Improving Physical Activity Level on Elderly People by using Transtheoretical Model Approach

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Abstract

It is importan to promote physical activity for elderly people, but to improve level of physical activity of elderly people is a challange for health workers. The purpose of this quasi- experimental study was to determine the effect of exercise consultation program by using Transtheoretical Model (TTM) approach on physical activity level in elderly people at Darussalam's Community Health Center in 2017. The two comparison groups for this study were purposively designed for pre-test/post-test procedures; sixty elderly people at Darussalam's Community Health Center with randomly allocated into the experimental (30 people) and the control (30 people) groups. While the experimental group received the exercise consultation for 6 weeks, the control group received routine care. Physical Activity Scale for Elderly (PASE) was use to assess the the physical acctivity of elderly. Comparative assessments on differences in level of physical activity both within group using Wilcoxson macthed-pairs and between group using Mann Withney U Test. The results of this study fond that after receiving exercise consultation program, level of physical activity in elderly people significantly increased in the experimental group ($p < .05$), but there was no significant difference in the control group. Between groups, level of physical activity significantly increased after receiving the exercise consultation while no change was found among those who did not ($p < .05$). The exercise consultation program by using TTM approach could increase level of physical activity of elderly people. Implication: Exercise counsultation by TTM is a simple intervention could promote the physical activity of elderly people. Suggestion: Health workercan use this interventio to improve physical exercise of elderly people.

Keywords: transtheoretical model; physical activity; elderly

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Introduction

A lack of physical activity is common in elderly people. Physical activity is one of essential diabetes management strategies for type 2 diabetes mellitus (Colberg et al.,2010; Sigal et al., 2006; Marotto et al,2007; Allen at al., 2008), help prevent osteoporosis (Kohrt et al., 2004; Murphy, 2009), stroke (Wedel-Vost *et al*., 2004) and coronary heart disease (Oguma and Shinoda, 2004). The physical activity also can increase muscle strength and cardiovalcular function (American College of Sport Medicine Position Stand, 1998; Sigal et al., 2006), increasing cognitive fuction (Singh-Manaoux *et al.*,2005). Therefore increasing pysical activity in elderly people can reduce the risk of the cronic disease like diabetes mellitus and cardiovascular disease and also increase their quality of life, however it is very difficult to encorrage elderly people to be active participated to ferform physical activity in everyday (Colbert et al., 2011). The physical exercise program based on the Transtheoretical Model (TTM) has been used in western countries including exercise consultation. Rather standard exercise information, the exercise consultation intervention based on TTM both in the short- and long-term has effectively promoted the exercise behavior in people with type 2 diabetes mellitus (Kirk et al., 2007; Plotnikoff et al., 2011; Grave et al., 2011; Jackson et al., 2007). The exercise consultation has been developed on the basis of physical activity counseling guided by the TTM and cognitive behavioural approach (Kirk et al., 2010; Laughlan and Mutrie, 1995). However, it has never been used to elderly people in Indonesia especially Darussalam Health Public Helath center.

Using the exercise consultation for physical activity with elderly people based on TTM approach is first study in Darussalam Medan. The majority of elderly people in Medan (75%), North Sumatera, Indonesia did not adequate in physical activity (Sinaga et al., 2011). Regard to increase of the number of eldely people Indonesia (KKBKR , 2012; Muzmil et al., 2014) especially in Medan activity (Sinaga et al., 2011), North Sumatera province, the researchers are interested to improving the physical activity through exercise consultation uguided by TTM. The aimed of this study was to examine the effect of exercise consultation program on level physical activity in elderly people at the Darussalam Community Health Center in Medan, Indonesia.

Material and Method

quasi-experimental study, pre-test/post-test comparison group design was used in this study with the purpose to determine the effect of exercise consultation program on level physical activity in elderly people. A total of 66 elderly were purposively recruited from Darussalam Public Health Center. Participants who were met the criteria were elderly people aged between 60 to 79 years, were in the stages of preparation or action (e.g., they did not meeting current physical activity guidelines, but intended to become more active). Eldrly

people with disability to conduct phsical activity with severe cardiovascular problems and other serious complications of disease were excluded. Participants were randomly assigned into two groups of the experimental group and the control group consisting of 33 eldrly people each. Five elderly were withdrawal due to personal reasons from the study, two of the experimental group and three of the control group. Only 61 participants remained in the study, 31 of the experimental group completed the 12 weeks exercise consultation by TTM adding to usual care and 30 participants received usual care.

Physical activity Scale for elderly (PASE) Indonesian version was used to assesed the physical activity of eldery people modified by Hidayat (2017). The PASE was modified a short 8 items questionnaire which assesses physical activity from past week (7 days). The questionnaires includes question not only on occupational, household, and leisure times activities but also living situation, sleep and restricted activity days. The frequency of activities are classified as never, seldom (1-2 day/week), often (3-4 days/week), and mostly (5-7 days/week) and duration minimum 30 minutes. The final PASE activity scores is determined by multiplying the mount of the day spend in each activity (days/week).

The exercise consultation program involving one-by-one discussion guideline (Laughlan and Mutrie, 1995; Prochaska and Velicer, 1997) has been adopted for use in this study with certain modifications to meet the goals of motivating and enhancing confidence to change.

The data was analyzed by using SPSS program version.22. The differences of physical activity both pre- and post-intervention within the same group were examined Wilcoxson macthed-pairs. The differences between the two groups were examined by using the Mann Withney U Test.

Ethical Consideration

Before collecting data, Sari Mutiara Indonesia University and Darussalam Public Health Center have approved the study and written informed consent was obtained from all participants.

Results

The results of this study found that mean age of the participants were 64.4 years (SD= 5.2) for the experimental group and 64.6 years (SD= 4.4) for the control groups. Majority of the participants in both groups were of female gender. Before receiving the exercise consultation based on TTM approach, the majority of the participants in the experimental and control group were in preparation stage of TTM or seldom frequancy level of physical activity (67.7% and 60%), respectively (Table 1).

Table 1. The level of physical activity elderly people in the experimental and control group pre-intervention (N= 61)

	Control Group (n= 30)	Experimental Group (n=31)
Age (M,SD) year	64.6 (4.4)	64.4 (5.2)
Gender		
Male (n,%)	11 (36.6)	13 (41.9)
Female (n,%)	19 (63.3)	18 (58.1)
Level of Phyisical Activity	8 (26.6)	9 (29.0)
Never (0 day/week)	20 (66.6)	19 (63.3)
Seldom (1-2 days/week)	2 (6.7)	3 (9.7)
Often (3-4 days/week)	-	-
Mostly (4-5 days/week)	-	-

Table 2 Comparison of the level of physical activity in elderly people between the two groups post-intervention (N=61).

Level of Physical Activity Elderly People	Control Group n (%)	Experimental Group n (%)	*p-value*
Never (0 day/week)	10 (33.4)	-	
Seldom (1-2 days/week)	19 (63.6)	2 (3.3)	.000
Often (3-4 days/week)	1(3.3)	29 (96.7)	
Mostly (4-5 days/week)	-	-	

Table 2 has shown that level of physical activty of elderly people in the experimental group has progressed to often (96.7%) after attending the exercise consultation based on TTM approach. While only 1out of 30 participants or a mere 3. 3% from the control group made it to often to ferforming physical activity. Further analysis using Mann Withney U Test revealed a significant difference of success rate of physical activity level between the experimental and control groups (p = .000, $p < .05$).

Discussion

The exercise consultation based on TTM aproach might motivate subjects to become more physically active and awareness of the benefits of physical activity, thereby lowering mental barriers to physical activity. Limited motivation and physical activity knowledge could be barriers to taking up regular activity among elderly people (Korkiakangas et al, 2009). Therefore, the exercise consultation should aim to support and motivate elderly people to do physical activity, as well as helping elderly to recognize their unhealthy behaviors. Enhancing elderly's motivation and educating elderly's family about the benefit of physical activity are the most successful strategies for them to engage the physical activity (Kirk et al., 2010). High

levels of physical activity have correlation with elderly people progressed their stage of change of TTM (Kirk et al., 2010), and it would be good if they could maintain their exercise behavior changes (Kirk et al., 2010; Plotnikoff et al., 2011). It is clear that exercise consultation program based on TTM approach increases the participant's motivations to doing physical activity regularly. Self- confident is an important factor of progressing individuals from the lower stages (seldom) to upper stages (mostly) through behavioral changes (Grave et al., 2011; Kirk et al., 2003; Nigg end Riebe 2002) like the instance of individuals moving from the contemplation or preparation (seldom) stages to the action (often) stage of TTM. Individuals in the contemplation or preparation stages may struggle to change due to lack of exercise knowledge (Plotnikoff et al., 2011) and lack of self-confidence in his or her ability to change. Individuals are able to move to the next stage of change whenever being comfortable with the selected physical activity plan which is practical to follow. Therefore, for individuals in contemplation or preparation stages their self-efficacy need to be enhanced. Iindividual's with higher self-efficacies had shown more confidences in maintaining their physical activity (Marcus et al., 1992; Plotnikoff et al., 2011).

Conclusion

Exercise consultation based on TTM program is a simple approach to counseling, tailored current attitude, confidence, and motivation of elderly people, to positively promote physical activity. This program is a feasible to encourage sedentary people like elderly people to perform physical activity. Health care providers consider using this program for life style modification to be better prevent chronic disease for elderly people.

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References

1. Colberg SR, Sigal RJ, Fernhal B, Regesteiner JG, Blismer BJ, Rubin RR, et al. Exercise and type 2 diabetes: the American College of Sports Medicine and the American Diabetes Association: joint position statement. Diabetes Care.2010; 12: 147-167.
2. Colbert,L.H.,Matthews,C.E.,Havighurst,T.C.,Kyungmann,K.,and Scoeller,D.A.(2011). Comparative validity of phsical activity measures in older adults.Medicine and science in sport and exercise, 43, 867-876

3. DiPietro,L. (2001). Physical Activity in aging; Changes in patterns and their relationship to helath and fuction correlates.The Journal of Gerontoogy Series A : Biological Sciences and Medical Sciences,56,13-22
4. Hidayat, A., Tamara,H., and Andri,I. (2007). Corelation between physical activities and elderly qua;ity of life at Posyandu in Selokerto,Sempor,Kebumen. Skripsi. STIKes Gembong.
5. Hunter,G.R., McCarthy,J.P.,and Barnman M.M (2004). Effects of resistance training on older adults. Sport Medicine,34,329-348
6. Kohrt, w.M., Bloomfield,S.A., Little,K.D., NelsonM.E., Yingling,V.R., and American College of Sport Medicine.(2004). : Medicine and Science in Sports and Exercise, 36,1985-1996.
7. Murphy,S.L (2009). Review of physical activity measurement using accelerometers in older adults : Considerations for research design and conduct : Preventive Medicine,28.108-114
8. Ogunma,Y.,Shinoda-Tagawa,T.(2004). Physical activity decrease cardiovascular disease risk wpmen: Review and meta-analysis. American Journal of Preventative Medicine, 26,407-418.
9. Sigal R.J, Kenny GP, Wasserman DH, Sceppa CC, White RD. Physical activity/ exercise and type 2diabetes: a consensus statement from the American Diabetes Association. Diabetes Care 2006;6:1433-8.
10. Morrato EH, Hill JO,Wyatt HR,Ghushchyan V,Sullivan PW. Physical activity in U.S adults with diabetes and risk for developing diabetes.**Diabetes** Care. 2007;2: 203-209.
11. Sinaga M, Hiswani, Jemadi. Karakteristik penderita diabetes mellitus dengan komplikasi yang dirawat inap di rumah sakit Vita Insani. University of North Sumatera, Indonesia. 2011.
12. Jackson R, Asimakopoulou K, Scammell A. Assessment of the transtheoretical model as used by dietitians in promoting physical activity in people with type 2 diabetes. Journal of Human Nutrition and Dietetics.2007;1: 27-36.
13. Krik A, Mutrie N, MacIntyre P, Fisher M. Increasing physical activity in people with type 2 diabetes. Diabetes Care. 2003; 4:1186-1192.
14. Plotnikoff RC, Pickering MA, Glenn N, Doze SL, Matthews ML, McLeod LJ, et al. The effects of a supplemental, theory-based physical activity counseling intervention for adults with type 2 diabetes.J Phys Act Health. 2011; 7:944-54.
15. Krik AF, Barnett J,Mutrie N. Physical activity consultation for people with type 2 diabetes evidence and guideline.Diabetes Medicine. 2007; 24: 809-816.

16. Grave RD, Calugi S, Centis E, ElGhok M, Marchesini G. Review article: cognitive-behavioral strategies to increase the adherence to exercise in management of obesity. Journal of Obesity. 2011; 1.
17. Marcus BH, Selby VC, Niaura RS, Rossi JS. Self-efficacy and the stage of exercise behavior change.Reseach Quarterly for Exercise and Sport. 1992; 63:60-66.
18. Loughlan C, Mutrie N. Conducting an exercise consultation: guidelines for health professionals. J Ins Health Edu.1995;33:78-82.
19. Prochaska JO,Velicer WF.The transtheoretical model of health behavior change. American Journal of Health Promotion.1997; 12: 38-48.
20. Kemetrian Koordinator Bidang Kesejahteraan Rakyat (KKBKR). (2012), Lansia masakini dan mendatang. Situs web: http://oldkesra.menkokesra.go.id
21. Korkiakangas EE, Alahuhta MA, Laitinen JH. Barrier to exercise among adults high risk or diagnosed type 2 diabetes : a systematic review. Journal Health Promotion International .2009; 4: 416-427.
22. Kirk AF, MacMillian, Webster N. Application of transtheoretical model to physical activity in older adult with type 2 diabetes and/or cardiovascular disease. Journal Psychology of Sport and Exercise. 2010;4:320-324.
23. Nigg CR, Riebe D. The Transtheoretical model: research review of exercise behavior and older adults. (pp.147-180). In P. Burbank and D Riebe (Eds.). Promoting exercise and behavior change in older adults: interventions with the Transtheoretical Model:Springer Publishing Company 2002.
24. Allen NA, Fain JA, Braun B, Chipkin SR. Continuos glucose monitoring counseling improves physical activity behaviors of individuals with type 2 diabetes: a randomized clinical trial. Diabetes Res Clin Pract.2008; 3: 371-379.
25. Plotnikoff RC, Trinh L, Courneya KS, Karunamuni MN, Sigal RJ. Predictors of physical activity in adults with type 2 diabetes. American Journal of Health Behavior. 2011; 35(3):359-370.
26. Washburn,R.A., McAuley,E.,Katula,J.,Mihalko,S.L., and Boileau,R.A. (1999). The physical activity scale for elserly (PASE): Evidence for validity. Journal of Clinical Epidemiology,52,643-651.