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Authors
Leutwyler, Heather
Hubbard, Erin M
Vinogradov, Sophia
et al.

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Videogames to Promote Physical Activity in Older Adults with Schizophrenia

Heather Leutwyler, RN, PhD, FNP-BC, CNS,[1] Erin M. Hubbard, MA,[1] Sophia Vinogradov, MD,[2,3] and Glenna A. Dowling, PhD, RN, FAAN[1,4]

Abstract

Older adults with schizophrenia need physical activity interventions to improve their physical health. The purpose of this report is to describe the preliminary acceptability of a videogame-based physical activity program using the Kinect™ for Xbox 360 game system (Microsoft, Redmond, WA) in older adults with schizophrenia.

Introduction

Schizophrenia is a chronic and severe psychotic disorder characterized by hallucinations, delusions, thought and movement disorders, negative symptoms, and cognitive impairment.[1] Older adults with schizophrenia are a growing segment of the population, and data indicate their physical health status is poor[2–4] because of common chronic medical conditions (e.g., chronic obstructive pulmonary disease, arthritis) and difficulty with physical activity related to normal aging.[5] Physical activity can be an effective and inexpensive adjunct treatment for age-related neurodegenerative processes.[6] For example, physical activity improves mobility, gait speed, and balance in older adults[7,8] and also enhances mood and cognition.[6]

Interventions tailored to improve physical activity in older adults with schizophrenia need to take into consideration the range of symptoms they experience (e.g., paranoia, hallucinations), which can prevent participation in community-based exercise classes and programs. Currently, no published data are available on interventions that promote physical activity in this population. In this article, we briefly discuss the intended benefits of videogames for older adults with schizophrenia, describe our physical activity program using videogames, report preliminary acceptability results, and conclude with recommendations for further study.

Intended Benefits of a Videogame-Based Physical Activity Program

Videogames may overcome barriers and facilitate engagement in physical activity in older adults with schizophrenia.[9] Videogames having an interface that require physical exertion to play, such as the Kinect™ for Xbox 360 game system (Microsoft, Redmond, WA), may promote physical activity. Videogames can make physical activity more appealing and engaging for people of all ages and can increase daily activity levels. Videogame research suggests that as people become more involved and successful with active play games, they develop skills that make it easier to engage in activity and experience more physical and emotional well-being.[10] Furthermore, active play videogames serve as a gateway to activities that lead to a more physically active lifestyle.[10]

Videogames can be done in a wide variety of settings, with minimal space, and are accessible to people across the lifespan. Videogames are also easily accessible to people who might not be involved in regular physical activity for a variety of reasons, such as cost, physical limitations, lack of interest, and time constraints.[10] Evidence from research in the field of videogames indicates that active game play improves physical/physiological outcomes (such as increased energy expenditure)[10] and psychological well-being.[11] More research is needed to make videogames available to the least fit, least active population and to low-income individuals.[10]

To date, no studies have focused on increasing the amount of physical activity in older adults with schizophrenia, and only one study to our knowledge has explored issues related to the lack of physical activity in older adults with schizophrenia.[9] Our previous and ongoing studies suggest a videogame-based physical activity program that can be offered at treatment facilities may engage older adults with schizophrenia in physical activity because of ease of access, social interaction, and minimization of stigmatizing situations.[9] Currently, we are conducting a pilot study that will provide

Departments of [1]Physiological Nursing and [2]Psychiatry, University of California, San Francisco, San Francisco, California.
[3]San Francisco VA Medical Center, San Francisco, California.
[4]Institute on Aging, Research Center, San Francisco, California.
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the data necessary to establish the feasibility, acceptability, and adherence to a videogame-based physical activity program for older adults with schizophrenia and data needed to design a larger randomized clinical trial of our program.

Description of the Videogame-Based Physical Activity Program

Recruitment and data collection began in May 2012. In our ongoing program, once a week for 6 weeks, participants play an active videogame, using the Kinect for Xbox 360 game system, for 30 minutes. Although current recommendations for older adults are to engage in moderate intensity physical activity 150 minutes each week,[12] the focus of this pilot study is to determine the feasibility, acceptability, and adherence to the program. It is anticipated that the future randomized clinical trial of the program will offer the intervention more frequently than once a week.

Inclusion criteria are that participants be (1) at least 55 years of age or older, (2) diagnosed with schizophrenia or schizoaffective disorder, and (3) competent to consent based on an evaluation of their comprehension of the consent form. Participants are excluded if they have known medical conditions or physical problems that need special attention in an exercise program (i.e., prior myocardial infarction, uncontrolled hypertension). Institutional review board approval was obtained from the Committee on Human Research, University of California, San Francisco.

The Principal Investigator and her research staff facilitate the weekly sessions. At each weekly session, participants choose from a variety of games and are encouraged to use a different game each week. Off-the-shelf videogames played to date include "Kinect Sports" (including bowling and darts), "Kinect Carnival Games," "Kinect Dance Central 2," "Kinect Adventures," and "Kinect Your Shape Fitness Evolved." Participants engage in the program in groups of three to four at a time and rate the games on appeal, ease of use, and graphics at the end of each session. The program takes place at the facility the person attends: An outpatient community treatment center or a locked mental health facility.

The Kinect for Xbox 360 system does not require the participant to use a controller. Instead, the participant uses his or her body to directly control the game. The Kinect sensor utilizes revolutionary full-body tracking that recognizes the participant's body and mirrors movements in the game. Each participant has appropriate amount of space in order to have full range of motion. Approximately 6 feet of free space between the participant and the Xbox Kinect sensor is needed. Each of the facilities has a room that is large enough to accommodate a group of three to four participants while they engage in the program. The games offer a variety of levels, and each group starts off at the beginner level. Participants are taught warning signs to be aware of while exercising (i.e., shortness of breath, dizziness). Participants are encouraged to discontinue the game if they notice any exercise warning signs and to notify the research staff.

Acceptability is measured with the Borg perceived exertion scale[13] and an acceptability questionnaire with both numerical ratings and open-ended questions. The Borg scale is a 10-point scale that measures perceived level of exertion: A score of 0 equates to no exertion, 1 is very light, 3 is moderate, 5 is hard, 7 is very hard, and 10 is very, very hard. The Borg scale has shown to be a valid measure of exercise intensity in healthy individuals.[14] The seven-item acceptability questionnaire is modified from a co-investigator's study in people with Parkinson's disease.[15] Examples of two questions include: On a scale of 1 to 5, with 1 equal to "did not like it at all" and 5 equal to "liked very much," how enjoyable were the games? What was your favorite game and why? The measurements are completed after the session each week.

Results

For this report, we present the preliminary acceptability results for the weekly session when participants first played bowling from the "Kinect Sports" disc because the majority of participants to date have completed a bowling session. Data for the bowling session are available on 15 participants. The mean age was 59 (SD, 3; range, 55–68) years.

Quantitative rating of acceptability

The average Borg score for bowling was 5 (SD, 2; range, 3–10), which indicates a strong level of perceived exertion.

On a scale of 1 to 5, with 1 equal to not enjoyable and 5 equal to very enjoyable, participants rated the bowling session on average as 4 (SD, 1; range, 2–5). On a scale of 1 to 5, with 1 equal to not appealing and 5 equal to very appealing, the graphics were rated on average as 4 (SD, 1; range, 1–5). On a scale of 1 to 5, with 1 equal to not easy and 5 equal to very easy, playing the game was rated on average as 4 (SD, 1; range, 1–5).

The majority of participants (73 percent) reported they would use the system at least one time per week.

Qualitative rating of acceptability

Positive comments about the bowling session included the following themes: Easy to play and do well, had fun, and enjoyed the group atmosphere.

In general, participants indicated they liked bowling because they could easily learn to play the game and be successful. For example, one participant stated the following about bowling: "Very satisfying to making a strike." Another participant liked bowling because "It was fair play and your chances were good." Another participant liked that "You don't have to be an athlete to enjoy it." Other participants enjoyed the games because they were fun: "This game playing has been the most fun I have had in a long time." Participants enjoyed the games in part due to the group dynamic: "I enjoyed the atmosphere of the groups, other members were congenial."

Participants reported few negative comments. The negative comments related to the participants' skill and ability to play the games. For example, one participant indicated he didn't like that he "always guttered" the ball.

Conclusions and Recommendations for Further Study

Older adults with schizophrenia need physical activity programs that promote well-being, are accessible, and are easily incorporated into their treatment programs. Videogames that use the Kinect for X-Box 360 game system are an ideal way to promote physical activity in this population because it makes physical activity fun, accessible, and social.

Preliminary acceptability results from an ongoing pilot physical activity program reveal that older adults with schizophrenia rate bowling as an enjoyable and fun way to be active. In order for participants to stay engaged, participants need to feel they have the necessary skills to play the games. Participants who frequently bowled gutter balls rated the game as less enjoyable, whereas participants who bowled strikes indicated greater satisfaction. Offering a practice session prior to playing the game may improve the overall acceptability.

One participant was concerned that she could not fully participate in the program because of her need to ambulate with the assistance of a front wheel walker. With assistance from the research team, she played bowling and scored a few strikes while still using the front wheel walker. She appeared pleasantly surprised at her skill and rated the game favorably. This suggests that videogames may be tailored to the needs of patients with various physical limitations.

Further work is needed to determine the feasibility, acceptability, and adherence to a videogame-based physical activity program in older adults with schizophrenia. First, an evaluation of acceptability for different games needs to be completed. Additional participants in a variety of settings need to be evaluated. The long- and short-term impact on level of physical activity needs to be evaluated. An evaluation of younger adults with schizophrenia would also help to understand the differences between physical activities with videogames in different age groups with a serious mental illness.

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Author Disclosure Statement

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References

1. National Institute of Mental Health. *Schizophrenia*. DHHS Publication Number 06-3517. Washington, DC: U.S. Government Printing Office; 2007.
2. Parks J, Svendsen D, Singer Pa, Foti M, eds. *Morbidity and Mortality in People with Serious Mental Illness*. Alexandria, VA: National Association of State Mental Health Program Directors (NASMHPD) Medical Directors Council; 2006.
3. Kilbourne A, Cornelius J, Han X, et al. General-medical conditions in older patients with serious mental illness. Am J Geriatr Psychiatry 2005; 13:250–254.
4. Chafetz L, White MC, Collins-Bride G, et al. Predictors of physical functioning among adults with severe mental illness. Psychiatr Serv 2006; 57:225–231.
5. Gallo J. Activities of daily living and instrumental activities of daily living assessment. In: Gallo J, Bogner H, Fulmer T, Paveza G, eds. *Handbook of Geriatric Assessment*. Sudbury, MA: Jones and Bartlett Publishers; 2006, pp. 193–240.
6. Deslandes A, Moraes H, Ferreira C, et al. Exercise and mental health: Many reasons to move. Neuropsychobiology 2009; 59:191–198.
7. Manini TM, Pahor M. Physical activity and maintaining physical function in older adults. Br J Sports Med 2009; 43:28–31.
8. Chou CH, Hwang CL, Wu YT. Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: A meta-analysis. Arch Phys Med Rehabil 2012; 93:237–244.
9. Leutwyler H, Hubbard EM, Jeste DV, Vinogradov S. "We're not just sitting on the periphery": A staff perspective of physical activity in older adults with schizophrenia. Gerontologist 2012 August 30 [Epub ahead of print]. doi: 10.1093/geront/gns092.
10. Lieberman DA, Chamberlin B, Medina E Jr, et al. The power of play: Innovations in Getting Active Summit 2011: A science panel proceedings report from the American Heart Association. Circulation 2011; 123:2507–2516.
11. Peng W, Crouse JC, Lin JH. Using active video games for physical activity promotion: A systematic review of the current state of research. Health Educ Behav 2012 July 6 [Epub ahead of print]. doi: 10.1177/1090198112444956.
12. U.S. Department of Health and Human Services. Physical activity guidelines for Americans. 2008. www.health.gov/PAGuidelines/pdf/paguide.pdf (accessed August 15, 2012).
13. Borg GA. Psychophysical bases of perceived exertion. Med Sci Sports Exerc 1982; 14:377–381.
14. Chen MJ, Fan X, Moe ST. Criterion-related validity of the Borg ratings of perceived exertion scale in healthy individuals: A meta-analysis. J Sports Sci 2002; 20:873–899.
15. Dowling GA, Hone R, Brown C, et al. Feasibility of adapting a classroom balance training program to a video game platform for people with Parkinson's disease. Telemed J E Health 2012 (in press). doi: 10.1089/tmj.2012.0055.

Address correspondence to:
Heather Leutwyler, RN, PhD, FNP-BC, CNS
Department of Physiological Nursing
University of California, San Francisco
2 Koret Way, N631A
Box 0610
San Francisco, CA 94143-0610

E-mail: heather.leutwyler@nursing.ucsf.edu