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Dance for Health: An intergenerational program to increase access to physical activity

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Abstract

Purpose—The purpose of this study was to evaluate Dance for Health, an intergenerational program to increase access to physical activity in an underserved, high risk urban community.

Design and Methods—Dance for Health was developed using community-based participatory research methods and evaluated using an observational study design. The program entailed two hour line dancing sessions delivered by trained dance instructors in the neighborhood recreation center. The weekly sessions were delivered for one month in the spring and one month in the fall from 2012-2016. Nurse practitioner students mentored local high school students to assess outcomes: achievement of target heart rate, Borg Rating of Perceived Exertion, number of pedometer steps during dance session, Physical Activity Enjoyment Scale, and adiposity. Analytic methods included descriptive statistics and mixed effects models.

Results—From 2012-2016, 521 participants ranging from 2-79 years attended Dance for Health. Approximately 50% of children and 80% of adults achieved target heart rate. Achievement of target heart rate was not related to perceived exertion, though it was related to pedometer steps in adults. All participants rated the program highly for enjoyment. There was no change in adiposity.

Conclusions—Dance for Health demonstrated high levels of community engagement and enjoyment. It led to adequate levels of exertion, particularly for adults. Our evaluation can inform program refinement and future intergenerational physical activity programs.

Practice Implications—Dance is an enjoyable, culturally appropriate, low cost method for increasing access to physical activity for children and families.

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Keywords

intergenerational; physical activity; exercise; dance; community based participatory research; community engagement

Introduction

Physical activity is associated with decreased risk of heart disease (Lee, Rexrode, Cook, Manson, & Buring, 2001; Sattelmair et al., 2011), stroke (Do Lee, Folsom, & Blair, 2003), type 2 diabetes (Krishnan, Rosenberg, & Palmer, 2009), colon cancer (Boyle, Keegel, Bull, Heyworth, & Fritschi, 2012), breast cancer (Wu, Zhang, & Kang, 2013), and mortality (Oguma, Sesso, Paffenbarger, & Lee, 2002; Samitz, Egger, & Zwahlen, 2011; Wen et al., 2011). Lack of physical activity during childhood can contribute to worse academic performance, poor cognitive skills (e.g., concentration, creativity), and negative attitudes (e.g., motivation, self-esteem) (Rasberry et al., 2011). As a result, increasing physical activity is a Healthy People 2020 objective (Healthy People 2020, 2017). Unfortunately, 73% children do not engage in the recommended 60 minutes per day of physical activity (Kann et al., 2014; US Department of Health and Human Services, 2008). Longitudinal evidence documents that low levels of physical activity in adolescence persist into adulthood (Gordon-Larsen, Nelson, & Popkin, 2004), highlighting the importance of establishing healthful physical activity levels at a young age.

Social determinants of health (SDOH) are the social, economic, and physical factors that account for up to 75% of health, functioning, and quality-of-life outcomes (Centers for Disease Control and Prevention, 2014). Access to resources and opportunities for physical activity is a key SDOH (Healthy People 2020, 2017; Shelton et al., 2011). Children from racial/ethnic minority groups, or who live in areas of poverty, are more likely to reside in neighborhoods with less opportunity for physical activity (Watson, 2016), which contributes to low levels of activity in these populations. In West Philadelphia, a neighborhood with a population that is largely African American and has a poverty rate among the highest in the country (Pew Charitable Trusts, 2015), four out of five children do not participate in the recommended amount of physical activity. One out of five Philadelphia children participate in no physical activity at all, a problem especially prevalent among African American girls (29.8%) (Trost et al., 2013). This only amplifies the other risk factors for disease in the West Philadelphia community, including high levels of obesity, low access to healthy foods, and poor cardiovascular fitness (Lipman et al., 2011).

When developing physical activity programs, it is critical to consider other SDOH and how they interact to influence activity level. For example, determinants such as neighborhood safety (when walking or in playgrounds) and physical environment (access to green spaces) impact the ability of children to be physically active in their home community. In addition, family-level SDOH such as social support (participation in physical activity by family and friends), and family income (parents' ability to afford sports programs) influence children's activity levels (Bauman et al., 2012; Ding, Sallis, Kerr, Lee, & Rosenberg, 2011; Gordon-Larsen, McMurray, & Popkin, 2000). Despite the significant impact on health outcomes,

SDOH are often overlooked by existing clinical and health behavior change interventions (Ball, Carver, Downing, Jackson, & O'Rourke, 2015; Gottlieb, Sandel, & Adler, 2013). Upstream interventions (those approaches that can affect large populations through regulation, increased access, or economic incentives) that address SDOH are more likely to meet the needs of children and families (Ball, 2015; Ball et al., 2015).

One potential strategy for increasing physical activity in children from underserved communities is to develop intergenerational programs (Davison, Jurkowski, Li, Kranz, & Lawson, 2013; Flora & Faulkner, 2007; Swanson, Studts, Bardach, Bersamin, & Schoenberg, 2011; Werner, Teufel, Holtgrave, & Brown, 2012). Given that children's health habits develop within the context of a family, intergenerational interventions that include parents, grandparents, or other adult caregivers can be promising modalities for supporting health behaviors (Kuo et al., 2012). Furthermore, interventions that include two or more generations can improve the health not only of participating children- but of entire families- an important consideration given that lack of physical activity is not only a problem for children; 51% of adults do not meet guidelines for aerobic physical activity (Ward, Barnes, Freeman, & Schiller, 2012). An intergenerational approach provides a source of social support within an intervention and encourages development of healthy behaviors at the family level (Swanson et al., 2011). This approach may be of most benefit for African American families, who ascribe more importance to social supports and prefer health programs that target the whole family (Lipman et al., 2012).

Dance has been identified as a beneficial program for intergenerational physical activity for underserved communities and has been shown to increase physical fitness, decrease stress, and decrease psychosomatic symptoms in children (Duberg, Hagberg, Sunvisson, & Möller, 2013; Quin, Frazer, & Redding, 2007). In adults, dance has demonstrated beneficial effects on anxiety, depression, physical function, disability, and memory (Jeong et al., 2005; Koch, Morlinghaus, & Fuchs, 2007; Murrock & Graor, 2014; Weuve et al., 2004). Previously studied dance interventions have decreased BMI, body fat, and blood pressure and improved quality of life in African American communities (Murrock & Gary, 2008; Murrock, Higgins, & Killion, 2009; Robinson et al., 2010), a population that is affected by multiple health disparities (Agency for Healthcare and Research Quality, 2013). Importantly, members of the African American community have reported dance to be culturally relevant (Murrock & Gary, 2010). Dance programs have also demonstrated lower dropout rates than other fitness programs (Quin et al., 2007) and dance is low cost, can be done at home, and requires no equipment - important considerations for families with limited financial resources.

The purpose of this study was to evaluate Dance for Health, an intergenerational program to increase access to physical activity for the West Philadelphia community. The key components that were evaluated included program attendance, impact on cardiovascular exertion, change in adiposity, and participant enjoyment.

Methods

Program Development

Dance for Health was developed using community-based participatory research (CBPR) methods (Minkler & Wallerstein, 2008), to ensure that the program arose from, and was developed in accordance with, the priorities, needs, strengths, and barriers of children and families in West Philadelphia. The program resulted from collaboration among an academic institution, the School District of Philadelphia, and a local school-based health center (Lipman et al., 2011). Prior to developing the Dance for Health, children and parents from West Philadelphia were surveyed and focus groups were conducted to determine their interest in various programs to increase their activity. Results demonstrated that families desired an activity that was easily accessible, free, fun, in a safe area, involved both parents and children, and could be done at home. Dance was chosen by both the children and the parents (Lipman et al., 2011). To align with community preferences, Dance for Health was designed to be without cost to participants and in a safe, indoor environment. School staff, students, and parents were engaged as key advisors to guide program development and evaluation (Lipman et al., 2011).

Intervention

Prior to beginning the study, Institutional Review Board approval was obtained from the University of Pennsylvania. Using a CBPR approach, a convenience sample of participants was recruited in partnership with community members through flyers at local schools and throughout the neighborhood, joint presentations and demonstrations at parent events, announcements at community meetings, radio announcements, and notices in the local newspaper. Dance for Health sessions were offered weekly for one month in the spring and one month in the fall (8 weeks total per year) from 2012-2016. Community members assisted with dance event coordination. Sessions took place in the evenings at a recreation center located in the West Philadelphia neighborhood. The dance entailed two hour group line dancing, led by two trained dance instructors well known by the local community.

Outcome Measurement

All outcome measures were collected weekly by local high school students trained and mentored by pediatric acute care nurse practitioner students. Training included both didactic content (e.g., normal patterns of child growth, the effects of physical activity on health) and interactive learning (e.g., measurement of heart rate, height, and weight). Training on measurement of heart rate, height, and weight was conducted in the high school's interactive learning lab and included hands-on practice (Lipman et al., 2011).

Participant demographics (age, gender, race) were collected at baseline. Adiposity, height and weight were measured according to methods described in a previous study (Lipman et al., 2004). Baseline and mid-activity heart rates and perceived exertion were assessed to measure cardiovascular exertion. Heart rate was collected by manual palpation of the radial artery, both prior to starting dance and at the midpoint of the session. Perceived exertion - a participant's assessment of how hard the body is working - was collected at the end of the session using the Borg Rating of Perceived Exertion (RPE) (Borg, 1998). The Borg RPE

ranges from 6 (no exertion) to 20 (maximal exertion), with a score of 12-14 indicating target moderate levels of exertion, has been found to be reliable and valid in both adults (Chen, Fan, & Moe, 2002) and children (Lamb, 1995; Pfeiffer, Pivarnik, Womack, Reeves, & Malina, 2002; Ward & Bar-Or, 1987). Participants also wore pedometers on their waistbands during the dance sessions to quantify the number of steps. To measure acceptability of the program, a modified Physical Activity Enjoyment Scales (PACES) was collected at the end of the session. PACES has been found to be reliable and valid in adults (Kendzierski & DeCarlo, 1991), older adults (Mullen et al., 2011), and children (Motl et al., 2001); the modified version used in this study included 5 questions.

Data Analysis

Basic descriptive statistics were calculated to examine participant demographics and all outcomes. Target heart rate was calculated as at least 50% of maximum heart rate (with maximum heart rate being equivalent to 220 minus age) (American Heart Association, 2015). Mixed effects models were used to assess associations with target heart rate, as well as changes over time. Linear or logistic regression was used, as appropriate for the outcome, and all models adjusted for session, year, and repeated observations within a participant. Data analyses were performed using Stata/MP 14 (StataCorp, 2015).

Results

Table 1 displays participant demographics. There were a total of 521 participants over five years, (n=372 adults, n=149 children). Adults ranged in age from 21 to 79 years (mean 52.4±14.5). Children ranged in age from 2 to 21 years (mean 12.2±9.5). Females comprised 85.8% of the participants (92.1% of adults; 70.1% of children). All were African American.

Table 2 summarizes program attendance, cardiovascular exertion, and enjoyment. Most participants (68.3%) attended 1 or 2 sessions, though some (7.7%) attended as many as 5 or more. On average, children attended fewer sessions than adults (2.4±1.8 adults; 1.9±1.2 children). There was no associated change in BMI z-score for children ($p=0.99$) or in weight for adults ($p=0.52$). Data on cardiovascular exertion showed that half (50.6%) of children reached target heart rate during dance sessions. A significantly higher percentage (80.5%) of adults reached their target heart rate ($p<0.001$). Older adults were more likely than younger adults to reach target heart rate, with a 6% increase in odds for each increase in year of age ($p<0.001$). Both adults and children perceived their level of cardiovascular exertion as measured by the Borg RPE was “somewhat hard” and within the target range of 12-14 (adults: mean=13.3±3.6; children: mean=13.3±4.3). Borg RPE did not predict likelihood of reaching target heart rate for adults ($p=0.16$) or children ($p=0.25$). Adults expended a median of 2507 steps during dance sessions, compared to 1999 for children; however, wide variation existed for step count in both groups (SD=3970 for adults; SD=2893 for children). Activity level during the dance session (as measured by pedometer steps) predicted likelihood of reaching target heart rate for adults ($p<0.001$), but not for children ($p=0.22$). For example, adults with 1000 steps while dancing had a 44% probability (95% CI: 0.07-0.81) of reaching their target heart rate; adults with 4000 steps had a 91% (95% CI: 0.87-0.95) probability of reaching their target heart rate. Regarding enjoyment of the program, both adults and

children rated the program very highly on the PACES scale (adults: mean=34.0±3.1; children: mean=32.8±4.6; out of 35 possible points).

Discussion

Our evaluation of Dance for Health, a free, intergenerational, culturally appropriate, physical activity program demonstrated some positive outcomes as well as identified areas for improvement. Overall, we found that the program was widely accepted and enjoyed by the West Philadelphia community, serving over 500 children and families during the 5 year evaluation period. While adults and children both rated adequate levels of perceived exertion, adults were more likely to reach target heart rate. All participants found the program to be highly enjoyable. Changes in adiposity were not achieved.

Some of our findings are consistent with existing literature. As shown by others, we found that dance was adequately strenuous and enjoyable form of physical exercise (e.g. (Duberg et al., 2013; Murrock & Gary, 2010; Quin et al., 2007)). Dance for Health did not lead to changes in adiposity that have been shown in other studies (Murrock & Gary, 2010; Murrock et al., 2009), though this was not surprising since this program was of low frequency, moderate intensity, and short duration (Greaves et al., 2011). While others have demonstrated that dance was sufficiently vigorous for children (Quin et al., 2007), we found that adults were more likely than children to reach target heart rate. It may be that line dancing, as delivered in this program, was not sufficiently intense for children. This could be addressed by tailoring future sessions to include varying levels of intensity and "challenges," while encouraging participants to push themselves if able. Another option would be to conduct more frequent heart rate monitoring and to encourage participants who are not meeting their target heart rate to engage more intensely in the dancing. An additional finding from our evaluation was that the majority of participants were adult females. Reasons for this are unclear. It may be that individuals view dance as a gendered activity (for females) or that adults find dance to be more appealing. This is unexpected, given that children suggested dance as a desired activity during program development. To address these imbalances, future recruitment efforts should highlight the non-gendered focus of dance (e.g., including pictures of men/boys and women/girls on flyers), encourage parents to bring their children, and recruit more heavily from sites that children frequent (e.g., schools).

Dance for Health was created to specifically address SDOH by utilizing an upstream approach and engaging with families to understand barriers to, priorities for, and interest in physical activity. The program was designed not *for* but in partnership *with* West Philadelphia children and families. Based on the input of children and families and the key stakeholders, the program was free of charge, in a safe community space, intergenerational (therefore alleviating the need for parents to find child care in order to be able to exercise), and culturally appropriate (Lipman et al., 2011). Given this partnership in development, the program demonstrated high acceptability not only on the PACES scale, but also anecdotally. Furthermore, a recent evaluation of Dance for Health's community engagement demonstrated that 64% of surveyed participants continue to dance for exercise at home, 100% found the program to be enjoyable, and 95% enjoyed the intergenerational and social aspect of the program (Feinberg, Bowman, & Lipman, 2016). Based on the interest of the

community, the program has been expanded to area public schools and a senior center. Perhaps most importantly, Dance for Health has been shown to be sustainable and feasible. Community members continue to meet in the recreation center to dance every week throughout the fall and spring, beyond the structured four week program. Local high school students who assisted with outcome measurement found their involvement to be fulfilling and engaging, promoting community ownership (Feinberg et al., 2016). This sustainability, feasibility, and acceptance to the community demonstrated key strengths of this program. Unlike many interventions, the program did not cease to exist when the researchers, clinicians, and funders were not present because community members felt ownership of and commitment to the program.

Intergenerational interventions, such as Dance for Health, are well suited to address child health and support behavior change because of the involvement of family members. Insofar as children's health behaviors develop within the context of a family environment, health interventions that include family members are more likely to be effective (Kuo et al., 2012). For physical activity interventions specifically, family involvement is associated with intervention effectiveness (McMinn, Griffin, Jones, & van Sluijs, 2013; Salmon, Booth, Phongsavan, Murphy, & Timperio, 2007; Van Sluijs, McMinn, & Griffin, 2007). Therefore, interventions focused on increasing children's activity may benefit from an intergenerational component. Of note, while it is important to include the parents of children who participate, family can be conceptualized broadly; other important caregivers and role models (e.g., aunts and uncles, coaches, teachers) can also play an important role in supporting health behavior and their participation in an intervention may be beneficial.

Nurses can play a unique role in addressing SDOH and developing upstream interventions, such as Dance for Health. Because nurses focus on the complex interaction between patient, environment, and health (Fawcett, 1984), they are particularly well suited to engage with underserved communities (Lathrop, 2013; Lipman, 2017). Pediatric nurses in clinical practice should address SDOH when working with children and families to increase physical activity and discuss options with the family to gain an understanding of their goals and priorities. Nurses working in policy can also address SDOH by advocating for policies that focus on the challenges faced by underserved populations. Policies and funding to increase safe, walkable green space in urban neighborhoods can help promote physical activity. Lastly, nurse scientists can address SDOH by developing sustainable, community based participatory research programs that engage high risk, vulnerable children and families as true partners. This can ensure that physical activity interventions align with participants' priorities, capitalize on their strengths, and ultimately become part of the local culture beyond the research testing phase (Quested, Ntoumanis, Thøgersen-Ntoumani, Hagger, & Hancox, 2017).

Our evaluation of Dance for Health suggests avenues for further research. This study was an observational evaluation of an existing “real world” program; a future formal evaluation could strengthen ability to make causal inferences by incorporating factors such as randomization, a defined intervention/control group, and more frequent outcome analyses. In addition, future studies of intergenerational activity should explore how intergenerational interventions can be tailored to be acceptable to and with adequate intensity for both youth

and adults. Given the high level of enjoyment of dance by all participants, future research should further explore its potential to lead to meaningful improvement in cardiovascular fitness- particularly for children.

Limitations of this study include that Dance for Health was designed to be feasible and sustainable; therefore, sophisticated and costly measures (such as continuous heart rate monitoring, bioelectrical impedance analysis to measure change in body fat) were not collected. This was also a community-based study and was open to all members of the West Philadelphia community. There was not a consistent intervention group; participants attended at varying times and with a range of frequencies. The intervention was only in four week sessions, and longer sessions are more likely to yield positive outcomes.

Strengths of this study include the program's “real world” implementation; the study reflected a community initiative as developed for, and sustained by a community. While this did not allow for the inference of causality that can be demonstrated in a randomized controlled trial, it does more accurately reflect how a physical activity program is delivered and maintained after a research testing period. In addition, since the program was delivered in alignment with the priorities, needs, strengths, resources, and culture of West Philadelphia children and families, the program did not reflect the imposition of the investigators' biases onto the community. Lastly, results of this study are relevant to policymakers to inform decisions about resource allocation for physical activity programs in communities with limited financial resources.

Conclusions

Dance for Health, an intergenerational dance program developed using CBPR methods, demonstrated high levels of community engagement and enjoyment. Future refinement will include efforts to increase physical intensity for children, recruit additional children and males, and increase the duration of program. Because dance is low cost, highly enjoyable, and appropriate for children and adults, it may provide a promising upstream approach for increasing physical activity in children from underserved communities. Effective programs for increasing access to physical activity in children are critically important, given current low levels of exercise and the serious health effects of physical inactivity. Interventions must address SDOH, be sustainable and culturally appropriate, and be developed in partnership with children and families. Nurses working in clinical practice, policy, and research can play a key role in partnering with children and families from underserved communities to increase physical activity.

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References

Agency for Healthcare and Research Quality. National Healthcare Disparities Report. 2013

American Heart Association. Target Heart Rates. 2015. Retrieved from http://www.heart.org/HEARTORG/HealthyLiving/PhysicalActivity/Target-Heart-Rates_UCM_434341_Article.jsp#.WRT4seXys2w

Ball K. Traversing myths and mountains: addressing socioeconomic inequities in the promotion of nutrition and physical activity behaviours. International Journal of Behavioral Nutrition and Physical Activity. 2015; 12(1):142. [PubMed: 26572225]

Ball K, Carver A, Downing K, Jackson M, O'Rourke K. Addressing the social determinants of inequities in physical activity and sedentary behaviours. Health Promotion International. 2015; 30(suppl 2):ii8–ii19.

Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW, Group LPASW. Correlates of physical activity: why are some people physically active and others not? The Lancet. 2012; 380(9838):258–271.

Borg, G. Borg's perceived exertion and pain scales. Human kinetics; 1998.

Boyle T, Keegel T, Bull F, Heyworth J, Fritschi L. Physical activity and risks of proximal and distal colon cancers: a systematic review and meta-analysis. Journal of the National Cancer Institute. 2012:djs354.

Centers for Disease Control and Prevention. NCHHSTP Social Determinants of Health. 2014. Retrieved from https://www.cdc.gov/nchhstp/socialdeterminants/faq.html

Chen MJ, Fan X, Moe ST. Criterion-related validity of the Borg ratings of perceived exertion scale in healthy individuals: a meta-analysis. Journal of Sports Sciences. 2002; 20(11):873–899. [PubMed: 12430990]

Davison KK, Jurkowski JM, Li K, Kranz S, Lawson HA. A childhood obesity intervention developed by families for families: results from a pilot study. International Journal of Behavioral Nutrition and Physical Activity. 2013; 10(1):3. [PubMed: 23289970]

Ding D, Sallis JF, Kerr J, Lee S, Rosenberg DE. Neighborhood environment and physical activity among youth: a review. American Journal of Preventive Medicine. 2011; 41(4):442–455. [PubMed: 21961474]

Do Lee C, Folsom AR, Blair SN. Physical activity and stroke risk. Stroke. 2003; 34(10):2475–2481. [PubMed: 14500932]

Duberg A, Hagberg L, Sunvisson H, Möller M. Influencing self-rated health among adolescent girls with dance intervention: a randomized controlled trial. JAMA Pediatrics. 2013; 167(1):27–31. [PubMed: 23403597]

Fawcett J. The metaparadigm of nursing: Present status and future refinements. Image: The Journal of Nursing Scholarship. 1984; 16(3):84–87. [PubMed: 6565629]

Feinberg JL, Bowman C, Lipman TH. Dance for health: The importance of community engagement and project sustainability. Journal of Nursing Education and Practice. 2016; 7(1):89.

Flora PK, Faulkner GE. Physical activity: An innovative context for intergenerational programming. Journal of Intergenerational Relationships. 2007; 4(4):63–74.

Gordon-Larsen P, McMurray RG, Popkin BM. Determinants of adolescent physical activity and inactivity patterns. Pediatrics. 2000; 105(6):e83–e83. [PubMed: 10835096]

Gordon-Larsen P, Nelson MC, Popkin BM. Longitudinal physical activity and sedentary behavior trends: adolescence to adulthood. American Journal of Preventive Medicine. 2004; 27(4):277–283. [PubMed: 15488356]

Gottlieb L, Sandel M, Adler NE. Collecting and applying data on social determinants of health in health care settings. JAMA Internal Medicine. 2013; 173(11):1017–1020. [PubMed: 23699778]

Greaves CJ, Sheppard KE, Abraham C, Hardeman W, Roden M, Evans PH, Schwarz P. Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. BMC Public Health. 2011; 11(1):119. [PubMed: 21333011]

Healthy People 2020. Social Determinants of Health. 2017. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health

Jeong YJ, Hong SC, Lee MS, Park MC, Kim YK, Suh CM. Dance movement therapy improves emotional responses and modulates neurohormones in adolescents with mild depression. International Journal of Neuroscience. 2005; 115(12):1711–1720. [PubMed: 16287635]

Kann L, Kinchen S, Shanklin SL, Flint KH, Hawkins J, Harris WA, Chyen D. Youth Risk Behavior Surveillance--United States, 2013. Morbidity and Mortality Weekly Report (MMWR). Surveillance Summaries. Centers for Disease Control and Prevention. 2014; 63(SS-4)

Kendzierski D, DeCarlo KJ. Physical activity enjoyment scale: Two validation studies. Journal of Sport and Exercise Psychology. 1991; 13(1):50–64.

Koch SC, Morlinghaus K, Fuchs T. The joy dance: Specific effects of a single dance intervention on psychiatric patients with depression. The Arts in Psychotherapy. 2007; 34(4):340–349.

Krishnan S, Rosenberg L, Palmer JR. Physical Activity and Television Watching in Relation to Risk of Type 2 Diabetes The Black Women's Health Study. American Journal of Epidemiology. 2009; 169(4):428–434. [PubMed: 19056835]

Kuo DZ, Houtrow AJ, Arango P, Kuhlthau KA, Simmons JM, Neff JM. Family-centered care: current applications and future directions in pediatric health care. Maternal and Child Health Journal. 2012; 16(2):297–305. [PubMed: 21318293]

Lamb KL. Children's ratings of effort during cycle ergometry: an examination of the validity of two effort rating scales. Pediatric Exercise Science. 1995; 7(4):407–421.

Lathrop B. Nursing Leadership in Addressing the Social Determinants of Health. Policy, Politics, & Nursing Practice. 2013; doi: 10.1177/1527154413489887

Lee IM, Rexrode KM, Cook NR, Manson JE, Buring JE. Physical activity and coronary heart disease in women: Is no pain, no gain passé? JAMA. 2001; 285(11):1447–1454. [PubMed: 11255420]

Lipman TH. Community Engagement for Pediatric Nurses: No Longer a Choice. Journal of Pediatric Nursing: Nursing Care of Children and Families. 2017; 33:101–102. DOI: 10.1016/j.pedn.2016.12.014

Lipman TH, Hench KD, Benyi T, Delaune J, Gilluly KA, Johnson L, Weber C. A multicentre randomized controlled trial of an intervention to improve the accuracy of linear growth measurement. Archives of Disease in Childhood. 2004; 89(4):342–346. DOI: 10.1136/adc.2003.030072 [PubMed: 15033843]

Lipman TH, Murphy KM, Kumanyika SK, Ratcliffe SJ, Jawad AF, Ginsburg KR. Racial differences in parents' perceptions of factors important for children to live well with diabetes. The Diabetes Educator. 2012; 38(1):58–66. [PubMed: 22146789]

Lipman TH, Schucker MM, Ratcliffe SJ, Holmberg T, Baier S, Deatrick JA. Diabetes risk factors in children: A partnership between nurse practitioner and high school students. MCN: The American Journal of Maternal/Child Nursing. 2011; 36(1):56–62.

McMinn AM, Griffin SJ, Jones AP, van Sluijs EM. Family and home influences on children's after-school and weekend physical activity. Eur J Public Health. 2013; 23(5):805–810. DOI: 10.1093/eurpub/cks160 [PubMed: 23172732]

Minkler, M., Wallerstein, N. Community Based Participatory Research in Health. 2. San Francisco, CA: Jossey-Bass; 2008.

Motl RW, Dishman RK, Saunders R, Dowda M, Felton G, Pate RR. Measuring enjoyment of physical activity in adolescent girls. American Journal of Preventive Medicine. 2001; 21(2):110–117. doi:https://doi.org/10.1016/S0749-3797(01)00326-9. [PubMed: 11457630]

Mullen SP, Olson EA, Phillips SM, Szabo AN, Wójcicki TR, Mailey EL, McAuley E. Measuring enjoyment of physical activity in older adults: invariance of the physical activity enjoyment scale (paces) across groups and time. International Journal of Behavioral Nutrition and Physical Activity. 2011; 8(1):103. [PubMed: 21951520]

Murrock CJ, Gary FA. A culturally-specific dance intervention to increase functional capacity in African American women. Journal of Cultural Diversity. 2008; 15(4):168. [PubMed: 19202718]

Murrock CJ, Gary FA. Culturally Specific Dance to Reduce Obesity in African American Women. Health Promotion Practice. 2010; 11(4):465–473. DOI: 10.1177/1524839908323520 [PubMed: 19098267]

Murrock CJ, Graor CH. Effects of dance on depression, physical function, and disability in underserved adults. Journal of aging and physical activity. 2014; 22(3):380–385. [PubMed: 23945631]

Murrock CJ, Higgins PA, Killion C. Dance and peer support to improve diabetes outcomes in African American women. The Diabetes Educator. 2009; 35(6):995–1003. [PubMed: 19776334]

Oguma Y, Sesso H, Paffenbarger R, Lee I. Physical activity and all cause mortality in women: a review of the evidence. British Journal of Sports Medicine. 2002; 36(3):162–172. [PubMed: 12055109]

Pew Charitable Trusts. Philadelphia 2015: The State of the City. 2015. Retrieved from http://www.pewtrusts.org/~/media/assets/2015/05/2015-state-of-the-city-report_web.pdf

Pfeiffer KA, Pivarnik JM, Womack CJ, Reeves MJ, Malina RM. Reliability and validity of the Borg and OMNI rating of perceived exertion scales in adolescent girls. Medicine and Science in Sports and Exercise. 2002; 34(12):2057–2061. [PubMed: 12471316]

Quested E, Ntoumanis N, Thøgersen-Ntoumani C, Hagger MS, Hancox JE. Evaluating quality of implementation in physical activity interventions based on theories of motivation: current challenges and future directions. International Review of Sport and Exercise Psychology. 2017; 10(1):252–269.

Quin E, Frazer L, Redding E. The health benefits of creative dance: Improving children's physical and psychological wellbeing. Education and health. 2007; 25(2):31–33.

Rasberry CN, Lee SM, Robin L, Laris B, Russell LA, Coyle KK, Nihiser AJ. The association between school-based physical activity, including physical education, and academic performance: a systematic review of the literature. Preventive Medicine. 2011; 52:S10–S20. [PubMed: 21291905]

Robinson TN, Matheson DM, Kraemer HC, Wilson DM, Obarzanek E, Thompson NS, Fujimoto M. A randomized controlled trial of culturally tailored dance and reducing screen time to prevent weight gain in low-income African American girls: Stanford GEMS. Archives of Pediatrics & Adolescent Medicine. 2010; 164(11):995–1004. [PubMed: 21041592]

Salmon J, Booth ML, Phongsavan P, Murphy N, Timperio A. Promoting physical activity participation among children and adolescents. Epidemiologic Reviews. 2007; 29(1):144–159. [PubMed: 17556765]

Samitz G, Egger M, Zwahlen M. Domains of physical activity and all-cause mortality: systematic review and dose–response meta-analysis of cohort studies. International Journal of Epidemiology. 2011; 40(5):1382–1400. [PubMed: 22039197]

Sattelmair J, Pertman J, Ding EL, Kohl HW, Haskell W, Lee IM. Dose response between physical activity and risk of coronary heart disease. Circulation. 2011 CIRCULATIONAHA. 110.010710.

Shelton RC, McNeill LH, Puleo E, Wolin KY, Emmons KM, Bennett GG. The Association Between Social Factors and Physical Activity Among Low-Income Adults Living in Public Housing. American Journal of Public Health. 2011; 101(11):2102–2110. DOI: 10.2105/AJPH.2010.196030 [PubMed: 21330588]

StataCorp. Stata Statistical Software (Version Release 14). College Station, TX: 2015.

Swanson M, Studts CR, Bardach SH, Bersamin A, Schoenberg NE. Intergenerational energy balance interventions: a systematic literature review. Health Education & Behavior. 2011; 38(2):171–197. [PubMed: 21378367]

Trost SG, Mccoy TA, Vander Veur SS, Mallya G, Duffy ML, Foster GD. Physical activity patterns of inner-city elementary schoolchildren. Medicine and Science in Sports and Exercise. 2013; 45(3): 470–474. [PubMed: 23059861]

US Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. 2008

Van Sluijs EM, McMinn AM, Griffin SJ. Effectiveness of interventions to promote physical activity in children and adolescents: systematic review of controlled trials. BMJ. 2007; 335(7622):703. [PubMed: 17884863]

Ward BW, Barnes P, Freeman G, Schiller JS. Early release of selected estimates based on data from the 2011 National Health Interview Survey. National Center for Health Statistics June. 2012

Ward D, Bar-Or O. Usefulness of RPE Scale for Exercise Presciption with Obese Youth. Medicine & Science in Sports & Exercise. 1987; 19(2):S15.

Watson KB. Disparities in Adolescents' Residence in Neighborhoods Supportive of Physical Activity —United States, 2011-2012. MMWR Morbidity and Mortality Weekly Report. 2016; 65

Wen CP, Wai JPM, Tsai MK, Yang YC, Cheng TYD, Lee MC, Wu X. Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study. The Lancet. 2011; 378(9798):1244–1253.

Werner D, Teufel J, Holtgrave PL, Brown SL. Active generations: an intergenerational approach to preventing childhood obesity. Journal of School Health. 2012; 82(8):380–386. [PubMed: 22712675]

Weuve J, Kang JH, Manson JE, Breteler MM, Ware JH, Grodstein F. Physical activity, including walking, and cognitive function in older women. JAMA. 2004; 292(12):1454–1461. [PubMed: 15383516]

Wu Y, Zhang D, Kang S. Physical activity and risk of breast cancer: a meta-analysis of prospective studies. Breast Cancer Research and Treatment. 2013; 137(3):869–882. [PubMed: 23274845]

Highlights

- An intergenerational dance program was developed to increase physical activity.
- The program led to adequate physical exertion and demonstrated high acceptability.
- Dance can be an enjoyable, culturally-appropriate, and low cost physical activity.

Table 1

Participant demographics at baseline

	Adults (n=372)	Children (n=149)
Age in years (mean±SD)	52.5±14.5	12.2±9.5
Gender (n [%])		
Female	339 (92.1)	103 (70.1)
Race (%)		
Black or African American	372 (100)	149 (100)
BMI z-score[a]	n/a	0.9±1.4

Note:

[a] n=128 children with complete data

Table 2
Intervention Participation, Impact on Physical Exertion, and Enjoyment

Participation	
Participants who attended at least one session (n)	
Total	521
Child	149
Adult	372
Number of sessions attended (mean)	
Child	2.4±1.8
Adult	1.9±1.2
Number of sessions attended by participants (%)	
1	44.3
2	24.0
3	15.0
4	9.0
5+	7.7
Cardiovascular Exertion	
Participants who reached target heart rate during session (%)[a]	
Child	50.6
Adult	80.5
Participants' Borg Rating of Perceived Exertion (mean±SD)[b]	
Child	13.3±4.3
Adult	13.3±3.6
Enjoyment	
Participants' enjoyment of dance per PACES scale (mean±SD)[c]	
Child	32.8±4.6
Adult	34.0±3.1

Note:

[a]Target heart rate was calculated as at least 50% of maximum heart rate (with maximum heart rate being equivalent to 220 minus age) (American Heart Association, 2015).

[b]Score ranges from 6 (no exertion) to 20 (maximal exertion). Goal exertion is 12-14, indicating moderate “somewhat hard” exertion (Borg, 1998).

[c]PACES=Physical Activity Enjoyment Scale. Score ranges from 0-35 points, with a higher score indicating greater enjoyment.