Article

Malone LA, Rowland JL, Rogers R, Mehta T, Padalabalanarayanan S, Thirumalai M, Rimmer JH. Active videogaming in youth with physical disability: gameplay and enjoyment. *Games Health J.* 2016;5(5):333-341. https://doi.org/10.1089/g4h.2015.0105.

Adaptive Sports/Recreation Topic Categories

- Physical activity performance
- Video gaming

Research question

- Are there associations between quality of gameplay, controller usage, heart rate, physical function, and enjoyment during Active VideoGaming play in youth with mobility impairments?

Methodology

- Participants: A convenience sample of 16 youth with lower extremity mobility impairments and partial or full use of upper extremities were recruited from local community organizations/children's hospitals.
    - Mean age = 13.8 years (range = 10-18 years)
    - 11 males, 5 females
    - All used a manual or a power wheelchair as primary mode of ambulation and played the games seated
    - Exclusions: Youth with an unstable cardiovascular condition, body weight over 350 pounds, visual impairment interfering with playing videogames, and low understanding of the project
- Procedure:
    - 17 activities from the International Classification of Functioning, Disability and Health were selected to assess physical function by the research staff. The participants performed these activities during the first session, and activities including stand, reach, throw and jump were chosen as most likely to be included in AVG sessions.
    - Participants attended three laboratory sessions where each participant played four AVGs on one of the three gaming platforms (Nintendo Wii, Sony PlayStation3 Move, Microsoft Xbox Kinect) for 8 minutes with a 5-minute rest between games. The gaming platform for each session was randomly assigned and the games were played in random order.
    - Before playing, the participants familiarized themselves with the AVG games. Participants who were able to move their legs while seated attached the controller to their leg when this was the game instruction.
    - Games were chosen to represent popular genres (e.g. dance, sport, outdoor endurance exercises). Games selected had an average perceived exertion of at least 5 on a 0–10-point scale by trial raters before testing.
    - Data were collected across the three sessions for:
        - Quality of gameplay and ability of youth to use the controller during the games by two researchers independently.
        - Game play intensity using heart rate (HR) recorded immediately at the end of each game.

  - Participant feedback regarding aspects pertaining to use of the system (e.g., did they experience pain, loss of balance).
  - Enjoyment of gameplay, participants completed the Physical Activity Enjoyment Scale (PACES) after each game.

Results

- Significant associations were found between several variables as follows:
  - As youth physical function level decreased, ability to use the controller and quality of game play were lower.
  - As youth ability to use the controller increased, quality of game play increased.
  - A higher HR was associated with higher quality of gameplay and a higher PACES score.
  - As quality of gameplay increased, the PACES score increased.

Discussion/Conclusion

- Correlations in the present study suggested that the ability to use the game controllers might have affected aspects of AVG play, including quality of gameplay, enjoyment, and exercise intensity.
- Modification of controllers provides an opportunity to reduce traditional activity limitations and participation restrictions, while providing the players with opportunities to fully engage in the gaming experience.
- It is important to determine the relationship between energy expenditure, enjoyment, and engagement, which may ultimately influence adherence.
- Longer periods of AVG programs are required to determine if physical activity levels could be influenced by the intervention in CP.

Article strengths

- Findings of the current study can be used to inform future research on key factors to examine to maximize enjoyment and the potential for sustainability of gaming activities.
- The study explored the factors that are associated with increased AVG participation in youth who use a wheelchair as primary mode of ambulation.

Article Weakness

- Given the small sample size, generalizability of the findings is limited
- The self-report nature of PACES and no baseline data for PACES or HR are additional limitations
- The inter-rater reliability was not tested for the 2 researchers who assessed the quality of gameplay and ability of youth to use the controller
- Past experience information in games offered was not collected, which may have influenced HR, enjoyment and PRE of activities and learning/motivation

Take Home Messages

- Enjoyment and HR intensity of AVG play in youth with mobility impairments is related to the quality of their game play and ability to utilize the controller as required for successful play.

- Modification of AVG controllers provides an opportunity to reduce traditional activity limitations and participation restrictions, while providing the players with opportunities to fully engage in the gaming experience.