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Integrative Review of Nurse-delivered Community-based Physical Activity Promotion

Abstract

Purpose: The purpose of this integrative review is to 1) describe intervention attributes, 2) describe the role of nurses in community PA promotion, and 3) describe the efficacy of the interventions in terms of PA behavior change. **Methods:** Computerized database and ancestry search strategies located distinct intervention trials between 1990 and 2015. **Results:** Thirteen national and international studies with 2,353 participants were reviewed. Multi-dose, face-to-face, group-based interventions with or without individual-based contacts for 6 months or less were the most common intervention delivery modes. Only 40% (n=5) of the studies integrated health behavior theory into intervention design. Less than half of the studies demonstrated efficacy in increasing PA. **Conclusions:** Results suggest that group-based community interventions, such as exercise classes, group walking and group education/counseling, may be more effective in increasing PA compared to individual-based education. Additional rigorously designed studies are warranted to explore the indicators for successful community-based PA promotion.

Key words: physical activity; intervention; community; nurse

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Background

Increasing population physical activity (PA) to an adequate level is a public health priority as it is a key primary and secondary prevention strategy for chronic diseases and some cancers and is ranked as a leading national health indicator by Healthy People 2020 (USDHHS, 2010). Despite this, fewer than 5% of US adults are sufficiently active to support health (Troiano et al., 2008). Reviews of PA counseling by healthcare providers show a decline in the percentage of PA counseling delivered solely by physicians (Tulloch, Fortier, & Hogg, 2006). This decline may be due to time constraints and lack of reimbursement for PA counseling efforts (Tulloch et al., 2006).

The Task Force on Community Preventive Services (2002) strongly recommends community-based PA interventions, especially interventions that focus on social support or individually-adapted health behavior change programs. In addition, community-based PA interventions have been found to be more cost-effective than supervised exercise sessions (Garrett et al., 2011). Furthermore, a broad review of community-based PA interventions concluded that these interventions are most effective when some form of personal contact for intervention delivery is included (Bock, Jarczok, & Litaker, 2014). Tailoring intervention content was also important in the success of interventions (Bock et al., 2014).

Given the importance of personal contact and tailoring of interventions to intervention success, nurses are well suited to deliver PA interventions in these community settings. Community-based nurses see patients in their natural environment and can involve families and support systems in the intervention. These nurses often have long-term contact with patients often see patients with existing chronic conditions that would benefit from increased PA. However, the specific role of nurses in community-based PA promotion is understudied.

Increased research on the effectiveness of PA interventions will assist with identifying practical aspects of interventions that can be efficiently integrated into diverse clinical and community settings. Therefore, a comprehensive review of the existing literature is warranted. For the purpose of this review, community-based PA interventions are defined as structured interventions with the main purpose of increasing PA and occur in one of a variety of community settings (i.e. church, community center). Interventions conducted solely in clinical, occupational, or home settings were not included because they comprise a separate body of literature. The purpose of this integrative review is to 1) describe intervention attributes, 2) describe the role of nurses in community PA promotion, and 3) describe the efficacy of the interventions in terms of PA behavior change.

Methods

Design and Sample

An integrative review was conducted to synthesize the peer-reviewed literature to describe the role of nurses in PA interventions conducted in community settings and to determine intervention attributes which lead to positive changes in PA behavior. This review followed the methodology suggested by Whitemore and Knafl (2005), which allows data to be categorized and synthesized using five steps: data reduction, data display, data comparison, conclusion drawing, and verification. A systematic search of existing peer-reviewed, community-based PA intervention studies was conducted through the following online databases: CINAHL, PubMed, PsycINFO, SportDiscus, Cochrane, and Sigma Theta Tau Research Repository. The following keywords and search strategy were chosen: (physical activity OR exercise OR walking) AND (community OR public) AND nurse. Studies were included if they: (1) were published in English from 1990-2015, (2) involved adult participants, (3) had a registered nurse (RN) or nurse

practitioner (NP) involved in intervention delivery, (4) conducted interventions in community settings, and (5) directly measured overall PA, exercise, or walking as an outcome. Intervention delivery was defined as the nurse having some direct interaction with the intervention recipient. For example, interventions which only involved mail-based modalities were not included.

The initial search resulted in a sample of 1,852 citations (see Figure 1). Both authors independently reviewed the studies to assess fit with the inclusion criteria. After removing duplicates and screening titles and abstracts, 130 potentially relevant studies were identified for evaluation. After full-text readings, 119 studies were excluded primarily because of duplicates, studies were not conducted in community settings, a nurse was not involved in the intervention, or studies did not assess a specific outcome of PA. Ancestry searches on previously published review articles and all potential primary studies identified 2 additional studies. The final sample for this integrative review was comprised of 13 studies.

Measures

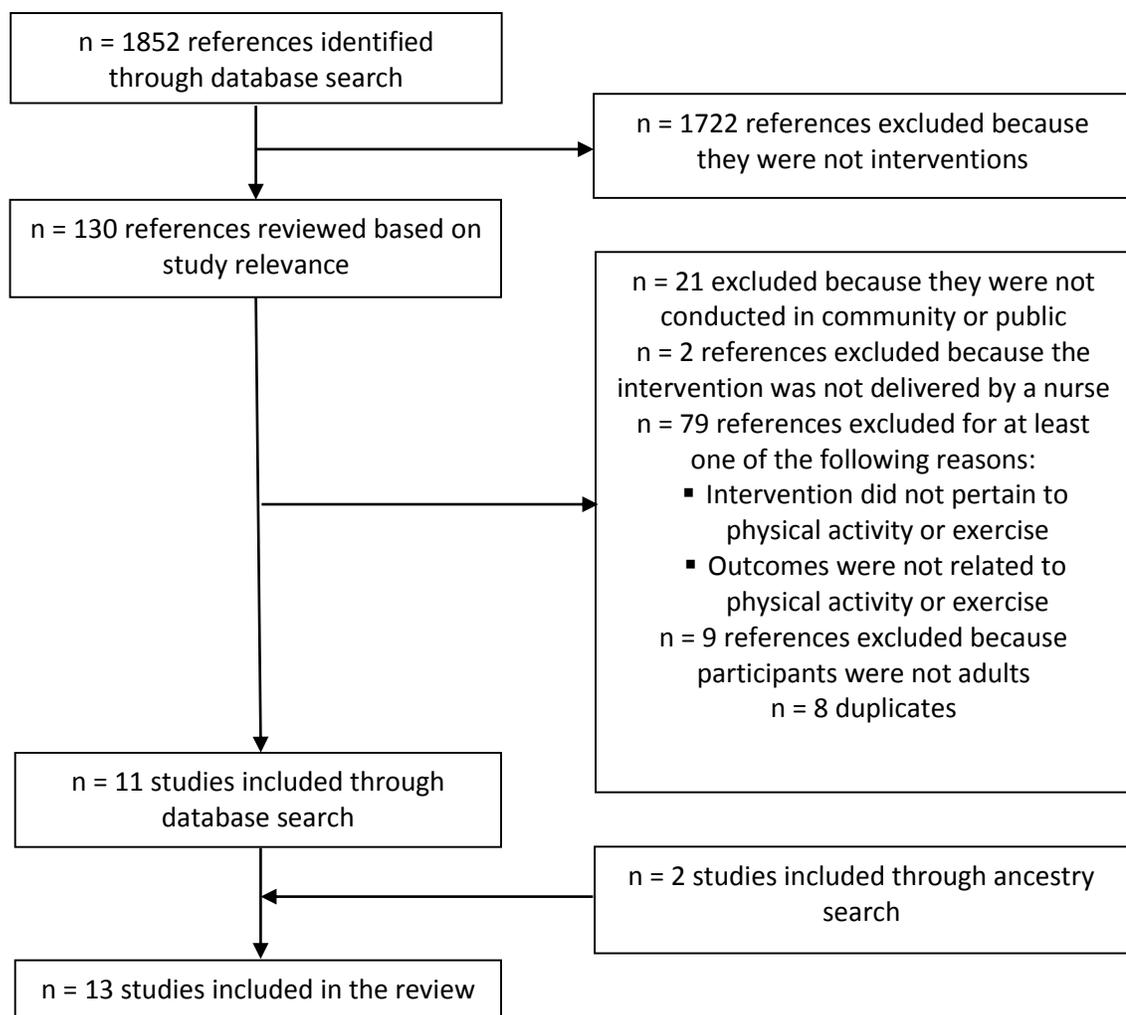
Once the studies were identified, determination of the qualities constituting a successful intervention was explored. In this review, the success of an intervention was defined as effectively producing the desired result (Puddy & Wilkins, 2011). The definition of effectiveness is based on the Continuum of Evidence of Effectiveness diagram designed by Puddy and Wilkins (2011) that ranges from highly rigorous and effective at the highest level of the scale to highly rigorous, yet harmful at the lowest level. The determination of effectiveness gradually increases as the rigor of the research methods increase while achieving significant research outcomes. Accordingly, evidence of effectiveness is considered “Harmful” (VII), “Unsupported” (VI), “Undetermined” (V), “Emerging” (IV), “Promising Direction” (III), “Supported”,(II) and “Well Supported” (I) (Puddy & Wilkins, 2011) (See Table 1). In the highest level of effectiveness, a

PA promotion strategy is considered effective when the reported findings of an experimental or quasi-experimental study design display evidence that the intended PA outcome occurred as a result of the research intervention (Puddy & Wilkins, 2011).

Data Abstraction and Synthesis

Identified studies were examined by selected variables (if available), using the following data collection categories: (1) design and sample: publication year, country, study design; (2) intervention characteristics: setting, content/delivery mode, duration, theoretical framework; (3) role of nurse; (4) sample characteristics; (5) PA measures and time points; and (6) key PA findings (see Table 1). The identified studies were not statistically combined (i.e. effect size) due to variation in study designs, samples, settings, and PA outcomes (Whittemore & Knafl, 2005).

Figure 1. Flowchart of selection of studies.



Results

Intervention Attributes. Interventions were conducted in community centers, senior centers, churches, a community fitness center, and a community nursing service setting. Seven studies solely used face-to-face intervention delivery (Baldwin, 2015; Banks-Wallace & Conn, 2005; Choi & Rush, 2012; Harris et al., 2013; Huang et al., 2002; Peterson, 2005; Smith, 2012), one study used telephone delivery only (Chiang & Sun, 2009), and the remaining five used more than one delivery mode (Holland et al., 2005; Lee et al., 2007; Leveille et al., 1998; Speck et al., 2007; Wallace et al., 1998). Four studies used individual-based intervention delivery only (Chiang & Sun, 2009; Harris et al., 2013; Lee et al., 2007; Peterson, 2005), four studies used group-based intervention only (Banks-Wallace & Conn, 2005; Choi & Rush, 2012; Huang et al., 2002; Smith, 2012), and the remaining five studies used a combination of individual- and group-based strategies.

Most (12/13, 92%) of the studies provided multiple intervention doses, except one study delivered a one-time weight-bearing exercise education session (Smith, 2012). Three of the 13 studies involved PA education only (Harris et al., 2013; Huang et al., 2002; Smith, 2012), eight studies involved some combination of PA education/counseling and cognitive-behavioral strategies (Baldwin, 2015; Banks-Wallace & Conn, 2005; Chiang & Sun, 2009; Choi & Rush, 2012; Holland et al., 2005; Lee et al., 2007; Leveille et al., 1998; Peterson, 2005), and the remaining two involved the combination of behavioral (i.e., exercise classes and supervised walking) and cognitive-behavioral strategies (Speck et al., 2007; Wallace et al., 1998). Most (10/13, 77%) of the studies had an intervention duration of 6 months or less. Only four studies

had follow-up measurements extending beyond immediately post-intervention (Banks-Wallace & Conn, 2005; Choi & Rush, 2012; Harris et al., 2013; Smith, 2012).

Role of the Nurse. In two of the 13 studies, nurses led community walking programs and provided weekly intervention contacts over 6 months (Speck et al., 2007) or monthly contacts over 12 months (Banks-Wallace & Conn, 2005). In five studies, nurses provided face-to-face or telephone PA counseling (Choi & Rush, 2012; Harris et al., 2013; Holland et al., 2005; Leveille et al., 1998; Smith, 2012). In one of these 5 studies, the counseling sessions were followed by supportive or motivational follow-up contacts (3 face-to-face visits and 9 telephone calls) (Leveille et al., 1998). In two studies, nurses delivered Chinese/Korean culturally-tailored PA counseling and motivational support (Chiang & Sun, 2009; Choi & Rush, 2012). Two of the 13 studies provided exercise training sessions organized by nurses and lead by exercise instructors (Huang et al., 2002; Wallace et al., 1998). In five of the 13 studies, nurses helped participants develop exercise plans (Baldwin, 2015; Holland et al., 2005; Leveille et al., 1998; Peterson, 2005; Wallace et al., 1998). In seven of the 13 studies nurses delivered motivational and/or supportive contacts as the main PA intervention.

Efficacy of Interventions for Increasing Physical Activity. Overall, seven of the 13 studies demonstrated efficacy in PA behavior change (Baldwin, 2015; Banks-Wallace & Conn, 2005; Holland et al., 2005; Huang et al., 2002; Lee et al., 2007; Leveille et al., 1998; Smith, 2012). Three of the five RCTs reported a significant difference between groups in self-reported PA outcomes post-intervention, with all three studies receiving an effectiveness rating of “well-supported” (i.e., level of general or aerobic PA, stretching exercise, or walking) (Holland et al., 2005; Lee et al., 2007; Leveille et al., 1998). Interventions in these 3 RCTs were all motivational/supportive interventions: encouraging subjects to engage in community PA

programs (i.e., PA education classes, swimming, dancing, and Tai Chi) or to increase walking, and monitoring goal attainment. All three non-randomized controlled trials reported non-significant differences between groups in PA outcomes and received an effectiveness rating of “unsupported” (Chiang & Sun, 2009; Harris et al., 2013; Speck et al., 2007).

Three of the 5 uncontrolled pretest-posttest studies reported significant increases in self-reported PA behaviors post-interventions (Baldwin, 2015; Huang et al., 2002) or at 1 month following a one-time exercise education (Smith, 2012). Baldwin (2015) and Huang (2002) received an effectiveness rating of “promising direction” while Smith (2012) received a rating of “well-supported”. One short-period study reported a dramatic trend of PA increase at 6-month follow-up ($p = 0.07$) (Choi & Rush, 2012). Therefore both of these studies received an effectiveness rating of “undetermined”. The remaining study found a 5% increase in pedometer-based daily step counts post intervention and a 37% increase at 6 months following the intervention with no statistical significance reported (Banks-Wallace & Conn, 2005). Five of the eight studies involving both PA education and cognitive-behavioral strategies demonstrated efficacy (Baldwin, 2015; Banks-Wallace & Conn, 2005; Holland et al., 2005; Lee et al., 2007; Leveille et al., 1998). Two of three studies with PA education only demonstrated efficacy (Huang et al., 2002; Smith, 2012), and neither of the 2 studies that used a combination of behavioral and cognitive-behavioral strategies demonstrated efficacy (Speck et al., 2007; Wallace et al., 1998). One of the four studies that delivered individual-based counseling and/or motivational contacts demonstrated efficacy (Lee et al., 2007), three of the four group-based interventions demonstrated efficacy (Banks-Wallace & Conn, 2005; Huang et al., 2002; Smith, 2012), and three of the five studies involving both individual- and group-based interventions demonstrated efficacy (Baldwin, 2015; Holland et al., 2005; Leveille et al., 1998). Four of the

ten studies with 6-month or less follow-ups demonstrated efficacy, while all three studies with follow-ups longer than 6 months demonstrated efficacy (Banks-Wallace & Conn, 2005; Holland et al., 2005; Leveille et al., 1998). Six of the eleven studies that measured PA outcomes by self-report demonstrated efficacy (Baldwin, 2015; Holland et al., 2005; Huang et al., 2002; Lee et al., 2007; Leveille et al., 1998; Smith, 2012), while one of the two studies using pedometer-based measures demonstrated efficacy (Banks-Wallace & Conn, 2005). Two of the five theory-based interventions resulted in positive findings (Lee et al., 2007; Smith, 2012) and half of the twelve multi-dose interventions demonstrated efficacy (Baldwin, 2015; Banks-Wallace & Conn, 2005; Holland et al., 2005; Huang et al., 2002; Lee et al., 2007; Leveille et al., 1998).

Summary of Results. More than half of the experimental and quasi-experimental studies did not demonstrate efficacy in PA behavior change. Efficacy was more likely demonstrated in studies with lower quality study designs according to the Continuum of Evidence of Effectiveness (Puddy & Wilkins, 2011). It is also unclear whether positive intervention effects could extend post intervention, because most studies included in this review measured PA outcomes at the end of the intervention period with no follow-up measures.

In general, most studies included in this review used multi-dose PA interventions and over half of the studies conducted multi-method interventions. Most interventions involved some combination of PA education, behavioral and cognitive-behavioral strategies. Most studies included community-dwelling older adults. Face-to-face, group-based interventions with or without individual-based contacts were the most common intervention delivery modes.

Discussion

No single intervention strategy consistently resulted in positive changes in PA behavior.

However, findings support that group-based community interventions, such as exercise classes, walking groups and group education/counseling, seem to be more effective compared to

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Table 1. Study Characteristics and Findings

Author (year) Location Continuum of Evidence of Effectiveness	Study Design	Intervention: -Setting -Content/delivery mode -Duration - Theory/Conceptual Framework	Role of nurse	Sample characteristics -Subjects -Age range (mean) -Gender (% male) -Race/Ethnicity	PA measures/ time points	PA findings
Baldwin (2015) USA II	Uncontrolled before-after	Neighborhood community center Intervention: WPP, a DM and CVA prevention program. Face-to-face; one introduction session, individual health coaching and motivational interviewing group sessions and at least 11 education classes Duration: 3 mos Theory not reported	RN + Nursing Students Delivered lifestyle modification, education classes, individualized health coaching, and motivational interviewing group sessions Helped create goals and plans of action Provided a pedometer with an individualized and buddy physical activity plan, a journal for writing and group-identified neighborhood walking maps	N= 38 Age >35 (58) Male 0% Ethnicity: Hispanic	Self-reported PA behaviors by questionnaire Daily step count by pedometer Baseline, 3 mos	3 mos vs. baseline: increased self-reported PA behaviors. At 3 mos: participants walked 5,600 steps per day on average (MPA)
Banks-Wallace (2005) USA III	Uncontrolled before-after	Churches and community center Intervention: group walks or line dancing, 5-40 min monthly; plus walks with a partner, 2 days/wk; plus heart health promotion meeting, 3-hr session monthly; plus Stanford Walking Kit; face-to-face Duration: 12 mos Theory not reported	RN Led group meetings and walks; encouraged peer walks	N= 23 Age 25-68 (50) Male 0% Ethnicity: African American 100% HTN	Pedometer based mean steps/day in 7 consecutive days Baseline, 6 mos, 12 mos, 18 mos	12 mos vs. baseline: Slight increase (5%) in mean daily steps 18 mos vs. baseline: 37% increase in mean daily steps
Chiang (2009) USA IV	Nonrandomized CT	Chinese churches, Chinese Golden Age Center, and Chinese outpatient clinics Intervention: CMW program; by phone every wk x 8 Control: NON-CMW program; by phone every wk x 8 Duration: 2 mos Theory: SOC and Culture Care Theory	RN Delivered Chinese culture based motivational support by phone	N= 128 (TX n=58; Control n=70) Age (73) Male 35% Ethnicity: Chinese Americans HTN	Duration, intensity, and frequency of walking Baseline, each wk (x8)	Intervention vs. control over time: no sig diff in duration of walking

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Author (year) Location Continuum of Evidence of Effectiveness	Study Design	Intervention: -Setting -Content/delivery mode -Duration - Theory/Conceptual Framework	Role of nurse	Sample characteristics -Subjects -Age range (mean) -Gender (% male) -Race/Ethnicity	PA measures/ time points	PA findings
Choi (2012) USA III	Uncontrolled before-after	Korean community center Intervention: CTCDSP x 2 sessions, 1.5 h + 2.5 h Duration: 3 wks Theory not reported	FNP Delivered DM self-management education, provision of counseling for activity change using cultural activities	N= 41 Age 30-87 (70) Male 46% Ethnicity: Korean Americans DM type 2	Frequency of PA Baseline, 3wk, 3 mos	Baseline, 3wk, 3 mos: trend-level increase in exercise (p=0.07)
Harris (2013) Australia IV	Nonrandomiz ed CT	Community nurse services Intervention: counseling for lifestyle change x ≥2 visits Control: usual care Duration: 3 mos Theory: 5 A's Behavior Change Model, SOC	Community nurse Provided brief PA and diet education tailored to SOC or referral to specialist for more intensive intervention	N= 804 (TX n=425; Control n=379) Age 30-80 Male 51% Ethnicity: Caucasian 99.5%, Aboriginal 0.5%	Change in mean PA score Change in adequate levels of PA Baseline, 3 mos, 6 mos	3 mos vs. baseline and 6 mos vs. baseline: increase in PA scores in both groups Intervention vs. control at 6 mos: no sig diff in PA score
Holland (2005) USA I	RCT	Senior centers Intervention: health promotion and fitness program; face-to- face interview x 1, phone contact x at least 4, monthly newsletter x 12; an average of 11 contact hours Control: no contact Duration: 12 mos Theory not reported	RN Helped develop a health action plan on participating in education classes, recommended readings, fitness programs and community programs Provided health education, counseling, and medication management coaching upon request, and motivation and support	N= 504 (TX n=255; Control n=249) Age ≥ 65 (73) Male 45% Ethnicity: Caucasian 82%	Self-reported aerobic activity (min/wk) and stretching exercise (min/wk) Baseline, 12 mos	Intervention vs. control at 12 mos: greater aerobic activity (min/wk) greater stretching exercise (min/wk)
Huang (2002) Taiwan II	Uncontrolled before-after	4 senior centers Intervention: health promotion program, including exercise promotion education; 2h x 5; Duration: 5 wks Theory not reported	RN Collaborated with physical education specialist in exercise education course	N= 119 Age ≥60 Male 31% Ethnicity not reported ≥1 chronic diseases	Vigorous exercise at least 20 min/wk (4 point likert scale) Baseline, 5wks	5 wks vs. baseline: increase in exercise
Lee (2007) Taiwan I	RCT	Community centers Intervention: community-based walking motivation program; a series (# not reported) of regular face-to-face visits and phone call + pedometer Control: usual care Duration: 6 mos Theory: SE, SOC	Public health nurse Delivered motivational individualized contacts	N= 202 (TX n=102; Control n=100) Age >60 (71.3) Male 59% Ethnicity not reported HTN	Self-reported walking Baseline, 6 mos	Intervention vs. control at 6 mos: higher proportion reported more walking (51.6% vs. 8.6%)

Author (year) Location Continuum of Evidence of Effectiveness	Study Design	Intervention: -Setting -Content/delivery mode -Duration - Theory/Conceptual Framework	Role of nurse	Sample characteristics -Subjects -Age range (mean) -Gender (% male) -Race/Ethnicity	PA measures/ time points	PA findings
Leveille (1998) USA I	RCT	Senior center Intervention: senior center-based or home-based exercise program; disease self-management counseling +/- courses; face-to-face follow-up visit x median 3 + phone calls x median 9 Control: A tour of the senior center + a schedule of senior center activities Duration: 12 mos Theory not reported	GNP Provided exercise options, face-to-face follow-up visits, and monitoring phone calls; a targeted health management plan Encouraged to use facilities at senior center for PA (walking, swimming, dancing, TaiChi, etc.) or home exercise options	N=201 (TX n=101; Control n=100) Age ≥70 (77) Male 44.3% Ethnicity not reported	Total leisure and work activity by PASE score Health behaviors (PA; senior center participation) Baseline, 6 mos, 12 mos	Intervention vs. control (averaged over 6- and 12-mo follow up): higher levels of PA and senior center participation higher PASE activity score
Peterson (2005) USA IV	RCT	Church Intervention: social support intervention program; interactive booklet + weekly face-to-face contact (1 hr x 12) + pedometer Control: AHA booklet + 1 hr verbal instructions of booklet and PA recommendations Duration: 3 mos Theory not reported	RN Provided PA recommendations, safety factors and CVD prevention Facilitated the development of group cohesiveness, spiritual messages, and establishing walking partners Provided services to assist members in meeting PA goals Provided positive feedback, self-monitoring fitness and goal attainment, and rewards for accomplishments Provided an individualized PA plan, a personal copy of a walking video and an audiotape, a pedometer	N= 42 (TX n=20; Control n=22) Age 35-64 (54) Male 0% Ethnicity: Caucasian 95%	Self-reported MPA duration/wk Baseline, 6 wks, 3 mos	Intervention vs. control over time: no sig change in MPA duration/wk
Smith (2012) USA I	Uncontrolled before-after	Health and fitness center Intervention: osteoporosis educational program; 2.5h x 1; Duration: 2.5 h Theory: ITHBC	NP Delivered education on weight-bearing exercise	N= 45 Age ≥ 50 (64) Male 7% Ethnicity: Caucasian 97%; African American 3%	Duration and frequency of activities (vigorous, moderate, and walking) Baseline, immediately post-intervention, 1 mo post-intervention	1 mo post-intervention vs. baseline: increase in MPA frequency and duration non-sig increase in VPA frequency/wk and duration/day non-sig increase in walking frequency/wk increase in walking duration/day

Author (year) Location Continuum of Evidence of Effectiveness	Study Design	Intervention: -Setting -Content/delivery mode -Duration - Theory/Conceptual Framework	Role of nurse	Sample characteristics -Subjects -Age range (mean) -Gender (% male) -Race/Ethnicity	PA measures/ time points	PA findings
Speck (2007) USA IV	Nonrandomized CT	Church-sponsored community center Intervention: PA opportunities at community center x 6; neighborhood walks weekly x24; PA promotion by phone contacts weekly x24; PA newsletters x3; a pedometer Control: usual care Duration: 6 mos Theory: HPM	NP Provided PA opportunities at community center and led neighborhood walks Delivered motivational phone calls	N= 106 (TX n=51; Control n=53) Age 18-63 (38) Male 0% Ethnicity: American Indian/Alaska Native 5%; Black or African American 81%; Caucasian 18%	PA by pedometer Baseline, 4 wks, 23 wks	Intervention vs. control from wk 4 to wk 23: no sig diff in step counts
Wallace (1998) USA IV	RCT	A senior center Intervention: disability-prevention program; face-to-face visit to RN, 30-60 min x 1; exercise classes by exercise instructor, 60 min x 3 times/wk Control: usual care Duration: 6 mos Theory not reported	RN Helped develop a targeted health promotion plan Provided phone contacts to review subjects' progress, motivate continued behavior change, and identify problems with compliance	N= 100 (TX n=53; Control n=47) Age >65 (72) Male 27% Ethnicity: Caucasian 99%	Exercise classes attendance rate Exercise adherence post intervention Baseline, 6 mos	During 6-mo trial period: 90% subjects in intervention group attended the thrice-weekly exercise classes After 6-mo trial period ended: About 50% subjects in intervention group continued to attend exercise classes 51% of control subjects joined exercise classes

Note: Level of Evidence: I= well-supported, II=promising direction, III=undetermined, IV4=unsupported
 PA = physical activity; WPP = Women's Path to Prevention; DM = diabetes mellitus; CVA = cerebrovascular accident; MPA = moderate physical activity; RN = registered nurse; HTN= hypertension; CT = control trial; CMW = culturally modified walking; SOC = stage of change; CTCDSP = culturally tailored, community-based diabetes self-management program; FNP = family nurse practitioner; RCT = randomized control trial; SE = Self-efficacy Theory; GNP = geriatric nurse practitioner; PASE = Physical Activity Scale for the Elderly; AHA = American Heart Association; CVD = cardiovascular disease; ITHBC = Integrated Theory of Health Behavior Change; NP = nurse practitioner; VPA = vigorous physical activity; HPM = Health Promotion Model; N = number who completed the study. Unless otherwise stated, all reported findings are significant at p<0.05 level.

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individual-based education or motivation/support only. In addition, a combination of education and cognitive-behavioral strategies appear to be more effective than education or behavioral strategies used individually. The effect of intervention intensity on PA outcomes was unclear. For example, interventions which involved weekly face-to-face (Peterson et al., 2005) or phone contact (Chiang et al., 2009) for 8-12 weeks did not result in significant changes in PA behavior while an intervention with three face-to-face meetings and an average of nine follow-up calls did result in significant PA behavior change (Leveille et al., 1998). Similarly, multi-method interventions did not result in consistent increases in PA. These findings are consistent with a recent systematic review examining community-wide PA promotion strategies which found no relationship between intervention intensity and intervention outcomes (Baker, Francis, Soares, Weightman, & Foster, 2011).

In line with previous studies, multi-dose PA interventions did not consistently result in positive PA changes when compared to interventions with only one contact (Hobbs et al., 2013). Also, multi-method interventions did not guarantee success; that is interventions that used multiple delivery strategies and/or included multiple components to the intervention, were not more likely to increase PA when compared to interventions with more simple designs (Hobbs et al., 2013).

Some findings in this review are inconsistent with findings from previous PA intervention studies. First, studies with short intervention duration and/or follow-ups (≤ 6 months) did not achieve higher rates of positive PA findings. Previous literature examining PA interventions among older adults found interventions with short-term follow up were more likely to result in significant changes in PA behavior (Marcus et al., 2006). Second, theory-based interventions did not achieve better PA outcomes when compared to interventions which did not

utilize a health behavior theory. Researchers reported that application of theory should improve the likelihood of effectiveness of interventions (Brug, Oenema, & Ferreira, 2005).

The mixed findings of this review suggest that additional primary research is warranted. To further explore the role of nurses in promoting PA behavior in community settings, experimental studies with large sample sizes are needed. Future studies with multi-method and multi-dose interventions should follow subjects for more than 6 months post-intervention in order to better understand the intervention effects and maintenance of behavior change (Marcus, 2006). Furthermore, intervention study reports should provide sufficient details about methods, including participant recruitment and intervention design and delivery, to allow meaningful interpretation of findings and replication of interventions. In addition, more studies are needed to better present the effort in promoting PA behaviors in underrepresented populations, such as minorities, immigrants, women, and older adults.

Inherent to integrative reviews, there are limitations worth noting. This review was limited to published articles written in English. Thus not all relevant research may have been included. In addition, this review was limited to the search terms and databases described in the methods section. The use of ancestry searches on all included articles could help minimize missing relevant research. Lastly, to further identify intervention characteristics that may be most effective in PA promotion, a future study should conduct meta-analysis that would include calculation of effect sizes between intervention characteristics and outcomes.

Based on this review, it appears that group-based community interventions, such as group exercise classes, group walking and group education/counseling, may be more effective in increasing PA compared to individual-based education. In addition, a combination of education and cognitive-behavioral strategies appear to be more effective than education or behavioral

strategies used individually. This integrative review adds to the nursing literature by integrating evidence regarding the valuable role of community nurses in promoting PA. It also facilitates the design of future nursing interventions that could better explore the indicators for successful community-based PA promotion.

References

- Baker, P. R., Francis, D. P., Soares, J., Weightman, A. L., & Foster, C. (2011). Community wide interventions for increasing physical activity. *Cochrane Database of Systematic Reviews*, 1, CD008366. doi: 10.1002/14651858.CD008366.pub3
- Baldwin, S. A. (2015). A neighborhood-centered clinical project: improving diabetes and cardiovascular outcomes in Hispanic women. *Journal of Nursing Education*, 54(3), 159-163. doi: 10.3928/01484834-20150218-16
- Banks-Wallace, J., & Conn, V. (2005). Changes in Steps Per Day Over the Course of A Pilot Walking Intervention. *Association of Black Nursing Faculty Journal*, 16(2), 28-32.
- Bock, C., Jarczok, M., & Litaker, D. (2014). Community-based efforts to promote physical activity: A systematic review of interventions considering mode of delivery, study quality and population subgroups. *Journal of Science and Medicine in Sport*, 17, 276-282.
- Brug, J., Oenema, A., & Ferreira, I. (2005). Theory, evidence and Intervention Mapping to improve behavior nutrition and physical activity interventions. *International Journal of Behavioral Nutrition and Physical Activity*, 2(1), 2. doi: 10.1186/1479-5868-2-2
- Chiang, C. Y., & Sun, F. K. (2009). The effects of a walking program on older Chinese American immigrants with hypertension: a pretest and posttest quasi-experimental design. *Public Health Nursing*, 26(3), 240-248. doi: 10.1111/j.1525-1446.2009.00776.x
- Christensen, A. J. (2004). *Patient adherence to medical treatment regimens: Bridging the gap between behavioral science and biomedicine*. New Haven, NY: Yale University Press.
- Choi, S. E., & Rush, E. B. (2012). Effect of a short-duration, culturally tailored, community-based diabetes self-management intervention for Korean immigrants: A pilot study. *Diabetes Education*, 38(3), 377-385. doi: 10.1177/0145721712443292
- Conn, V. S., Hafdahl, A. R., Brown, S. A., & Brown, L. M. (2008). Meta-analysis of patient education interventions to increase physical activity among chronically ill adults. *Patient Education Counseling*, 70(2), 157-172. doi: 10.1016/j.pec.2007.10.004
- Conn, V. S., Minor, M. A., Burks, K. J., Rantz, M. J., & Pomeroy, S. H. (2003). Integrative review of physical activity intervention research with aging adults. *Journal of the American Geriatrics Society*, 51(8), 1159-1168.

- Conn, V. S., Phillips, L. J., Ruppar, T. M., & Chase, J. A. (2012). Physical activity interventions with healthy minority adults: Meta-analysis of behavior and health outcomes. *Journal of Health Care for the Poor and Underserved, 23*(1), 59-80. doi: 10.1353/hpu.2012.0032
- Conn, V. S., Valentine, J. C., & Cooper, H. M. (2002). Interventions to increase physical activity among aging adults: A meta-analysis. *Annals of Behavioral Medicine, 24*(3), 190-200.
- Croteau, K. A. (2004). A preliminary study on the impact of a pedometer-based intervention on daily steps. *American Journal of Health Promotion, 18*(3), 217-220.
- Foster, C., Hillsdon, M., Thorogood, M., Kaur, A., & Wedatilake, T. (2005). Interventions for promoting physical activity. *Cochrane Database of Systematic Reviews*(1), CD003180. doi: 10.1002/14651858.CD003180.pub2
- Garrett, S., Elley, C. R., Rose, S. B., O'Dea, D., Lawton, B. A., & Dowell, A. C. (2011). Are physical activity interventions in primary care and the community cost-effective? A systematic review of the evidence. *British Journal of General Practice, 61*(584), e125-133. doi: 10.3399/bjgp11X561249
- Glanz, K., Rimer, B. K., & Viswanath, K. (2008). *Health Behavior and Health Education: Theory, Research and Practice* (4th ed.): Jossey-Bass.
- Gourlan, M., Bernard, P., Bortholon, C., Romain, A., Lareyre, O., Carayol, M., . . . Boiche, J. (2014). Efficacy of theory-based interventions to promote physical activity. A meta-analysis of randomized controlled trials. *Health Psychology Reviews, 1*-74.
- Harris, M. F., Chan, B. C., Laws, R. A., Williams, A. M., Davies, G. P., Jayasinghe, U. W., . . . Milat, A. (2013). The impact of a brief lifestyle intervention delivered by generalist community nurses (CN SNAP trial). *BMC Public Health, 13*, 375. doi: 10.1186/1471-2458-13-375
- Hobbs, N., Godfrey, A., Lara, J., Errington, L., Meyer, T. D., Rochester, L., . . . Sniehotta, F. F. (2013). Are behavioral interventions effective in increasing physical activity at 12 to 36 months in adults aged 55 to 70 years? A systematic review and meta-analysis. *BMC Medicine, 11*, 75. doi: 10.1186/1741-7015-11-75
- Holland, S. K., Greenberg, J., Tidwell, L., Malone, J., Mullan, J., & Newcomer, R. (2005). Community-based health coaching, exercise, and health service utilization. *Journal of Aging and Health, 17*(6), 697-716. doi: 10.1177/0898264305277959

- Huang, L. H., Chen, S. W., Yu, Y. P., Chen, P. R., & Lin, Y. C. (2002). The effectiveness of health promotion education programs for community elderly. *Journal of Nursing Research, 10*(4), 261-270.
- Lee, L. L., Arthur, A., & Avis, M. (2007). Evaluating a community-based walking intervention for hypertensive older people in Taiwan: a randomized controlled trial. *Preventive Medicine, 44*(2), 160-166. doi: 10.1016/j.ypmed.2006.09.001
- Leveille, S. G., Wagner, E. H., Davis, C., Grothaus, L., Wallace, J., LoGerfo, M., & Kent, D. (1998). Preventing disability and managing chronic illness in frail older adults: a randomized trial of a community-based partnership with primary care. *Journal of the American Geriatrics Society, 46*(10), 1191-1198.
- Marcus, B. H., Williams, D. M., Dubbert, P. M., Sallis, J. F., King, A. C., Yancey, A. K., . . . Claytor, R. P. (2006). Physical activity intervention studies: what we know and what we need to know: a scientific statement from the American Heart Association Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity); Council on Cardiovascular Disease in the Young; and the Interdisciplinary Working Group on Quality of Care and Outcomes Research. *Circulation, 114*(24), 2739-2752. doi: 10.1161/circulationaha.106.179683
- Ogilvie, D., Foster, C. E., Rothnie, H., Cavill, N., Hamilton, V., Fitzsimons, C. F., & Mutrie, N. (2007). Interventions to promote walking: systematic review. *BMJ: British Medical Journal, 334*(7605), 1204. doi: 10.1136/bmj.39198.722720.BE
- Orow, G., Kinmonth, A.-L., Sanderson, S., & Sutton, S. (2012). Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. *BMJ: British Medical Journal (Overseas & Retired Doctors Edition), 344*(7850), 16-16. doi: 10.1136/bmj.e1389
- Peterson, J. (2005). Effects of a Physical Activity Intervention for Women. *Western Journal of Nursing Research, 27*(1), 93-110.
- Puddy, R. W. & Wilkins, N. (2011). *Understanding Evidence: Best Available Research Evidence. A Guide to the Continuum of Evidence of Effectiveness*. Atlanta, GA: Centers for Disease Control and Prevention.

- Robbins, L. B., Pender, N. J., Conn, V. S., Frenn, M. D., B, N. G., Nies, M. A., . . . Wilbur, J. (2001). Physical Activity in Nursing Research. *Journal of Nursing Scholarship*, 33(4), 315-321.
- Roux, L., Pratt, M., Lee, I. M., Bazzarre, T., & Buchne, D. (2014). Does Age Modify the Cost-Effectiveness of Community-Based Physical Activity Interventions? *Journal of Physical Activity & Health*. doi: 10.1123/jpah.2013-0167
- Roux, L., Pratt, M., Tengs, T. O., Yore, M. M., Yanagawa, T. L., Van Den Bos, J., . . . Buchner, D. M. (2008). Cost effectiveness of community-based physical activity interventions. *American Journal of Preventive Medicine*, 35(6), 578-588. doi: 10.1016/j.amepre.2008.06.040
- Shaw, R., Fenwick, E., Baker, G., McAdam, C., Fitzsimons, C., & Mutrie, N. (2011). 'Pedometers cost buttons': the feasibility of implementing a pedometer based walking programme within the community. *BMC Public Health*, 11, 200. doi: 10.1186/1471-2458-11-200
- Smith, C. A. (2012). *Evaluation of a Community-Based Osteoporosis Educational Program*. D.N.P., West Virginia University. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=cin20&AN=2012250677&site=ehost-live> Available from EBSCOhost cin20 database.
- Speck, B. J., Hines-Martin, V., Stetson, B. A., & Looney, S. W. (2007). An environmental intervention aimed at increasing physical activity levels in low-income women. *Journal of Cardiovascular Nursing*, 22(4), 263-271. doi: 10.1097/01.JCN.0000278957.98124.8a
- Spetz, J. (2005). The cost and cost-effectiveness of nursing services in health care. *Nursing Outlook*, 53(6), 305-309. doi: 10.1016/j.outlook.2005.05.006
- Swartz, A. M., Strath, S. J., Bassett, D. R., Moore, J. B., Redwine, B. A., Groer, M., & Thompson, D. L. (2003). Increasing daily walking improves glucose tolerance in overweight women. *Preventative Medicine*, 37(4), 356-362.
- Task Force on Community Preventive Services. (2002). Recommendations to increase physical activity in communities. *American Journal of Preventive Medicine*, 22(4 Suppl), 67-72.
- Thompson, D. R., Chair, S. Y., Chan, S. W., Astin, F., Davidson, P. M., & Ski, C. F. (2011). Motivational interviewing: a useful approach to improving cardiovascular health?

- Journal of Clinical Nursing*, 20(9-10), 1236-1244. doi: 10.1111/j.1365-2702.2010.03558.x
- Troiano, R. P., Berrigan, D., Dodd, K. W., Mâsse, L. C., Tilert, T., & McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine & Science in Sports & Exercise*, 40(1), 181-188. doi: 10.1249/mss.0b013e31815a51b3
- Tulloch, H., Fortier, M., & Hogg, W. (2006). Physical activity counseling in primary care: who has and who should be counseling? *Patient Education Counseling*, 64(1-3), 6-20. doi: 10.1016/j.pec.2005.10.010
- U.S. Department of Health and Human Services. (2010). *Healthy people 2020*. Retrieved from <http://healthypeople.gov/2020/default.aspx>.
- Wallace, J. I., Buchner, D. M., Grothaus, L., Leveille, S., Tyll, L., LaCroix, A. Z., & Wagner, E. H. (1998). Implementation and effectiveness of a community-based health promotion program for older adults. *Journals of Gerontology. Series A: Biological Sciences and Medical Sciences*, 53(4), M301-306.
- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553. doi: 10.1111/j.1365-2648.2005.03621.x
- Young, M. D., Plotnikoff, R. C., Collins, C. E., Callister, R., & Morgan, P. J. (2014). Social cognitive theory and physical activity: a systematic review and meta-analysis. *Obesity Reviews*, 15(12), 983-995. doi: 10.1111/obr.12225