

**THE EFFECT OF TRANS-THEORETICAL MODEL BASED-
MOTIVATIONAL INTERVIEWING ON PROMOTING EXERCISE
BEHAVIOR IN HEALTHY OLDER ADULTS:
STUDY PROTOCOL OF A RANDOMIZED-CONTROLLED TRIAL**

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ABSTRACT

Individualized health promotion activities are needed to bring the disadvantaged groups into healthy lifestyle behaviors. The older adult is both the most inactive and the most affected by physical inactivity in the community. Primary care nurses can help 65+ adults to gain exercise behavior by using their educator and guidance roles. The Trans-Theoretical Model (TTM) is an individualized counselling model that evaluates the behavior change as a process. TTM with motivational interviews (MI) is used to promote various health behaviors. This randomized-controlled trial will be conducted to investigate the effect of TTM based-MI on promoting exercise behavior in healthy older adults. The population is constituted of voluntary seniors who meet the inclusion criteria (n=117) from 65-74 aged adults (N=1630) who registered to a family health center. A power analysis was performed to sample size estimation with .30 effect size and .80 power. The projected sample size was found 90. The participants are divided into stratum, blocking according to the age, gender and exercise behavior stages of change. The seniors from the created stratum is allocated into intervention and control groups randomly. The data will be gathered via a questionnaire, TTM scales, KATZ Activities of Daily Living Scale (KATZ-ADL) and Physical Activity Scale for Elderly (PASE). Waist circumferences will be measured and average weekly step counts will be calculated via a pedometer. The data will be collected via an independent researcher, blinded to the study groups. TTM-based MI for gaining exercise behavior program is planned to apply to the intervention group overall six times (face-to-face for four times biweekly and twice via telephone by four weeks). Intervention period is planned as six months. The results obtained are expected to guide the community health nurses in terms of gaining exercise behavior of the older adults. This study is registered to clinicaltrials.gov, NCT04128553.

Keywords: *Older Adult, Community Health Nursing, Exercise, Motivational Interviewing, Transtheoretical Model*

1. INTRODUCTION

Physical inactivity is known to be responsible for 6% of all deaths among the global causes of mortality. It is estimated that approximately 21-25% of breast and colon cancer burden, 27% of diabetes and approximately 30% of ischemic heart disease burden are mainly attributed to physical inactivity (WHO, 2010:10).

Physical activity is proven as important for all the individuals at any age. Since the seniors have been the most physically inactive and the most affected group by physical inactivity in the community, promoting physical activity is accepted even more significant in this population (WHO, 2018: 7; WHO, 2010: 10,30-33). Physical activity is one of the effective non-pharmacological method to maintain the health and the functional independence especially for older adults. Therefore, it is very vital to initiate and progress to exercising slowly with the wisdom of a physically active lifestyle is a lifelong goal (Paterson et al., 2007). Gaining physical activity behavior contributes greatly to healthy aging (WHO, 2018: 7; WHO, 2010: 10,30-33). Regular physical activity in seniors reduces the risks of non-communicable diseases, such as coronary heart disease, stroke, diabetes, hypertension, colon and breast cancers, and depression. There are also benefits of being physically active in old ages, such as reducing the fall risk, improving the cognitive functions and controlling body weight (WHO, 2010: 30-31, 10).

While the physical activity is known to have numerous health benefits, a considerable proportion of older adults do not exercise and many of them indicate musculoskeletal system disorders or other systemic diseases as reasons for not exercising (Nied & Franklin, 2002). Centers for Disease Control and Prevention (CDC) states that even those with co-morbidities such as arthritis, diabetes or heart diseases, should not be inactive and regular physical activity can improve the quality of life and reduce the any complication risks related to the present co-morbidities of the older adult (CDC, 2020).

Although the health promotion activities are needed in seniors, the lack of motivation is one of the barriers of promoting the elder's health (Kitiş, 2017: 119-120). Adams-Fryatt (2010) states that, changing the physical inactivity behavior of older adults can be challenging, but it is not impossible. In a study, approximately half of the older adults were found not to exercise due to the lack of motivation; and individual and comprehensive approaches are needed in the exercise programs which are provided to older adults, is stated (Cohen-Mansfield et al., 2003). Community health nurse, as a primary care server, can identify the needs and barriers related to exercising by interviewing and monitoring the seniors one-by-one. They can motivate by guiding the older adults on this issue (Nies & Mcewen, 2019:777). The Trans-Theoretical Model (TTM), one of the most widely used models in the health promotion, recognizes the importance of the motivation and emphasizes the importance of strengthening the factors or the processes which trigger the behavior change (Emmons & Rollnick, 2001; Velicer et al., 1998; Spencer et al., 2006). Nurses can play a role in the acquisition of healthy lifestyle habits for the seniors via improving their knowledge and skills about the TTM, which is one of the individualized behavior change models, and motivational interviewing (MI), which is an individual-based counselling and guiding approach to be ensured behavior changes via helping individuals to recognize and solve their ambivalences (Cangöl & Şahin, 2017; Emmons & Rollnick, 2001).

There are different studies which investigate the effectiveness of the TTM on various health behaviors conducted by nurses in the literature. In the study conducted by Kim and Kang (2013), it is stated that the TTM-based physical activity intervention has positive impacts on reducing the cardiovascular disease risk. In the study of Cornacchione and Smith (2012), related to smoking, it is found that the TTM-based intervention has positive effects on

smoking cessation. In the research of Fahrenwald et al. (2005), TTM-based intervention was found effective to be increased the physical activity levels of the participants. Studies in the literature showed that the MI also has effects on improving the physical activity levels of individuals (Tse et al., 2013; Lin et al., 2016).

In the systematic reviews and meta-analysis in the literature, it is stated that even 15 minutes-long MIs make positive impacts on acquiring physical activity habit and other health promoting behaviors (McKenzie et al., 2015; Rubak et al., 2005; Van Der Bij et al., 2002). Physical activity self-efficacy levels of the individuals can be improved via MIs (Lilienthal et al., 2014; Tse et al., 2013). Moreover, feel of confidence and solving individual's problems and conflicts would be provided by personal communication (Emmons & Rollnick, 2001; Rollnick et al., 1992).

To the best of our knowledge, there are currently no studies evaluating the effectiveness TTM-based MI in the seniors in our country. Therefore, it is needed to assess the efficacy of TTM-based MI for gaining the physical activity behavior in the older adults in this study.

This study will be conducted to investigate the effect of TTM based-MI on promoting exercise behavior in healthy older adults. The main hypothesis and the sub-hypotheses of the research are as follows:

H₁: The TTM-based MI makes progress on the exercise behavior stages of change of the older adults.

H₁₋₁:The TTM-based MI increases the average score of processes of change in exercise of the older adults.

H₁₋₂:The TTM-based MI increases the average score of exercise self-efficacy of the older adults.

H₁₋₃:The TTM-based MI increases the average score of balance of decision-making of the older adults.

H₁₋₄: The TTM-based MI increases the physical activity levels of the older adults.

2. METHODS

2.1. Type of Study

This is a randomized controlled study.

2.2. Study Population and Inclusion-Exclusion Criteria

The study population is constituted of volunteer individuals who meet the inclusion criteria (n=117) from 65-74 aged adults (N=1630) who registered to a family health center (FHC) in a city, located in the middle region of the country.

Inclusion criteria are as follows:

- 65-74 aged seniors, who will voluntarily participate in the study
- Seniors, at least literate or elementary school graduated
- Seniors, at the pre-contemplation or contemplation stages of exercise behavior change
- No cognitive impairment which affects the interpersonal communication
- No muscle-joint problems to be a barrier for the physical activity
- No neuropsychiatric disorder

Exclusion criteria are as follows:

- Individuals whose age are less than 65 and bigger than 75.

- Seniors whose Mini Mental State Test (MMT) scores under 24 points (Mild Cognitive Impairment)
- Seniors whose Geriatric Depression Scale (GDS) scores above 5 points
- Seniors diagnosed with Cancer, Insulin-dependent Type-2 Diabetes Mellitus, Uncontrolled-Hypertension, Heart Failure, Chronic Obstructive Pulmonary Disease (COPD) and Asthma

Termination criteria are changing in the mental status of the senior during the follow-ups, requesting for leaving the research at any stage and any situation that requires hospitalization needs of the senior.

2.3. Study Group and Power Analysis

A power analysis was performed for sample size estimation with .30 effect size and .80 power. The projected sample size was found (at least) 90 with the allocation ratio 1:1.

2.4. Randomization and Blinding

In randomization, the seniors, planned to participate in this research, will be divided into stratum according to the age (65-69, 70-74), gender (male-female) and exercise behavior stages of change (pre-contemplation and contemplation). The block randomization will be used for bringing balance between the stratum. The seniors will be divided into two groups according to their exercise stages of change (pre-contemplation and contemplation), determined according to the Stage of Change Level Short Question Form. The seniors from the created stratum will be allocated into intervention and control groups randomly. The simple-random assignment of the research groups will be performed via an independent statistician to prevent the selection bias.

Blinding will not be applied to the participants due to the nature of the study. The data will be gathered, recorded and analyzed via an independent co-researcher who is blinded to the study groups, to avoid the bias. This co-researcher will be informed about the data collection process by the main research team.

2.5. Data Collection Tools and Implementation Process

A questionnaire, The Trans-Theoretical Model (TTM) Scales, KATZ Activities of Daily Living Scale (KATZ-ADL) and Physical Activity Scale for Elderly (PASE) will be used for the data collection. A pedometer (JP-600) will be used for calculating the weekly step counts of each participant. Waist circumference of the seniors will be measured via a tape-measure. The data will be gathered via the co-researcher through face-to-face interviews in the selected FHC. The flowchart of the study procedure is depicted in Figure 1. Outcomes and follow-ups are depicted in Table 1.

Table 1. Outcomes and Measurement Intervals (n =117)

Variables*	Intervention								Control		
	Weeks										
	0	2	4	6	8	12	16	20	24	0	24
The questionnaire	x									x	
The TTM Scales	x					x			x	x	x
KATZ-ADL	x					x			x	x	x
PASE	x					x			x	x	x
Waist circumference	x					x			x	x	x
Weekly average step counts	x				x	x			x	x	x
MI		x	x	x	x		x	x			

*The TTM Scales: The Trans-Theoretical Model Scales; KATZ-ADL: KATZ Activities of Daily Living Scale; PASE: Physical Activity Scale for Elderly; MI: Motivational Interviewing

Implementation of the intervention

In the first meeting (Week 0., the first follow-up), the research team will meet the participants in the intervention group, objective of the study will be explained to the seniors and the pretest (the questionnaire, the TTM Scales, KATZ-ADL, PASE) will be applied along with the body weight, height and waist circumference measurements. A pedometer (JP-600) will be handed out every senior in the intervention group and asked to carry it for one week (end of week 0.) to calculate the average weekly step counts (end of the 1st week.). The face-to-face individualized MI will be performed by the research team member (ES) in the following 2nd (the second follow-up), 4th (the third follow-up), 6th (the fourth follow-up) and 8th (the fifth follow-up) weeks. Stage of Change Level Short Question Form will be applied before every MI to maintain the next MI according to the senior's current stage of change. Following the fifth follow-up, the intervention group will be asked to carry the given pedometer for one week (end of 8th week) and the average weekly step counts will be calculated (end of 9th week). An inter-test (the TTM Scales, KATZ-ADL, PASE) will be applied along with the body weight and waist circumference measurements in the 12th week (the sixth follow-up). The intervention group will be asked to carry the given pedometer for one week again (end of 12th week) and the average weekly step counts will be calculated (end of 13th week). In this phase, the MI will be performed by the same researcher via telephone calls in the 16th (the seventh follow-up) and 20th (the eighth follow-up) weeks. The posttest (the TTM Scales, KATZ-ADL, PASE) will be applied along with the weight and waist circumference measurements in the 24th week of the study (the ninth follow-up). The intervention group will be asked to carry the given pedometer for one week again (end of 24th week) and the average weekly step counts will be calculated (end of 25th week). The MI will be performed six times in total, four times face-to-face and two times via telephone calls, to the intervention group during the study period (6 months). The MI will be conducted either the elder's own home or in a reserved-private room of the FHC, according to the individuals' choice.

For the control group, the pretest will be applied along with the body weight, height and waist circumference measurements to the seniors in the first consultation (Week 0., the first follow-up). A same brand pedometer will be handed out every senior in the control group and asked to carry it for one week (end of week 0.) to calculate the average weekly step counts (end of 1st week.). The posttest will be applied along with the body weight and waist circumference measurements in the 24th week of the study (the second follow-up). The control group will be asked to carry the given pedometer for one week again (end of 24th week) and the average weekly step counts will be calculated (end of 25th week). The MI will not be performed to the control group.

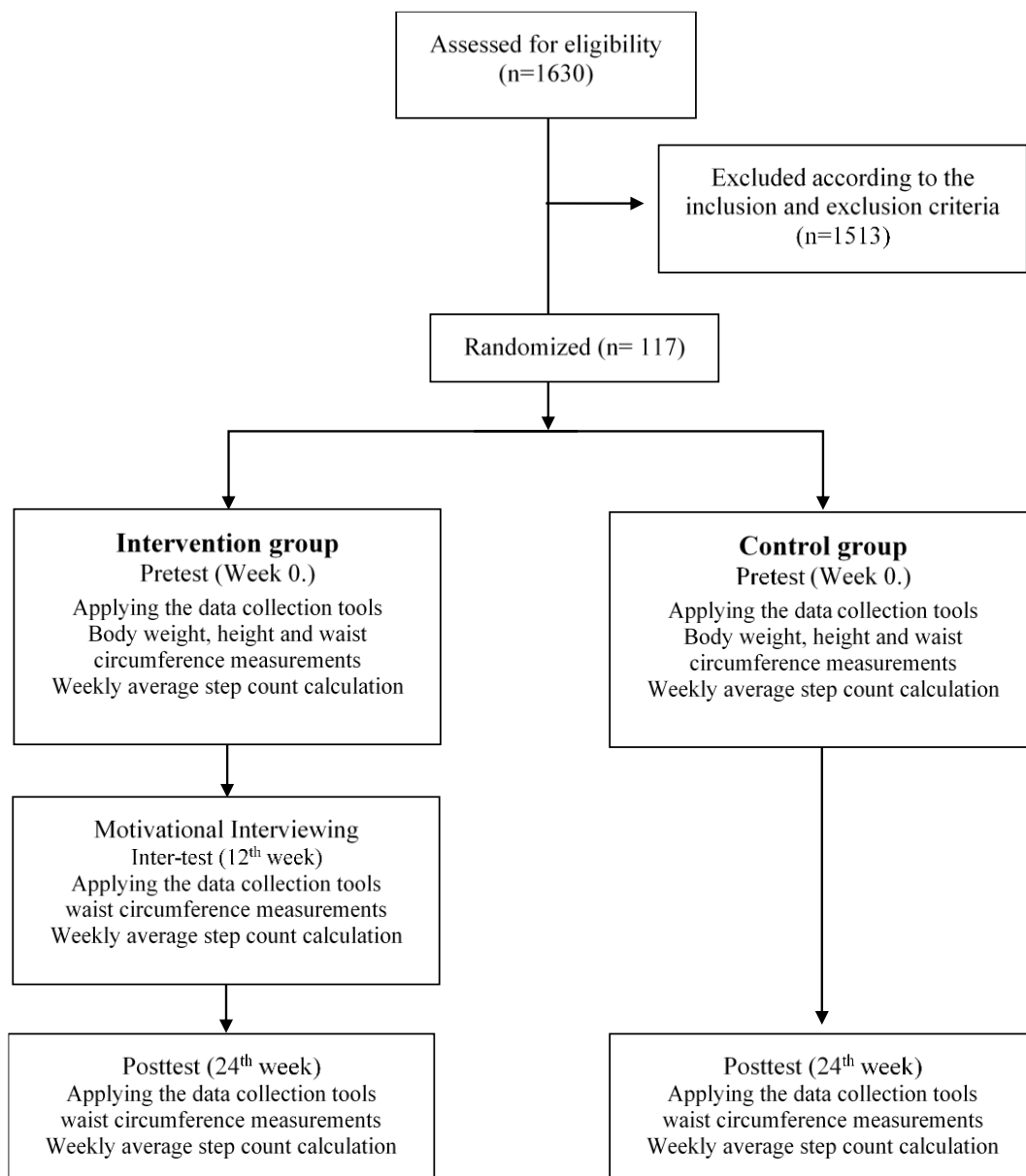
2.6. Data Analysis

The data will be analyzed via the Statistical Package for the Social Sciences (SPSS) version 18.0. Frequencies will be used to present the socio-demographic characteristics. The chi-square test will be used for comparing the categorical variables. Independent samples t-test or Mann Whitney-U test will be used according to the result of the normality test. Correlation analysis will be performed to explore the relation between follow-up scores of the scales.

2.7. Ethical Considerations

The ethical approval was gathered from the university's Clinical Research Ethics Committee (Approval number/date: 838/12.11.2018). The written permissions were obtained to the selected FHC. Both verbal and written consents of the seniors will be gathered before initiating the study.

Figure 1. Flowchart of the Study Procedure



3. RESULTS

The study is ongoing.

4. DISCUSSION AND CONCLUSION

The effect of TTM based-MI on promoting exercise behavior in healthy older adults will be investigated in this study. The results obtained in this study are expected to guide the community health nurses in terms of gaining the exercise behavior of the older adults who are under their care. The results also can present further evidences to the geriatric care researchers.

Acknowledgement

This is the protocol of a PhD. thesis with the same topic, which was registered to the clinicaltrials.gov, on 15.10.2019. The registration number is NCT04128553.

Conflict of interest

No conflict of interest has been declared by the authors.

REFERENCES

- ADAMS-FRYATT, A. (2010). Facilitating successful aging: encouraging older adults to be physically active. *J. Nurse Pract.*, 6(3), 187-192.
- KİTİŞ, Y. (2017). Yaşlı Bireylerde Sağlığın Korunması ve Geliştirilmesi, In: *Yaşlılık ve Yaşlı Sağlığı Yaşlı Bakımı Alanında Hizmet Veren Profesyoneller İçin*, N. BİLGİLİ & Y. KİTİŞ (eds), Vize Basın Yayın, Ankara, 978-605-9278-21-8.
- CANGÖL, E. & ŞAHİN, N. H. (2017). Emzirmenin Desteklenmesinde Bir Model: Pender'in Sağlığı Geliştirme Modeline Dayalı Motivasyonel Görüşmeler. *HEAD*, 14(1), 98-103.
- CDC. (2020). Making Physical Activity a Part of an Older Adult's Life [online], Geneva, <https://www.cdc.gov/physicalactivity/basics/adding-pa/activities-olderadults.htm>, [Date Accessed: 14 June 2020].
- COHEN-MANSFIELD, J., MARX, M. S., & GURALNIK, J. M. (2003). Motivators and barriers to exercise in an older community-dwelling population. *JAPA*, 11(2), 242-253.
- CORNACCHIONE J. & SMITH S.W. (2012). The effects of message framing within the stages of change on smoking cessation intentions and behaviors. *Health Commun.*, 27(6), 612-22.
- EMMONS, K.M. & ROLLNICK, S. (2001). Motivational interviewing in health care settings: opportunities and limitations. *Am. J. Prev. Med.*, 20(1), 68-74.
- FAHRENWALD N.L., ATWOOD J.R. & JOHNSON D.R. (2005). Mediator analysis of moms on the move. *West. J. Nurs. Res.*, 27(3), 271-91.
- KIM, C.J. & KANG, S. (2013). Development and a pilot test of an internet-based cardiovascular risk reduction program for Korean male workers with metabolic syndrome. *Comput. Inform. Nu.*, 31(4), 157-66.
- LILIENTHAL, K.R., PIGNOL, A.E., HOLM, J.E. & VOGELTANZ-HOLM, N. (2014). Telephone-based motivational interviewing to promote physical activity and stage of change progression in older adults. *JAPA*, 22(4), 527-535.
- LIN, C.H., CHIANG, S.L., HEITKEMPER, M.M., HUNG, Y.J., LEE, M.S., TZENG, W.C. & CHIANG, L.C. (2016). Effects of telephone-based motivational interviewing in lifestyle modification program on reducing metabolic risks in middle-aged and older women with metabolic syndrome: A randomized controlled trial. *Int. J. Nurs*, 60, 12-23.
- MCKENZIE, K. J., PIERCE, D. & GUNN, J. M. (2015). A systematic review of motivational interviewing in healthcare: the potential of motivational interviewing to address the lifestyle factors relevant to multimorbidity. *JOC*, 5(1), 162-174.
- NIED, R.J. & FRANKLIN, B.A. (2002). Promoting and prescribing exercise in the elderly. *Am. Fam. Physician*, 65(3), 419.
- NIES, M.A. & MCEWEN, M. (2019). *Community/Public Health Nursing: Promoting the Health of Populations*. (Seventh edition), Elsevier, USA, 978-0-323-52894-8.
- PATERSON, D.H., JONES, G.R. & RICE, C.L. (2007). Ageing and physical activity: evidence to develop exercise recommendations for older adults. *Appl. Physiol. Nutr. Me.*, 32(S2E), 69-108.

- ROLLNICK, S., HEATHER, N. & BELL, A. (1992). Negotiating behaviour change in medical, settings: the development of brief motivational interviewing. *J. Ment. Health*, 1(1), 25-37.
- RUBAK, S., SANDBÆK, A., LAURITZEN, T. & CHRISTENSEN, B. (2005). Motivational interviewing: a systematic review and meta-analysis. *Br. J. Gen. Pract.*, 55(513), 305-312.
- SPENCER, L., ADAMS, T.B., MALONE, S., ROY, L. & YOST, E. (2006). Applying the transtheoretical model to exercise: a systematic and comprehensive review of the literature. *Health Promot. Pract.*, 7(4), 428-443.
- TSE, M.M., VONG, S.K. & TANG, S.K. (2013). Motivational interviewing and exercise programme for community-dwelling older persons with chronic pain: a randomised controlled study. *J. Clin. Nurs.*, 22(13-14), 1843-1856.
- VAN DER BIJ, A.K., LAURANT, M.G. & WENSING, M. (2002). Effectiveness of physical activity interventions for older adults: a review. *Am. J. Prev. Med.*, 22(2), 120-133.
- VELICER, W.F., PROCHASKA, J.O., FAVA, J.L., NORMAN, G.J. & REDDING, C.A. (1998). Detailed overview of the transtheoretical model. *Homeostasis*, 38, 216-33.
- WHO. (2010). Global recommendations on physical activity for health [online], Geneva, <https://www.who.int/dietphysicalactivity/publications/9789241599979/en/>, [Date Accessed: 14/06/2020].
- WHO. (2018). Global action plan on physical activity 2018–2030: more active people for a healthier World [online], Geneva, <https://www.who.int/ncds/prevention/physical-activity/global-action-plan-2018-2030/en/>, [Date Accessed: 14/06/2020].