

Elderly people's perceptions of ICT's role in alleviating social isolation during the COVID-19 pandemic

Piia Silvennoinen, Sari Heikkinen

Laurea University of Applied Sciences, Vantaa, Finland

**Piia Silvennoinen, PhD, Laurea University of Applied Sciences, Ratatie 22, FI-01300 Vantaa, FINLAND.
Email: piia.silvennoinen@laurea.fi**

Abstract

Technological advances and increasing life expectancy create a situation where technology becomes embedded in the lives of the elderly in various ways. In March 2020, stay-at-home orders were put into place in Finland to reduce transmission of the SARS-CoV-2 virus. The physical distancing recommendations were especially targeted to the elderly over 70 years old, with guidance to avoid social contacts outside the family. The social isolation caused by the restrictions increased the use of technology among the elderly, for example, as a venue to maintain contact with other people. Based on semi-structured telephone interviews of 10 Finnish elderly gathered during spring 2021, we explored what kind of role Information and Communication Technology (ICT) had in maintaining their personal networks and social activity during the pandemic. The 10 interviewees (7 women and 3 men) were between 65 and 83 years old. They all lived independently in their homes, either alone or with a spouse. The interviews were analysed by using inductive content analysis. The results show that ICT mitigated the experience of social isolation in multiple ways. Technological devices were used for communication, replacing face-to-face interaction. Moreover, interviewees became active on social media, creating blogs and online materials for their children and grandchildren. The interviewees also used different kinds of devices for entertainment purposes. In addition, they participated in various types of online courses and learnt to use the needed everyday devices. The results highlight the importance of ICT in alleviating the social isolation of the elderly during the pandemic. As the pandemic restricted everyday life, it also provided the solitude to dwell in the digital world and learn to use it to maintain daily routines. Furthermore, due to the pandemic, the interviewees' digital skills improved and expanded. This study highlights the importance of technology in promoting health, well-being and active ageing among the elderly.

Keywords: technology, pandemic, elderly, social isolation

Published under a CC BY 4.0 license (<https://creativecommons.org/licenses/by/4.0/>).

Introduction

We are currently experiencing the digitalisation of all spheres of society and an increase in lifespan in Western societies [1,2]. The increased longevity opens a new horizon for investigating the role of new technologies in the lives of the elderly since longer lifespans are at the individual level influenced by and integrated with digital technologies [2]. During the past decades, the elderly have experienced the domestication of ICT, and ICT plays an essential role in their daily life [3,4]. The elderly use ICT for health, leisure and learning purposes [2]. In addition, the digitalisation of public services also concerns the elderly.

It is important to acknowledge that the elderly are not a homogenous group in adopting and using digital technologies since generational and socio-demographic components compound the digital divide among the elderly [2,5–9]. Tech-savvy elderly people tend to have a higher socio-economic status and represent younger cohorts and generations [2,5–9]. Therefore, in designing and developing ICT technologies, the multifaceted nature of ageing should be acknowledged [10–12]. Moreover, addressing the heterogeneity of the elderly as users of digital solutions also promote inclusiveness of the elderly in digital society [11–13].

For many elderly people, the outbreak of COVID-19 challenged the maintenance of everyday functions due to strict recommendations to avoid social contact outside the family sphere [14]. The COVID-19 pandemic increased loneliness among the elderly and negatively affected their social activity [15–17]. Studies have shown that maintaining social connections and personal networks indicates better health and well-being throughout life [14]. Personal networks and social activity protect against a premature decline in health and functioning. Social isolation increases feelings of lone-

liness, poor quality of life and the risk for diseases and disabilities among the elderly [14,18,19]. Therefore, it is sufficient to state that the COVID-19 pandemic posed health-related risks for the elderly.

However, there are differences among the experiences of the elderly related to the COVID-19 pandemic's effects on their personal lives. The studies indicate that the elderly with more comprehensive and encompassing social networks experienced less loneliness during the pandemic [20] and that the pandemic's effects may vary during the pandemic [14]. Moreover, active Internet use among the elderly is linked to high cognitive abilities [21]. However, a Finnish study reveals that the pandemic somewhat decreased the contacts of the elderly with friends and relatives [22]. Another Finnish study found that technology provided a meaningful and important venue to maintain connections with family members during the pandemic [14]. The study also revealed that the elderly seemed to cope well with the social restrictions of the pandemic [14]. In addition, as studies highlight, the use of digital technologies to maintain social contacts and hobbies was relatively common, and Internet use increased during the pandemic among the elderly [23–25]. Studies show that even though stay-at-home orders during the COVID-19 pandemic severely hindered leisure involvement of the elderly, it was successfully replaced and compensated through different kinds of virtual venues and platforms, such as using smartphones, tablets and computers (for example, in videoconferencing) to learn new languages, listen to music and for self-expression (writing) purposes [26–29]. During the pandemic, the elderly were able to adjust their leisure activities in a meaningful way [30].

The aim of the study is to increase the understanding how ICT helped the elderly to cope with the social restrictions imposed upon them during the COVID-19 pandemic. In this study, we concentrated on analysing how the elderly experienced the pandemic and what kind of role technology had in their everyday lives during the pandemic. The study's research question was: What kind of meaning technology had in elderly people's life during the pandemic?

Material and methods

The interview data is a part of the larger research interview entity, that has been conducted in SHAPES-project (*Smart and Healthy Ageing through People Engaging in Supportive Systems* 2019-2023). The project is funded the Horizon 2020 Framework Programme of the European Union for Research Innovation. Grant agreement number: 857159 - SHAPES – H2020 – SC1-FA-DTS – 2018-2020. The aim of the SHAPES project is to provide active and healthy ageing for the elderly of the 14 participant countries through for example technological solutions. The interview data of this article was gathered in the project's work package 2.1 (WP2) titled "Understanding Older People: Lives, Communities and Contexts". Total of eight countries (Czechia, Finland, Germany, Greece, Italy, Northern Ireland, Portugal, Spain) conducted the interviews with the elderly according to the interview protocol's nine themes. The article concentrates on the interviews done with Finnish elderly according to interview protocol's two interview themes that focused on the use of digital services and technology during the pandemic, namely *Corona – experience and Home, Objects and Technology*.

The data collection was approved by Maynooth University Research Ethics Committee on 6th Jan-

uary 2021 (Amendment on Approved Project-Phase1 - SRESC-2020-2409421: SHAPES - Smart and Health Ageing through People Engaging in Supportive Systems; Ethical Review requested for WP2.1. Understanding Older People: Lives, Communities and Contexts). The university was in charge of developing the interview protocol and gaining ethical approval for the interviews on behalf of all participating countries in the SHAPES project.

The data consists of ten semi-structured thematic telephone interviews of Finnish elderly between 68 and 83 years old. The semi-structured interview guide (SSI) consists of fixed set of sequential questions, but also allows additional questions to facilitate further exploration of the issue [31]. Seven of the interviewees were women, and three were men. The interviews aimed to gain an in-depth understanding of a given phenomenon [32]. All interviewees lived independently, either alone or with their spouses. Interviewees lived in different parts of Finland in towns, cities and the countryside. Both authors conducted the interviews, and the interviews were recorded.

The interviewees were recruited through snowball sampling by the second author of the article. She knew an elderly person who was interested in to take part in the research and asked the interviewee to name other possible candidates for the interviews. Snowball sampling is a sampling procedure in which each interviewee lists a possible new candidate to be interviewed [33]. It is often employed with groups that are hard to access otherwise [33]. Snowball sampling was employed because it was a safe way to reach interviewees during the pandemic and it also opened a change to reach interviewees across Finland.

The researchers were not aware beforehand how much the interviewees used ICT in their daily lives.

Each interviewee was interviewed only once, but they could contact the interviewers if they wanted to add something to their interviews. One interviewee wanted to add information to her interview afterwards. The duration of the interviews varied approximately between 62 to 164 minutes. The transcribed and translated research data in English included 262 pages with font size 11 and line spacing being 1,5. Each interviewee orally and voluntarily agreed to participate in the research. In accordance with the ethical research protocol, the interviewees were guaranteed that the interviews and their identities would not be revealed at any point in the research. In the field work we followed General Data Protection Regulation (GDPR).

The qualitative data were analysed using inductive content analysis. Inductive content analysis is based on the process of abstraction in which the researcher reduces and groups data into categories or themes while answering the research questions [34]. In general, inductive content analysis is suitable when there is little knowledge of the phe-

nomenon or when the research on the matter is fragmented [35,36]. Since the interviews were semi-structured thematic interviews, the aim was to get a comprehensive understanding and broad description of the research themes in question [35–38].

In the first phase, each interview was transcribed verbatim. The meaning units related to the research questions were identified and compressed in the second phase. In the third phase, the compressed meaning units were abstracted into codes, followed by the process of groupings, categorisation and leading in the final phase to the category generation through abstraction. The analysis was conducted by both authors. Second author concluded the preliminary analysis of the phases two and three. After that both authors took part in finalizing the analysis. In data analysis no data analysis programme was used. An example of inductive content analysis is described in the Figure number 1.

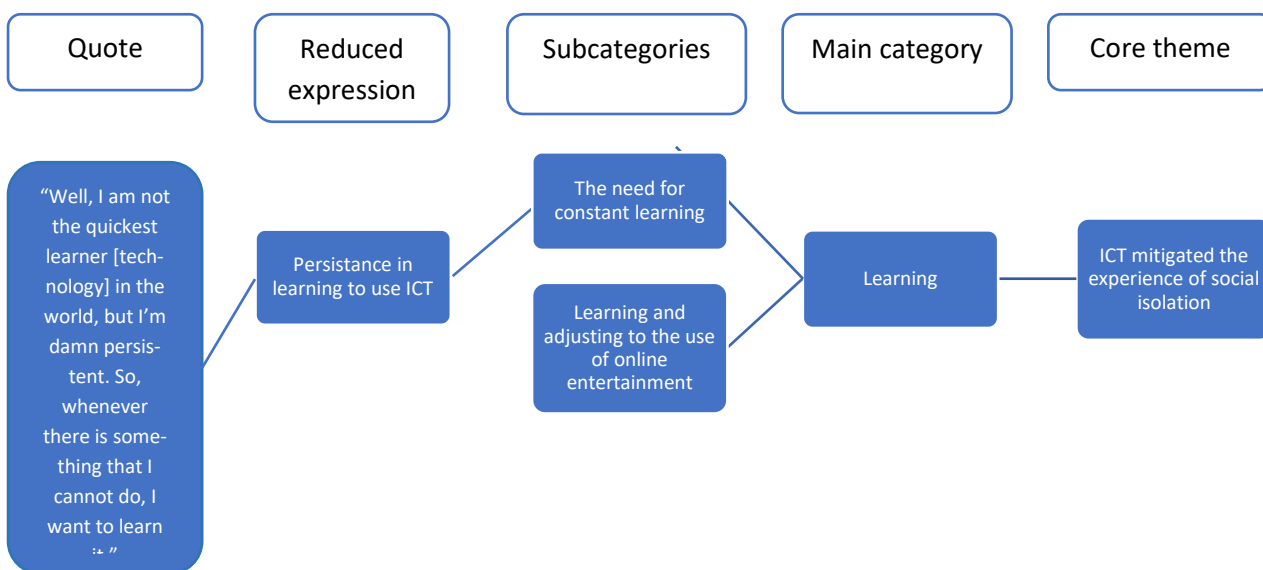


Figure 1. Example of inductive content analysis.

Results

Analysis of the interviews resulted in one core theme: *ICT mitigated the experience of social isolation* and two main categories, *Communication* and *Learning* and their respective subcategories. The main *Communication* category has two subcategories: *Communicating via apps and robots* and *Employing digital devices for self-expression*. The main *Learning* category has two subcategories: *Learning and adjusting to the use of online entertainment* and *The need for constant learning*. The results are first summarised into the core theme and then described according to the main categories and their subcategories. The results are illustrated with interview extracts from the elderly interviewed. The names of the interviewed elderly are pseudonyms.

ICT mitigated the experience of social isolation

The results show that using ICT mitigated the experience of social isolation in multiple ways. Technological devices were used in communication, replacing face-to-face interaction. In addition, the interviewees employed different virtual entertainment platforms and became active in online learning and social media platforms.

Communication

The results show that the pandemic dramatically changed how the interviewees were able to communicate with their family and friends. It prohibited face-to-face social contact with family members and friends. In addition, the pandemic halted all social activities that had brought people together before, such as sports and cultural events. As Jacob states:

It has changed my life in the sense that all the active hobbies I used to do came to a halt.

And of course, if you consider concerts and cultural hobbies, they have also stopped. All interaction and stuff like that has stopped.

Communicating via apps and robots

In the same manner, the interviewees adopted new and alternative ways of communicating with family and friends and integrated themselves into different kinds of virtual social activities. The results show that the interviewees found various ways to keep in contact with family members such as children, grandchildren and friends. The main venue to stay in touch with family and friends during the pandemic seemed to be various WhatsApp groups and smartphones in general. Aliina and Hanna stated:

Well, that's what I use these days, having limited chances to meet and talk to people, so I message them on WhatsApp. (Aliina)

We, yeah, basically, we're [with grandchildren] in contact with each other every day because we have this WhatsApp group called the Heart group. So we message each other daily to let them know we're alive [during the corona pandemic]. (Hanna)

The more intensive use of the WhatsApp application was easy for the interviewees since they were accustomed to using it before the pandemic as a virtual venue for staying in touch. Even though virtual applications enabled them to maintain contact with family members, the interviewees were sad that they could not meet, especially the grandchildren, during the pandemic. As Bertil states:

Our situation lately has been such that our daughter gave birth to a girl in February ... we couldn't go see her at all, it has been a gloomy, awful situation.

However, Bertil and his wife participated in a robotics project through which they received a telepresence robot for personal use. Bertil described the telepresence robot as:

The saving grace was the [communication robot] that brought the girls closer to us, to our breakfast table, and in the evening before going to bed. So, they came into our living room, and we had the chance to sing songs and tell bedtime stories and see how they develop, and things like that.

The telepresence robot enabled them to follow the newborn baby's development and communicate with the baby's family more authentically and comprehensively due to its mobile functionality. The telepresence robot, called Double3, had a tablet screen, and it was on wheels and, therefore, easy to move from room to room.

Employing digital devices for self-expression

Another venue for meaningful contact with family and relatives was writing blogs and digging into family history through online genealogy. For example, Fanny started to write blogs and stories for her grandchildren and other relatives:

I started writing a blog about my childhood memories; they are my grandchild's favourite bedtime stories. So, my daughter suggested why not write them out in a blog so that other relatives could read them, too. And I began with that.

On the other hand, Hanna engaged with online genealogy, for which the isolation caused by the pandemic gave her needed time:

I am focused on doing genealogy, studying my family, and this isolation has proven very useful.

In addition, some interviewees engaged themselves in online courses, and online learning was a positive experience for Aliisa and Eeva:

Since I have taken two courses at the institute—English conversation and Japanese—they are both done remotely now. So, I don't think it's all that bad (Aliina).

Development of Western music. I am glad that I took the course [online]. So yeah, it has increased some activities (Eeva).

Learning

Technological solutions were essential in the interviewees' lives in maintaining social contacts and hobbies during the pandemic. The interviewees adopted and learnt to use different kinds of digital devices and applications daily. Their children and family members encouraged and taught them to use the devices. On the other hand, learning to use the devices was sometimes experienced as a constant and compulsory activity.

Learning and adjusting to the use of online entertainment

During the pandemic, the interviewees used online entertainment for recreational purposes. For example, the closing of libraries led some interviewees to use audiobooks. Fanny vividly describes how she was encouraged by her daughter to use audiobooks:

Well, it has in a way, like all my hobbies have stopped. When the isolation started, my daughter suggested all kinds of activities, and I was excited to try everything out ... I also started listening to audiobooks.

Since the concert halls were closed, the interviewees watched music performances and movies on

YouTube. Eeva, for example, listened to music and watched movies on YouTube:

Well, what's terrible is that I haven't had the chance to go to concerts with my season pass. But I have listened to music on YouTube instead. So there is always some replacement ... and I have also watched more speech programmes and interviews on Areena or movies, so I have been following them much more actively.

Hanna even has a home theatre system:

Then I have, well, you can't really call it 'using', but I have a home theatre speaker system hooked up to my television so I can listen to music. I am able to use that.

Not all the interviewees engaged in using modern online entertainment applications such as YouTube but tended to use more familiar digital applications, such as the Internet and streaming apps for TV. As Gabriella states:

And when I'm at the cabin, and I have no television there—I have a television, but I don't watch it that much, so there, in the mornings I tend to watch whatever's on Areena or Netflix. So, there I keep the computer on the table and turned on more frequently. That's where I read up on everything happening in Finland and the world.

The need for constant learning

However, learning has not always been a voluntary choice but more as a prerequisite to get along in daily living during the pandemic, as in the case of Cecilia:

I got a new phone almost three weeks ago, so I have learnt a lot of this new stuff, and I am

quite courageous to try whenever I feel up to it. My daughter-in-law, whom I mentioned, tells me that I'm more courageous, that I'm not afraid that something will break down and that something crazy might occur—like her mother [laughs]. But these days, from time to time, I have so little energy that I cannot get myself interested in learning new things that are not vital (--) phone that I was forced to learn. And I keep saying to myself: I will not be as fast or capable as I was in my younger days.

In addition, as Lisak states, learning has had its ups and downs because of the constant development of digital applications:

I'm on Facebook, too, but they keep changing it all the time, so I don't always know ... sometimes I don't use it for weeks because I cannot figure out what it all means. But WhatsApp has been very simple to use thus far.

Some interviewees learnt to use only the most necessary digital applications, such as paying bills online, since few bank offices are left in Finland. As Doris points out:

All my bills are e-bills, barring occasional bills. I pay them on my phone. So, that much I can manage.

Discussion

This qualitative study with ten semi-structured telephone interviews among the elderly in Finland during the COVID-19 pandemic showed how adopting ICT alleviated social isolation and sustained their health, well-being and active ageing during the pandemic. The former face-to-face encounters with family and friends and various hobbies and services were replaced by virtual encoun-

ters in a satisfactory manner. The elderly in the study used many technological devices such as smartphones, computers and telepresence robots in many ways to maintain contact with their close ones. In addition, they learnt to use social various media solutions for self-expression purposes and continued their hobbies and learning activities via online venues.

Our findings are consistent with similar conclusions stating that elderly people's ICT-related communication with family, friends and hobbies compensated respective physical engagements in a gratifying manner during the pandemic [14,23,24,25,27–29]. The ability to digitally maintain social connections and hobbies during the pandemic positively affects health and well-being [14]. In addition, the possibility to learn new technologies accumulates as perceived and experienced well-being. However, it is noteworthy to acknowledge the disparity in the experiences since not all interviewees had identical experiences concerning the use and adoption of ICT during the pandemic. Some respondents said they incorporated only the necessary digital solutions into daily living, such as e-banking. These elderly people found the digital solutions challenging to learn and therefore chose not to use them.

The study reveals that the children and family members helped the elderly with digital affairs. Studies show that both the support of social networks and usability and usefulness experiences strongly affect the adoption and use of technological devices among the elderly [3, 5, 10]. Digital technologies are perceived as useful when they provide satisfactory experiences for the elderly, for example when they enhance opportunities to contacts with other people and provide feelings of security [11].

Furthermore, satisfying ICT integration into elderly people's lives requires understanding the diversity and complexity of ageing and incorporating that gained understanding into the design process of technologies [12]. Age-friendly digital technologies are best to support social participation of the elderly through activities they find relevant for themselves, and thus both minimize their social isolation and supporting independent living [11]. Therefore, the attainment of an inclusive digital society needs to meet vulnerable groups' particular needs and acknowledge the issue's complexity [13].

Strengths and limitations

The study findings have both strengths and limitations. First, the data is rather small (N = 10). Thus, the results should be generalised in a qualitative research framework. In qualitative research, the aim is to get an in-depth understanding of a phenomenon. Thus, the sample size is not directive factor [39]. In qualitative research the richness of the sample, meaning the information the sample holds is more essential, than the amount of participants [40].

In addition, the purposive sampling of the study aimed to guarantee the appropriateness and adequacy of the sample, thus enabling the transferability of the qualitative research findings to people and settings that resemble those in the present study [41]. The interviewees do not represent the variety of the elderly population in Finland. They form a rather homogeneous group that has access to digital services and technology. The study also reveals that Finland, as a big and sparsely populated country, has good Internet connections that offer everyone the same possibilities to use digital services and technology.

Conclusion

Study findings underscore the role of communication technology in preventing social isolation of the elderly during the COVID-19 pandemic. Findings emphasize that the elderly found innovative means to stay active and in contact with other people by using different kind of digital solutions. Our findings suggest that the adoption of ICT had positive effects on wellbeing, it promoted the overall wellbeing, including social participation, communications and contacts with other people and thus enabled active ageing of the elderly of the study during the pandemic.

However, what is noteworthy to acknowledge is that the realities among the elderly in adopting and using ICTs varies greatly. The elderly people are heterogeneous group because of generational and sociodemographic components. Therefore, it is important to conduct future research on the matter with larger and more diverse samples.

References

- [1] Houssein C. Seniors and technologies: Issues of inclusion and exclusion. *Can J Commun.* 2017;42(2):189-194. <https://doi.org/10.22230/cjc.2017v42n2a3277>
- [2] Taipale S, Hänninen R. More Years, More Technologies: Aging in the Digital Era. *Human Technology.* 2018;14(3):258-263. <https://doi.org/10.17011/ht/urn.201811224833>
- [3] Olsson T, Viscovi D. Warm Experts for Elderly Users: Who Are They and What Do They Do? *Human Technology.* 2018;14(3):324-342. <https://doi.org/10.17011/ht/urn.201811224836>
- [4] Näsi M, Räsänen P, Sarpila O. ICT activity in later life: Internet use and leisure activities amongst senior citizens in Finland. *Eur J Ageing.* 2011 Dec 21;9(2):169-176. <https://doi.org/10.1007/s10433-011-0210-8>
- [5] Friemel TN. The digital divide has grown old: Determinants of a digital divide among seniors. *New Media Soc.* 2016;18(2):313-331. <https://doi.org/10.1177/1461444814538648>
- [6] Godfrey M, Johnson O. Digital circles of support: Meeting the information needs of older people. *Comput Hum Behav.* 2009;25(3):633-642. <https://doi.org/10.1016/j.chb.2008.08.016>
- [7] Hargittai E, Dobransky K. Old dogs, new clicks: Digital inequality in skills and uses among older adults. *Can J Commun.* 2017;42(2):195-212. <https://doi.org/10.22230/cjc.2017v42n2a3176>

Conflict of interest

The authors have no conflict of interest.

Acknowledgements

The study is part of and funded by two projects:

SHAPES: Smart and Healthy Ageing through People Engaging in Supportive Systems—funded by the Horizon 2020 Framework Programme of the European Union for Research Innovation. Grant agreement number: 857159–SHAPES–H2020-SC1-FA-DTS-2018-2020.

Towards socially inclusive digital society: transforming service culture project (DigiILN), [Grant numbers 327169/327145 and 352506/352501], funded by the Strategic Research Council at the Academy of Finland.

- [8] Siren A, Knudsen SG. Older adults and emerging digital service delivery: A mixed methods study on information and communications technology use, skills, and attitudes. *J Aging Soc Policy*. 2017 Jan-Feb;29(1):35-50. <https://doi.org/10.1080/08959420.2016.1187036>
- [9] Spann A, Stewart E. Barriers and facilitators of older people's mHealth usage: A qualitative review of older people's views. *Human Technology*. 2018 Nov;14(3):264-296. <https://doi.org/10.17011/ht/urn.201811224834>
- [10] Schreurs K, Quan-Haase A, Martin K. Problematizing the digital literacy paradox in the context of older adults' ICT use: Aging, media discourse, and self-determination. *Can J Commun*. 2017;42(2):359-377. <https://doi.org/10.22230/cjc.2017v42n2a3130>
- [11] Fischl C, Lindelöf N, Lindgren H, Nilsson I. Older Adults' Perceptions of Contexts Surrounding their Social Participation in a Digitalized Society – An Exploration in Rural Communities in Northern Sweden. *Eur J Ageing*. 2020 Feb 11;17(3):281-290. <https://doi.org/10.1007/s10433-020-00558-7>
- [12] Evangelista L, Steinhubl SR, Topol EJ. Digital health care for older adults. *Lancet*. 2019 Apr 13;393(10180):1493. [https://doi.org/10.1016/S0140-6736\(19\)30800-1](https://doi.org/10.1016/S0140-6736(19)30800-1)
- [13] Rantanen T, Gluschkoff K, Silvennoinen P, Heponiemi T. The Associations Between Mental Health Problems and Attitudes Toward Web-Based Health and Social Care Services: Evidence from a Finnish Population-Based Study. *Journal of Med Internet Res*. 2021; 23(9):28066. <https://doi.org/10.2196/28066>
- [14] Kulmala J, Tiilikainen E, Lisko I, Ngandu T, Kivipelto M, Solomon A. Personal Social Networks of Community-Dwelling Old During the Covid-19 Pandemic – A Qualitative Study. *Front Public Health*. 2021 Dec 24;9:770965. <https://doi.org/10.3389/fpubh.2021.770965>
- [15] Dahlberg L. Loneliness during the COVID-19 pandemic. *Aging Ment Health*. 2021 Jul;25(7):1161-1164. <https://doi.org/10.1080/13607863.2021.1875195>
- [16] Luchetti M, Lee JH, Aschwanden D, Sesker A, Strickhouser JE, Terracciano A, Sutin AR. The trajectory of loneliness in response to COVID-19. *Am Psychol*. 2020 Oct;75(7):897-908. <https://doi.org/10.1037/amp0000690>
- [17] Kotwal AA, Holt-Lunstad J, Newmark RL, Cenzer I, Smith AK, Covinsky KE, et al. Social Isolation and Loneliness Among San Francisco Bay Area older Adults During the Covid-19 shelter-in-place orders. *J Am Geriatr Soc*. 2021 Jan;69(1):20-29. <https://doi.org/10.1111/jgs.16865>
- [18] Harrison J, Ryan J. Musical taste and ageing. *Ageing Soc*. 2010;30(4):649–669. <https://doi.org/10.1017/S0144686X09990778>
- [19] Karp A, Paillard-Borg S, Wang HX, Silverstein M, Winblad B, Fratiglioni L. Mental, physical and social components in leisure activities equally contribute to decrease dementia risk. *Dement Geriatr Cogn Disord*. 2006;21(2):65-73. <https://doi.org/10.1159/000089919>
- [20] Macdonald B, Huler G. Well-being and loneliness in Swiss older adults during the COVID-19 pandemic: the role of social relationships. *Gerontologist*. 2021 Feb 23;61(2):240-250. <https://doi.org/10.1093/geront/gnaa194>
- [21] Taylor AM, Page D, Okely JA, Corley J, Welstead M, Skarabela B, et al. Impact of COVID-19 lockdown on psychosocial factors, health, and lifestyle in Scottish octogenarians: the Lothian Birth cohort 1936 study. *PLoS One*. 2021 Jun 17;16(6):e0253153. <https://doi.org/10.1371/journal.pone.0253153>

- [22] Lehtisalo J, Palmer K, Mangialasche F, Solomon A, Kivipelto M, Ngandu T. Changes in lifestyle, behaviors, and risk factors for cognitive impairment in older persons during the first wave of the coronavirus disease 2019 pandemic in Finland: results from the FINGER study. *Front Psychiatry*. 2021 Feb 12;12:624125. <https://doi.org/10.3389/fpsy.2021.624125>
- [23] Kremers EM, Janssen JHM, Nieuwboer MS, Olde Rikkert MGM, Peeters GMEEG. The psychosocial adaptability of independently living older adults to COVID-19 related social isolation in the Netherlands: A qualitative study. *Health Soc Care Community*. 2022 Jan;30(1):e67-e74. <https://doi.org/10.1111/hsc.13436>
- [24] Whitehead BR, Torossian E. Older adults' experience of the COVID-19 pandemic: a mixed-methods analysis of stresses and joys. *Gerontologist*. 2021 Jan 21;61(1):36-47. <https://doi.org/10.1093/geront/gnaa126>
- [25] Wallinheimo AS, Evans SL. More frequent internet use during the COVID-19 pandemic associates with enhanced quality of life and lower depression scores in middle-aged and older adults. *Healthcare (Basel)*. 2021 Apr 1;9(4):393. <https://doi.org/10.3390/healthcare9040393>
- [26] Alonso Ruiz RA, Sáenz de Jubera Ocón M, Valdemoros San Emeterio MA, Ponce de León Elizondo A. Digital Leisure: An Opportunity for Inter-generational Well-Being in Times of Pandemic. *J. New Approaches in Educ Res*. 2022;11(1):31-48. <https://doi.org/10.7821/naer.2022.1.806>
- [27] Rivera-Torres S, Mpofu E, Keller MJ, Ingman S. Older Adults' Mental Health Through Leisure Activities During COVID-19: A Scoping Review. *Gerontol Geriatr Med*. 2021 Aug 9;7:23337214211036776. <https://doi.org/10.1177/23337214211036776>
- [28] Strutt PA, Johnco CJ, Chen J, Muir C, Maurice O, Dawes P, Siette J, Dias CB, Hillebrandt H, Wuthrich VM. Stress and coping in older Australians during COVID-19: Health, service utilisation, grandparenting, and technology use. *Clin Gerontol*. 2022 Jan-Feb;45(1):106-119. <https://doi.org/10.1080/07317115.2021.1884158>
- [29] von Humboldt S, Mendoza-Ruvalcaba NM, Arias-Merino ED, Costa A, Cabras E, Low G, Leal I. Smart technology and the meaning in life of older adults during the COVID-19 public health emergency period: A cross-cultural qualitative study. *Int Rev Psychiatry*. 2020 Nov-Dec;32(7-8):713-722. <https://doi.org/10.1080/09540261.2020.1810643>
- [30] Koskinen VK, Leinonen EA. Leisure Adjustments of Older Finnish Adults during the Early Stages of the COVID-19 Pandemic. *Int J Sociol Leis*. 2022;5:373-391. <https://doi.org/10.1007/s41978-022-00113-x>
- [31] Cachia M, Millward L. The telephone medium and semi-structured interviews: a complementary fit. *Qual Res Organ Manag*. 2011;6(3):265-277. <https://doi.org/10.1108/17465641111188420>
- [32] Ryan F, Coughlan M, Cronin P. Interviewing in qualitative research: the one-to-one interview. *Int J Ther Rehabil*. 2013 Sep;16(6):309-314. <https://doi.org/10.12968/ijtr.2009.16.6.42433>
- [33] Noy C. Sampling knowledge: the hermeneutics of snowball sampling in qualitative re-search. *Int J Soc Res Methodol* 2008 Oct;11(4):327-344. <https://doi.org/10.1080/13645570701401305>
- [34] Kyngäs H. Inductive Content Analysis. In: Kyngäs H, Mikkonen H, Kääriäinen M (Eds). *The Application of Content Analysis in Nursing Science Research*. Springer; 2020. p. 13-21. https://doi.org/10.1007/978-3-030-30199-6_2

- [35] Elo S, Kyngäs H. The Qualitative Content Analysis Process. *J Adv Nurs*. 2008 Apr;62(1):107-15. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>
- [36] Tuomi J, Sarajärvi A. *Laadullinen tutkimus ja sisällönanalyysi*. Tammi; 2013.
- [37] Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psych*. 2006;3(2):77–101. <https://doi.org/10.1191/1478088706qp063oa>
- [38] Braun V, Clarke V. Conceptual and design thinking for thematic analysis. *Qual Psych*. 2022; 9(1):3-26. <https://doi.org/10.1037/qup0000196>
- [39] Dworkin SL. Sample Size Policy for Qualitative Studies Using In-Depth Interviews. *Arch Sex Behav*. 2012 Dec;41(6):1319-20. <https://doi.org/10.1007/s10508-012-0016-6>
- [40] Malterud K, Siersma VD, Guassora AD. Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qual Health Res*. 2016 Nov;26(13):1753-1760. <https://doi.org/10.1177/1049732315617444>
- [41] Polit DF, Beck CT. Generalization in quantitative and qualitative research: Myths and strategies. *Int J Nurs Stud*. 2010 Nov;47(11):1451-8. <https://doi.org/10.1016/j.ijnurstu.2010.06.004>