



Effect of Telephone Counseling on the Nutritional Status and Physical Activity in Iranian Middle-Aged Women

Behnaz Enjezab ¹, Behnaz Rahbarnia *², Mahshid Bokaie ¹, Ali Dehghani ³

1. Department of Midwifery, Faculty of Nursing & Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

2. Student Research Committee, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

3. Department of Biostatistics and Epidemiology, Public Health School, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Correspondence: Student Research Committee, Nursing and Midwifery School, Yazd Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Tel: +989162608393, E-mail: bn.rahbarnia@yahoo.com

ARTICLE HISTORY

Received: Feb 10 2020

Received: in revised form: Feb 29 2020

Accepted: Mar 11 2020

Published online: April 15 2021

DOI: [10.29252/jgbfm.18.1.30](https://doi.org/10.29252/jgbfm.18.1.30)

Keywords:

Telephone counseling

Middle-aged women

Nutritional status

Exercise

Article Type: Original Article

Abstract

Background: Lifestyle modification is an important factor in promoting the health of middle-aged women. Therefore, this study aimed to determine the effect of telephone counseling on the nutritional status and physical activity of middle-aged women in Yazd, Iran.

Methods: This randomized controlled clinical trial was done on 50 middle-aged women during September to February 2017. Eligible women were recruited from religious places and then were randomly assigned into two intervention and control groups. The participants in the intervention group received the counseling program in 8 calls for 20-30 minutes twice per week. The control group received no intervention. Data were gathered using a health promoting life-style questionnaire for middle-aged women in three time points; before intervention, immediately, and one month after the intervention. Data were analyzed in SPSS 16 software using Chi-square, repeated measures ANOVA and independent t-test. A significance level was considered $P < 0.05$.

Results: There was no significant difference between the two groups in terms of nutritional status and physical activity (PA) before the intervention, but there was significant difference between them immediately and one month after the intervention. Also adjusting the baseline values, repeated measures ANOVA test showed a significantly premiere mean of nutritional status in telephone counseling compared to the control group ($P < 0.001$).

Conclusion: The results of the study showed that telephone counseling significantly improved the lifestyle of the middle-aged women. Also, recommended that health care providers use of telephone counseling that effective and efficient tool for promoting women's health.

Introduction

Women are considered as main component of social development and the core of family health (1). With increasing age and lifestyle changes, women are more likely to face obesity and overweight than before. Changes in food habits and reduced physical activity have led to an ever-increasing rise in these problems in developing and developed countries (2, 3). Middle age is one of the most important periods in women's life (4, 5). On the other hand, in middle-aged women, each of the factors of lifestyle independently and significantly predicts chronic diseases and mortality (4). In fact, lifestyle is related to the individual's daily patterns in various dimensions, especially nutrition and physical activity (6). It is believed that healthy lifestyle contributes to health promotion and unhealthy lifestyle has adverse effects on health and lifestyle modification is one of the important factors in health promotion (7). One of the goals of the People Health Program in 2020 is to promote and develop health and healthy behaviors at every stage of life (8). Unfortunately, individual ways of reducing lifestyle risks, such as a healthier diet and physical activity, are still uncommon in the lives of middle-aged women, and these women threaten their health with an undesirable health pattern throughout their lives and performing harmful behaviors (9, 10). Inactive lifestyle and obesity are major risk factors for cardiovascular disease, diabetes, some cancers, osteoporosis, bone fracture and some mental health problems (11). According to the World Health Organization, more than 60% of adults do not have enough physical activity to maintain their health (12). In addition, 66.7% - 80% of Iranian middle-aged women suffer from obesity and overweight (13, 14). Changes in nutritional behavior and physical activity are very important in early prevention and management of chronic diseases (15). People play an important role in lifestyle control because these behaviors can be changed and health care providers can be effective in changing their behavior through education and counseling (16). In recent years, the medical professions focus on counseling and informing programs (6). Consultation is a public idiom used for different processes, such as guiding, interviewing and conducting trials to support individuals (17). Consultation includes two types of attendance and distance (18). In the distance counseling of the communication equipment such as video, Internet and telephone are used (19, 20). From the communication devices used in the distance counseling, telephone is tool available to majority

people in the community which is increasingly being used (20). In addition, Telephone counseling used in many of the world's advanced Health centers. This counseling technique leads to economical savings, increased quality of care (21) and reduced workload of the health system (22). The results of a study showed that telephone counseling was effective, efficient and led to changes in dietary behavior and physical activity of adults (15). Therefore, given the importance of this stage in the lives of women and the epidemic nature of chronic diseases associated with nutrition and physical activity (23), as well as the low referral of this age group to health centers, it is necessary to provide interventions based on changes in nutritional status and physical activity in order to maintain and improve their health. Therefore, the present study was conducted the effect of telephone counseling on nutritional status and physical activity of middle-aged women in Yazd, Iran.

Methods

This randomized controlled clinical trial study with pre-posttest and follow-up design which was conducted on 50 middle-aged women that were present in seven religious places of Yazd city, Iran from September to February 2017. This study was not blinded. The inclusion criteria were 40-60 years old woman, not having (diabetes, hypertension and dyslipidemia), and access to the phone and exclusion criteria including: having severe or debilitating physical or psychological diseases which would prevent the person from attending the program, having a hearing and speaking problem, falling criteria included: lack of responding to more than two telephone calls.

The sample size according to the following formula and taking into account 95% confidence level, test power of 80%, and according to the study conducted by Heidari et al (24) was determined to be 23 individuals in each group. Considering possibility of 10% drops out in samples, 25 middle aged women were considered in each group.

$$n = \frac{2\sigma^2 \left[z_{1-\alpha/2} + z_{1-\beta} \right]^2}{\mu^2} n = \frac{2 \times 23.155 [1.96 + 0.84]^2}{16} = 22.69 \approx 23$$

Sampling began after approving from the ethics committee of Yazd University of Medical Sciences (IR.SSU.REC.1396.90), and Iranian Registry of Clinical Trials (IRCT20180111038310N1). At First, the researcher visited the religious places and the goal and method of work and voluntary nature of the research and confidentiality of their information were explained to all middle-aged women. From the 282 middle-aged women attending religious places, 50 people entered the study according to inclusion and exclusion criteria. After based on a random number table, the subjects were randomly divided into two intervention and control groups using random number table. After providing a list of all the eligible subjects, the researcher explained the objectives and method of the study to them in a pre-intervention meeting. The women, who were willing to participate in the study, completed the written informed consent form. Then the researcher completed the demographic and the health promotion behaviors questionnaire by interviewing in the religious' place. (Figure 1).

The telephone counseling was conducted by MSc student in midwifery counseling (Table 1). Participants in the intervention group received the counseling program including 8 calls twice a week each consulting took about 20-30 minutes. Regarding the initial coordination with themselves the samples and setting the appropriate time, every morning with five people, and every afternoon with five people were called on the phone, and this program was repeated twice a week. During this period the control group was not given any counseling. At the end of the intervention, post-test was performed in the religious place on all two groups and they followed-up after one month in the religious place and two groups separately invited to the religious place to complete the questionnaire by interviewing.

Table 1: Content of the consultation intervention and homework

Weeks	contents	Homework
First	Advice on the risks of obesity and healthy eating habits, food pyramid and educate the number of food contributions, general guidelines for proper nutrition and training nutrition guide sticker, questions and answers with consumers in relation to the above.	List of actions taken to improve nutritional behavior, prepare food list and share consumption of each group per week, complete the list of physical activity (PA) done in the week.
Second	Summary of the contents of the previous meeting, review the homework sessions before, advice on the risks of obesity and physical inactivity and their health effects, basic PA concepts, exercise benefits and the effect of exercise on physical and mental health, provide a sports program and PA according to their conditions, questions and answers with consumers in relation to the above and related problems.	List of actions taken to improve PA, complete the food list and the share consumption per group per week, and complete the list of PA done in the week.
Third	Summary of the contents of the previous meeting, review the homework sessions before, effects of PA and proper nutrition on diseases (diabetes and fatty liver) and prevention ways.	Complete the food list and the share consumption per group per week, complete the list of PA done in the week.
Fourth	Summary of the contents of the previous meeting, review the homework sessions before, effects of PA and proper nutrition on diseases (osteoporosis and cancer) and prevention ways.	Complete the food list and the share consumption per group per week, complete the list of PA done in the week.

The data was gathered using two domains of Health-Promoting Lifestyle Profile II (HPLP-II) including nutritional behaviors and Physical Activity (PA) which was developed by Walker, Sechrist and Pender in 1987. This scale consists of 52 items with four-point Likert response format to measure the frequency of Health Promotion Behaviors in the six domains; health responsibility, PA, nutrition, spiritual growth, interpersonal relations and stress management (25). Its validity and reliability ($\alpha=0.87$) have been confirmed (9).

The nutritional status included 12 questions and PA included 7 questions. Answers for each question include the never (1), sometimes (2), often (3) and always (4), and score 1 to 4 was assigned to each of them.

The total score range of nutritional behaviors and the PA is between 19 and 76 and a separate score can be calculated for each domain. To better understand the results and compare them with the results of other articles, the raw score of each subgroup was converted to an adaptive score so that the raw score of each subgroup was divided into the number of questions, and therefore the average score was in the range of 1-4 and the scores: (1-1/99: Weak level), (2-2/99: Intermediate level), (3-4: Good level) of behavior Was considered.

After data collection, SPSS Statistics for Windows, version x.0 (SPSS Inc., Chicago, Ill., USA). The normality of the quantitative variables was checked using the Kolmogorov-Smirnov test. The distribution of all variables was normal. To compare groups in terms of demographic characteristics, independent T-Test, Chi-square test were used. The groups were compared in terms of mean nutritional status and PA scores using independent T-Test. the test repeated measures analysis of variance (ANOVA) was used for intra-group comparison at frequent intervals (before the intervention, immediately and one month after the intervention). To determine the significance level, the level was considered to be less than 0.05.

Results

The mean age of the women were 48.88 ± 5.24 and 47 ± 5.12 years in the control and intervention groups, respectively. The majority of them were married (%93.5), housewife (%89.5) and primary education level (%55.9). The results of the study showed no significant difference between the two groups in terms of marital status, educational level, employment, age, husband age, number of pregnancy, number of children, menopausal age. But, there was significant difference between the two groups in terms of BMI (table 2).

Table 2: The frequency distribution of demographic characteristics of the participants in two groups

		Control (n=25)	Intervention (n=23)	P-value
Marital status, N (%)	Married	24 (96)	21 (91)	0.601*
	Single	1 (4)	2 (9)	
Educational level, N (%)	Primary	16 (64)	11 (47.8)	0.512*
	Elementary	3 (12)	10 (43.4)	
	Diploma	6 (24)	2 (8.6)	
Employment, N (%)	Employee	2 (8)	3 (13)	0.66*
	Housewife	23 (92)	20 (87)	
Age (Mean \pm SD)		5.24 \pm 48.88	5.12 \pm 47	0.216**
Husband Age (Mean \pm SD)		8.09 \pm 54.6	6.7 \pm 53.28	0.54**
BMI (Mean \pm SD)		3.7 \pm 29.5	4.81 \pm 32.53	0.018**
Number of Pregnancy (Mean \pm SD)		2.1 \pm 3.92	1.25 \pm 3.73	0.722**
Number of children (Mean \pm SD)		1.33 \pm 3.04	1.17 \pm 3.26	0.547**
Menopausal Age (Mean \pm SD)		3.14 \pm 48.5	3.71 \pm 45.8	0.17**

Chi square test*, independent T-Test**

Mean (SD) of nutritional status score before the intervention was 2.14 ± 0.2 in telephone counseling and 2.28 ± 0.31 in control group, showed that there was no significant difference between them ($P=0.077$). Immediately after and one months after intervention, showed that there was significant difference between them in term of nutritional status ($P<0.001$). Immediately after and one months after the intervention, mean (SD) of nutritional status scores were 3.28 ± 0.22 and 3.32 ± 0.24 , respectively, in telephone counseling and 2.26 ± 0.3 and 2.24 ± 0.29 , respectively, in the control group. According to table3 and figure 2, after controlling baseline values, the tests of within-subjects contrasts in the repeated measure ANOVA test showed that mean score of nutritional status was significantly premiere in the telephone counseling compared to the control group ($P<0.001$). The results of this test in the control group showed that the mean scores of nutritional status decreased significantly after intervention and one month after intervention ($P=0.005$).

Table 3: Comparison of mean and standard deviation of nutritional status score in two groups in three time points

Group	possible range	Intervention Mean \pm SD	Control Mean \pm SD	P-Value*
Before the intervention	1-4	2.14 \pm 0.2	2.28 \pm 0.31	0.077
Immediately after the intervention	1-4	3.28 \pm 0.22	2.26 \pm 0.3	<0.001
One months after the intervention	1-4	3.32 \pm 0.24	2.24 \pm 0.29	<0.001
P value**		<0.001	0.005	

*Independent t-test

**Repeated measure ANOVA test

Table 4: Comparison of mean and standard deviation of PA score in two groups in three stages of research

Group	possible range	Telephone counseling M \pm (SD)	Control group M \pm (SD)	P-value*
Before Intervention	1-4	1.32 \pm (0.19)	1.4 \pm (0.18)	0.167
Immediately After Intervention	1-4	2.62 \pm (0.51)	1.36 \pm (0.16)	<0.001
One months after intervention	1-4	2.62 \pm (0.50)	1.32 \pm (0.14)	<0.001
P-value**		<0.001	<0.001	

*Independent t-test

**Repeated measure ANOVA test

Mean (SD) of PA score before the intervention was 1.32 ± 0.19 in telephone counseling and 1.4 ± 0.18 in control group, showed that there was no significant difference between them ($P=0.167$). After and one months after intervention, independent t-test showed that there was significant difference between them in term of PA ($P<0.001$). Immediately after and one months after the intervention, mean (SD) of PA scores were 2.62 ± 0.51 and 2.62 ± 0.50 , respectively, in telephone counseling and 1.36 ± 0.16 and 1.32 ± 0.14 , respectively, in control group. According to table 4 and figure 3, after controlling baseline values, the tests of within-subjects contrasts in the repeated measure ANOVA test showed that mean score of PA was significantly premiere in the telephone counseling compared to the control group ($P<0.001$). The results of this test in the control group showed that the mean scores of PA decreased significantly after intervention and one month after intervention ($P<0.001$).

Discussion

According to review of articles, the present study is the first to explore the effects of the telephone counseling intervention on the nutrition behaviors and PA as a method of health promotion for Iranian middle aged women. Based on the findings of this research, mean of nutrition and PA status in the participants in this study were in the moderate and weak level respectively. We found that this technique of intervention was prosperous in improving of the means of scores of nutrition and PA behaviors as obtained immediately and one month after the intervention in the telephone counseling group compared with control group, so proved the effectiveness of the telephone counseling. Strong evidence has suggested that correct of nutrition and PA behaviors is the cornerstone of the management of health promotion and prevention numerous chronic conditions (26, 27). Therefore, counseling is one of the important factors in changing lifestyle in terms of nutritional status and PA, which ultimately leads to the promotion of healthy behaviors among middle-aged women. The findings of the present study are in agreement with other findings from studies on the effectiveness of telephone counseling programs. A study with regard to the impact of counseling on the lifestyle of postmenopausal women and their husbands showed that counseling with couples was one of the effective ways to improve nutritional status and physical activity with the aim of modifying the lifestyle (6).result of other study showed that providing health promotion program can be effective in promoting the lifestyles of middle-aged women (24).Also, in another study with the effect of telephone counseling on quality of life in postpartum women showed the positive effect of telephone counseling on quality of life (28). Also, in a clinical trial conducted on Indian patients with type 2 diabetes, result showed using a regular telephonic counseling significantly improved dietary and lifestyle modifications (29). the results of a study in Finland with the aim of determining the effect of lifestyle counseling on diet pattern and physical activity of overweight drivers who had waist circumference more than 100 showed that the effectiveness of the combination of face-to-face counseling (in 6 individual counseling sessions) and telephone counseling (7 telephone calls) techniques in 12 months increased the mean score of the food index and physical activity (30). A study investigated the effect of telephone counseling in the form of 18 calls within 12 months on improving diet and physical activity in low-income adults with chronic disease (type 2 diabetes and high blood pressure) and their results indicated that telephone counseling is an effective means for modifying the lifestyle (31), which this result is consistent with that of present study. In other studies showed improved dietary habits in these people by examining the effect of telephone counseling on adult nutrition promotion (32).In a review study conducted to evaluate the effect of telephone counseling on changes in diet and physical activity, that reported significant improvement in physical activity and diet (33). In another review study with aim of determine the effectiveness of technology-based distance interventions in promoting physical activity, result showed effectiveness of technology-based distance interventions for promoting physical activity (19).

Evidence display that telephone lifestyle counseling obtains an effective tool for improving dietary and PA behaviors (34).

Also, the results showed that contrary to belief of majority of people who think physical presence is a fundamental and inevitable factor in the counseling process; telephone counseling would be very effective, if implemented structurally and follow a specified goal and pattern. In this study, it was revealed that telephone counseling was a feasible and effective tool for modifying the lifestyle of women to promote healthy behaviors, and it should be noted that in telephone counseling, due to lack of face-to-face communication, counselor needs to have high level of abilities and skills to encourage clients to continue conversation.

This study had a limitations: The majority of the study samples had primary education therefore generalizability of this study could have limited and limitation of this study was short-term follow-up time. Thus, Future studies are essential to be conducted with long-term follow-up to assess the stability of the intervention's effectiveness.

Conclusion

The results showed that the telephone counseling improved nutritional and PA behaviors in middle-aged women. According to the results of this study, midwives and health providers can use this effective and efficient way to improve of healthy behaviors of middle-aged women, and to provide care services in the area of prevention. According to the experimental evidence of the positive and alike effects of the telephone counseling, it is recommended that all health providers could employ telephone counseling as a cost effective and practical method.

Acknowledgements

This manuscript is part of the dissertation for the Master's degree in midwifery counseling with the grant No. 5348 at Shahid Sadoughi University of Medical Sciences, Yazd, IRAN. We thereby appreciate all honorable professors and authorities as well as participants of this study, who cooperated with us in conducting this research.

Funding source

The study was supported by Shahid Sadoughi University of Medical Sciences in Yazd (grant No. 5348).

Ethical statement

This study was approved by the Ethics Committee of Yazd University of Medical Sciences (IR.SSU.REC.1396.90).

Conflict of interest

The authors declared no conflict of interest

Author contributions

Conceptualization: Behnaz Enjezab, Behnaz Rahbarnia, Mahshid Bokaie; Methodology, analysis, research a review: Behnaz Enjezab, Behnaz Rahbarnia, Ali Dehghani; Writing and editing: Behnaz Enjezab, Behnaz Rahbarnia.

References

- Baheiraei A, Mirghafourvand M, Mohammadi E, Mohammad-Alizadeh Charandabi S, Nedjat S. Determining appropriate strategies for improving wo1.Baheiraei A, Mirghafourvand M, Mohammadi E, Mohammad-Alizadeh Charandabi S, Nedjat S. Determining appropriate strategies for improving women's health promoting behaviours: using the nominal group technique. *East Mediterr Health J.* 2013; 19(5):409-16. [View at publisher] [DOI] [Google Scholar]
- Griffin JB, Struempler B, Funderburk K, Parmer SM, Tran C, Wadsworth DD. My Quest, an Intervention Using Text Messaging to Improve Dietary and Physical Activity Behaviors and Promote Weight Loss in Low-Income Women. *J Nutr Educ Behav.* 2018; 50(1):11-8. [View at publisher] [DOI] [Google Scholar]
- Khodaveisi M, Omid A, Farokhi S, Soltanian AR. The Effect of Pender's Health Promotion Model in Improving the Nutritional Behavior of Overweight and Obese Women. *Int J Community Based Nurs Midwifery.* 2017;5(2):165-74. [View at publisher] [DOI] [Google Scholar]
- Heidari F, Mohammadkhan Kermanshahi S, Vanaki Z, KAZEMNEJAD A. A Survey the effect of planned program of health promotion on stress management in middle-aged women. *IJNR.* 2011;6:16-23. [Persian]. [View at publisher] [Google Scholar]
- Bansal P, Chaudhary A, Soni RK, Sharma S, Gupta VK, Kaushal P. Depression and anxiety among middle-aged women: A community-based study. *J Family Med Prim Care.* 2015; 4(4):576-81. [View at publisher] [DOI] [Google Scholar]
- Tiznobaik A, Mirmolaei T, Kazemnejad A. The effects of the counseling on life style of menopausal women and their husbands. *Adv Nurs Midwifery.* 2013; 22(77):52-9. [Persian]. [View at publisher] [Google Scholar]
- Shohani M, Rasouli M. Comparison of health behaviors among students of Iranian medical and human sciences universities. *Electron physician.* 2018; 10(5):6836-42. [View at publisher] [DOI] [Google Scholar]
- Lyons BP. Nutrition education intervention with community-dwelling older adults: Research challenges and opportunities. *J Community Health.* 2014; 39(4):810-8. [View at publisher] [DOI] [Google Scholar]
- Enjezab B, Farajzadegan Z, Taleghani F, Aflatoonian A, Morowatisharifabad MA. Health promoting behaviors in a population-based sample of middle-aged women and its relevant factors in Yazd, Iran. *Int J Prev Med.* 2012; 3(Suppl 1):191-8. [View at publisher] [Google Scholar]
- Holahan CK, Holahan CJ, Li X, Chen YT. Association of health-related behaviors, attitudes, and appraisals to leisure-time physical activity in middle-aged and older women. *Women & Health.* 2017; 57(2):121-36. [View at publisher] [DOI] [Google Scholar]
- Deng S, Liu T. A survey of physical activity among urban women in China. *Front. Med. China.* 2009; 3(4):463-9. [View at publisher] [DOI] [Google Scholar]
- Mirzaee Vishkae K, Rahmaninia F, Elmieh A. The relationship between nutritional knowledge, body composition and physical activity level in middle-aged, obese and underweight females. 2013; 5(10):33-43. [View at publisher] [Google Scholar]
- Hajian-Tilaki K, Heidari B. Prevalence of obesity, central obesity and the associated factors in urban population aged 20–70 years, in the north of Iran: a population-based study and regression approach. *Obese Rev.* 2007; 8(1):3-10. [View at publisher] [DOI] [Google Scholar]
- Esteghamati A, Meysamie A, Khalilzadeh O, Rashidi A, Haghazali M, Asgari F, et al. Third national Surveillance of Risk Factors of Non-Communicable Diseases (SuRFNCD-2007) in Iran: methods and results on prevalence of diabetes, hypertension, obesity, central obesity, and dyslipidemia. *BMC Public Health.* 2009; 9(1):1-10. [View at publisher] [DOI] [Google Scholar]
- Goode AD, Reeves MM, Eakin EG. Telephone-delivered interventions for physical activity and dietary behavior change: an updated systematic review. *Am j prev med.* 2012; 42(1):81-8. [View at publisher] [DOI] [Google Scholar]
- Lerner-Geva L, Boyko V, Blumstein T. The impact of education, cultural background, and lifestyle on symptoms of the menopausal transition: the Women's Health at Midlife Study. *J women's health.* 2009; 19(5):975-85. [View at publisher] [DOI] [Google Scholar]

17. Ustunsoz A, Guvenc G, Akyuz A, Oflaz F. Comparison of maternal–and paternal–fetal attachment in Turkish couples. *Midwifery*. 2010; 26(2):1-9. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
18. Ramelet AS, Fonjallaz B, Rapin J, Gueniat C, Hofer M. Impact of a telenursing service on satisfaction and health outcomes of children with inflammatory rheumatic diseases and their families: a crossover randomized trial study protocol. *BMC Pediatr*. 2014; 14(1):151. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
19. Hakala S, Rintala A, Immonen J, Karvanen J, Heinonen A, Sjogren T. Effectiveness Of Technology-Based Distance Interventions Promoting Physical Activity: Systematic Review, Meta-Analysis And Meta-regression. *J Rehabil Med*. 2017; 49(2):97-105. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
20. Zheng MC, Zhang JE, Qin HY, Fang Y, Wu X. Telephone follow-up for patients returning home with colostomies: views and experiences of patients and enterostomal nurses. *Eur J Oncol Nurs*. 2013; 17(2):184-9. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
21. Wegner SE, Humble CG, Feaganes J, Stiles AD. Estimated savings from paid telephone consultations between subspecialists and primary care physicians. *Pediatrics*. 2008; 122(6):1136-40. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
22. Inglis SC, Conway A, Cleland JG, Clark RA. Is age a factor in the success or failure of remote monitoring in heart failure? Telemonitoring and structured telephone support in elderly heart failure patients. *Eur J Cardiovasc Nurs*. 2015; 14(3):248-55. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
23. Xu X, Mishra GD, Dobson AJ, Jones M. Progression of diabetes, heart disease, and stroke multimorbidity in middle-aged women: A 20-year cohort study. *Plos Medicine*. 2018; 15(3):1002516. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
24. Heidari F, Mohammad Khan Kermanshahi S, Vanaki Z. The effect of a supportive health promotion program on the lifestyle of premenopause teachers. *FEYZ*. 2013; 17(1):14-24. [Persian]. [[View at publisher](#)] [[Google Scholar](#)]
25. Walker S, Sechrist K, Pender N. The health-promoting lifestyle profile: development and psychometric characteristics. *Nursing Res*. 1987;36:76-81. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
26. Korn L, Ben-Ami N, Azmon M, Einstein O, Lotan M. Evaluating the Effectiveness of a Health Promotion Intervention Program Among Physiotherapy Undergraduate Students. *Medical Science Monitor: International Medical Journal of Experimental And Clinical Research*. 2017; 23:3518-27. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
27. Macdowall W, Bonnell C, Davies M. Health promotion practice: McGraw-Hill Education (UK); 2006. books.google.com [[View at publisher](#)]
28. Khakbazan Z, Tehrani S, Payghambardoost R, Kazemnejad A. Effect of Telephone Counseling during Post-Partum Period on Women's Quality of Life. *Hayat*. 2009; 15(4):5-12. [Persian]. [[View at publisher](#)] [[Google Scholar](#)]
29. Salgaonkar V, Singh A, Singh V, Guntur S. A retrospective analysis of the impact of telephonic counseling on dietary and lifestyle modifications in Indian patients with type 2 diabetes mellitus. *Int J Diabetes Dev Ctries*. 2018; 38(4):1-9. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
30. Puhkala J, Kukkonen-Harjula K, Aittasalo M, Mansikkamäki K, Partinen M, Hublin C, et al. Lifestyle counseling in overweight truck and bus drivers-Effects on dietary patterns and physical activity. *Prev Med Rep*. 2016; 4:435-40. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
31. Eakin EG, Reeves MM, Lawler SP, Oldenburg B, Del Mar C, Wilkie K, et al. The Logan Healthy Living Program: a cluster randomized trial of a telephone-delivered physical activity and dietary behavior intervention for primary care patients with type 2 diabetes or hypertension from a socially disadvantaged community—rationale, design and recruitment. *Contemp Clin Trials*. 2008; 29(3):439-54. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
32. Newman VA, Flatt SW, Pierce JP. Telephone counseling promotes dietary change in healthy adults: results of a pilot trial. *J Am Diet Assoc*. 2008; 108(8):1350-4. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
33. Eakin EG, Lawler SP, Vandelanotte C, Owen N. Telephone interventions for physical activity and dietary behavior change: a systematic review. *Am J Prev Med*. 2007; 32(5):419-34. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]
34. Graves N, Barnett AG, Halton KA, Veerman JL, Winkler E, Owen N, et al. Cost-effectiveness of a telephone-delivered intervention for physical activity and diet. *Plos One*. 2009; 4(9):e7135. [[View at publisher](#)] [[DOI](#)] [[Google Scholar](#)]

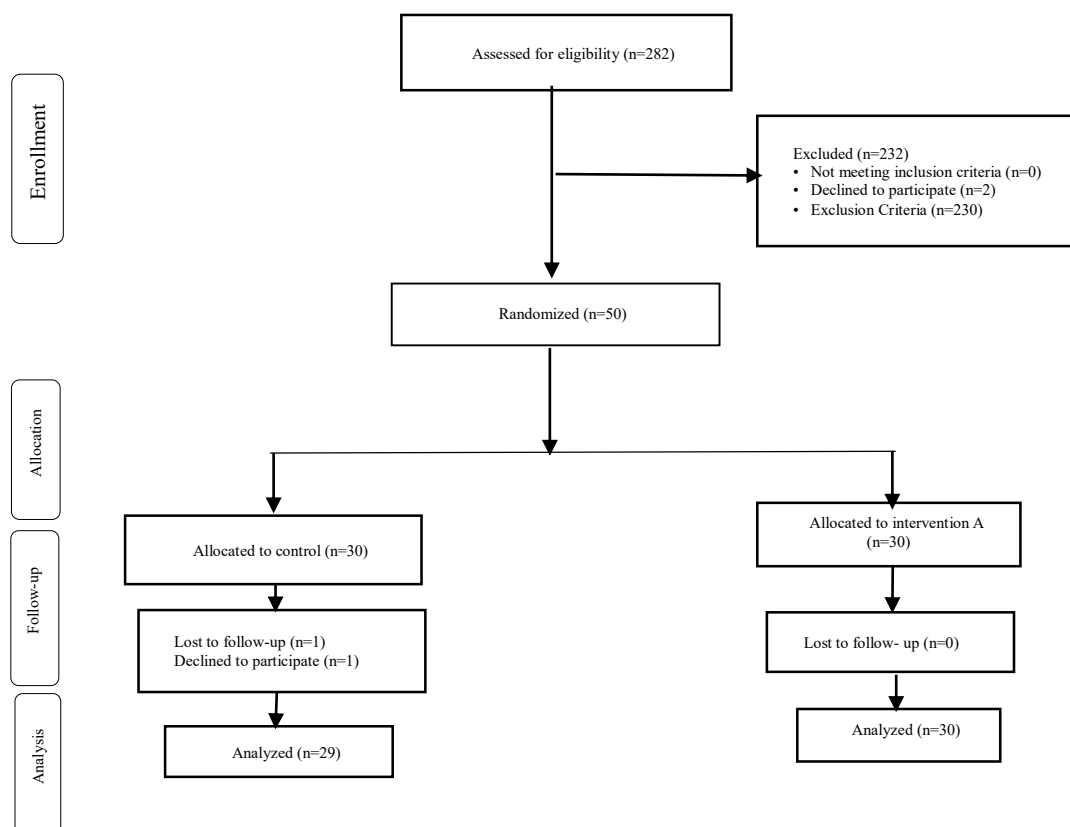


Figure 1. Diagram of representation of the study

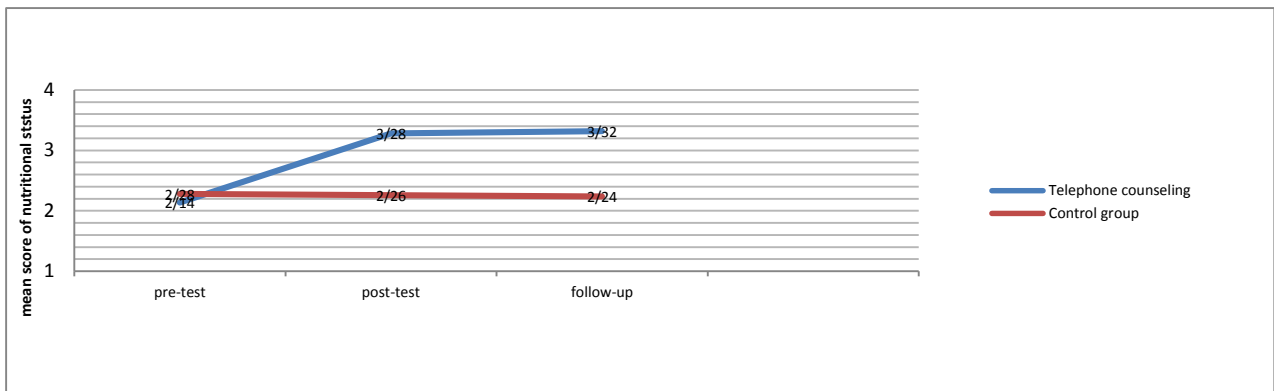


Figure 2: The mean difference of nutritional status scores before intervention, immediately and 1 months after the intervention in the two groups

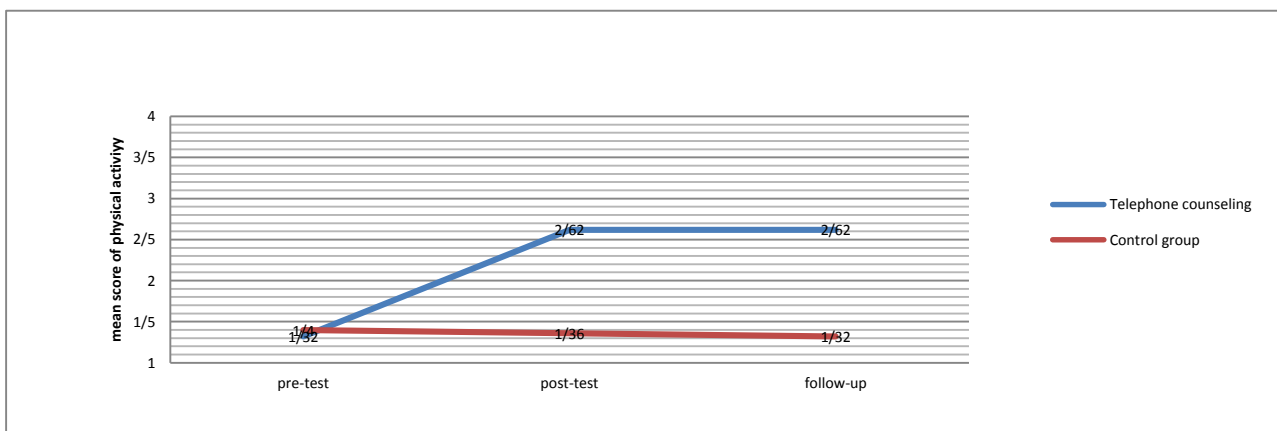


Figure 3: The mean difference of PA scores before intervention, immediately and 1 months after the intervention in the two groups

How to Cite:

Behnaz Enjezab, Behnaz Rahbarnia, Mahshid Bokaie, Ali Dehghani. Effect of telephone counseling on the nutritional status and physical activity in Iranian middle-aged women. *Journal of Research Development in Nursing & Midwifery*, 2021; 18 (1): 30-34