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Psychosocial Factors and Theory in Physical Activity Studies in Minorities

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Abstract

Objectives—To summarize the effectiveness of interventions targeting psychosocial factors to increase physical activity (PA) among ethnic minority adults and explore theory use in PA interventions.

Methods—Studies (N = 11) were identified through a systematic review and targeted African American/Hispanic adults, specific psychosocial factors, and PA. Data were extracted using a standard code sheet and the Theory Coding Scheme.

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Human Subjects Statement

No human subjects were involved in this systematic review. Therefore, this study was exempt from institutional review board approval. All primary studies included in this review received institutional review and approval from their respective institutions.

Conflict of Interest Statement

The authors have no conflicts of interest to disclose.

Results—Social support was the most common psychosocial factor reported, followed by motivational readiness, and self-efficacy, as being associated with increased PA. Only 7 studies explicitly reported using a theoretical framework.

Conclusions—Future efforts should explore theory use in PA interventions and how integration of theoretical constructs, including psychosocial factors, increases PA.

Keywords

exercise; cognitive aspects; social environment; systematic review

Physical inactivity is an ongoing challenge in the US that contributes to at least 4 of the leading causes of death: heart disease, stroke, diabetes and cancer.¹ Self-report measures suggest that nearly 50% of the adult population fail to meet physical activity recommendations,² and objective measures suggest that only 5% of adults actually meet aerobic physical activity recommendations of 30 minutes per day on 5 or more days per week.³ Despite increases in physical activity over the past decade,^{4,5} the majority of Americans still do not meet guideline minimums. The problem is particularly evident among African Americans, or non-Hispanic Blacks, and Hispanics, who are less likely to meet physical activity guidelines and who engage in less physical activity than non-Hispanic Whites do.^{4,6,7} Thus, in the US and among ethnic minorities, primary prevention efforts aimed at reducing cancer and cardiovascular disease risk have included strategies to increase physical activity adoption and promote physical activity maintenance.⁸

Although several physical activity interventions have been developed for large population groups, few have succeeded among ethnic minority adults, suggesting a lack of suitability and need to target additional, ethnically relevant correlates related to physical activity.^{9–11} Theoretical frameworks, such as Social Cognitive Theory and the Transtheoretical Model, have identified intrapersonal factors related to physical activity (eg, biologic and physiologic characteristics, self-efficacy, beliefs, attitudes or knowledge related to physical activity) and interpersonal relationships (eg, support from family and friends to do physical activity regularly) as important correlates of physical activity. Previous research has shown that psychosocial factors, including intrapersonal and interpersonal factors, are related and contribute significantly to behavioral mechanistic pathways for physical activity adoption and maintenance in African Americans and Hispanics.¹²

Although psychosocial factors related to physical activity often are included as intervention components based on theoretical frameworks, the effectiveness of interventions based on improving psychosocial factors as pathways to physical activity adoption or maintenance remains unclear.^{13–15} For example, Resnick et al¹⁶ found that an intervention which promoted self-efficacy through group exercise sessions, education materials, and discussions led to increased physical activity among older African American women.¹⁷ However, other studies in African Americans reported that interventions that included one or more psychosocial factors did not lead to hypothesized increases in physical activity.^{14,18} Because the reported findings are inconclusive, it is important to understand which psychosocial factors are effective for physical activity adoption and whether these psychosocial factors

individually or in combination lead to increases in physical activity adoption in African Americans and Hispanics.

Psychosocial factors are usually linked to a particular theory or theory-related construct or to multiple theories and/or constructs; they can vary from study to study and may be included individually or in combination with other psychosocial factors within a study. Because of these variations, a systematic review is needed to improve understanding of the theoretical foundations of interventions and to identify the psychosocial factors that are found to be effective for physical activity engagement in African American and Hispanic adults. Previous systematic reviews that looked at the effectiveness of physical activity interventions in ethnic minority groups mostly focused on environmental interventions versus interventions that included psychosocial factors.^{19–22} Studies that included psychosocial factors as intervention components looked at them in the context of overall behavior change related to obesity and weight loss and were not specific to physical activity.²³

This systematic review goes beyond previous reviews by examining the use of theory in physical activity interventions, focusing on interventions that target psychosocial factors related to physical activity, and synthesizing the results of interventions that address these factors. The purposes of this study were to summarize (1) the results of physical activity interventions that include psychosocial factors to increase physical activity among adult African Americans and Hispanics in randomized controlled trials; and (2) the use of theory and theoretical constructs in physical activity interventions.

METHODS

Data Sources

The articles reviewed for the current study were obtained from a systematic search of Ovid Medline (1946 through May 17, 2013) and PubMed Medline (through May 17, 2013) with the help of a trained librarian and search specialist. The key concepts used for the search included: physical activity, exercise, exercise movement techniques, motor activity, physical fitness, running, bicycling, walking, yoga, strength resistance or training, African continental ancestry group, ethnic group, race, ethnicity, African American, Black, Hispanic, Latino, Hispanic American, adult, middle-aged, young adult, case-control, control group, comparison group, matched-pair analysis, cohort, longitudinal, prospective, retrospective, clinical trial, randomized controlled trial, evaluation study, program evaluation, intervention study, health promotion, exercise promotion, health education, exercise education, and consumer health information. The complete search strategies and keywords used are available from the author upon request.

Inclusion and Exclusion Criteria

Studies included in this review were primary research reports that were published in English in peer-reviewed journals before May 17, 2013; used a case-control, cohort, clinical trial, or longitudinal program evaluation design; and that included one or more psychosocial factors listed below as components of a physical activity intervention program, regardless of how

they were measured or analyzed. Only primary studies published after 2006 were included in the current review to avoid overlap with a similar review that included physical activity intervention studies.²³ No other time restrictions were imposed. Only studies including young and middle-aged adults between the ages of 18 and 60 years were considered. Studies that included samples made up of children, adolescents, or adults > 60 years of age were excluded from this review, as intervention designs vary for these age groups, which may respond to psychosocial constructs related to physical activity differently than do adults between the ages of 18 and 60. The primary outcomes of interest were physical activity, exercise, or aerobic fitness, measured objectively or via self-reports. The secondary outcomes of interest were psychosocial factors related to physical activity adoption, including, but not limited to, exercise self-efficacy, social support, and motivational readiness or stage of change.

Data Extraction

Psychosocial factors—We developed a data extraction sheet to mine information from each study on (1) characteristics of trial participants (including age, sex, ethnicity, and socioeconomic status) and the trial's inclusion and exclusion criteria; (2) type of intervention (including type, dose, duration, and frequency); and (3) type of outcome measure (including physical activity, other behavioral outcomes, psychosocial factors, and anthropometry). The data extraction sheet was pilot-tested on 8 randomly-selected included studies and refined accordingly. The final protocol and data extraction sheet are available upon request from the primary author.

Theory use—The Theory Coding Scheme was used to code reported theory use for the development and evaluation of interventions.²⁴ Each of the 19 items within the Theory Coding Scheme requires a 'Yes' or 'No' response and has shown good inter-rater reliability.²⁴ The percentage of studies that were coded "Yes" for each item on the Theory Coding Scheme was calculated. Calculations were performed for percentages of all studies and studies that explicitly stated a theoretical foundation. The specific theory (eg, Transtheoretical Model/Stages of Change, Social Cognitive Theory, Health Belief Model) upon which the intervention was reported to be based also was coded.

Data Synthesis

One reviewer screened the title and abstract of each citation to determine eligibility. Another reviewer independently screened a randomly selected subsample of titles and abstracts ($N = 25$; maybes $k = 10$, nos $k = 15$) using standardized guidelines based on the pre-specified inclusion criteria. Inter-rater reliability was high ($k = .93$), and when disagreement existed, the selection decision made was in the conservative or inclusive direction.

Two reviewers independently coded each of the included studies. Coders agreed on 62.5% to 100% ($M = 81.8\%$, $SD = 10.3$) of the judgments for categorical constructs and 82.4% to 100% ($M = 92.0\%$, $SD = 5.4$) for continuous constructs. Disagreements were resolved by discussion between the 2 coders; if no agreement could be reached, it was planned that a third author would decide. However, this was not necessary during this review. Reviewers were not blinded to authors, affiliations, journal, or funding source during coding.

RESULTS

Eleven studies were identified for inclusion in the review. The original search identified 447 unique citations. Of these, 410 studies were discarded after reviewing the titles and abstracts because they did not meet one or more of the inclusion criteria. Review of the full text of the remaining 37 studies led to the exclusion of 26 studies, of which 12 did not address a psychosocial factor as part of the physical activity intervention. The flow diagram in Figure 1 shows the total number of references that were found through all searches.

The 11 included studies were published or reported between 2008 and 2013 and are summarized in Table 1. Of the 11 studies included in this review, all but one study had a proportion of women included in the samples that exceeded 50%.²⁵ Nearly half (45.5%) reported the mean age of participants to be between 40 and 50 years old,^{26–30} and the remaining studies reported the mean age of participants to be between 50 and 60 years old.^{25,31–35} Only one study included African Americans exclusively.³² The remaining 6 studies included a mix of races and ethnicities. One study did not specify the exact breakdown of non-white, ethnic minority participants, but did report a non-white sample proportion of roughly one-third.²⁸

Psychosocial Factors

Overall, mental health and well-being (45.5%) was the most common factor included as an intervention component. The most common psychosocial factors included were social support (27.3%), motivational readiness (27.3%) and self-efficacy (27.3%), followed by decisional balance (9.0%), perceived stress (9.0%) and attitude or mood (9.0%). All but one study that included one or more psychosocial factors as part of the intervention saw increases in physical activity over time in the intervention group.²⁷ Studies that included social support as part of the intervention saw greater changes in physical activity over time than those that did not include social support,^{28,33} and reported higher participant completion rates.^{28,29,33} Studies that included self-efficacy and motivational readiness or stage of change as components of the intervention showed mixed results,^{27,28,30,31} suggesting that social support may be a more effective pathway for behavior change.

Theory Use

Seven of the 11 included studies (63.6%) explicitly reported using theory to some degree to explain or predict physical activity. Only 4 theories were discussed among the 7 studies that used theory. One study used 3 theories,³⁵ one used 2 theories,³⁰ and the remaining 5 used only one theory in their intervention designs.^{25–28,32} The 2 equally commonly reported theories were the Transtheoretical Model/Stages of Change^{36–39} and Social Cognitive Theory.⁴⁰ These were explicitly used to select or develop intervention strategies in 5 of the 7 (72.7%) studies and were cited in the study methods. Only 2 (18.2%) studies explicitly linked all intervention strategies to theory-relevant constructs, and most (54.5%) linked a group of strategies to a group of constructs or predictors. Three studies (27.3%) used theory or predictors, eg, stage of change, to tailor their intervention to participants.^{28,30,35} Six of the 7 studies (85.7%) explicitly reported using theory measured theory-relevant constructs or

predictors pre- and/or post-intervention, but only 2 (18.2%) discussed intervention results in relation to the theory used.^{28,30}

DISCUSSION

Our findings suggest that mental health and overall well-being more commonly are included as part of physical activity interventions than other psychosocial factors. However, the targeting of mental health and well-being did not translate to improved intervention results. Interventions including psychosocial factors, specifically social support and encouragement for behavior change, as intervention components were associated with greater positive changes in physical activity than those including any other psychosocial factor. This review is among the first to explore the efficacy of interventions that include psychosocial factors related to physical activity as components of behavior change and the use of theory in physical activity interventions. We believe it will contribute to improving success at increasing physical activity adoption and maintenance in African-American and Hispanic adults.

There is a known relationship between mental health and well-being and physical activity, with a lower risk of psychological distress with increased intensity and duration of physical activity,^{41,42} making it a routinely included component of behavior change interventions. However, there is limited evidence on the effectiveness of interventions including mental health and psychological well-being and physical activity or inactivity over time.^{43,44} The results of this review echo previous findings and suggest that other psychosocial factors may be more important than mental health and well-being for influencing behavior change, specifically for physical activity adoption. Although social support from family and peers is also an important interpersonal factor leading to increased physical activity and decreased sedentariness in African-American and Hispanic women,⁴⁵⁻⁵⁰ only 3 of the 11 studies included in this review specifically used increasing social support as a strategy to promote physical activity. The vast majority of the literature exploring the relationship between social support and physical activity is cross-sectional,^{45,46,48} suggesting the need for longitudinal intervention studies to explore this relationship further.

Theory is often cited as the foundation for physical activity intervention studies, but its use and degree of integration rarely are assessed thoroughly, and theoretical frameworks rarely are used to develop interventions. In our study, 7 of 11 included studies reported using theory to some degree, but only 2 explicitly linked interventions to a theory or relevant construct, such as exercise self-efficacy. A previous review that explored the use of theory in physical activity interventions similarly found that studies reported to be based on theory rarely used it to develop or evaluate the intervention.⁵¹

Our review expands on a previous meta-analysis that examined the effectiveness of psycho-behavioral obesity interventions by focusing on physical activity interventions and added a review of theory use in these interventions.²³ Although this study focused only on physical activity interventions and did not explore nutrition interventions, our findings support those of the previous review. Seo and Sa²³ found that interventions that allow family involvement, or promote social support from family members, were more effective and resulted in the

greatest weight loss among all interventions included in the review. The effectiveness of interventions that allowed family involvement was even more apparent among studies that included Blacks and Mexican Americans,²³ emphasizing the importance of social support, encouragement, and family involvement in behavior change strategies. Because this review included only physical activity interventions that measured related psychosocial factors, it is difficult to draw additional similarities between the 2 reviews.

Our findings suggest several possible avenues for future research. First, there needs to be greater consistency among physical activity indicators and measures, which would facilitate accurate comparison of interventions in terms of effectiveness through a meta-analysis. The National Cancer Institute's Division of Cancer Control and Population Sciences has compiled a compendium of standardized physical activity questionnaires, which includes 113 distinct questionnaires with 85 validation studies,⁵² and highlights the vast number of physical activity questionnaires contributing to inconsistencies. Standardization and consistency of physical activity questionnaires used in studies would aid in our ability to compare findings across studies and generalize results to a specific population. Additional subgroup analysis by psychosocial factor would help expand our understanding of how each psychosocial factor, including self-efficacy, motivational readiness and social support, contributes to physical activity adoption. Future reviews should determine the extent to which studies not only measure psychosocial factors as intervention components but also include them in mediation or moderation analyses to help understand intervention effects among African Americans and Hispanics. It also would be helpful to incorporate a standard measure of theory implementation in intervention studies to understand how theory translates into practice in research settings. Finally, additional research is needed to compare intervention effects between studies targeting intrapersonal and interpersonal factors versus those targeting the built environment to gain a richer understanding of the context in which interventions worked.

Our review is among the first to describe the efficacy of interventions that include one or more psychosocial factors related to physical activity as components of behavior change and the use of theory. The focus on ethnic minorities, including African Americans and Hispanics, is, to our knowledge, unique and important for improving health outcomes and reducing health disparities in these vulnerable populations. The use of a trained librarian and search specialist further strengthens our review and ensures a thorough search of the behavioral science literature. Although fulfilling a unique need, our review is not without limitations. Due to limited resources and lack of multilingual staff, only English language articles were included in this study. Inclusion of Spanish and Portuguese language articles would likely have increased the quantity of primary studies that looked at predominantly Hispanic men and women. Another limitation was the exclusion of the grey literature, or informally published works (eg, reports, conference proceedings), and unpublished works. Due to funding and access restrictions, searches were limited to Ovid Medline and PubMed Medline, which may not have been sensitive to additional theoretical literature on behavior change that may be found in PsychINFO or ERIC, thereby resulting in selection bias. Although self-efficacy and motivational readiness are widely accepted as important for behavior change, their effects on physical activity adoption were mixed in the studies reviewed, likely due to the temporal restriction to studies published between 2006 and 2013,

which may have biased the results. The current study operationalized ethnic minority adults as African-American and Hispanic men and women, limiting generalizability of review findings to these populations. Additional work is needed to confirm findings in other ethnic minority populations, including Native Americans/Alaska Natives and South Asians, who also experience obesity and related chronic health diseases from physical inactivity. Furthermore, despite the focus on African-American and Hispanic populations, there were limited studies to increase physical activity that included a psychosocial component in these groups exclusively. Thus, several of the studies included non-Hispanic whites and other ethnic minorities. In these studies, at least one-third of the study sample was either African Americans or Hispanics and/or results were reported by ethnicity.

Our findings indicate that social support from family and peers is an important component, either alone or in combination with other psychosocial factors, in improving the effectiveness of physical activity interventions among African-American and Hispanic populations. Previous research indicates that individuals who enlist support from family and friends are more likely to follow physical activity recommendations and maintain healthy habits.^{53,54} Time with family and friends and social rituals are cherished by African Americans and Hispanics,^{55,56} further supporting inclusion of these psychosocial factors in physical activity interventions. Policymakers can get involved by promoting healthy messages endorsed by government agencies and increasing community involvement, similar to the “5 Pasos por tu Salud” program under way across Mexico, which promotes physical activity and sharing time with family and friends as 2 of the 5 steps toward a healthy lifestyle.⁵⁷ Additional programs that are based on theory, allow family members to engage in healthy behaviors together, and include multiple psychosocial factors, such as social support, are needed to serve as behavioral change pathways for increasing physical activity adoption and maintenance among ethnic minorities.

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Figure 1.
Flow Chart of Primary Studies

Table 1

Evidence Table of Primary Studies^a

First Author, Year	Demographics (age, sex, race/ ethnicity, edu, income), Sample Size	Study Design	Intervention/ Control Groups (intensity, duration)	Measurement Times	Psychosocial Factors (measure)	Measure of Physical Activity	Results
Aggarwal, 2010, Ref. 28	48 ± 15 years 66% Women 36% Non-White, racial ethnic minorities 62% > High school edu N = 501	FTT Heart RCT	Educational special intervention (SI) – received education on exercise and recommendations for PA (met in person or over the phone at 2 weeks, 6 weeks, 3 months, 6 months, and 9 months over the course of 1 year) Control intervention (CI)	Baseline and 1 year	Social support (Enhancing Recovery in Coronary Heart Disease Patients Social Support Inventory, 7 items, self-report) Readiness to change (adapted from a validated staging algorithm) Depressive symptoms (Beck Depression Inventory)	BRFSS PA questions -At least once a week, do you engage in any regular PA long enough to work up a sweat? -If yes, how many days per week do you engage in PA that works up a sweat? -For each time you engage in PA, how many minutes do you exercise for?	Higher social support was a significant predictor of physical activity after 1 year 72% completion rate at 9 months
Carroll, 2010, Ref. 27	46.4 ± 11.4 years 69% Women 59% Af Am 48% College grad 31% < \$35,000 per year N = 394	RCT	Exercise intervention group received tailored messages based on survey feedback, including information addressing psychosocial factors (completed surveys at 1, 3 and 6 months and received immediate feedback messages) Prevention control group received information on preventive tests and questions to ask their provider (completed surveys at 1, 3, and 6 months and received immediate information)	1, 3, and 6 months	Motivation and behavior change Strategies and techniques for change Decisional balance Self- efficacy	7-Day Physical Activity Recall (7- Day PAR)	No significant differences in PA between intervention and control groups 89% received the materials, and 86.2% reported they read the materials
Choo, 2010, Ref. 26	44.6 ± 8.3 years 86.6% Women 31% Non-White 56% > \$50,000 per year	Secondary analysis of a longitudinal study of participants who completed a behavioral intervention	Weight loss intervention designed to gradually increase PA time and	Baseline and 6 and 12 months	NR	Energy expenditure (Paffenbarger activity questionnaire, average total energy expenditure during	Energy expenditure increased over the 12-month

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Dunton, 2008, Ref. 30	42.8 ± 12.8 years 100% Women 15.3% Af Am 8.2% Hispanic 38.8% College grad N = 85	RCT	Physical activity intervention included access to a tailored fitness webpage (weekly emails during 3- month project)	Baseline and 1, 2, and 3 months	Self-efficacy (Self-Efficacy for Exercise Behaviors) Perceived barriers and perceived benefits (Sallis, 1989)	Physical activity inventory (frequency and duration in minutes for 29 activities, converted to METs and MVPA per week)	Intervention group increased walking faster than control group, by 69 minutes per week over the 3-month intervention period; no differences in psychosocial factors between groups 5% never visited the website, 21% visited 1–2 times, 37% visited 3–5 times, 29% visited 6–10 times, and 8% visited > 10 times; 23% of participants opened all emails
Glasgow, 2011, Ref. 25	57.8 ± 9.3 years 48.1% Women 18.1% Af Am 22.3% Latino 20.4% High school edu 44.8% < \$49,000 per year N = 270	3-arm, patient-level randomized practical effectiveness trial	Interactive, multimedia diabetes self-management program, multimedia program with social support, and enhanced usual care program	Baseline, 6 weeks, and 4 months	NR	CHAMPS, 28-items	No significant difference between website-only and website plus support in engagement variables or outcomes M visits = 28 (range: 1–119); website usage 70% up to 6 weeks and 47% 6–17 weeks

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Harvey-Berino, 2010, Ref. 29	46.6 ± 9.9 years 93% Women 28% Af Am 65% College grad N = 481	Randomized trial	Internet group, in- person, or hybrid (6 months)	Baseline and 6 months	Social support (Perceived Social Support Scale, Working Alliance Inventory)	Paffenbarger Physical Activity Questionnaire	No differences between groups in change in energy expended in physical activity from baseline to 6 months Participants attended 76% of internet, 71% of in person and 72% of hybrid sessions
Hollis, 2008, Ref. 35	54.8 ± 9.1 years 67.3% Women 44% Af Am 1.4% Hispanic 91% Some college 45% < \$60,000 per year N = 1685	Cohort	20 group weight loss sessions (6 months)	Baseline and 6 months	NR	Moderate-intensity physical activity per week	Increases in physical activity led to greater weight loss Participants attended 72% of weekly group sessions
Kanaya, 2012, Ref. 34	> 55 years 73% Women 23% Af Am 35–39% Latino 32% College grad N = 230	RCT	Lifestyle intervention group and weight loss control group (6 months of active intervention, 6 months of maintenance)	Baseline, 6 and 12 months	Participant health Psychological Distress II and Psychological Well-Being II indices Perceived Stress Scale	(1) hours per week in any physical activity, (2) metabolic equivalent hours per week in any physical activity, and (3) hours per week walking (CHAMPS Physical Activity Questionnaire)	No significant differences in physical activity at 6 months between groups; within the control group, participants increased their physical activity at 12 months M sessions attended = 12.5 (SD = 4.9) out of 19
Rimmer, 2009, Ref. 33	58.8 ± years 94.6% Women 87% Af Am 67% High school edu N = 92	RCT	Awareness group, Personalized Exercise Program (PEP) with lower level support (weekly call), PEP with higher level support (weekly	Baseline, 6 months post-intervention	General health (Quality of Well- Being Scale) Social support (CAR-DIA-2, 11 items)	Physical Activity and Disability Scale (PADS)	Both the higher- and lower-support groups had increases in physical activity scores (39% and 30%,

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Whitt-Glover, 2008, Ref. 32	52 ± 4 years 89% Women 100% Af Am 96% High school edu N = 87	Pilot study, pre- intervention and post- intervention study design with no control group	Physical activity intervention based on social cognitive theory (8 weekly group sessions, 90 minutes each)	Baseline and 3 months	Perceived general health and well- being	Daily walking (Accusplit Eagle pedometer), moderate- and vigorous-intensity physical activity (International Physical Activity Questionnaire)	respectively) compared with a decline of 13% in the awareness group Completion rate NR
Woods, 2013, Ref. 31	45–64 years 73% Women 90% Af Am 80% Some college 60% > \$45,000 per year N = 106	Randomized pilot study	Living Well By Faith program (8 weeks), minimal intervention control group	Baseline and 2-month follow-up	General and functional health status Motivation and self-efficacy in making physical activity changes (BRFSS)	Cardiovascular fitness step test	Intervention group significantly increased physical fitness at 2-months 42% attended 14–16 sessions, 17% attended 8–10, 26% attended 11–13, and 15% attended < 7

Note.

^a Abbreviations used in Table include: African American (Af Am); Behavioral Risk Factor Surveillance System (BRFSS); Community Healthy Activities Model Program for Seniors (CHAMPS); Coronary Artery Risk Development in Young Adults (CARDIA); education (edu); mean (M); metabolic equivalent of tasks (METs); moderate to vigorous physical activity (MVPA); not reported (NR); physical activity (PA); randomized controlled trial (RCT); and standard deviation (SD).