Title:

Keywords: Health promotion, Older adults, Community, Intervention, Quality of life

Abstract

**Introduction**

As global population continues to age rapidly, it seems that the parallel growth of age-related diseases creates a challenge for the health system and policymakers as well as for older adults and their caregivers (Chang et al., 2019). The importance of health promotion interventions therefor arises, as a mean for withholding age-related functional deterioration and maintaining quality of life (QoL) in the aging population (Berger et al., 2018; Peel, McClure, & Barlett, 2005).

QoL is a diversely defined factor, that consists of subjective components as well as objective measures (Karimi & Braizer, 2016). According to the world health organization QoL is defined as “an individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (Kuyken, 1995). This broad definition implies that QoL cannot be defined by a single measure, and includes various aspects, such as physical, psychological, social and environmental (Skevington, Lotfy, & O'Connell, 2004). The physical health domain regards to activities of daily living, the dependence on medical aids, physical abilities and symptoms, such as mobility, sleep, pain and fatigue. The psychological domain measures perceptions of body and self, feelings, spirituality and cognitive components such as learning and memory. Social relationships domain consists of personal relationships, social support and sexual activity. The environmental domain spans from financial resources, perceptions of freedom, personal safety, health care, home and outdoor environment, participation and opportunities for recreation activities (WHO, 1996).

Depression was found to be significantly associated with poorer QoL in older adults (Sivertsen et al., 2015). It is associated with increased morbidity and mortality and is a public health problem especially in older adults (Yaka, Keskinoglu, Ucku, Yener, Tunca., 2014). This raises the importance of developing and researching interventions that aim to reduce depression and elevate QoL in the older population.

There is evidence that supports the correlation between functional levels, QoL, well-being and lower rates of depression and older adults' activity participation (Johansson & Bjorklund, 2016; Musick & Wilson, 2003; Park & Park, 2020; Smallfield & Molitor, 2018). In a financial perspective, it was found that besides the health outcome benefits, occupation-based interventions that aim to promote health and maintain participation in the older population are cost effective and contribute to reducing healthcare-related financial burden (Hay et al., 2002; Zingmark et al., 2016).

Lifestyle Redesign (LR) is an Occupational-based intervention that strives to promote health, maximize independence and enhance function in the well older adult population, was developed in the United-States and has been studied for many years (Clark et al., 2012). In a randomized control trial, they found that the LR group showed improvement in health perception, function and QoL as appose to the control groups (social activity and nontreatment) (Clark et al., 1997). Another study with a larger population (Clark et al., 2012) proved effects compared to a nontreatment control group. Previous studies also showed that the LR has been adapted to different cultural areas (Johansson & Bjorklund, 2016; Schepens Niemiec et al., 2019) and various health conditions (Ng, Chan, Chan & Chow, 2013; Simon & Collins, 2017).

As in the rest of the world, the population of the older adults in Israel is growing, with a parallel significant percent of independently functioning older adults (Shnoor & Beer, 2019). Health enhancement has thus become of greater awareness, in terms of research and policy tendencies (Shnoor, 2015). A pilot study has been held in Israel, in order to assess the feasibility and potential effectiveness of the Israeli Lifestyle Redesign (ILR) intervention (Maeir et al., 2020). Based on the promising results of the pilot study which demonstrated potential for improving QoL and depressive symptoms in independent community-dwelling older adults, the aim of this study was to explore the effect of the Israeli Lifestyle Program (ILP) within a large‐scale evaluation study. The study hypothesis is that QoL and depression measures will improve in the study group post intervention as appose to the control group.

**Method**

**Participants**

Participants in this study were older adults:79 in the intervention group and 20 in the control group. They were mostly women, 61 to 83 years old, with a mean age of 69.01 years (*SD* = 5.74). Older adults in the intervention group participated in six small groups, including 9 to 18 participants each. Three small groups took place in rural areas (N = 39, 49.4%), and three other groups were in urban areas (*N* = 40, 50.6%). No demographic differences were found between the rural and urban participants except for in economic status, which was higher for the rural participants (*N* = 28, 73.7% above average, vs. *N* = 12 38.7% above average, *Z* = 2.93, *p* = .003).

The inclusion criteria were independent older adults (according to self-report), 60+ years living in the community. Participants were excluded if they scored lower than 19 on the Montreal Cognitive Assessment (MoCA).

**Instruments**

A socio- demographic questionnaire

**Cognitive screening**

Montreal Cognitive assessment (MOCA) (Nasreddine et al., 2005). A cognitive status screening tool with a total score of up to a maximum of 30 points. The test was found to identify participants with Mild Cognitive Impairment with high sensitivity (83%-90%) (Nasreddine et al., 2005).

**Quality of Life**

The QoL questionnaire (WHOQoL-BREF) (Whoqol Group, 1998), Is a self- report questionnaire that consists of 26 items represent four domains of QoL: physical health, psychological health, social relationships and environment (Skevington & McCrate, 2012). Each item is scored on a 5-point scale, from 1-5. The scores are transformed on a scale of 0 to 100, better QoL indicated by higher scores. The test was found to have good to excellent reliability and validity scores (Skevington, Lotfy, & O'Connell, 2004). Acceptable to good internal consistencies were found in the current study, over time: physical health- α = .77, psychological health- α = .64, social relationships- α = .73, and environment- α = .73.

**Depression**

The Personal Health Questionnaire (PHQ-9) (Kroenke, Spitzer, & Williams, 2001) is a self-report 9-item questionnaire, that is used for screening, diagnosing, monitoring, and measuring the severity of depressives symptoms according to the DSM -IV. Each symptom (DSM-IV) is rated between 0 and 3 giving a total score between 0-27, higher scores indicating greater frequency of depressive symptoms. The PHQ-9 is used to identify persons at risk of depression in a variety of settings and ages (Smarr & Keefer, 2011). PHQ-9 has a sound internal consistency for use in clinical and nonclinical settings (Reynolds, 2010).

Acceptable internal consistency was found in the current study, over time: α = .65.

**Procedure**

The research was a non-randomized controlled pre-post intervention**,** and was authorized by the ethics committee of Ono Academic College, Israel

כשלב ראשון במחקר נעשתה פנייה יזומה למרכזים שבהם יש פעילויות שונות לבני הגיל השלישי (כמו חוג מחשבים, התעמלות, הרצאות) בכדי לעניין אותם בתוכנית. לאלו שהביעו עניין נערך מפגש עם האחראי שבה הוצגה התוכנית, לאחר מכן הוכן פלייר שיווקי שהופץ למשתתפי המרכז.

6 מרכזים נענו ובהם התגבשה קבוצה של אנשים שבחרו להשתתף בתוכנית כאשר רובם הסכימו להשתתף במחקר ( רק 6 משתתפים מכל הקבוצות לא הסכימו להשתתף במחקר, כלומר 79 מתוך 85 – 93% הסכמה). קבוצת המחקר השתתפה ב- 15 מפגשים קבוצתיים של שעה וחצי ו-2 מפגשים פרטניים בני חצי שעה באמצע ובסוף התוכנית שיועדו לקביעת והשגת מטרות אישיות. המפגש האחרון הוקדש לסיכום, הכולל משוב בנוגע לתוכנית ושביעות רצון. התוכנית הונחתה על ידי מרפאה בעיסוק בעלת ניסיון בהנחיית קבוצות ועבודה עם אוכלוסייה מבוגרת, ונערכה בכל הקבוצות על פי פרוטוקול קבוע.

Each session the participants received worksheets and handouts.

קבוצת הביקורת גויסה על ידי פרסום נוסף מאותם מרכזים,

The participants had similar background characteristics and met the inclusion criteria for the study

בקבוצה זו המשתתפים קיבלו

an educational booklet based on the content of the ILP. Each unit provided explanations relating the value of specific lifestyles and "how to" implement healthy lifestyle (Maeir et el., 2020). In addition, they received information of resources in the community for enhancing healthy lifestyle and participation in health promoting activities. This group received no further intervention. Willingness to participate was low. פירוט התאמת ותיקוף התוכנית לארץ מפורטים במחקר הפיילוט

(Maeir et el., 2020).

After obtaining signed informed consent, all participants completed before the intervention the socio-demographic questionnaire, the MoCA, the TUG test, the WHOQoL-BREF and the PHQ-9. The two last assessments were administered also post intervention (after 15 weeks). The evaluation was completed in one session of an hour, which took place in the community center or in the participant's home. In addition, at the concluding session, a focus group was held with the participants and a satisfaction questionnaire was administered.

**Data analysis**

Data were analyzed with SPSS ver. 26. Background characteristics of the participants were described with frequencies, percents, means and standard deviations, according to their distribution, and compared by group with Z tests for differences between two independent proportions and t-tets, respectively. Internal consistencies for the study variables were computed with Cronbach α, over time. Scores for PHQ-9 were positively skewed and were thus log transormed. Means, standard deviations and Pearson correlations for the study variables, at pre- and post- tests, were calculated. T-tests and Pearson correlations were calculated to assess the relationships between the study variables at pre-test and the demographic characteristics. Pre-test group differences were examined with a series of t-tests. Time and group differences were examined with two-way analyses of variance, and significant interactions were interpreted with Estimated Marginal Means.

**Results**

**Descriptive results**

Most participants were married or in a relationship (about 65%), and most others were divorced or widowed, with no significant group differences (table 1). Education level of most participants (about 72%) was beyond high school, and over a half (about 56%) reported above average economic status, with no significant group differences. About 60% of the participants in the intervention group and 85% of those in the control group were Israeli born, with a significant difference (*p* = .030). Most perceived their health to be good or very good (close to 70%) with no group difference. All scored at least 19 on the MOCA, with no group difference. Mean for the initial TUG test was 9.61 seconds (*SD* = 2.92) with no group difference, and most participants in both groups were classified in the normative range.

[Insert Table 1 about here]

Table 1: Background characteristics of the participants, by group (*N* = 99)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Intervention | Control |  |
| Gender (*N*,%) | Female | 63 (79.7) | 20 (100.0) | -- |
| Age (*M*, *SD*) | 61-83 | 68.96 (5.64) | 69.20 (6.26) | *t*(96) = 0.16(*p* = .869) |
| Marital status (*N*,%) | Single | 3 (3.8) | 3 (15.0) | *Z* = 0.56(*p* = .576)(Married, in a relationship vs. others) |
| Married, in a relationship | 52 (66.7) | 12 (60.0) |
| Divorced | 10 (12.8) | 3 (15.0) |
| Widow | 13 (16.7) | 2 (10.0) |
| Education level (*N*,%) | Up to high school and high school | 20 (29.0) | 5 (25.0) | *Z* = 0.35(*p* = .727) |
| Beyond high school | 49 (71.0) | 15 (75.0) |
| Economic status (*N*,%) | Average / below average | 29 (42.0) | 10 (50.0) | *Z* = 0.63(*p* = .527) |
| Above average | 40 (58.0) | 10 (50.0) |
| Country of birth (*N*,%) | Israel | 46 (59.0) | 17 (85.0) | *Z* = 2.17(*p* = .030) |
| Other | 32 (41.0) | 3 (15.0) |
| Perception of health (*N*,%) | Not good | 8 (11.6) | 1 (5.0) | *Z* = 0.71(*p* = .480)(Not good and moderate vs. good and very good) |
|  | Moderate | 15 (21.7) | 4 (20.0) |
|  | Good | 36 (52.2) | 8 (40.0) |
|  | Very good | 10 (14.5) | 7 (35.0) |
| MOCA (*M*, *SD*) | 19-30 | 25.30 (2.70) | 25.45 (3.17) | *t*(97) = 0.21(*p* = .835) |
| TUG (*M*, *SD*) | 5-21 | 9.48 (2.23) | 9.21 (2.76) | *t*(97) = -0.45(*p* = .651) |
| TUG normative *(N*,%) | Yes | 77 (97.5) | 17 (85.0) | -- |

No initial differences were found in the intervention group by area of living (urban vs. rural). That is, the older adults' participants in this study were functioning rather normatively, both cognitively and physically. Initial scores for QoL were moderate-high on average, ranging between 69 and 76 (of 100). Final score ranged between 74 and 79 (table 2). Accordingly, mean depression was rather low. Significant correlations were found between the study variables at pre-test. Positive correlations were found between most aspects of QoL, and higher QoL was generally related with lower levels of depression**.**

[Insert Tables 2 about here]

Table 2: Means, standard deviations and intercorrelations for the study variables, at pre- test (*N* = 99)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *M* (*SD*) | 2. | 3. | 4. | 5. |
| 1.Physical health (0-100) | 74.25 (16.54) | 0.26\*\* | -0.09 | 0.50\*\*\* | -0.46\*\*\* |
| 2.Psychological health (0-100) | 71.24 (11.40) |  | 0.24\* | 0.38\*\*\* | -0.43\*\*\* |
| 3.Social relationships (0-100) | 69.05 (21.52) |  |  | 0.26\*\* | -0.17 |
| 4.Environment (0-100) | 76.15 (12.40) |  |  |  | -0.30\*\* |
| 5.Depression (0-27) | 3.82 (3.42) |  |  |  |  |

\**p*<.05, \*\**p*<.01, \*\*\**p*<.001

The relationships between the study variables at pre-test and the demographic characteristics were mostly non-significant. They were non-significant for age, gender, marital status, and education level. Few significant differences were found by the participants’ economic status, with those reporting an above average economic status also reporting higher physical QoL (*p* <.001), and higher environmental QoL (*p* <.001), than those with average or below average economic status. Thus, economic status should have been controlled for. However, due to missing data on this variable (n = 10), the main analyses did not control for it, and its effect was examined separately.

Pre-test group differences in the study variables were examined with a series of t-tests, revealing no significant differences, except for social relationships, which were initially higher in the control group (table 3). Differences in the study variables by time and group were examined with two-way analyses of variance and showed significant differences. QoL in terms of physical health (WHOQoL- BREF) has increased beyond group and controlling for economic status had no effect on the result. QoL in terms of psychological health (WHOQoL- BREF) has increased in the intervention group (*F*(1,94) = 16.77, *p* < .001, η2 = .154) and did not change in the control group (*F*(1,94) = 0.02, *p* = .887, η2 = .001). Likewise, QoL in terms of social relationships (WHOQoL -BREF) has increased in the intervention group (*F*(1,94) = 13.69, *p* < .001, η2 = .131) and did not change in the control group (*F*(1,94) = 0.14, *p* = .712, η2 = .002). However, controlling for the initial difference left the post-intervention difference non-significant (*F*(1,94) = 0.08, *p* = .783, η2 = .001), and thus the significant interaction should be interpreted with caution. Further, QoL in terms of the environment (WHOQoL -BREF) has increased in the intervention group (*F*(1,94) = 10.39, *p* = .002, η2 = .105) and did not change in the control group (*F*(1,94) = 0.53, *p* = .470, η2 = .006). Controlling for economic status had no effect on the result.

Interesting results were found for depression. It showed no change in the intervention group (*F*(1,94) = 0.65, *p* = .424, η2 = .007) and increased in the control group (*F*(1,94) = 7.03, *p* = .009, η2 = .070) (table 3).

An examination of the change between urban and rural participants, within the intervention group, revealed no significant differences.

[Insert Tables 3 about here]

Table 3: Means, standard deviations and *F* values for the study variables, by group and time (*N* = 99)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Intervention  | Control | Pre-test group difference | Pre-test post-test differences |
|  | Pre-test*M* (*SD*) | Post-test*M* (*SD*) | Pre-test*M* (*SD*) | Post-test*M* (*SD*) | *t*(96)(*p*) | *F*time (1, 94)(*p*)(η2) | *F*group (1, 94)(*p*)(η2) | *F*time X group (1, 94)(*p*)(η2) |
| Physical health (0-100) | 74.97 (17.06) | 77.97 (14.70) | 70.45 (14.90) | 75.10 (15.40) | -1.12(.264) | **5.58****(.020)****(.056)** | 1.01(.317)(.011) | 0.23(.629)(.002) |
| Psychological health (0-100) | 71.03 (11.48) | 75.61 (12.27) | 72.05 (11.39) | 71.74 (14.23) | 0.34(.735) | 2.94(.090)(.031) | 0.25(.617)(.003) | **3.87****(.050)****(.040)** |
| Social relationships (0-100) | 65.57 (21.87) | 72.22 (18.79) | 82.63 (13.48) | 81.32 (12.74) | **3.18****(.002)** | 1.80(.183)(.019) | **8.40****(.005)****(.085)** | **4.01****(.048)****(.042)** |
| Environment (0-100) | 75.62 (10.84) | 79.63 (11.41) | 78.47 (17.94) | 76.59 (14.39) | 0.57(.575) | 0.55(.462)(.006) | 0.01(.975)(.001) | **4.19****(.044)****(.045)** |
| Depression (0-27) | 3.95 (3.58) | 3.23(2.58) | 3.35 (2.76) | 4.80(3.37) | -0.20(.839) | **4.07****(.047)****(.041)** | 1.02(.315)(.011) | **7.46****(.008)****(.074)** |
|  |  |  |  |  |  |  |  |

**Discussion**

This study focused on the influence of the ILP on the QoL and depression in a wide Israeli independent older adult sample,

וזאת במטרה להמשיך להוכיח את יעילותו כתוכנית מקדמת בריאות, גם בקרב זקנים בישראל.

"Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization (WHO), 1946),

כפי שניתן לראות יש משמעות גדולה למצב נפשי ורווחה אישית במדדים של בריאות.

ואכן במחקר הנוכחי נמצא שברוב המדדים של שאלון איכות החיים נמצאו הבדלים מובהקים בין הקבוצה לפני ואחרי ההתערבות לעומת קבוצת הביקורת.

 The ILR was adapted from the American version to suit the Israeli population and culture. In the modification process, protocols were developed in order to present the program contents to the participants within a group setting. Social isolation is recognized as one of the major public health concerns regarding healthy aging and has previously been associated with lower QoL in the older adult population (Hawton et al., 2011). Goll, Charlesworth and Stott (2015), have found that lack of supportive communities and lack of acceptable social opportunities were among the main barriers to social participation of older adults. In light of that, it is not surprising that previous studies have found positive effects of group interventions on QoL (Bar-Netzer & Bocos, 2018; Calandri, Graziano, Borghi, & Bonino, 2017; Markle‐Reid et al., 2018). Yalom (1995), has described several therapeutic factors that develop during group therapy, affecting the intervention outcome. One of the factors is group cohesiveness, when members develop a sense of belonging to the group. It is therefore reasonable to assume that the group dynamics during sessions have created an encouraging environment for social participation, and while building the sense of belonging among the participants – increased their QoL. The social aspects of the program (Which is part of model 3), can also shed light on the increase in social relationships and the psychological domain of QoL, since this domain measured cognitive components such as learning and memory, that have been found complexly associated with social networks and social isolation (DiNapoli, Wu, & Scogin, 2014; Litwin & Stoeckel, 2016).

As one of the Participant said at the end session: " In general, the program helped me to be even more optimistic than the person I am, and another great gift I received that I have a new friend, which I am in a just wonderful relationship with".

 The physical aspect was expressed in intervention modules that relate to mobility enhancement and preventing chronic inflammation, both have been previously found to be associated with QoL in the older adult population (La Grow et al., 2013; Nowakowski, 2014; Rantakokko et al., 2016). These associations can explain the increase in the physical domain of QoL in the intervention group. "I am more aware of the importance of exercise, so today I do walks every day". Interestingly, even in the control group there was a small increase in physical health, it is possible that the information from the booklet on the subject encouraged them to be more physically active.

 Environmental aspects were approached in the program with a home and community safety module. In their systematic review, Vappio et al. (2009), have found that only a few of the reviewed studies found a positive association between fall prevention interventions on quality of life. Nevertheless, Schoene et al. (2019), in a large systematic review that included 30 studies, have found that in most studies fear of falling was associated with QoL. Other studies have found associations between actual falling and poorer QoL in the older population (Stenhagen et al., 2014; Thiem et al., 2014). Enhancing safe behavior in the house and community may have increased participants' confidence, reduced fear of falling and even prevented actual falls, and by that increased their QoL. "The topics discussed raised awareness of possible dangers, for example the knowledge in the field of falls has contributed a lot to me".

 The interesting results regarding depression, showed no change in the intervention group and an increase in the control group post-test. Many of the participants in the study were in a retirement process during the study period and expressed difficulties on behalf of losing interaction with coworkers and work friends. Retirement is a significant occupational transition that has been studied over the past couple decades in the occupational science field and described as having a wide impact on occupational rhythm and balance (Jonsson, Borell, & Sadlo, 2000; Wiseman & Whiteford, 2009). Keil & Carr (2019), have discussed the association between retirement, depression and social support. They found that for retirees with average levels of social support, the retiring process was associated with a small but significant increase in depressive symptoms. The change in social relationships as result of the retirement process was also discussed by Segal-Karpas, Ayalon and Lachman (2018), who found that retirees were more likely to experience depressive symptoms if they felt lonely before retirement, and associated this to the sudden lack of distracting effect that was previously provided by work. This can explain the control group's increase in depression, as they did not benefit the social attributes of the intervention group environment. They had to face a dramatic loss of a previously central life role and occupation, while the intervention group participants attended group sessions that provided an alternative occupational routine as well as an encouraging social environment. As one of the particpen described " There were topics I was not aware of before the program and today I have more knowledge. For example, prepare for retirement both financially and occupationally".

**Limitations and recommendations**

The study design is of a non-randomized trial and control group was smaller significantly than the intervention group, and hence limits the generalizing extent of study conclusions. However, while health enhancement is a desirable outcome in healthy aging policy, the ILR was found to affect significant measures of older population's health and QoL. Future studies should continue to explore the program in Israel while widening the understanding of its impact on various geographical, language speaking, and sociocultural populations.

**conclusion**

the ILP is

The translated and culturally adapted Lifestyle Redesign is a promising occupational therapy intervention for community-dwelling older French-Canadians.

Health promotion programs have even greater significance today, following the recommendation of WHO [for a Decade of Healthy Ageing (2020-2030)](https://www.who.int/news-room/detail)  (World Health Organization, 2020),

"הסדנה הצליחה "לגעת" בכל אחד מהמשתתפים למדנו דברים חדשים. בנוסף הייתה התייחסות לכל אחד ברמה הפרטנית והכי חשוב הוא שרכשתי ארגז כלים שישמש אותי לשיפור בתחומים הרבים והחשובים בהם עסקנו.

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