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Association between Loneliness, Well-Being, and Life Satisfaction before and during the COVID-19 Pandemic: A Cross-Sectional Study

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Abstract: Good psychological well-being contributes to a satisfying life, reduces loneliness, and enables a better quality of life. Due to the COVID-19 pandemic, people worldwide have faced various challenges, which manifest in mental health problems, dissatisfaction with life and increased loneliness. This study aimed to investigate the influence of loneliness on mental well-being and life satisfaction among the adult population during the COVID-19 pandemic. A cross-sectional study was conducted between October 2021 and January 2022. A total of 664 participants took part in the survey, of whom 484 (73%) were female and 180 (27%) were male. Our results show that loneliness can explain 48% of the total variability in mental well-being and 52% of the variability in life satisfaction. The results show a higher level of loneliness and use of information and communication technology and a lower level of contact with relatives and friends, life satisfaction, and well-being during COVID-19 than they considered before the time of COVID-19. Study findings can help improve loneliness and mental well-being, and, consequently, life satisfaction.

Keywords: loneliness; well-being; life satisfaction; cross-sectional study

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1. Introduction

The COVID-19 pandemic has forced the world to impose certain restrictions to protect vulnerable and at-risk people [1]. COVID-19 has changed the daily routines and the way in which people socialize worldwide. Social distance is a major risk to people's mental well-being [2]. Mental well-being problems can be increased during social isolation, such as those observed during periods of social distancing [3–5]. Increased rates of depression, emotional disturbances, stress reactions, low mood, irritability [3], insomnia, and even higher suicide rates have been reported [4,5].

Consequences of reduced social life include reduced daily physical activity, leading to obesity and decreased life satisfaction [6]. Reduced physical activity also adversely affects mental well-being and dissatisfaction among the general population. Life satisfaction is an individual's life assessment, while quality of life refers to general well-being. An individual's assessment of the quality of life can also be subjective and dependent on mood or circumstances (e.g., the pandemic). In the literature [7], positive well-being is defined as personal happiness and satisfaction, and psychological well-being focuses on fulfilling a social need. Loneliness and pandemic restrictions have negatively affected the population's well-being [8].

Social isolation is an important predictor of loneliness [9,10], and both social isolation and loneliness have detrimental effects on human well-being [11–13] and; social media use can have both positive and negative effects on human well-being during the COVID-19 pandemic [14]. In addition, some researchers have found that internet use can significantly improve individuals' subjective well-being, while others have reported that the frequency of internet use significantly improves emotional well-being [15]. Social isolation has contributed to increased loneliness and dissatisfaction with life, resulting in poor well-being

and the onset of frailty [16]. However, it should be noted that social isolation and loneliness can lead to losing contact with friends, relatives and family members and consequently lead to poorer mental well-being [17–19]. There may even be signs of psychological shock, often leading to emotional instability, deep sadness, and depression. This leads to additional loneliness and isolation in the subjects [20].

For this reason, we aimed to investigate the association of loneliness with mental well-being and life satisfaction among the adult population during the COVID-19 pandemic. Based on this, we have tested two hypotheses: whether loneliness is associated with adults' mental well-being (H1) and if loneliness is associated with adults' life satisfaction (H2).

1.1. Loneliness

Loneliness is a subjective feeling described as a sense of isolation. For example, people can live a solitary life and not feel lonely or have many social relationships and still feel lonely [21]. Loneliness is also described as feeling bad about the quality and quantity of social relationships, which are below the ideal number of people; this has a major impact on health and quality of life [22]. Loneliness is often described as a state of absence from society and isolation from the community or society. A dark and unhappy feeling is a risk factor for many mental disorders, such as depression, anxiety, chronic stress, and even dementia [23]. Loneliness has multiple dimensions: social; emotional; and existential [24]. Loneliness is also strongly linked to poor health. Loneliness increases the likelihood of cognitive decline [25], reduces social activities, and leads to greater physical limitation [26]. Researchers have also highlighted the adverse impact of social isolation and loneliness on various diseases, including cardiovascular, inflammatory, neuroendocrine, and cognitive disorders [27,28]. Acute stress disorders, irritability, insomnia, emotional distress, and mood disorders have occurred, including depression, fear and panic, anxiety, and stress due to financial worries, frustration and boredom, loneliness, lack of supplies, and poor communication [29–31]. Plattner et al. (2022) argue that loneliness is the most important factor in determining health.

1.2. Life Satisfaction

Life satisfaction can be defined as the degree to which an individual evaluates the general quality of his life in work, family, friends, education, and relationships with others [32]. Clair et al. [33] show that younger adults in their 20s reported greater social isolation than those aged 50 and older during the COVID-19 pandemic. This supports the findings of Nyqvist et al. [34], who found that teenagers and young adults in Finland reported more loneliness than other adults. Individuals who reported higher levels of social isolation were less satisfied with life [33]. Social isolation and loneliness are associated with poor life satisfaction in various areas, work-related stress, and less trust in state institutions. Digitisation and technological change can contribute positively or negatively to life satisfaction. They can help create new opportunities for networking, health literacy, and knowledge sharing.

1.3. Mental Well-Being

Well-being is a combination of mental well-being and good functioning in society, experiencing positive emotions, developing one's potential, controlling one's life, feeling meaningful, and experiencing positive relationships [35]. Better mental well-being is associated with many better outcomes in physical health and longevity [36] and with better individual performance at work [37], while greater life satisfaction is associated with better economic performance [38]. People's mental health has become a public health problem [39]; therefore, authors have become interested in the mental well-being of the entire population [40], as we know that all of this affects mental health [41]. Good mental well-being is associated with better mental health [40] and better life success [42].

Limiting social contact and experiencing increased levels of social isolation act as mediators that lead to increased negative mood and lower life satisfaction [43–45]. Röhr et al. [2]

noted that social distance is a major risk to people's mental well-being. The relationship between mental well-being, a sense of control, and life satisfaction is associated with good mental health [44]. Dissatisfaction with one's life and job instability contribute to social isolation and poor mental well-being [29,41,46–50]. When assessing mental well-being, it is important to measure perceived social isolation and loneliness [33].

2. Materials and Methods

2.1. Setting and Participants

In the present study, we asked people living in Slovenia to evaluate their loneliness, life satisfaction, use of information and communication technology (ICT), and mental well-being during the past seven days. To test for temporal changes in the associations between these variables, cross-sectional data were collected over 14 weeks in October 2021 and January 2022 when we were still living with restrictions. Many citizens were urged to work from home and stay at home as much as possible. People were allowed to leave home, but physical and social interactions were hugely restricted.

This study used convenience sampling. Adults who visited any health centres in Slovenia or were visited by community register nurses at home (in the Styria region) and met the inclusion criteria were invited to participate in the study. The inclusion criteria for the sample were adults (18+ years) with good cognitive ability (cognitive ability was assessed in order that the healthcare professional considered which participants could participate in the study. In doing so, they looked at the absence of known organic or psychiatric factors affecting cognitive ability) to complete the questionnaire and were accepted for participation in the study. The sample size was calculated using the Cochran formula [51]. According to the Statistical Office of the Republic of Slovenia (SURS), the share of adults in the total population in 2021 was 1,732,182. Based on the above formula, we calculated a representative sample of 384 (e = 95%; z = 5%).

2.2. Data Collection and Analysis

In the study, a combination of the revised UCLA loneliness scale [52], Diener's life satisfaction scale [53], and the Warwick – Edinburgh mental wellbeing scale (WEMWBS) [54] was used. Various questionnaires measure loneliness, life satisfaction, and mental well-being in the literature. However, these three questionnaires are most often used for their assessment; therefore, we chose them. We also added eight fundamental questions (*age, gender, presence of chronic disease, relationship status, living conditions, fear due to COVID-19, acceptance of epidemic, independence of everyday life*) and twelve self-assessed items which were related to economic status, life satisfaction, mental well-being, loneliness, frequency of ICT use, frequency of contact with relatives in the time which related to the time of the research during COVID-19 and before it. These statements from participants were self-assessed on a five-point Likert scale.

The UCLA loneliness scale is a 20-item scale designed to measure one's subjective feelings of loneliness and social isolation. Participants rate each item on a scale: 1 (Never), 2 (Rarely), 3 (Sometimes), and 4 (Often). The range of possible scores is 20 to 80. The cut-offs for loneliness severity were adapted from the report by Cacioppo and Patrick [55] as follows: total score <28 = no/low loneliness, total score 28 to 43 = moderate loneliness, and total score >43 = high loneliness. The Cronbach α coefficient (alpha) was 0.786.

The satisfaction with life scale (SWLS) is a short five-item instrument designed to measure judgments of satisfaction with an individual's life. Participants indicate how much they agree or disagree with each of the five items using a seven-point scale that ranges from 7 strongly agree to 1 strongly disagree. The range of possible scores is 5 to 35. The cut-offs for life satisfaction are as follows: 31–35 (Extremely satisfied), 26–30 (Satisfied), 21–25 (Slightly satisfied), 20 (Neutral), 15–19 (Slightly dissatisfied), 10–14 (Dissatisfied) and 5–9 (Extremely dissatisfied). The Cronbach α coefficient (alpha) was 0.876.

The Warwick–Edinburgh mental wellbeing scale (WEMWBS) was developed to monitor mental well-being in the general population. The 14 statements have five response categories

from 1 (None of the time) to 5 (All of the time)**.** Scores range from 14 to 70, and higher scores indicate greater positive mental well-being. Cronbach's α coefficient (alpha) was 0.922.

Data were collected from October 2021 to January 2022 in the health centres and the local community based on prior ethical approval and written permission from participating health centres and participants in community-dwelling. To include adults living at home, we were assisted by community registered nurses who performed preventive or curative visits. The research team distributed 1500 paper-based questionnaires, and 765 were returned. After removing 101 questionnaires because of missing data, we had 664 questionnaires fully completed for further analysis (the response rate was 44.3%).

We included all data in the analysis and used descriptive and inference statistics to analyse the data. Categorical variables were presented as frequencies and percentages. The Shapiro–Wilk test was used to check the normality distribution of variables. Based on the Shapiro–Wilk test, we found that the data were not normally distributed. Mann–Whitney U tests were used to compare participant groups' mean scores for continuous or ordinal variables. The Spearman correlation coefficient and linear regression analysis were used to evaluate loneliness's association with life satisfaction and mental well-being. We used Cronbach's α (alpha) to verify the questionnaire's reliability. Here we considered that Cronbach's α coefficient (alpha) is acceptable when its value is above 0.70 [56]. All three questionnaires showed acceptable internal validity, as Cronbach's α coefficient was above 0.70.

2.3. Ethical Considerations

Before conducting the research, we asked the relevant ethical committee for approval (Ref.: 038/2021/2053-3/902). Additionally, we obtained permission to conduct the study from the health centre and from individual participants. Participants in the study were informed in writing of the purpose and objectives, confidentiality, anonymity, and voluntary withdrawal from participation before submitting the questionnaire. The study strictly adheres to the ethical principles of the Declaration of Helsinki [57] and the Oviedo Convention provisions [58]. We additionally obtained consent from the authors of the individual questionnaires to use them in our research.

3. Results

A total of 664 participants participated in the study, of whom 484 (73%) were female, and 180 (27 %) were male. The mean age was 39.45 years (*SD* = 12.75; Mdn = 39; IQR = 19). In terms of relationship status, the highest proportion were in an extramarital relationship (35% (*n* = 234), followed by married 32% (*n* = 2012) and single 27% (*n* = 178)). The largest proportion of participants (54%; *n* = 366) had a secondary education, followed by participants with high or higher education (27%, *n* = 177) and postgraduate education in 13% (*n* = 89). A total of 462 (70 %) participants had no chronic disease, and 202 (30%) had at least one chronic illness. Some 320 (48%) participants lived with partners, and 79 (12%) lived alone. Most of them (530, 80%) were employed. Forty percent (*n* = 264) of participants self-assessed that their mental well-being had changed, and the same percentage self-assessed that their social life and 50% (*n* = 329) self-assessed that their life satisfaction were altered. Fifty percent (*n* = 334) self-assessed that their economic status had changed, and 82% (*n* = 542) assessed that their quality of life had changed. The majority (523, 79%) self-assessed that during the COVID-19 epidemic, their frequency of use of information communication technology had changed. In addition, 60% (*n* = 395) of participants expressed fear due to COVID-19.

Results show that the mean for loneliness was 51.71 ± 5.78 (95%, CI = 21.27–52.15, Min = 37, Max = 63, Me = 51, IQR = 11), which shows a high level of loneliness. Mean values for life satisfaction were 22.27 ± 5.33 (95%, CI = 21.86–22.67, Min = 8, Max = 32, Me = 23, IQR = 11), which shows on average that they are slightly satisfied. For mental well-being, the average value was 51.17 ± 8.82 (95%, CI = 50.49–51.84, Min = 14.00, Max = 70, Me = 51, IQR = 14.7), which shows slightly positive mental well-being (73% from the total value).

With the Mann–hitney test (Table 1), we found significant differences in loneliness (U = 6.048, $p < 0.001$) and life satisfaction (U = 3.438, $p < 0.001$) and used the ICT (U = 3.005, $p = 0.003$) according to gender. Men felt lonelier and rated their life satisfaction lower than women. We also found significant differences in loneliness (H(2) = 18.216, $p < 0.001$), well-being (H(2) = 14.456, $p = 0.002$) and use of ICT (H(2) = 32.265, $p < 0.001$) according to the level of education, where we found that adults with a higher level of education felt less lonely and were more satisfied with their lives. According to results on the frequency of contact with relatives, we found that those who had daily contact with relatives felt a significantly smaller difference in loneliness (H(2) = 19.350; $p < 0.001$), life satisfaction (H(2) = 8.362, $p = 0.039$), and well-being (H(2) = 29.343, $p < 0.001$). According to results on age, we found significant differences in loneliness (H(2) = 32.241; $p < 0.001$), life satisfaction (H(2) = 19.508; $p < 0.001$) and well-being (H(2) = 1.332; $p = 0.514$), where it was found that with age people felt less lonely, they were more satisfied with life and additionally had better mental well-being. We did not find significant differences in any studied variables if participants had a chronic disease. In addition, the percentage of self-assessed for mental well-being (77%) is comparable to that for the Warwick – Edinburgh scale (73%).

Table 1. Descriptive statistics for loneliness, life satisfaction, mental well-being, and use of ICT.

Variables	Loneliness	Life Satisfaction	Mental Well-Being	Use of ICT
Gender	U = 30,306.0; $p < 0.001$ *	U = 36,039.0; $p < 0.001$ *	U = 43,287.5; $p = 0.901$	U = 37,063.5; $p = 0.006$ *
Male (n = 180)	54.1 ± 5.99	21.34 ± 5.22	51.58 ± 8.66	3.36 ± 0.64
Female (n = 484)	50.85 ± 5.46	22.1 ± 5.33	51.1 ± 8.88	3.44 ± 0.51
Age	H(2) = 32.241; $p < 0.001$ *	H(2) = 19.508; $p < 0.001$ *	H(2) = 32.954; $p < 0.001$ *	H(2) = 1.332; $p = 0.514$
18–35 years (n = 258)	53.1 ± 5.71	22.1 ± 5.81	49.6 ± 9.62	3.44 ± 0.59
36–59 years (n = 305)	51.4 ± 5.87	21.7 ± 5.19	51.0 ± 7.78	3.43 ± 0.51
>60 years (n = 101)	49.2 ± 4.58	24.44 ± 3.71	55.8 ± 8.13	3.32 ± 0.57
Relationship status	U = 29.099; $p < 0.001$ *	U = 13.184; $p = 0.010$ *	U = 11.343; $p = 0.023$ *	U = 49.390; $p < 0.001$ *
Single (n = 178)	54.5 ± 5.64	20.5 ± 5.92	48.7 ± 9.28	3.2 ± 0.45
Married (n = 212)	48.9 ± 7.71	23.5 ± 4.90	54.5 ± 7.99	3.4 ± 0.56
Divorced (n = 38)	51.1 ± 4.06	22.7 ± 3.35	51.7 ± 4.98	3.6 ± 0.32
Cohabitation (n = 234)	52.1 ± 5.87	22.4 ± 5.17	49.9 ± 8.78	3.6 ± 0.60
Widowed (n = 2)	58.0 ± 0.0	21.0 ± 0.0	52.0 ± 0.0	3.25 ± 0.0
Education	H(3) = 18.216; $p < 0.001$ *	H(3) = 7.129; $p = 0.068$	H(3) = 14.456; $p = 0.002$ *	H(3) = 32.256; $p < 0.001$ *
Primary (n = 32)	54.2 ± 6.29	22.5 ± 4.13	56.7±	3.1 ± 50.44
Secondary (n = 366)	51.9 ± 5.81	22.1 ± 55.47	52.2 ± 8.87	3.4 ± 0.53
Bachelor (n = 177)	51.9 ± 6.2	21.9 ± 5.41	49.3 ± 9.41	3.5 ± 0.65
Master/Doctoral (n = 89)	49.6 ± 3.72	23.5 ± 4.81	50.1 ± 7.36	3.6 ± 0.40
Chronic disease	U = 36,150.5; $p = 0.063$	U = 39,874.5; $p = 0.966$	U = 36,938.5; $p = 0.140$	U = 37,604; $p = 0.245$
None (n = 462)	51.3 ± 5.84	22.4 ± 5.29	51.6 ± 9.24	3.4 ± 0.59
One or more (n = 202)	52.6 ± 5.44	22.7 ± 4.72	50.6 ± 7.76	3.4 ± 0.47
Frequency of contact with relatives or friends	H(3) = 19.350; $p < 0.03$ *	H(3) = 8.362; $p = 0.039$ *	H(3) = 29.313; $p < 0.001$ *	H(3) = 4.860; $p = 0.182$
Daily (n = 166)	50.6 ± 5.44	22.7 ± 5.82	52.1 ± 10.84	3.3 ± 0.61
Few times per week (n = 120)	51.7 ± 5.24	22.0 ± 6.09	51.17 ± 8.81	3.4 ± 0.55
Once per week to a few times per month (n = 219)	51.6 ± 5.84	22.5 ± 4.92	52.8 ± 7.85	3.4 ± 0.59
Less than once a month (n = 114)	53.4 ± 6.64	21.4 ± 4.65	47.6 ± 7.65	3.4 ± 0.41
Never (n = 45)	52.2 ± 4.81	22.2 ± 4.65	48.9 ± 3.27	3.6 ± 0.40

Note: n—Sample size; *—Statistical significance ($p < 0.05$); *SD*—Standard deviation; H—Kruskal–Wallis test value; U—Mann–Whitney test value.

In Table 2, we can see that participants during the COVID-19 pandemic self-assessed loneliness significantly (t = 13.327, $p < 0.001$) higher (4.76 ± 0.023 (60% from 5)) than they assessed it before the COVID-19 pandemic (3.08 ± 0.582 (95% from 5)). Additionally, from the mean value from the UCLA loneliness scale, we set almost the same percentage—64% from the total value for the UCLA loneliness scale. In contrast, life satisfaction was self-assessed significantly (t = 16.616, $p < 0.001$) lower (2.71 ± 1.165 (54% from 5)) compared with the time before the COVID-19 pandemic (3.89 ± 0.940 (78% from 5)). From the mean value from the Diner's life-satisfaction scale, we assessed 64% of the total value from the Diner's life-satisfaction scale. Furthermore, participants self-assessed their frequency of contact with relatives (t = 16.098, $p < 0.001$) to be lower during the COVID-19 pandemic (1.72 ± 0.839 (34% from 5)) in comparison with the time before the COVID-19 pandemic (2.83 ± 1.219 (57% from 5)).

Table 2. Mean difference of studied variables before and during COVID-19.

Variables	Group	*M*	*SD*	Mdn	IQR	Min-Max	*t*	*p*
Loneliness	Before COVID-19 pandemic	3.08	0.582	3	0	2–4	13.327	0.001 *
	During COVID-19 pandemic	4.76	0.023	4	1	2–5		
Life satisfaction	Before COVID-19	3.89	0.940	4	0	1–5	16.616	<0.001 *
	During COVID-19	2.71	1.165	3	2	1–5		
Mental well-being	Before COVID-19 pandemic	3.85	0.698	4	0	1–5	0.965	0.335
	During COVID-19 pandemic	3.84	0.671	4	0	1–5		
Contact with relatives/friends	Before COVID-19 pandemic	2.83	1.219	3	2	1–5	16.098	<0.001 *
	During COVID-19 pandemic	1.72	0.839	2	1	1–5		

Note: *n*—Sample size; *—Statistical significance ($p < 0.05$); *SD*—Standard deviation; *M*—Mean; Mdn—Median; IQR—Interquartile range; *t*—*t*-test value.

Using a regression analysis, we found that with studied variables related to restrictions in the COVID-19 pandemic (contact with relatives, use of ICT, fear due to COVID-19 pandemic, acceptance of the epidemic, and economic status), we can explain 52% of the total variability in loneliness (Table 3). When we add some other studied variables (age, gender, educational level, presence of chronic disease, independence in everyday life, and living conditions) unrelated to the COVID-19 pandemic, we can explain the 66% of total variability in loneliness.

Table 3. Results of the regression analysis for loneliness.

	Variables	*B*	SE	*β*	*t*	*p*
R^2 = 0.520	Contact with relatives/friends	−0.661	0.160	−0.139	−4.130	<0.001
	Use of ICT	−2.085	0.375	−0.200	−5.564	<0.001
	Fear due to the COVID-19 pandemic	1.298	0.377	0.171	3.441	<0.001
	Economic status	1.077	0.328	0.148	3.283	0.003
	Acceptance of the COVID-19 pandemic	5.183	0.450	0.548	11.516	<0.001

Note: R^2—coefficient of determination; *B*—unstandardised regression coefficient; SE—standard error; *β*—standardised regression coefficient; *t*—a value of t-statistic; *p*—a significance value.

With linear regression analysis, we also found that with loneliness, we can explain 48% of the total variability of mental well-being ($B = -0.737$; SE = 0.052; $\beta = -0.483$; $t = -14.201$; $p < 0.001$) and 52% of the variability of life satisfaction ($B = -0.475$; SE = 0.031; $\beta = -0.515$; $t = -15.470$; $p < 0.001$). With the Spearman correlation coefficient, we found that life satisfaction and mental well-being strongly correlate ($r_s = 0.724$; $p < 0.001$).

4. Discussion

We aimed to evaluate the loneliness, mental well-being, and life satisfaction of adults in Slovenia during the COVID-19 pandemic. The results show that loneliness is an important variable associated with life satisfaction, mental well-being, and the use of ICT. This study represents the initial approach to bringing the issue of loneliness in modern society to the attention of the younger generations, and not only those who are older. This is particularly crucial when there are unprecedented circumstances, such as the pandemic. It raises a significant issue that, if not evaluated and adequately managed by the healthcare system, could negatively affect an individual's capacity to meet their demands due to decreased life satisfaction and mental well-being. Concern for better mental well-being, not only a desire to be independent in everyday life, is the main goal of public health, which is taken care of by community nurses to the greatest extent. Our positive results revealed that mean values show slightly positive life satisfaction and slightly positive mental well-being despite a higher level of loneliness.

Most of the studies during the COVID-19 pandemic focused on loneliness among older adults in association with the use of ICT [59,60], and some of them also focused on teenagers [61,62]. Some other studies focused on loneliness in association with well-being [63,64] or loneliness in association with quality of life [65,66] among older adults or some other vulnerable group (e.g., adolescents). In a systematic review, Choi and Lee [59] included and analysed 14 studies on the effectiveness of ICT interventions for older adults to reduce loneliness during the COVID-19 pandemic and noted that ICT interventions are needed to respond effectively to the needs of older adults. Our research found that a greater frequency of ICT use is associated with a lower level of loneliness, and at the same time. We also found differences in the use of ICT according to gender, relationship status and level of education, but we did not find differences in the use of ICT between adults of different age groups.

Our results show that loneliness could explain 48% of the total variability in mental well-being and 52% of the variability in life satisfaction. Gubler et al. [67] included 466 adult citizens from Switzerland, and Landmann and Rohmann [68] also had 578 community-dwelling adult citizens from Germany in research on loneliness in association with well-being. According to previous studies, loneliness dimensions varied regarding prevalence during contact restrictions and associations with age and personality. Furthermore, this finding is consistent with the findings of our study, which revealed that participants in partnerships reported better mental well-being and less loneliness. Men reported more increased well-being than women, which is generally in line with previous research [36]. On the other hand, Geirdal et al. [69], in a comparable cross-country study in which 3810 respondents from four countries were included during the COVID-19 pandemic, revealed that 50–74% showed a high level of emotional distress. They found that high-frequency use of social media was associated with poorer mental and psychosocial health. Subjective well-being and health are closely related. Of participants from participating countries, 30% assessed their quality of life as inferior. In our research, 82% of participants self-assessed that their quality of life was changed.

Results show that participants assessed higher levels of loneliness and use of ICT and lower levels of contact with relatives and friends, life satisfaction, and well-being during the COVID-19 pandemic than they considered before the time of the COVID-19 pandemic, which is in line with some other studies, which found a high level of loneliness during the COVID-19 pandemic [8,70] and higher use of ICT [71,72]. As we found loneliness to be an important variable associated with life satisfaction and mental well-being, we also found that life satisfaction and mental well-being are positively strongly associated.

With regression analysis, we found that with variables related to restrictions in the COVID-19 pandemic, e.g., contact with relatives and friends, use of ICT, fear due to the COVID–19 pandemic, acceptance of the epidemic, and economic status, we can explain 52% of the total variability in loneliness. With age, gender, educational level, presence of the chronic disease, independence in everyday life, and living conditions, we can explain

66% of the total variability in loneliness. All variables related to restriction during the COVID-19 pandemic were changed compared to the previous time, which can confirm the higher level of loneliness during the COVID-19 pandemic. In addition to these factors, loneliness is also affected by age, gender, relationship status, and economic status. We found that younger adults (<35 years old) reported higher levels of loneliness and lower levels of well-being compared to adults older than 35. Adults older than 60 assessed their loneliness as the lowest and their mental well-being as the highest. It was also surprising that men assessed a higher level of loneliness than women, which we can explain by the physical and social interaction restrictions. Additionally, many people worked from home and had to stay at home as much as possible. Furthermore, Li and Wang [70] noted that age (group from 18 to 30 years), gender (male), and living with partners predicted loneliness among adults during the COVID-19 pandemic in the United Kingdom. Clair, Gordon, Kroon and Reilly [33] noted that younger adults in their 20s reported greater social isolation than those aged 50 and older during the COVID-19 pandemic. This supports the findings of Nyqvist et al. already in 2016, who found that teenagers and young adults in Finland reported more loneliness than other adults. Individuals who reported higher levels of social isolation were less satisfied with life [33]. ICT interventions have been shown to reduce loneliness in older adults [59]. Given that we found that younger adults rate their loneliness to be higher, it would be reasonable to consider using various ICT interventions to prevent loneliness in everyday life in all adult age groups.

In the presence of chronic disease and a level of (in)dependence in daily activities, we did not find significant differences in the level of loneliness, or even in the level of well-being or life satisfaction. We agree with Gan et al. [73], who noted that we need to be aware of the impact of the environment on our physical, psychological, and mental well-being and life satisfaction. Neighbourhoods and the local community can help us fight against loneliness because, by strengthening interventions in the local community, we can reduce loneliness and positively impact life satisfaction and mental well-being. After the time of the COVID-19 pandemic and according to all the results, local community and health policy needs to recognise the importance of constantly monitoring the levels of loneliness and health and, at the same time, prepare an action plan of activities for the reduction of loneliness and thereby contribute to the greater life satisfaction and mental well-being of community-dwelling adults.

These findings can reduce loneliness as well as improve mental well-being and life satisfaction, can help to predict factors for loneliness, and confirm that loneliness is an important predictor for individuals' mental well-being and life satisfaction. In our study, three variables were included, and involved community-dwelling adults. Until now, research has only mostly focused on one or two variables and mostly on different vulnerable groups.

The strengths of this study lie in the comprehensiveness of data analysis on the association between loneliness, use of ICT, life satisfaction, and the mental well-being of adults. Most studies have investigated the connection with each component separately rather than its entirety with all three elements. The extensive survey was subject to rigorous quality control, making it a high-quality data source.

This study had some limitations that need to be addressed; first, it used a cross-sectional design; therefore, causal inferences could not be made. Second, recall bias can occur in a cross-sectional study, which we point out as a potential study limitation. Another limitation of the study could present the type of sampling and its effect on the results. Due to the majority share of one gender, we cannot generalize the entire results to the whole population. In addition, the study used self-assessed data, which could introduce social desirability bias, where respondents over- or under-report their answers based on social norms. The response rate in the study could also be a limitation, as it was 33.2%, which could be considered satisfactory, and no major system failures were found. However, as participation in the study was voluntary, we do not know whether the sample fully represents the key population characteristics.

Despite these limitations, the present study provided important insights into the association between loneliness, life satisfaction, and well-being as well as the importance of factors related to loneliness according to restrictions during a global health crisis. At the same time, it revealed potential guidelines for future research.

5. Conclusions

Through this study, we identified a link between loneliness, mental well-being and life satisfaction and the resulting impact of the COVID-19 pandemic on adults. Understanding the effects of loneliness on mental well-being and life satisfaction can help to prevent a negative impact on an adult's quality of life. The results of our survey can help health professionals to improve loneliness and mental well-being and life satisfaction, as well as help predict factors of loneliness and confirm that loneliness is an important predictor of mental well-being and life satisfaction in individuals.

6. Patient

No patient or public contribution was required to design, measure, or undertake this research. Head nurses from nursing homes and the community helped to recruit older adults. Older adults contributed only to the data collection.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. The patient(s) provided written informed consent to publish this paper.

Data Availability Statement: Additional data from this study are not publicly available in order to maintain participants' anonymity but can be provided on request.

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