Disease-related factors such as joint pain and stiffness cited in the literature <sup>3</sup> as the major barriers to exercise among people with SLE was only mentioned by a few participants when they played Wii Fit at the beginning. No participants mentioned fear of flare up as a barrier to playing Wii Fit. Based on the report from the participants, it seems Wii Fit served as a form of entertainment while exercising which can minimize sensations of discomfort and improve participants' motivation and adherence.<sup>20</sup>

Many of the motivators and facilitators for exercise mentioned in the five themes or embedded in the themes were also reported in the literature, which include weight loss, having more energy, convenience (home facilities, no need to require child care) and social (family or peer) support.<sup>16,17</sup> The Wii Fit program helped participants realize the role and importance of exercise in alleviating fatigue. In addition, the program has increased the health awareness of some participants and led them to make better healthy lifestyle choices, which extends beyond the objective of the program. For example, several participants have implemented their personal workout plan such as taking the stairs more and walking more, and adopted healthy diet plans. One participant (P9) was going to have knee surgery and discussed with her physical therapist plans for continuing to play Wii Fit after the surgery.

The research-related motivational elements for engaging in the Wii Fit program were also consistent with adherence to participation in other home-based exercise trials.<sup>21–24</sup> These included the commitment and altruistic behavior of participants' contribution to a better life of others through participation in the research study,<sup>22–24</sup> and the notion of not letting the research coordinator down.<sup>21</sup> This notion is believed to come from the strong rapport built between the participants and the research coordinator through flexible scheduling of monitoring, frequent contact (telephone and home visits), and a caring attitude, which have been shown to be effective retention strategies in physical activity studies.<sup>25</sup>

#### Limitations and recommendations

The qualitative nature of this cross-sectional study with a one-time interview of 14 sedentary female African Americans with SLE from one study site limits the transferability of the results to the wider SLE patient population. Continued long-term adherence to the program may be more complex, and involve willingness, ability, and commitment of the patients to

accommodate and integrate the exercise routine into their habits. Future studies should explore factors contributing to long-term adherence to regular exercise using Wii Fit or other exergames among patients with SLE.

By understanding the important elements that motivate sedentary African American women with SLE to exercise using the Wii Fit, clinicians will be better prepared to develop individualized home exercise programs for them. Programs that include Wii Fit or other exergames may serve as a viable alternative mode of home-based conditioning exercise for this population, who tend to be less motivated to exercise.

As several participants commented they were not able to do many activities, master certain games, or figure out how to play some, results of this study may provide crucial information for the Wii Fit or other exergames developers to include more exercise games that are less physically and cognitively demanding or challenging, as well as tailoring these games/ activities to meet the needs of people with chronic health conditions and/or disabilities. Implementation of a sustainable home-based exercise programs with exergames for this population may help prevent the development of secondary health conditions.

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	No	31	59	-37	73.8	3.5
3	Yes	19	58	-15	58.1	-3.1
0	No	6	50	-11	48.1	0.9
2	Yes	27	63	-3	74.5	-6.3
0	No	26	50	-12	68.5	-3.2
0	No	26	57	ŝ	47.6	-0.9
0	No	37	41	9-	96.6	-3.2
3	No	23 <i>c</i>	53	-14	88.5	0.9
0	No	52	59	-3	84.4	1.8
1	No	34	58	-16	82.1	-1.6
0	$q^{\mathrm{oN}}$	11	52	-24	65.8	-0.9
2	Yes	17	56	-4	106.1	-2.3
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0	Yes	34	55	L-	65.8	-5.0
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CR assesses the accumulated damage

 $b_{
m Darticipant}$  was on prednisone from week 6 on; FFS score change of this patient was calculated between baseline and week 5.

 $^{\mathcal{C}}$ Data were from the participant's exercise log.

dFSS = Fatigue Severity Scale (range from 9 to 63). Lower scores indicate less fatigue. "-" sign means reduction in fatigue score.

 $e_{,-,}$  sign means weight loss.

Table 1

# Table 2

# Interview guiding questions

Topics	Questions	
Reaction to Wii Fit	1	How would you describe your exercise pattern prior to having the Wii Fit?
	2	How did the Wii Fit exercise program fit into your daily routine?
	3	Describe what it was like to exercise using the Wii Fit.
Concerns, and perceived difficulties/barriers of the Wii Fit related to exercise, and	1	Tell me about a typical Wii Fit exercise routine.
	2	What do you like/dislike about the Wii Fit?
suggestions for improvement	3	How would you compare exercise using the Wii Fit with your usual exercise routine?
1	4	Based on your experience, what were the difficulties of exercising with the Wii Fit?
	5	What can we change to make the Wii Fit exercise program better?
Satisfaction, and usefulness of	1	How satisfied are you with exercise using the Wii Fit?
to exercise	2	How useful was the Wii Fit to motivate you to exercise?
	3	What was the most useful part about Wii Fit for you?
	4	Please tell me how the Wii Fit motivates you to exercise.
	5	Please tell me which part of the Wii Fit motivates you to exercise.
Impact on your health and fatigue	1	How do you feel about your health and fatigue compared to before exercise with Wii Fit?
	2	How would you describe your health and fatigue since you started exercising using the Wii Fit?
Wrap-up	1	Describe how using the Wii Fit changed your lifestyle or activity level.
	2	How likely are you to continue exercising with the Wii Fit?
	3	Are there any other feedback, thoughts, or concerns you want to share?

#### Table 3

Emerging themes and subthemes from the participants' experience of playing Wii Fit

Theme set	Theme	Subtheme	Example
Specific to the current study			
	Enjoyment		P7: I went an hour once and kinda lost track of time. It just kinda motivated me a whole lot.
			P9: What I like about it you didn't get the impression you were exercising, it was like you were doing a fun game.
		Interactive	P4: I guess I just like when you turn it [Wii Fit] on and the little thing says "good evening" and it will remind that "hey I didn't see you yesterday".
		Challenging	P1: When you got the score that you wanted it just means that you were determined to do better.
			P6: It was more like a competition with me who could do what's best, so that push me to try and do better. [This participant had balance problem and poor stamina].
			P15: It tells me I'm such and such a[n] age. I say, "Oh no I'm not!" I have to keep going at it [playing Wii Fit] until it comes down to what I want to see like 60 something.
		Competitive with an embedded social element	P3: I had someone to compete with that was a lot of motivation for me and competition.
	Health Benefits		P5: I can plan to go somewhere when I exercise. I know I can start the day. Let me just get up and get my little exercise going. So I can do a little housework or whatever, light housework. It helps me to do a little something around the house. I can out to the mall, whatever, and walk around.
			P15: It makes me when I get up, I want to do it [Wii Fit exercise]. Let me just go to this [Wii Fit exercise] so I'll be able to perform and walk and do what I want to do for the rest of the day. It kinda helps me get through the day. If I miss that day part and I do it in the evening, that helps me too to sleep. I won't be as restless, awake late in the morning.
	Sense of Accomplishment		P9: It [Wii Fit exercise] may wear you out for half an hour and each day would get shorter, your recovery time. So that helped me to want to do it and it was just amazing that I was able
	Convenience		P8: I'd rather do the Wii Fit than just go outside and walk or run or do activities outside versus being inside and being able to do it or going to a gym at a certain time and having to put that time in my schedule being able to do it on my own time and not having to put it in a schedule where I have to go somewhere and do it. I could be at home doing other things and doing my Wii Fit. So it's a more motivation to exercise
	Personalized		P10: like having a private coach in my house.
Generic to home-based exercise trials			
	Ethical principal of keeping a commitment with the intention of helping others		P5: The very best that I do will help to get the information that you need so that we can help others that might have the disease.
	Don't want to let anyone down		P10: Having the girls [research coordinator and assistant] come, knowing they were coming, kept me motivated to do what I was supposed to do.