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Internet use, social networks, loneliness, and quality of life among adults aged 50 and older: mediating and moderating effects

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Abstract

Background The increase in longevity of people on one hand, and on the other hand the fact that the social networks in later life become increasingly narrower, highlights the importance of Internet use to enhance quality of life (QoL). However, whether Internet use increases or decreases social networks, loneliness, and quality of life is not clear-cut.

Purposes To explore the direct and/or indirect effects of Internet use on QoL, and to examine whether ethnicity and time the elderly spent with family moderate the mediation effect of Internet use on quality of life throughout loneliness.

Methods This descriptive-correlational study was carried out in 2016 by structured interviews with a convenience sample of 502 respondents aged 50 and older, living in northern Israel. Bootstrapping with resampling strategies was used for testing mediation a model.

Results Use of the Internet was found to be positively associated with QoL. However, this relationship was mediated by loneliness, and moderated by the time the elderly spent with family members. In addition, respondents' ethnicity significantly moderated the mediation effect between Internet use and loneliness.

Conclusions Internet use can enhance QoL of older adults directly or indirectly by reducing loneliness. However, these effects are conditional on other variables. The indirect effect moderated by ethnicity, and the direct effect moderated by the time the elderly spend with their families. Researchers and practitioners should be aware of these interactions which can impact loneliness and quality of life of older persons differently.

Keyword Internet · Ethnicity · Social capital · Well-being

Introduction

Recently, researchers in the field of gerontology have been increasingly recognizing that the quality of life (QoL) of adults aged 50 and older is a complex and multifaceted idea that requires in-depth understanding [1, 2]. The term QoL refers to objective and subjective aspects of later life [3]. While the objective aspects contain physical health measures, the subjective aspects reflect a subjective experience of well-being and satisfaction with life [4].

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Studies of aging have suggested that QoL is positively associated with active social contacts and supportive face-to-face social networks [3, 5]. However, social networks and contacts in later life decrease due to retirement, and death of family members and friends [6]. Social networks and social cohesion are important not just in order to maintain the social life before retirement, but were also found to be part of the success of health intervention programs [7] Narrowing of social networks contributes to increased social isolation and loneliness [8, 9], and leads to the deterioration of well-being and QoL among adult persons [10].

Over the last two decades, Internet use has become an important tool in health campaigns [11] social activity and leisure time resources for adults [12, 13], and many social programs suggest that older people be encouraged to learn computer skills and use the Internet in their daily life to reduce loneliness and enhance QoL [14]. However, studies examining the association between Internet use and QoL among older persons describe two opposite possible

effects of Internet use on their QoL [12]. On one hand, some researchers found that Internet use is significantly associated with decreased time spent with friends, and decreased local social networking, which increased loneliness and decreased various aspects of QoL [13, 15]. Further study showed that Internet use displaces face-to-face contacts with weaker online ties and replaces in-person social activities with Internet time [16], which may result in lack of personal contacts [17], and new forms of isolation and marginalization [14].

On the other hand, the literature suggests that adults and older adults can benefit from Internet use in a variety of aspects such as new personal friendships, positive effects on quantity and quality of contacts with family and friends, and maintaining social involvement [17, 21, 22] Internet use and online networks can also enhance digital socializing [13], and provide adults with various forms of entertainment [17, 18], enhance empowerment by affecting interpersonal interactions and contributing to the experience of control among adults [19].

Internet use is also beneficial in reducing loneliness among adults [20–22], and in enhancing life satisfaction, health, and QoL [12, 23, 24]. Studies revealed that loneliness is a risk factor for poor QoL in later life [6, 25, 26], which can contribute to various health problems [27] and even to mortality [26]. Given the above relationships between Internet use, loneliness, and QoL, one can assume that the loneliness can mediate the relationship between Internet use and QoL.

Researchers also documented the importance of face-to-face social networks for maintaining QoL and decreasing loneliness in later life, such as the size of the social network, type of relationship, frequency of contact, and time spent with relatives [6, 28, 29]. Others showed that adults with wide networks of close relatives and friends have good QoL and well-being [29]. More frequent contacts with family were also positively correlated with QoL [736, 29].

Other studies showed that beginning or maintaining participation in social activities in later life is associated with greater QoL [6, 23, 30]. Adults who continue to work into old age reported higher QoL than the unemployed or retired [23]. Adults and older adults living alone or unmarried reported high loneliness levels [31] and low level of QoL than those who are married or living with a partner [30, 32].

Demographic characteristics are also related to high QoL in later life, but not consistently, including younger age [23], female gender [33], high level of education [23, 30], and majority group ethnicity compared with minority or immigrant groups in different countries [24, 34, 35], including Israel [30]. The QoL among Israeli adults was highest among veteran Jews, followed by immigrants from the Former Soviet Union (FSU) and Arabs, respectively [36]. Differences were also found between ethnic groups in Internet use and loneliness [26]. For example, Arab elderly

were less likely to use the Internet [37], and more likely to report higher loneliness than elderly Jews [38]. Given the above differences in Internet use and loneliness between ethnic groups, one can assume that ethnicity can be also a moderator in the relations between Internet use with loneliness and QoL.

The literature emphasizes the importance of Internet use and social contacts for enhancing better quality of life of adults and older people. However, the studies described above was not clear-cut, whether Internet use and virtual contacts can replace the real social contacts, or if both together are better than one for decreasing loneliness and maintain better QoL. Therefore, it is important to understand the mechanisms through which the Internet use and social contacts impact the feeling of loneliness and QoL among adult people. The aim of the current study is to provide new insights regarding the mediating role of loneliness between Internet use and QoL, and to reach better understanding of how ethnicity and social contacts intervene in the relationships between Internet use, loneliness, and quality of life among adults aged 50 and older.

Hypotheses

1. Internet use is associated directly with higher QoL among adults aged 50 and older.
2. Internet use is associated with less loneliness, which is indirectly related to greater QoL among adults aged 50 and older.
3. The association between Internet use and loneliness is moderated by the ethnicity of the respondents.
4. The association between Internet use and QoL depends on the selected values of the time the respondent spent with family members

Methods

Study design and participants

This was a cross-sectional study of a convenience community-dwelling sample of 525 adults aged 50 and over representing the three main ethnic groups, living in northern Israel, including Jews, FSU immigrants, and Arabs. Inclusion criteria were aged 50 and over, and able to speak and understand (but did not have to be able to read) Hebrew, Russian, or Arabic, and living in the community. However, incoherent adults were excluded.

Procedures

The study was approved by the Research Ethics Committee of the college at which the research took place. Participants gave written consent and received an explanation of their

right to withdraw at any time without academic penalty. Strict confidentiality was maintained.

Data collection was performed through face-to-face interviews (we took into account that not all adults aged 50 and older are literate), using appropriate translated, validated, and structured questionnaires. Thirty-five nursing students who had been studying in a research seminar, carried out the interviews after they received training and permission.

Each student had to recruit 15 eligible interviewees and ask them to participate in the study. The recruitment of the participants was done on the basis of personal acquaintance (convenience sample), or through their own friends (snowball sample). The interviews were done in convenient places for the interviewee such as participant's home, work place, or other suitable public places. The students reported that 23 adults declined participation, because they did not agree to participate, did not complete the interview or were found to be incoherent. These respondents almost represent the three ethnic groups. The final sample in the current study was 502 participants, comprising 138 Jews, 73 FSU immigrants, and 291 Arabs (response rate 95.6%). Data collection lasted from March to May 2016.

Measures

Independent variable

Internet use

Internet use was elicited by asking the respondents to indicate if they go online through any device (e.g., computer, tablet, or smartphone), coded as (user = 1 or non-user = 0).

Dependent variable

Quality of life

The CASP-19 scale was used to assess quality of life (QoL) among adults under four domains: Control, Autonomy, Self-realization, and Pleasure [1]. The scale comprised 19 questions eliciting responses on a 4-point Likert scale, ranging from 0 (never), 1 (not very often), 2 (sometimes), to 3 (often). Thirteen items were worded positively and six negatively. The latter were reverse-coded so that all responses were in the same direction. Possible totals ranged from 0 to 57, with higher scores indicating a higher QoL. Hyde and colleagues [1] tested whether the four dimensions are interrelated and measure a common underlying concept of QoL. They found strong evidence for a single, underlying QoL factor with strong loadings of the four different dimensions, ranging from 0.71 to 0.88. For our study sample, the Cronbach $\alpha = 0.89$.

Mediator

Loneliness

The Revised UCLA Loneliness Scale was used to assess loneliness [39], reflecting a conceptualization of loneliness as a complex phenomenon with both emotional and social components. The revised instrument comprises 20 items, with 10 positively and 10 negatively worded items. Each item on the scale is followed by a 4-point Likert scale from 1 ("never"), to 4 ("often"). Responses for the negative items were reverse-coded, then the total scores were calculated; possible totals ranged from 20 to 80, with higher scores indicating greater loneliness. Scores over 40 are generally considered to indicate loneliness. The revised version has high Cronbach $\alpha = 0.94$, and concurrent and discriminate validity evidence [39]. For our study sample, the Cronbach $\alpha = 0.83$.

Covariates and moderators

Social networks characteristics

Social networks characteristics assessed by marital status, employment status, participation in social activities, number of family members, time the respondents spent with family, and satisfaction with family contacts were collected. Marital status was coded as with partner = "1," or without partner (single, widowed, or divorced) = "0." Employment status was dichotomized as "employed = 1," or "unemployed/retired = 0." Number of family members was elicited by asking the respondents to indicate the number of relatives who visited in the last month. The social activity variable was evaluated by asking the respondents to indicate if they participated in social activities in the last month, such as taking part in social events, or using social services. The answer was coded as "yes = 1," or "no = 0." Satisfaction with family contacts was evaluated by one question: "Overall, how satisfied are you with your family contacts?" with answers ranging from 1 ("not satisfied at all") to 5 ("very satisfied"); a higher score indicated greater satisfaction with family contacts. Participants were also asked to indicate hours spent daily with relatives, the variable used **as moderator** in the current study.

Demographics variables

Data were collected on age, gender, education level, and ethnicity. Age and education level were measured as years at the time of the interview. Gender was dichotomous as male or female. Ethnicity was categorized as Jews, FSU

immigrants, or Arabs, the variable used as a moderator in the current study.

All instruments were translated into Hebrew, Russian, and Arabic by bilingual translators. The complete questionnaire underwent a pilot test on 15 adults aged 50 and older (5 participants from each ethnic group). The questionnaire took approximately 30 min to complete, the written and verbal instructions were comprehensible, and there was no need for further changes prior to 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 QoL and independent variables using an independent t-test, one-way ANOVA, Pearson, or Spearman correlation tests.

Mediation analyses were then computed in which the selected mediator (loneliness) 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 [40, 41]. Thus, the meditation model was examined by directly testing the significance of the indirect effect of the independent variable (*IV* internet use) on the dependent variable (*DV* quality of life) through the mediator (*MeV* Loneliness), 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 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 5000 samples. Confidence intervals were calculated using this method by sorting the lowest to highest of these 5000 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).

The moderation hypotheses were then tested using the bootstrap moderation method (Model 1) as described by Hayes [40]. This method calculates the conditional effect of IV on MeV/DV at different values (−1SD, mean, +1 SD) of each moderator (Mo1; ethnicity and Mo2; time spent with family), through bootstrapping, set at 5000 samples. All analyses were run using SPSS 20.0 with PROCESS statistical program [40]. All estimated effects reported by PROCESS are unstandardized regression coefficients.

Results

Table 1 shows that women accounted for the majority of the sample. The age range was 50–86 years, with about half younger than 60. Mean years of education was about 12.0, with some 61.1% reporting 12 or fewer years of education. Majority of the respondents were Arabs, followed by Jews and FSU immigrants, respectively. Most of the participants had partners. The majority of respondents were employed and the others were unemployed or retired. On average the social network was about 10 members with a wide range. The mean time that participants spent daily with family members was about 5 h, and about 15% spent 10 h or more. The majority of participants had participated in social activities during the last month. Average score of satisfaction with family contacts was fairly high in this sample, with 65% of the participants reporting satisfied or very satisfied with family contacts.

Table 1 also shows that about three-quarters of the participants went online by computer, tablet, or smartphone, of whom 41% were under 60. Further analysis revealed that veteran Israeli Jews were more likely to use the Internet than FSU immigrants, and Arabs were less likely than others. The loneliness score was moderate with a mean of 35.0 (SD = 11.8) and a range of 20–80. Additional analyses revealed significant differences between ethnic groups in reporting loneliness level [F(2, 502) = 13.6, p = 0.001], whereas the highest loneliness level was reported by FSU immigrant respondents (Mean = 40.8, SD = 15.8), followed by Arabs (mean = 35.0, SD = 11.0), and Jewish respondents (Mean = 32.1, SD = 10.1). The overall QoL score was moderate with a median of 39.0 (mean = 37.8, SD = 10.7) and a range of 0–57 (data not shown).

Table 2 presents the bivariate tests between the study variables with QoL as the dependent variable. Results revealed that all demographic variables were significantly related to QoL, except gender. Advanced age was negatively correlated with QoL. Higher educational level was correlated with higher reported QoL. An ethnic difference in QOL was also found. The results revealed that the FSU immigrant group had lower QoL than other ethnic groups (no statistical difference was found between Jews and Arabs). The highest QoL was reported by Jews, followed by Arabs and FSU immigrants.

Among the social network characteristics, only the number of family members was not statistically associated with QoL. Married respondents and employed respondents reported higher QoL than unemployed and retired, respectively. Quality of life was greater among respondents involved in social activities, who spent more hours daily with family members, and those with greater satisfaction

Table 1 Descriptive statistics of the study variables (N = 502)

Covariates	Total sample		
Demographic variable	N (%)	Mean (SD)	Range
Gender			
Men	238 (47.4)		
Women	264 (52.6)		
Age		61.4 (6.6)	50–86
Education		12.2 (3.9)	0–30
Ethnicity			
Jews	138 (27.5)		
Immigrants from the Former Soviet Union (FSU)	73 (14.5)		
Arabs	291 (58.0)		
Social networks characteristics			
Marital status			
Without a partner	115 (22.9)		
With a partner	387 (77.1)		
Employment status			
Employed	300 (59.8)		
Unemployed	123 (24.5)		
Retired	79 (15.7)		
Number of family members		10.2 (8.7)	0–60
Time spent with family members (h/d)		5.3 (3.5)	0–24
Satisfaction with family contacts		3.7 (1.0)	1–5
Social activities			
No	140 (27.9)		
Yes	362 (72.1)		
Independent variable			
Internet use			
User	362 (72.1)		
Non-user	140 (27.9)		
Mediator			
Loneliness		35.0 (11.8)	20–80
Dependent variable			
Quality of life (QoL)		37.8 (10.7)	0–57

with family contacts. The results also showed that loneliness was negatively correlated with QoL.

Additional analysis revealed that Internet users reported lower loneliness scores (mean = 33.5, SD = 10.7), as compared to non-users (mean = 39.2, SD = 13.5), [t(502) = 4.9, p = 0.001] (data not shown).

The mediation analyses

Using PROCESS model 4, we tested the first two hypotheses, whether loneliness mediated the relationship between Internet use and QoL controlling for covariates (see Table 3; Fig. 1). The results indicated a significant total direct effect (*path c*; without mediator) of

Internet use on QoL (B = 5.39, t(502) = 3.90, p = 0.001, 95%CI = 2.67, 8.12; R^2 = 0.26), significant direct effect (*path c*; with mediator) (B = 3.71, t(502) = 2.76, p = 0.005, 95%CI = 1.07, 6.35; R^2 = 0.345), and a significant indirect effect through loneliness (B = 1.68, 95% CI = 0.78, 2.86). The results also showed that the Internet use was associated with lower loneliness scores (path *a*; B = − 5.28, p = 0.001), and loneliness, in turn, was negatively associated with QoL (path *b*; B = − 0.31, p = 0.001).

It was also discovered that employed status (as compared with unemployed and retired), participation in social activities and greater satisfaction with family contacts were associated with better QoL. However, no significant associations were found between QoL with other covariates: ethnicity,

Table 2 Bivariate tests between demographic characteristics, social networks characteristics, Internet use, and loneliness, with the dependent variable - quality of life (N = 502)

Variables	Quality of life		
	Mean (SD)	Test	p value
Demographic characteristics			
Gender			
Female	37.8 (10.7)	t = 0.04	0.96
Male	37.7 (10.7)		
Age		r = -0.19	0.001
Education		r = 0.18	0.001
*Ethnicity			
Jews	40.0 (10.2)	f = 10.3	0.001
FSU immigrants	33.0 (11.2)		
Arabs	37.9 (10.5)		
Social networks characteristics			
Marital status			
Has partner	39.1 (10.3)	t = − 5.0	0.001
No partner	33.4 (10.9)		
Employment status			
Employed	39.0 (10.1)	f = 7.9	0.001
Unemployed	37.1 (11.4)		
Retired	33.8 (10.7)		
Number of family members		r = 0.06	0.88
*Time spent with family members (h/d)		r = 0.12	0.05
Satisfaction with family contacts		r = 0.34	0.001
Social activities			
Yes	40.7 (9.5)	t = − 4.6	0.001
No	36.1 (11.0)		
Independent variable			
Internet use			
0 = not user	32.1 (10.8)	t = − 7.6	0.001
1 = user	39.9 (9.8)		
Mediator			
Loneliness		r = − 0.50	0.001

Note variables with * are the moderators

FSU Former Soviet Union immigrants

Test referring to the bivariate analysis between independent variables and quality of life (e.g., *t* = independent *t* test, *f* = one-way ANOVA, and *r* = Pearson correlation coefficient)

gender, age, education, marital status, and number of family members.

The moderation analyses

A simple moderation analysis was next conducted to explore the effect of the Internet use–ethnicity interaction on loneliness (Hypothesis 3). The results show that the slope of the negative relationship between Internet use and loneliness is significant for Jews and FSU immigrants, but not for Arab respondents. Evidence for the moderating effect of ethnicity is provided visually in Fig. 2.

To explore the effect of the interaction (Internet use * time spent with family) on QoL, we conducted a simple

moderation analysis (Hypothesis 4). Results showed that the slope of the positive relationship between Internet use and QoL is significant for respondents who spent average and above average hours a day with their family members, but not significant among those who spent below average time. Evidence for the moderating effect of time with family is also provided visually in Fig. 3.

Discussion

The present study investigated the impact of Internet use on QoL in middle and later life, while paying special attention to its mechanisms and context. First the results

Table 3 Summary of the mediation model analyses using 5000 bootstraps ($N = 502$)

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)		(bath a)	(bath b)	(bath C)	(a x b)	95%CI	(C)	R^2
Age	Internet use	Loneliness	Quality of life	n.s	− 5.28***	− 0.31***	3.71**	1.68	0.7–2.8	5.39***	0.35***
Marital status				n.s							
Education years				n.s							
Ethnicity_D1				n.s							
Ethnicity_D2				n.s							
Employment_D1				− 5.44**							
Employment_D2				− 2.68*							
Number of family members				n.s							
Time spent with family members (h/d)				n.s							
Satisfaction with family contacts				1.30*							
Social activities				2.40*							

Notes Value labels of categorical variables: Marital status (0 = no partner, 1 = has partner); ethnicity_D1 (0 = Jews, 1 = Former Soviet immigrants); ethnicity_D2 (0 = Jews, 1 = Arabs); employment_D1 (0 = employed, 1 = retired); employment_D2 (0 = employed, 1 = unemployed); social activities (0 = no, 1 = yes)

n.s not significant

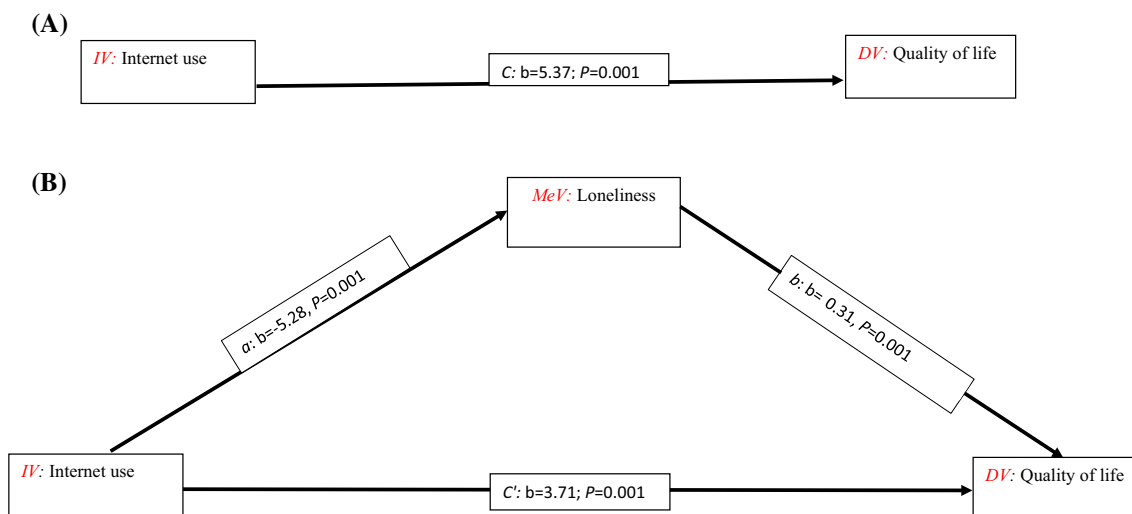*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$

(A)

(B)

Fig. 1 The mediating model depicting direct and indirect effects of Internet use (IV) on Quality of life (DV) tested in the current study, controlling for covariates. Notes: Graphic A depicts the total effect (*C*) of Internet use (IV) on Quality of life (DV). Graphic B depicts the direct effect (*C'*) of Internet use (IV) on Quality of life (DV) after including the mediator (MeV; loneliness). Values represent unstandardized regression coefficients

Fig. 2 Relationship between internet use and loneliness among different ethnic groups (Jews, Former Soviet immigrant, and Arabs), controlling for covariates
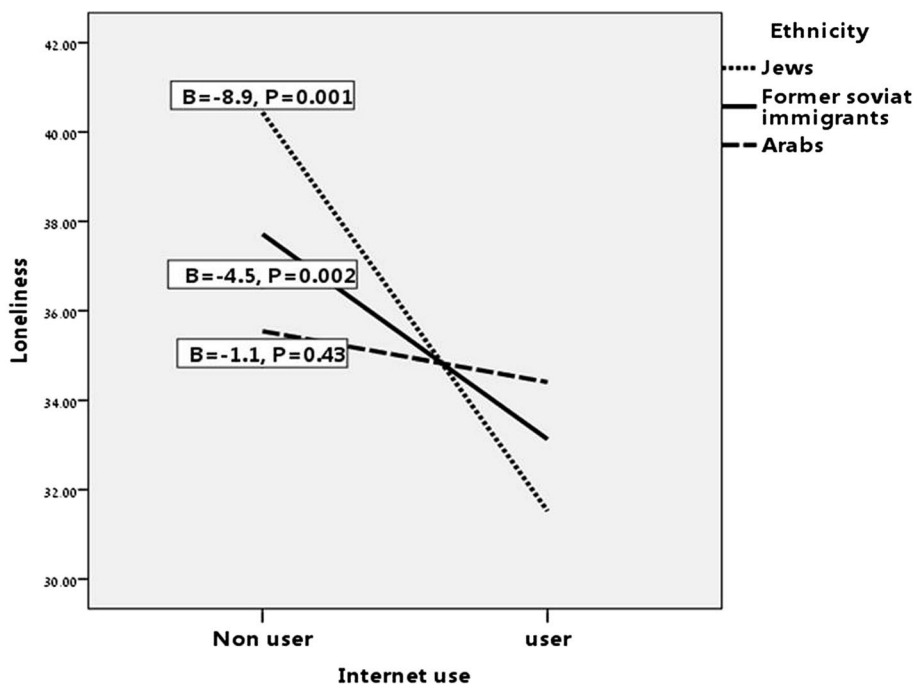
showed that adults who use Internet report better QoL. Second, in addition to that direct linkage, the association was also be mediated by loneliness. Thus, those who use Internet also had lower loneliness scores, which in turn were linked to a better QoL. Third, the mediation bath between Internet use and loneliness was moderated by ethnicity. Thus, Internet use was related to lower loneliness only among the veteran Jews and FSU immigrants, while among the Arab Israelis Internet use was not related to loneliness at all. Last, the direct bath between Internet use and QoL was moderated by the time the adults spent with family. In other words, this relationship is significant only for adults who spent lone time with relatives and friends.

Fig. 3 Relationship between Internet use and QoL at different levels of time spent with family (Below average, average, above average), controlling for covariates and mediator
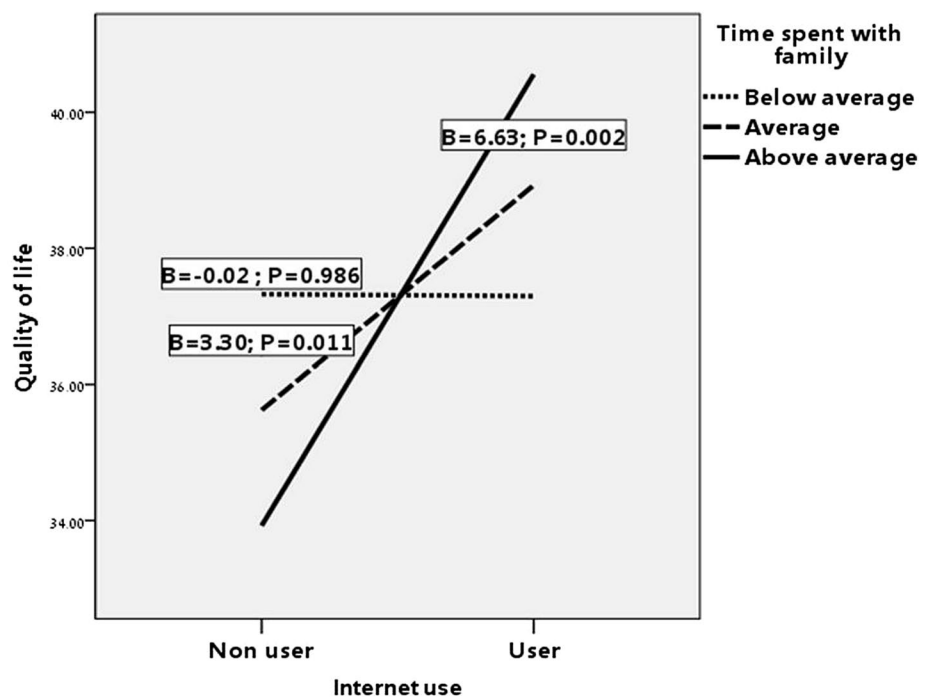
The mediation effects

Overall, our first hypothesis was supported, as Internet use was found to be generally beneficial for the QoL of adult people. This finding is consistent with numerous studies [18, 23, 24] which explored such relationships. This result highlights the benefits from digital socializing by Internet use and virtual social networks in middle and later life [18].

An explanation consistent with the second mediation hypotheses for the relationship between Internet use and QoL through loneliness was also confirmed. In other words, Internet use was associated with lower level of loneliness, which in turn was related to greater QoL. These findings are consistent with previous studies which revealed a negative association between Internet use and loneliness [21, 22, 42] and a negative association between loneliness and QoL [25, 27]. However, these results contradict other previous studies which showed that Internet use can lead to social isolation and loneliness [13–15].

Social networks characteristics were also found to be associated with enhanced QoL. Three characteristics were significantly related to QoL: being employed, participation in social activities, and satisfaction with family contacts. These results are congruent with findings from other studies which point to the importance of social networks in predicting an individual's QoL [6, 32, 43]. These results reinforce the assumption that social capital is an important resource for active aging, alleviating loneliness, and improving well-being [44–46]. These results suggest that helping adults maintain their social ties might directly enhance QoL, or indirectly via reducing loneliness.

The moderation effects

The results also demonstrated that Internet use interacts with ethnicity to predict loneliness, which in turn predicts QoL. This result confirmed the third hypothesis, i.e., Internet use decreased loneliness levels for Jews and FSU immigrants, but not for Arabs who, in turn, had higher QoL. Namely, for adult Arabs, Internet use is not a protective factor against loneliness. Indeed, the results also showed Jews and FSU immigrants use the Internet more frequently than the Arab respondents and a difference was also found in the loneliness levels between these ethnic groups. These results reinforce previous studies that showed different levels of Internet use [37] and different frequency of loneliness between majority and minority groups in the same country [24, 26, 38]. A possible explanation for this finding is that the effect of Internet use on loneliness in Arab respondents was blocked by the other indices of social networks having stronger predictability. Indeed, additional analysis revealed that Arabs reported large family size, and spent more time with family than their Jewish and FSU immigrant counterparts. It is also possible that FSU immigrants use the Internet to combat post-immigration loneliness, to strengthen local and international social contacts, and cope with social gaps and the difficult integration into Israeli society.

Results also revealed that the direct effect between Internet use and QoL was moderated by the time the adults spent

with their family members daily (but not by ethnicity), thus confirming the fourth hypothesis, i.e., for respondents who spent less than average time with family, Internet use did not impact their QoL. Internet use was found to be helpful in increasing QoL only for those who spent average or more time with family. These results suggested a synergism effect on QoL between online contacts (Internet use) and face-to-face contacts (spent time with family), especially since without face-to-face contacts with family members, Internet use has no added value on predicting QoL. However, previous studies did not examine the impact of Internet use and face-to-face social networks on QoL, therefore, these results are unique for the current study.

Limitations

Despite the study's strengths, a few limitations should be noted. The first is its cross-sectional design, which does not allow confirmation of causal inferences about the association between Internet use, loneliness, and QoL. The second is the non-random selection of the convenience sample; it may be difficult to generalize the results beyond this population, and it may not be representative of other adults from different areas in Israel. The third limitation is the face-to-face interviews with the participants, which could be suspected of information bias (social desirability).

Conclusions and implications

The study indicated that Internet use is vital and important for adults aged 50 and older, because it can decrease loneliness and enhance QOL. The results also found that social networks are important in enhancing a successful life for older adults. The combination of Internet use and social networks has a synergism effect on QoL. However, Internet use has no effect on QoL without existing face-to-face contacts between adult people and family members. These results emphasize the importance of social capital in reducing loneliness and enhancing QoL. Results further revealed the effect of Internet use on loneliness and, in turn, on QoL differences between the three main ethnic groups in Israel: Internet use is important in decreasing loneliness for Jews and FSU immigrants but not for Arabs. This is an issue that should be considered in future studies of this population.

The study has implications for healthcare policy and services, suggesting broad interventions on a nationwide scale to educate adults and older adults to use the Internet (particularly for older Jews and FSU immigrants) to encourage older adults and their families to maintain strong ties and contacts, and to integrate adults in social activities. Theses interventions should especially target lone adults and those with narrow social networks, particularly those unsatisfied

by their family contacts. These interventions may enable them to be socially active, to feel less lonely, and, in turn, to contribute to better QoL later in life.

Compliance with ethical standards

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