



Original article

Relationships between public health nurse-delivered physical activity interventions and client physical activity behavior



Jeanette M. Olsen, PhD, RN Assistant Professor^{a,*},
 Melissa L. Horning, PhD, RN, PHN Assistant Professor^b, Diane Thorson, MSN, RN, PHN Director^c,
 Karen A. Monsen, PhD, RN, FAAN Associate Professor^b

^a University of Wisconsin – Eau Claire, WI, USA

^b University of Minnesota School of Nursing, Minneapolis, MN, USA

^c Otter Tail County Public Health Department, Fergus Falls, MN, USA

ARTICLE INFO

Keywords:

Physical activity
 Rural health
 Public health nurse
 Exercise
 Interventions
 Outcomes
 Omaha System

ABSTRACT

Aim: The purpose of this study was to identify physical activity interventions delivered by public health nurses (PHNs) and examine their association with physical activity behavior change among adult clients.

Background: Physical activity is a public health priority, yet little is known about nurse-delivered physical activity interventions in day-to-day practice or their outcomes.

Methods: This quantitative retrospective evaluation examined de-identified electronic-health-record data. Adult clients with at least two Omaha System Physical activity Knowledge, Behavior, and Status (KBS) ratings documented by PHNs between October 2010–June 2016 ($N = 419$) were included. Omaha System baseline and follow-up Physical activity KBS ratings, interventions, and demographics were examined.

Results: Younger clients typically receiving maternal-child/family services were more likely to receive interventions than older clients ($p < 0.001$). A total of 2869 Physical activity interventions were documented among 197 clients. Most were from categories of Teaching, Guidance, Counseling ($n = 1639$) or Surveillance ($n = 1183$). Few were Case Management ($n = 46$). Hierarchical regression modeling explained 15.4% of the variance for change in Physical activity Behavior rating with significant influence from intervention dose ($p = 0.03$) and change in Physical activity Knowledge ($p < 0.001$).

Conclusion: This study identified and described physical activity interventions delivered by PHNs. Implementation of department-wide policy requiring documentation of Physical activity assessment for all clients enabled the evaluation. A higher dose of physical activity interventions and increased Physical activity knowledge were associated with increased Physical activity Behavior. More research is needed to identify factors influencing who receives interventions and how interventions are selected.

1. Background

Physical activity improves health and well-being, reduces risk of disease, and helps prevent premature death (Centers for Disease Control and Prevention [CDC], 2015). Yet, only 21.7% of adults meet the United States (US) physical activity guidelines for both muscle strengthening and aerobic activity (CDC, 2017a). Consequently, increasing physical activity is a public health priority (World Health Organization, 2017). Efforts to accomplish this goal align well with the definition and key elements of public health nursing practice (American Public Health Association [APHA], 2013). Public health nursing services are delivered using a population-based approach to priority groups within a geographic jurisdiction. They are often shaped by

program requirements, funding sources, and policies set by department leadership. Even so, the nature of public health nursing provides unique opportunities for addressing physical activity that are rarely available to nurses and health professionals practicing in other settings. For example, public health nurses (PHNs) often interact with clients in their own homes and community settings where they can assess for social and environmental factors that may affect physical activity behavior. In addition, PHNs often care for vulnerable populations with disparate levels of factors known to influence physical activity, such as income, education, and disability (United States Department of Health and Human Services [USDHHS], 2017). Therefore, PHNs are well-positioned to advance health in this important area through individual and population-level physical activity assessment and interventions.

* Corresponding author.

E-mail address: olsenjea@uwec.edu (J.M. Olsen).

Physical activity interventions have been studied extensively for their impact on physical activity behavior. Evidence supports using a socioecological approach (CDC, 2011a). For example, the ecological model for health promotion suggests multiple systems within the social environment influence physical activity: intrapersonal factors (i.e., physical health status, body mass index [BMI], gender, age, knowledge, and behaviors), interpersonal factors (i.e., social support), institutional and community factors (i.e., access to places for physical activity), and public policy (McLeroy, Steckler, Bibeau, & Glanz, 1988). Research supporting the significance of these factors is well documented (CDC, 2017b; CDC, 2011b; Olsen, 2013). Consequently, interventions should address “individual and social environmental factors” (McLeroy et al., 1988, p. 351). This comprehensive approach, inclusive of interventions at all system levels, is consistent with current evidence-based guidelines (CDC, 2011a; USDHHS, 2008). Examples of interventions recommended at the intrapersonal level include regular assessment of physical activity and individually tailored education and counseling for behavior change (American Heart Association [AHA], 2017; CDC, 2011a; Haskell et al., 2007; USDHHS, 2008). Interpersonal-level interventions include improving social support and group-based education programs (AHA, 2017; CDC, 2011a; The Community Guide, 2017; USDHHS, 2008). Guideline-supported interventions that address institutional, community, and policy levels include worksite programming, increasing access to places for physical activity, and changing land-use policies to support active communities (CDC, 2011a; USDHHS, 2008).

Recently, outcomes of nurse-delivered interventions have received increasing attention in the literature as evidenced by the publication of three integrative reviews in the following contexts: primary care (Richards & Cai, 2016a), home settings (Richards & Cai, 2016b), and community-based settings (Richards & Cai, 2016c). Statistically significant interventions reported in these and other studies are consistent with the ecological model (McLeroy et al., 1988). The findings support intrapersonal-level interventions such as goal setting (Blackford et al., 2016; Floegel et al., 2015; Richards & Cai, 2016a; Richards & Cai, 2016b; Richards & Cai, 2016c; Seekamp, Dollman, & Gilbert-Hunt, 2016), creating action plans (Floegel et al., 2015; Richards & Cai, 2016c), and supportive counseling and/or use of motivational interviewing (Richards & Cai, 2016b; Richards & Cai, 2016c). At the interpersonal-level, the literature supports increasing social support and offering group programs (Floegel et al., 2015; Cai & Richards, 2016a; Richards & Cai, 2016b; Richards & Cai, 2016c; Richards et al., 2013). Institutional and community level intervention findings lend support to encouraging community programs and tailoring interventions to social or environmental factors (Richards & Cai, 2016b; Richards & Cai, 2016c). Further, evidence supports a comprehensive, multilevel approach to interventions, incorporating both individual and group support (Richards et al., 2013). The literature is unclear, however, regarding the effect of intervention dose. Studies of multi-dose nursing interventions delivered in the community setting did not consistently increase physical activity (Richards & Cai, 2016c). However, 15 of 17 studies of multi-dose nursing interventions in a primary care setting reported significant increases in this health behavior, while two with one-time interventions did not (Richards & Cai, 2016a). Notably, most of what is known about physical activity interventions and associated outcomes is largely from studies in which a program or protocol was administered as part of a research study. Little is known, however, about what nurses are actually doing to increase client physical activity as part of their day-to-day practice or the results of those efforts.

Electronic health record (EHR) systems and documentation using standardized terminologies provide a way to efficiently capture client data and then retrieve and analyze it for departmental improvement efforts or research (Monsen, Swenson, & Kerr, 2016; Monsen, Swenson, Klotzbach, Mathiason, & Johnson, 2017). The Omaha System is a standardized terminology recognized by the American Nurses Association and is commonly used in public health and community health

settings (American Nurses Association, 2012; Martin, 2005). It has three components which together guide the delivery of comprehensive client care and documentation. They include the Problem Classification Scheme, Intervention Scheme, and Problem Rating Scheme for Outcomes (Martin, 2005). The Problem Classification Scheme consists of 42 health problems organized within one of four domains: Physiological (18 problems), Psychosocial (12 problems), Environmental (4 problems), or Health-related Behaviors (8 problems) (Martin, 2005). The domain structure is well-aligned with the ecological model for health promotion (Olsen, Baisch, & Monsen, 2017). Problems can be further described as health promotion topics, potential issues, or actual problems with signs and symptoms. Physical activity is one of 8 problems within the Health-related Behaviors domain.

The Intervention Scheme describes interventions that address identified problems from the Problem Classification Scheme in three levels: category (4 defined terms that describe the action of the intervention), target (75 defined terms that further specify the intervention), and client-specific information (a customizable term) (Martin, 2005). Three of the Categories describe the actions of typical Physical activity interventions: Surveillance, Case Management, and Teaching, Guidance, Counseling (the Treatments and Procedures category is not often used by nurses for Physical activity interventions). Numerous Target terms are relevant for Physical activity interventions. For example, a nurse may address Physical activity using the *Teaching, Guidance, Counseling* category with *exercises* target and *pacing activities* client-specific information.

Finally, the Problem Rating Scale for Outcomes is used to measure problem-specific Knowledge, Behavior, and Status (KBS) for a Problem from the Problem Classification Scheme with five-point Likert-type scales (1 = lowest, 5 = highest) (Martin, 2005). For example, a client with no knowledge about physical activity would have a Knowledge rating of 1, whereas a client with superior physical activity knowledge would have a rating of 5. Similarly, a client who does not engage in physical activity would have a Behavior rating of 1 while a client who regularly meets physical activity recommendations would have a rating of 5. Status relates to the presence of signs and symptoms with a rating of 1 indicating signs and symptoms are extreme and a rating of 5 indicating signs and symptoms are absent. Baseline ratings are recorded before interventions are implemented to establish a reference point for future comparison with later ratings (Martin, 2005).

In 2010, a public health department in west-central Minnesota identified physical activity as a public health priority and implemented a policy requiring physical activity assessment on all clients as well as documentation in each client's EHR using the Omaha System in order to advance evidence-based health promotion at the system, community, and individual levels; and to obtain data for population health improvement. This provided the opportunity to examine PHN-delivered physical activity interventions and outcomes.

1.1. Purpose and aims

The purpose of this study was to identify and describe physical activity interventions delivered by PHNs and examine their association with physical activity behavior change among adult clients. The four aims of the study were as follows:

- Aim 1: Examine characteristics of PHN clients who did and did not receive physical activity interventions.
- Aim 2: Examine the relationship between physical activity interventions delivered by PHNs and change in Physical activity KBS ratings for adult clients.
- Aim 3: Identify the types and frequencies of physical activity interventions documented by PHNs following a department policy change requiring Physical activity KBS assessment for all clients.
- Aim 4: Examine the association between change in Physical activity Behavior rating and intervention dose and comprehensiveness

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