ETHNIC DIFFERENCES IN LONELINESS, DEPRESSION, AND MALNUTRITION AMONG OLDER ADULTS DURING COVID-19 QUARANTINE

A.V. SCHORR[1,*], I. YEHUDA[1,2,*], S. TAMIR[1,3]

1. Shamir Research Institute, P.O.B 97 Katsrin, 1290000, Haifa University, Israel; 2. Tel-Hai College, Upper Galilee, 1220800 Israel; 3. Laboratory of Human Health and Nutrition Sciences, MIGAL-Galilee Research Institute, Kiryat-Shmona, Israel; *contributed equally to the study. Corresponding author: Dr. Adi Vitman- Schorr, Shamir Research Institute, Kazrin 1290000, Israel, Haifa University, Tel: +972-50-6301998, e-mail: adivitman@gmail.com

Abstract: *Background:* Depression in older adults may result from a variety of reasons such as loneliness feelings and malnutrition. *Objective:* To examine the direct and indirect effect of loneliness feelings on depressive symptoms, mediated by malnutrition, among older adults from different cultures during the Coronavirus disease 2019 (Covid-19) pandemic quarantine. *Method:* A convenience sample of 101 Arabs and 100 Jewish older adults aged 65 and over was interviewed. Using bootstrapping, we tested the strength and significance of the conditional indirect effect of malnutrition (mediator) on the relationship between loneliness feelings and depressive symptoms. *Results:* The relationship between loneliness feelings and depressive symptoms was mediated by malnutrition and Arab older adults reported a higher level than Jewish older adults of loneliness, depression, and malnutrition during the Covid-19 pandemic quarantine. *Conclusions and implications:* To reduce loneliness feelings, depressive symptoms, and malnutrition in times of crisis like the Covid-19 pandemic, it is essential to develop new communication methods for and with older adults in general, with particular attention paid to ethnic differences, that will be effective in reducing loneliness and in promoting nutrition intervention. Possible solutions include new social network technologies for reducing loneliness, with continued reliance on phone communication for combined intervention that includes psychological support accompanied by instructions for a healthy lifestyle and malnutrition prevention.

Key words: Loneliness feelings, depressive symptoms, malnutrition, Covid-19, older adults.

Introduction and Theoretical Background

Depression in Older Adults

The world population is rapidly aging: Between 2015 and 2050, the percentage of people in the world over the age of 60 will nearly double, from 12% to 22% (1). Depression among older adults is one of the most serious public health problems facing modern societies (2). The appearance of depression is associated with serious consequences, including disability, functional decline, diminished quality of life, increased mortality, increased service utilization, and high levels of suicide in adults (3). In older adults, depression is connected with a marked reduction in cognitive abilities which, in turn, is commonly accompanied by a decrease in social and physical activities (4). Alongside coronary heart disease, cancer, and cardiovascular diseases, depression is a major public health problem that has become a common chronic disease in older adults (5).

Depression symptoms greatly influence both physical and cognitive functioning of older adults. Longitudinal studies have reported that depressive symptoms are connected to functional decline, as determined by both self-reported and objective measures of physical performance (6). They also contribute to limitation of basic activities of daily living (ADL) in high functioning older adults initially free from disability (7). As depression deepens and more symptoms surface, the likelihood of becoming disabled increases. Moreover, depressive symptoms may accelerate the disablement process

in older adults already exhibiting early signs of disability (8), and individuals with chronic depressive symptoms have greater declines in functioning compared to those who remained non-depressed (9).

Late-life depression is also associated with an increased risk of decline in cognitive functioning. Older adults with depression are more likely to have concomitant cognitive deficits, especially executive cognitive functioning deficits, or are subsequently more likely to develop dementia (4). Older adults with depression often develop cognitive impairment following onset of depression. Thus, depression might be a risk factor or an early symptom of dementia (10).

One of the risk indicators for depression is lack of social support and social networks. Many of depressed older adults are also lonely, and a correlation has been found between depression and loneliness. Depression with feelings of loneliness leads to more pronounced motivational depletion and serious consequences, including social isolation, reduced self-care, decreased mobility, and poor diet (3).

Social Behavior and Loneliness in Older Adults

Research on loneliness conducted in different countries has demonstrated that it is a common, universal phenomenon, although its prevalence varies between societies and cultures (11). In the United States, more than 19% of older adults aged 65 and older reported loneliness feelings (12); in Australia, the comparable figure was 40% (13). In a study of loneliness in Israel (14), it was found that nearly half (47.1%) of the

participants reported loneliness feelings in the week prior to the interview. The loneliest group was that of age 75+; women reported higher levels of loneliness than men, as did Arabs compared with Jews.

Today, loneliness is also perceived as a biological structure, similar to hunger, thirst, or pain, which are internal mechanisms activating behavior that prevents harm to the person. Hunger makes us seek food; loneliness prompts us to seek social relationships (15). Correlations have been reported between the feeling of loneliness and several physical health problems: cardiovascular diseases, chronic diseases, cancer, stroke, high blood pressure, and mental illness (such as depression), low levels of emotional wellbeing, and a high level of suicidal thoughts (16). The problems caused by loneliness lead to decreased quality of life, increased mortality, poor recovery from illness, and high hospitalization rates among older adults (16).

Depression in older adults may result from a variety of reasons apart from loneliness feelings, including malnutrition. Some studies have reported a strong and independent association between nutritional deficit and depression, demonstrating that depression increased the risk of impaired nutritional status (17), whereas others have shown a modest association, or no association (18, 19). Significantly, over 10% of adults with depression residing in the United States also suffer from malnutrition (20). Malnutrition impacts quality of life by undermining individual autonomy to perform necessary, instrumental, and social activities of daily living (21).

Malnutrition is defined as a state in which a deficiency, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue/body form (body shape, size, and composition), function, and clinical outcome (21). It is more prevalent and increases among older adults (22, 23, 24). Although malnutrition's etiology is multifactorial, adverse physiological, psychological, and social causes of malnutrition in older adults are consistently reported in the literature (25). Aging is accompanied by physiologic changes that can negatively impact nutritional status: Sensory impairment may result in reduced appetite and poor oral health and dental problems can lead to difficulty chewing, inflammation, and a monotonous diet that is poor in quality. The progressive loss of vision and hearing may also limit mobility and affect the elderly's ability to shop for food and prepare meals (26, 27).

Along with physiologic changes, older adults may also experience profound psychosocial and social changes contributing to poor nutritional status. These include cognitive impairment, heavy use of medication, periods of lengthy hospitalization isolation, retirement from paid work, bereavement, increasing frailty, and loneliness and depression (27, 28). These factors influence the ability of older adults to meet dietary needs or to digest, absorb, utilize or excrete nutrients that are ingested. The outcome is reduced energy intake and lean body mass, resulting in a reduced metabolic rate and a proportional decline in total energy expenditure that may lead to malnutrition (29, 30, 31).

Apart from the possible direct connection between loneliness feelings and depressive symptoms, loneliness feelings can have widespread implications for the mental and social lives of older adults, and these implications can explain some of the effects of loneliness feelings on depressive symptoms. Specifically, one mediator might be at play - malnutrition.

The Current Study

The current study was conducted in Israel in 2020 during a Covid-19 pandemic quarantine, providing a unique opportunity to assess the effect of loneliness feelings on depressive symptoms, mediated by malnutrition, among older adults from different cultures during a particularly stressful period.

We posited three hypotheses:
1. Loneliness feelings due to the Covid-19 pandemic is associated with depressive symptoms.
2. Loneliness feelings due to the Covid-19 pandemic are indirectly associated with depressive symptoms through malnutrition; older adults feeling lonely will report higher levels of malnutrition, which will be associated with increased depressive symptoms.
3. Loneliness feelings, depressive symptoms, and malnutrition levels will differ between older adults from different cultures as a result of Covid-19 imposed quarantines.

Method

Study Design and Participants

The research employed a cross-sectional study of a convenience sample of 201 Jewish and Arab older adults, aged 65 and over, representing the two main ethnic groups living in Israel. Inclusion criteria were age 65 and over and the ability to speak and understand (but not necessarily to read) Hebrew or Arabic.

Procedure

The study was approved by the Research Ethics Committee of the college at which the research took place. Recruitment of participants was random and the final sample comprised 100 Jews and 101 Arabs. Researchers explained the study objectives and procedure to the participants, including their right to withdraw freely at any time. Strict confidentiality was maintained. Data collection was performed by professional interviewers through telephone interviews, adhering to Covid-19 quarantine restrictions, using appropriate translated, validated, and structured questionnaires. Data collection took place from April to May 2020.

THE JOURNAL OF NUTRITION, HEALTH & AGING

Table 1
Descriptive Statistics of the Study Variables (N= 201)

Background characteristics		Total sample	Ethnicity			
			Arabs N=101	Jews N=100	p value	Effect Size Cohen's d
Gender - N (%)	Men	96 (47.8)	50 (49.5)	46 (46.0)	0.62	-
	Women	105 (52.2)	51 (50.5)	54 (55.0)		
Age - Mean (S.D)		74.3 (6.3)	74.43 (6.9)	74.2 (5.6)	0.762	-
Education - N(%)		10.0 (4.0)	7.5 (3.1)	12.5 (3.2)	0.000	1.587
Marital status - N (%)	Without a partner	54 (26.9)	24 (23.8)	30 (30.6)	0.32	-
	With a partner	143 (71.1)	75 (74.3)	68 (69.4)		
	Missing value	4 (2.0)	2 (2.0)	2 (2.0)		
Independent Variable						
Mean (S.D) Range						
Loneliness feelings		2.21 (1.1) 1-5				
Mediators						
Mean (S.D) Range						
Malnutrition		6.82 (4.3) 0-18	9.43 (4.0)	4.18 (2.8)	0.000	1.520
Dependent variable						
Depressive symptoms						1.256
Mean (S.D) Range		4.77 (3.2) 0–14	6.48 (3.1)	3.05 (2.3)	0.000	

Measures

Independent variable

Loneliness. Loneliness was measured by a single direct question: «Do you sometimes feel lonely?» with four options: never, seldom, sometimes, often.

Dependent variable

Depressive symptoms. Depressive symptoms were measured by the Geriatrics Depression Scale (GDS) developed by Yesavage and Brink (32). The purpose of the questionnaire was to determine participants' depressive symptoms by using a simple and reliable tool that does not require the time and skills of a professional interviewer. The tool is composed of 15 items, in a yes (1) / no (2) response formats ($\alpha = .80$).

Mediator

Malnutrition. Malnutrition was measured by the Determine Nutrition Screening Initiative (NSI) developed jointly by the American Diabetes Association, the American Family Doctors Association, and the National Council of Old Age. The purpose of the questionnaire was to detect older adults at risk for malnutrition. The tool is composed of 10 items, in a yes (with changing score) / no (0) response format.

Covariates

The study controlled for socioeconomic variables. Background variables included gender, age, marital status, and years of education. Age and years of education were both defined as continuous measures. Gender was coded as dichotomous (0 = male, 1 = female). Marital status was coded as "with partner" = 1; or "without a partner" (single, widowed or divorced) = 0.

All instruments were translated into Hebrew and Arabic by bilingual translators. The complete questionnaire underwent a pilot test. The questionnaire took approximately 15 minutes to complete, the verbal instructions were comprehensible, and there was no need for further changes before administering the questionnaire.

Data Analyses

Descriptive statistics were employed to calculate the means and standard deviations of the continuous variables and the percentage and frequency of the categorical variables. In the second stage, bivariate analyses were performed to examine the association between depressive symptoms and the independent variable, mediator variable, and socio-economic variable using an independent t-test, one-way ANOVA, Pearson or Spearman correlation tests.

Mediation analyses were then computed in which the selected mediator (malnutrition) was entered to test the components of the mediation model (Model 4) using the bootstrapping method to assess the indirect effects of the mediation model (33, 34). Thus, the meditation model was examined by directly testing the significance of the indirect effect of the independent variable (IV; loneliness feelings) on

ETHNIC DIFFERENCES IN LONELINESS, DEPRESSION, AND MALNUTRITION DURING COVID-19 QUARANTINE

Table 2
Bivariate Tests between Demographic Characteristics, Malnutrition, and Loneliness, with the Dependent Variable – Depressive Symptoms (N = 201)

variables		Depressive symptoms		
Demographic characteristics		Mean (S.D)	Test	p value
Gender	Female	4.97 (3.2)	t=-0.912	0.38
	Male	4.55 (3.3)		
Age			r=0.15	0.04
Education			r=-0.35	0.000
Marital status	With partner	4.69 (3.0)		
	Without partner	4.78 (3.5)	t = -0.18	0.86
Ethnicity	Jews	3.05 (2.3)		
	Arabs	6.48 (3.1)	t=-8.8	0.000
Independent variable				
Loneliness feelings			r=0.38	0.000
Mediator				
Malnutrition			r =0.58	0.000

Test: referring to the bivariate analysis between independent variables and depressive symptoms (e.g., t=independent t-test and r=Pearson correlation coefficient)

the dependent variable (DV; depressive symptoms) through the mediator (MeV; malnutrition), while controlling for background variables that were identified earlier as significant in the bivariate analyses.

This method is based on regression analysis, calculating the direct effect (weight C', with a mediator), total effect (C, without mediator) and indirect effects (a × b weights) of an independent variable on a dependent variable. The total and specific indirect effects were calculated through bootstrapping set at 5,000 samples. Confidence intervals were calculated using this method by sorting the lowest to highest of these 5,000 samples of the original dataset, yielding a 95-percentile confidence interval (if the number 0 falls within the confidence intervals, the tested effect would be non-significant). All analyses were run using SPSS 25.0 with the PROCESS statistical program (33). All estimated effects reported by PROCESS are unstandardized regression coefficients.

Results

Of the participants, 105 were women and 96 were men, ranging in age from 65 to 95 (M = 74.3, SD = 6.3). Years of education ranged from 6 to 21 (M = 10.0, SD = 4.0) and 71.1% had a partner. The group had equal numbers of Arab and Jewish participants. There were significant differences based on ethnicity with regard to education, with Jewish participants reporting more years of education than Arab participants; the Cohen's effect size value was high. Arab participants reported a significantly higher level than Jewish participants of loneliness (independent variable), malnutrition (mediator), and depressive symptoms (dependent variable). For most variables,

the Cohen's effect size values were relatively high (Table 1).

Table 2 presents the bivariate tests between the study variables with depressive symptoms as the dependent variable. Results revealed that all demographic variables, except for gender and marital status, were significantly related to depressive symptoms. Advanced age was positively correlated with depressive symptoms. Lower educational level was correlated with higher reported depressive symptoms. An ethnic difference in depressive symptoms was also found with Arab participants reporting higher depressive symptoms than Jewish participants. Both the independent and mediator variables were significantly related to the dependent variable-depressive symptoms. High malnutrition and high loneliness were positively associated with depressive symptoms.

The Mediation Analyses

Using PROCESS model 4, we tested hypotheses two and three, whether malnutrition mediated the relationship between loneliness feelings and depressive symptoms controlling for covariates (Table 3 and Fig. 1). The results indicated a significant total direct effect (path c; without mediator) of loneliness feelings on depressive symptoms, a significant direct effect, and a significant indirect effect through malnutrition. The results also showed that loneliness feelings were associated with higher malnutrition scores and that malnutrition was positively associated with depressive symptoms. Finally, ethnicity was associated with depressive symptoms. However, no significant associations were found between depressive symptoms and the other covariates: gender, age, education, and marital status.

THE JOURNAL OF NUTRITION, HEALTH & AGING

Table 3
Summary of the Mediation Model Analyses Using 5,000 Bootstraps (N=201)

Covariates	Independent variable	Mediating variable	Dependent variable	Covariates →DV	IV →M	MV →DV	Direct effect IV → DV	Indirect effect		Total effect	Adj R2
	(IV)	(MeV)	(DV)		(path a)	(path b)	(path C')	(a x b)	95%CI	(C)	R2
Gender	Loneliness feelings	Malnutrition	Depressive symptoms	-0.16 (n.s)	0.81*	0.28***	1.02***	0.22	0.008 – 0.52	1.24***	0.43***
Age											
Marital status				0.03 (n.s)							
				-0.49 (n.s)							
Education				0.02 (n.s.)							
Ethnicity_D1				1.44 (0.003)							

Notes: Value labels of categorical variables: gender (1= male, 2= female), marital status (1= with partner, 2= without partner), ethnicity_D1 (1=Jewish, 2=Arab); n.s= not significant; *p < .05. **p < .01. ***p< .001

Figure 1
Mediator model depicting direct and indirect effects of loneliness feelings on depressive symptoms, controlling for background variables. Notes: Graphic A depicts the total effect of loneliness feelings on depressive symptoms. Graphic B depicts the direct effect of loneliness feelings on depressive symptoms after including mediator and controlling for all background variables. Values represent unstandardized regression coefficients
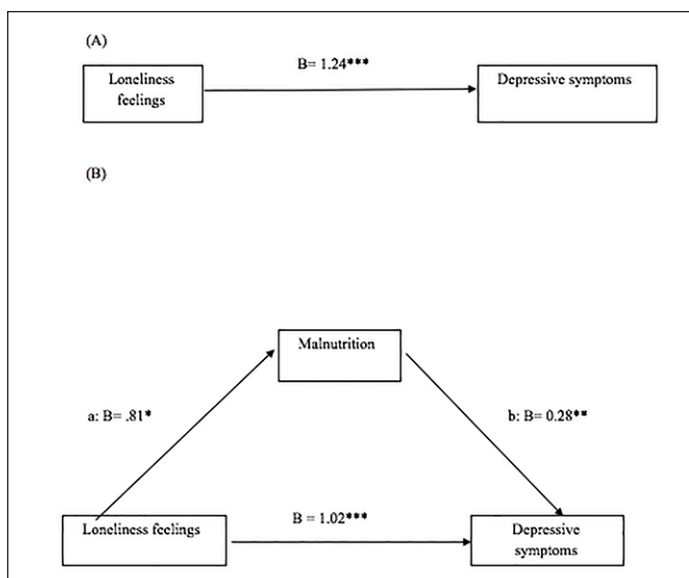
Discussion

The general purpose of this study was to examine the extent to which loneliness feelings are connected with depressive symptoms of older adults from different cultures during isolation by conducting research during a Covid-19 pandemic quarantine in Israel. We measured whether older adults who suffered from higher degrees of loneliness feelings due to the Covid-19 quarantine had higher levels of depressive symptoms and what potentially accounted for this association. The findings confirmed the first hypothesis that older adults suffering from a high degree of loneliness feelings suffer from higher levels of depressive symptoms. These results are consistent with other studies executed before and during the Covid-19 pandemic, reporting that loneliness feelings are associated with mental wellbeing (35, 36).

The mediation model confirmed the second hypothesis that the connection between loneliness feelings and depressive symptoms is accounted for by level of malnutrition. The association between loneliness feelings, depressive symptoms, and level of malnutrition can be explained by two different aspects: dietary behavior and the influence nutrition has on depressive symptoms. With regard to dietary behavior, loneliness feelings may affect appetite and nutrient intake through a decline in mood, physical functioning, or cognition (37). These various declines combine with the difficulty people have eating alone. Appetite can be further inhibited by changes in social status, particularly when older adults experience loneliness and/or bereavement due to loss of a spouse or friends of the same age-group (38). Eating in the company of others can help prevent malnutrition. It increases caloric intake and is related to healthier food habits (39, 40), and maintains the motivation of older adults to eat and cook, providing them with opportunities for social interaction and connectedness (41).

The current study took place during a Covid-19 quarantine when older adults, as a high-risk group, were counseled to stay at home with their permanent partners only and to avoid, as much as possible, from going shopping and to depend on home deliveries. Hence, it is likely that older adults were forced not only to eat alone, but to be alone most of the time, resulting in insufficient food intake and, consequently, malnutrition.

The second aspect concerns the connection between depression and the diet of older adults. Recent studies have suggested that depressive symptoms are more prevalent in individuals with impaired nutritional status than in other older patients. It has been observed that individuals with specific

ETHNIC DIFFERENCES IN LONELINESS, DEPRESSION, AND MALNUTRITION DURING COVID-19 QUARANTINE

nutritional deficiencies such as lack of folic acid and vitamin B12 as well as antioxidant vitamins had more depressive symptoms than those with normal nutritional status (42). The mechanism that might be at work here is that older adults who suffer from loneliness feelings tend to eat less and lack a healthy appetite and, for that reason, they will not consume all the nutrients they need and will suffer from malnutrition or depressive symptoms. This mechanism accelerates during a quarantine, when even older adults who do not suffer from loneliness ordinarily suffer from isolation.

The third study hypothesis was that research variable levels will differ between cultures, particularly due to the extremity of the Covid-19 quarantine. Indeed, Arab older adults reported greater loneliness feelings, higher level depressive symptoms, and greater malnutrition compared to the Jewish older adults. The results with regard to depressive symptoms are consistent with studies reporting that being a member of an ethnic or racial minority is a risk factor for depression. Specifically, Arab respondents have reported higher depressive symptoms than Jewish respondents (43, 44); however, there are also contradictory results (45).

Concerning the higher levels of loneliness and malnutrition, the Covid-19 quarantine may have posed new challenges to the Arab study participants that explain the study findings. Arab society in Israel is known for family consolidation and solidarity. The extended family maintains a multi-generational structure, with grown children obligated to filial piety responsibilities (46). The Covid-19 quarantine forced new ways of communication upon family members, exposing the absence of digital literacy among Arab older adults: for Arab older adults, Internet use does not protect against loneliness (47). Moreover, the extended family often lives together, with the daughters and daughters-in-law cooking and serving the older adults (48). The quarantine isolated the Arab older adults from their extended family, resulting in reduced help with cooking and serving meals. Moreover, the strong connection between feeling loneliness and malnutrition cited above (37, 38) amplified the problem.

Conclusion and Implications

The present study was executed during a Covid-19 pandemic quarantine. The results indicate that there is a connection between loneliness feelings, depressive symptoms, and malnutrition. The primary conclusion is that loneliness feelings are a serious problem facing all older adults since they negatively affect both depressive symptoms and malnutrition. In order to overcome these feelings, it is important to connect older adults to social network technologies and teach them how to use these technologies. Families can also receive guidance for meeting while maintaining social distancing. Another option is to encourage neighbors in the same building to talk to each other and find ways for mutual support.

Research indicates that members of the Arab society in Israel are a high-risk group and much more vulnerable to loneliness feelings, depressive symptoms, and malnutrition in times of crisis such as the Covid-19 pandemic. The lives of many Arab older adults changed from being surrounded and supported by their extended family to being alone during the quarantine and to suffering from malnutrition. In order to fight these two related outcomes, one possible solution is to provide psychological- nutrition intervention (49) by telephone. This would provide by missing human contact and nutrition guidelines and encouragement to cook and eat healthier foods.

We should point out three main limitations of the current study. One is the cross-sectional study design, which does not allow for prediction of a causal relationship between the variables. A future study should use longitudinal data to examine the relationship between loneliness feelings and depressive symptoms. A further limitation might be the use of only one question concerning loneliness feelings. However, previous studies have also used one question in order to describe loneliness feelings (50). Third, a generalization of the findings is limited because the sample and the sampling procedure do not guarantee the representativeness of Jewish and Arab older adults. The sample was conducted by telephone and included only older adults who answered the telephone at that moment. Those who did not answer or did not have a telephone are not represented in this study. These various factors may have biased the results.

Despite these limitations, the present study provides initial insights into the mechanisms of the association between loneliness feelings, malnutrition, and depressive symptoms during periods of quarantine imposed isolation.

References

1. WHO. 2018. Ageing and Health. World Health Organization, Geneva.
2. Chapman, D., & Perry, G. Depression as major component of public health for older adults. Preventive Chronic Diseases, 2008;5, A22. Retrieved from http://www.ncbi. nlm.nih.gov/pmc/articles/PMC2248771/ at: 19/10/14
3. Sayied, N. E., Mohamed, H. S., Thabet, R. A. Feeling of depression and loneliness among elderly people attending geriatric clubs at Assiut City. Life Science Journal, 2012;9(2), 140- 145.
4. Fiske, A., Loebach, J., Wetherell, & Gatz, M. Depression in older adults. The Annual Review of Clinical Psychology, 2009;5 , 363–589.
5. Arslantas, D., Alaettin, Ü.,Demet, O. Prevalence of depression and associated risk factors among the elderly in Middle Anatolia, Turkey. Geriatrics Gerontology International, 2014;14,100–108
6. Penninx, B. W., Guralnik, J. M., Ferrucci, L., Simonsick, E. M., Deeg, D. J., & Wallace, R. B. Depressive symptoms and physical decline in community-dwelling older persons. JAMA, 1998;279(21), 1720–1726.
7. Bruce, M. L.,Seeman, T. E., Merrill, S.S ., Blazer, D. G. The impact of depressive symptomatology on physical disability: MacArthur studies of successful aging. American Journal Public Health, 1994;84, 1796–1799.
8. Van Gool, C. H., Kempen, G. I., Penninx, B. W. Impact of depression on disablement in late middle aged and older persons: Results from the longitudinal aging study Amsterdam. Social Science & Medicine, 2005;60, 25–36.
9. Hybels, C. F., Pieper, C. F., Blazer, D. G., Fillenbaum, G. G., & Steffens, D. C. Trajectories of mobility and IADL function in older patients diagnosed with major depression. International Journal of Geriatric Psychiatry, 2010;25, 74–81.

10. Heun, R., Kockler, M., & Ptok, U. Depression in Alzheimer's disease: Is there a temporal relationship between the onset of depression and the onset of dementia? European Psychiatry, 2002;17, 254-258.

11. Perlman, D. European and Canadian studies of loneliness among seniors. Canadian Journal of Aging, 2004;23, 181–188.

12. Theeke, L. A. Predictors of loneliness in U.S. adults over age sixty-five. Archives of Psychiatric Nursing, 2009;23, 387–396.

13. Steed, L., Boldy, D., Grenade L., & Iredell, H. The demographics of loneliness among older people in Perth, Western Australia. Australian Journal on Ageing, 2007;26, 81–86.

14. Shiovitz-Ezra, S. Loneliness while getting old: Exploring the phenomenon in Israel and the U.S.A. Society and Welfare, 2011;31, 91-111. (In Hebrew).

15. Masi, C. M., Chen, H-Y., Hawkley, L. C., & Cacioppo, J. T. A meta- analysis of interventions to reduce loneliness. Personality and Social Psychology Review, 2011;15(3), 219-266.

16. Shiovitz-Ezra, S. Committee report to examine ways of dealing with loneliness in old people, 2014.

17. Kvamme, J. M., Grønli, O., Florholmen, J., & Jacobsen, B. K. Risk of malnutrition is associated with mental health symptoms in community living elderly men and women: The Tromsø Study. BMC Psychiatry, 2011;11(1), 112. https://doi.org/10.1186/1471-244X-11-112

18 Smoliner, C., Norman, K., Wagner, K. H., Hartig, W., Lochs, H., & Pirlich, M. .Malnutrition and depression in the institutionalised elderly. British Journal of Nutrition, 2009;102(11), 1663-1667. https://doi.org/10.1017/S0007114509990900

19. Yoshimura, K., Yamada, M., Kajiwara, Y., Nishiguchi, S., & Aoyama, T. Relationship between depression and risk of malnutrition among community-dwelling young-old and old-old elderly people. Aging and Mental Health, 2013;17(4), 456-460. https://doi.org/10.1080/13607863.2012.743961

20. Graham, J., Fan, L., Meadows, E. S., Partridge, J., & Goates, S. Addressing malnutrition across the continuum of care: Which patients are likely to receive oral nutritional supplements. Journal Of Ageing Research and Healthcare, 2017;1, 9. https://doi.org/10.14302/issn.2474-7785.jarh-16-1398

21. Stratton, R. J., Green, C. J., & Elia, M. Scientific criteria for defining malnutrition. In Disease-related Malnutrition: An Evidence-based Approach to Treatment. CABI Publishing.Theeke, L. A. Predictors of loneliness in U.S. adults over age sixty-five. Archives of Psychiatric Nursing, 2003;23, 387-396.

22. Brownie, S. Why are elderly individuals at risk of nutritional deficiency? International Journal of Nursing Practice, 2006;12(2), 110-118. https://doi.org/10.1111/j.1440-172X.2006.00557.x

23. Cereda, E., Pedrolli, C., Klersy, C., Bonardi, C., Quarleri, L., Cappello, S., Turri, A., Rondanelli, M., & Caccialanza, R. Nutritional status in older persons according to healthcare setting: A systematic review and meta-analysis of prevalence data using MNA®. Clinical Nutrition, 2016;35(6), 1282-1290. https://doi.org/10.1016/j.clnu.2016.03.008

24. De Morais, C., Oliveira, B., Afonso, C., Lumbers, M., Raats, M., & De Almeida, M. D. V. Nutritional risk of European elderly. European Journal of Clinical Nutrition, 2013;67(11), 1215-1219. https://doi.org/10.1038/ejcn.2013.175

25. World Health Organization. 2015. WHO | World report on ageing and health 2015. In World Health Organisation. https://doi.org/10.1016/j.jmgm.2016.10.012

26. Guyonnet, S., & Rolland, Y. Screening for malnutrition in older people. Clinics in Geriatric Medicine, 2015;31(3) 429-437. https://doi.org/10.1016/j.cger.2015.04.009

27. Kalan, U., Arik, F., & Soysal, P. 2019) Malnutrition in older people. In Encyclopedia of Biomedical Gerontology. https://doi.org/10.1016/B978-0-12-801238-3.62171-2

28. Soenen, S., & Chapman, I. M. Body weight, anorexia, and undernutrition in older people. Journal of the American Medical Directors Association, 2013;14(9), 642-648. https://doi.org/10.1016/j.jamda.2013.02.004

29. Chen, C. C. H., Schilling, L. S., & Lyder, C. H. A concept analysis of malnutrition in the elderly. Journal of Advanced Nursing, 2001;36 (1), 131-142. https://doi.org/10.1046/j.1365-2648.2001.01950.x

30. Fávaro-Moreira, N. C., Krausch-Hofmann, S., Matthys, C., Vereecken, C., Vanhauwaert, E., Declercq, A., Bekkering, G. E., & Duyck, J. Risk factors for malnutrition in older adults: A systematic review of the literature based on longitudinal data. Advances in Nutrition, 2016;7(3), 507-522. https://doi.org/10.3945/an.115.011254

31. Mangels, A. R. 2018. Malnutrition in older adults: An evidence-based review of risk factors, assessment, and intervention. The American Journal of Nutrition. https://doi.org/10.1097/01.NAJ.0000530915.26091.be

32. Yesavage, J. A., & Brink, T. L. Development and validation of a geriatric depression screening scale: A preliminary report. Journal of Psychiatric Research, 1983;17(1), 37-49.

33. Hayes, A. F. 2012. PROCESS [Macro]. http://afhayes.com/ introduction-to-mediation-moderation-and-conditional-process-analysis.html.

34. Preacher, K. J., & Hayes, A. F. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods, 200840, 879-891.

35. Gonyea, J. G., Curley, A., Melekis, K., Levine, N., & Lee, Y. Loneliness and depression among older adults in urban subsidized housing. Journal of Aging and Health, 2016;30, 458-474.

36. Armitage, R., & Nellums, L. B. COVID-19 and the consequences of isolating the elderly. The Lancet Public Health, 2020;5(5), e256.

37. Eskelinen, K., Hartikainen, S., & Nykanen, I. Is loneliness associated with malnutrition in older people? International Journal of Gerontology, 2016;10, 43- 45.

38. Chatindiara, I., Sheridan, N., Kruger, M., & Wham, C. Eating less the logical thing to do? Vulnerability to malnutrition with advancing age: A qualitative study. Appetite, 2020;146.

39. Hammons, A.J., & Fiese, B. H. Is frequency of shared family meals related to the nutritional health of children and adolescents? Pediatrics, 2011;127(6), e1565-1574.

40. Locher, J. L., Robinson, C. O., Roth, D. L., Ritchie, C. S., Burgio, K. L. The effect of the presence of others on caloric intake in homebound older adults. The Journals of Gerontology series A: Biological sciences and Medical sciences, 2005;60(11), 1475–1478.

41. Bofill, S. Aging and loneliness in Catalonia: The social dimension of food behavior. Ageing International, 2004;29(4), 385–98.

42. German, L., Feldblum, I., Bilenko, N., Bilenko, N., Castel, H., Harman-Boehm, I., & Shahar, D. R. Depressive symptoms and risk for malnutrition among hospitalized elderly people. The Journal of Nutrition, Health & Aging, 2008;12, 313- 318.

43. Jackson-Triche, M. E., Greer-Sullivan, J. G., Wells, K. B., Rogers, W., Camp, P., & Mazel, R. Depression and health-related quality of life in ethnic minorities seeking care in general medical settings. Journal of Affective Disorders, 2000;58, 89–97.

44. Kaplan, G., Saralee Glasser, S., Murad, H., Ahmed Atamna, A., Alpert, G., Uri Goldbourt, U., & Kalter-Leibovici, O. Depression among Arabs and Jews in Israel: A population-based study. Social Psychiatry and Psychiatric Epidemiology, 2009;45, 931- 939.

45. Khalaila, R. Depression statuses and related predictors in later life: A 10-year follow-up study in Israel. European Journal of Ageing, 2016;13(4), 311-321.

46. Khalaila, R. Modernization and filial piety to elderly parents in Arab-Israeli society. Gerontology, 2009;4, 77- 98 (In Hebrew).

47. Khalaila, R., Vitman Schorr, A. Internet use, social networks, loneliness and quality of life among adults aged 50 and older: Mediating and moderating effects. Quality of Life Research, 2017;27(2), 479- 489.

48. Vitman-Schorr, A., & Ayalon, L. The changing status of Israeli Arab women as reflected in their role as main caregivers. Journal of Family Issues, 2020;0192513X19898829.

49. Kreausukon, P., Gellert, P., Lippke, S., & Schwarzer, R. Planning and self-efficacy can increase fruit and vegetable consumption: a randomized controlled trial. Journal of Behavioral Medicine, 2012;35, 443- 451

50. Holwerda, T. J., Deeg, D. J., Beekman, A. T., van Tilburg, T. G., Stek, M. L., Jonker, C., & Schoevers, R. A. Feelings of loneliness, but not social isolation, predict dementia onset: Results from the Amsterdam Study of the Elderly (AMSTEL). Journal of Neurology, Neurosurgery & Psychiatry, 2014; 85(2), 135-142