Asian Nursing Research 9 (2015) 328–335

Contents lists available at ScienceDirect

Asian Nursing Research

journal homepage: www.asian-nursingresearch.com

Research Article

Effectiveness of a Stroke Risk Self-Management Intervention for Adults with Prehypertension

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ARTICLE INFO

Article history:
Received 8 December 2014
Received in revised form
26 April 2015
Accepted 16 September 2015

Key words:
prehypertension
primary prevention
risk
self-care
stroke

SUMMARY

Purpose: The aim of this study was to evaluate the effectiveness of a community-based intervention for prehypertensive adults, to enhance stroke risk awareness and to adopt a preventive lifestyle for primary stroke prevention.
Methods: This was a single-blinded, repeated measures quasi-experimental study with 47 participants (23 in the experimental group and 24 in the control group) recruited through convenience sampling from two urban areas. The stroke risk self-management intervention consisted of three weekly, 2-hour, face-to-face sessions and two booster telephone sessions, utilizing strategies to enhance motivation for behavioral changes based on the Self-Determination Theory. All participants completed a pretest, a 1-month and a 3-month post test of stroke risk awareness and preventive lifestyle including blood pressure self-monitoring, healthy diet, and regular physical activity. Data were analyzed using descriptive statistics, chi-square test, two sample *t* test, repeated measures analysis of variance, and Friedman test with PASW Statistics 18.0.
Results: After the intervention, significant improvements were found in the experimental group for stroke risk awareness, blood pressure self-monitoring and regular physical activity, and were sustained over time.
Conclusions: Our preliminary results indicate that the stroke risk self-management intervention is feasible and associated with improvement in self-management of stroke risk factors for primary stroke prevention among a prehypertensive population.

Introduction

Stroke is the second most common cause of death and a major cause of disability worldwide [1,2]; the condition imposes substantial health, economic and social costs on individuals, families and health systems. In 2008, the total annual cost related to stroke care was estimated at $65.5 billion in the US and €27 billion in the European Union [1]. In Korea, annual costs for patients hospitalized with stroke increased by 42.8% between 2005 and 2010 [3].

In spite of the serious and pervasive impacts of stoke, stroke can be prevented by identifying and modifying risk factors including hypertension, hyperlipidemia, atrial fibrillation, physical inactivity, obesity, and smoking [4,5]. Elevated blood pressure (BP) is a powerful and prevalent determinant of increased risk for both ischemic and hemorrhagic stroke [6], which suggests the importance of BP control for primary stroke prevention.

Recently, individuals with prehypertension (characterized as a systolic BP of 120–139 mmHg and/or diastolic BP of 80–89 mmHg) have been targeted for primary stroke prevention because prehypertension has been associated with increased risk of hypertension and stroke relative to normal BP [7–9] across races and ethnicities [10]. In addition, findings from various national and international samples suggest that individuals with prehypertension are likely to have multiple risk factors for stroke such as hypercholesterolemia, diabetes, overweight/obesity [8,11], lack of physical activity and a high-fat diet [12,13]. These findings warrant the need for interventions to detect and control multiple risk factors aforementioned, along with BP, in prehypertensive adults in the community.

However, previous research findings on prehypertension have primarily focused on epidemiology, and, until now, intervention studies for stroke prevention in this population [14–17] have been

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http://dx.doi.org/10.1016/j.anr.2015.10.002
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insufficient. In many intervention studies, the study sample was composed of people with hypertension as well as prehypertension and few explicit theoretical models have been used to develop interventions and evaluate the independent contribution of specific variables [18]. In other words, the effect or theoretical base of intervention strategies for prehypertension in free-living conditions remains unclear; thus, it is difficult to identify evidence based on these interventions and apply it to real practice.

In addition, individuals with prehypertension who do not have any other current medical diagnosis mostly consider themselves healthy and are unlikely to seek expert help to manage their health [19,20]. Resources and expertise in the community, which can be used for preventive intervention, are also very limited. In this regard, further studies are warranted to develop effective interventions that are based on a sound theoretical base and feasible for this population. These interventions should focus on enhancing awareness of stroke risk and lifestyle changes that can be modified to control stroke risk.

Given these circumstances which require feasible as well as efficacious interventions for community populations, an alternative option highlighted recently is a self-management approach. For this approach, it has been suggested that people who involve themselves in hypertension management have been shown to have better BP control [21]. A number of studies investigated the effectiveness of the self-management approach to enhance stroke preventive behaviors in a community population, including home BP self-monitoring [22], self-examination of pulse for cardiovascular disease prevention [23], and BP self-monitoring among stroke survivors to prevent recurrent stroke [24].

Self-management emphasizes the responsibility for self-care in response to an increased risk of developing disease, and individual motivation is critical for success [25–27] as motivation is the reason or incentive for performing and maintaining behaviors [5]. One of the theoretical perspectives that examines motivation, the Self-Determination Theory (SDT), is a well-established theory of human motivation and behavior [28]. It focuses on autonomous motivation, not controlled autonomy, which refers to acting with a sense of volition and the experience of willingness [29]. According to SDT, autonomously motivated people take on changing a particular behavior or goal and are more whole-heartedly engaged, persistent, and efficacious than individuals that have controlled motivations [29,30].

In this regard, elements of SDT are likely applicable to self-management strategies and existing findings have indicated that self-management intervention based on SDT theory were effective in community populations for behavioral changes [29,30]. However, few studies have developed and tested the effectiveness of SDT-based self-management intervention and targeted prehypertensive populations.

Therefore, this study incorporated strategies based on a theoretical approach of SDT into an intervention to enhance stroke risk self-management (SRSM) among adults with prehypertension living in the community. The hypothesis was that intervention for SRSM would result in greater awareness of stroke risk and adoption of a preventive lifestyle, that is, BP self-monitoring, a healthy diet, and regular physical activity.

Methods

Design

A single-blinded, repeated measures quasi-experimental design was used with data collection at three time points (preintervention and, 1 month and 3 months postintervention).

Participant sampling

The sample of 56 participants (28 experimental; 28 control) was recruited from community cultural centers and private groups in one church in two urban areas within G Province, South Korea. Convenience sampling was used. The inclusion criteria were (a) Joint National Committee (JNC) 7 stage prehypertension (i.e., systolic BP 120–139 mmHg or diastolic BP 80–89 mmHg) [7], (b) age between 40 years and 64 years, (c) community dwelling, (d) no activity restrictions or impairments in the ability to perform daily living activities and (e) no use of antihypertensive medication.

The sample size was calculated by G*power 2.0, to determine what was necessary to use repeated measure analysis with a significance level of α at .05, power of 0.8 and effect size of 0.35, which resulted in 23 participants for each group. Effect size of 0.35 was calculated based on an estimated effect size d from a previous finding on the effectiveness of an educational intervention among community-living adults [31].

The dropout rate was considered and 56 participants were recruited. The actual attrition rate was 16.1%, including five participants in the experimental group and four participants in the control group. These nine people were excluded from data analysis because of the following reasons in both groups: In the experimental group, three withdrew voluntarily before the end of the intervention and two did not complete the postintervention measurements. In the control group, two withdrew voluntarily before the end of the intervention, and two did not complete the postintervention measurements (Figure 1). No significant differences existed in the demographic characteristics between the completers ($n = 47$) and the dropouts ($n = 9$).

Ethical consideration

To protect the human rights of the participants, the study was reviewed and approved by the Yonsei University Institutional Review Board (IRB-2010-48). All participants provided informed consent prior to data collection, after being informed about the nature of the study, the voluntary nature of participation, the right to refuse to participate in the study and to withdraw consent at any time without reprisal, the anticipated benefits and potential risks of the study, and the confidentiality of responses.

Data collection

To recruit participants, the investigator contacted a representative of each group, and explained the goals and the procedure of the study. The flyers to solicit the potential participants were posted on the bulletin boards at the churches and centers. The contact numbers of the representatives and research assistants were also posted to let potential participants voluntarily contact and express interest in participation. Then the research assistants attended those meetings or gatherings, explained the study, identified and contacted potential participants who had expressed interest in participating.

To identify subjects who met the inclusion criteria among those who wished to participate, BP was measured twice and the mean value of the two measurements was used. BP was measured by research assistants on the right arm of participants, using an appropriately sized cuff and a standard mercury sphygmomanometer, after participants had been seated for 15 minutes, with feet on the floor and arm supported.

The primary investigator decided on participants who met the inclusion criteria of the study. These individuals who met the inclusion criteria provided informed consents prior to data collection,