

## **Video-based communication and its association with loneliness, mental health and quality of life among older people during the COVID-19 outbreak**

### Authors:

Tore Bonsaksen<sup>1, 2</sup>, Hilde Thygesen<sup>2, 3</sup>, Janni Leung<sup>4</sup>, Mary C. Ruffolo<sup>5</sup>, Mariyana Schoultz<sup>6</sup>, Daicia Price<sup>5</sup>, Amy Østertun Geirdal<sup>7</sup>

### Affiliations:

<sup>1</sup>Department of Health and Nursing Science, Faculty of Social and Health Sciences, Inland Norway University of Applied Sciences, Elverum, Norway. ORCiD 0000-0001-6315-1111

<sup>2</sup>Faculty of Health Studies, VID Specialized University, Sandnes, Norway

<sup>3</sup>Oslo Metropolitan University, Faculty of Health Sciences, Department of Occupational Therapy, Prosthetics and Orthotics, Oslo, Norway. ORCiD 0000-0002-5942-0662

<sup>4</sup>Faculty of Health and Behavioural Science, The University of Queensland, Brisbane, Australia

<sup>5</sup>University of Michigan, School of Social Work, Ann Arbor, MI, USA. ORCiD 0000-0003-1293-5025 (MCR)

<sup>6</sup>Northumbria University, Faculty of Health and Life Sciences, Newcastle, UK

<sup>7</sup>Oslo Metropolitan University, Faculty of Social Sciences, Department of Social Work, Oslo, Norway. ORCiD 0000-0003-0016-8244

Corresponding author: Tore Bonsaksen, Department of Health and Nursing Science, Faculty of Social and Health Sciences, Inland Norway University of Applied Sciences, Elverum, Norway. [tore.bonsaksen@inn.no](mailto:tore.bonsaksen@inn.no)

## Abstract

The aim of the study was to examine the use of video-based communication and its association with loneliness, mental health and quality of life in older adults (60-69 years versus 70+ years) during the COVID-19 pandemic. A cross-sectional online survey was conducted in Norway, UK, USA and Australia during April/May 2020, and 836 participants in the relevant age groups were included in the analysis. Multiple regression analyses were conducted to examine associations between use of video-based communication tools and loneliness, mental health and quality of life within age groups, while adjusting by sociodemographic variables. Video-based communication tools were found to be more often used among participants aged 60-69 years (60.1%), compared to participants aged 70 or above (51.8%,  $p < 0.05$ ). Adjusting for all variables, use of video-based communication was associated with less loneliness ( $\beta = -0.12$ ,  $p < 0.01$ ) and higher quality of life ( $\beta = 0.14$ ,  $p < 0.01$ ) among participants aged 60-69 years, while no associations occurred for participants in the oldest age group. The use of video-based communication tools was therefore associated with favorable psychological outcomes among participants in their sixties, but not among participants in the oldest age group. The study results support the notion that age may influence the association between use of video-based communication tools and psychological outcomes amongst older people.

**Keywords:** coronavirus; cross-national study; pandemic; physical distancing; psychological outcomes; social distancing

## 1. Introduction

Current video-based communication tools use an internet connection to allow users to communicate in real-time and see each other while doing so. In recent years, several such tools have also developed to enable digital sharing of materials between the persons taking part in the call. Thus, video-based communication tools can greatly enhance the possibilities for exchange as well as the general communication experience, in comparison to regular telephone calls. While the first video-based communication system was launched by AT&T in 1964 [1], recent years have seen great improvements in the employed technologies and there is much competition to attract users.

With the onset of the global COVID-19 pandemic in March 2020, many countries experienced a lockdown. People were generally instructed to practice ‘social distancing’ [2], which implied maintaining a physical distance to people outside the household and, as far as possible, to stay at home to prevent viral spread. Schools and nurseries were closed, as were many shops and businesses [3]. Flights and travels were cancelled, as were all sporting, religious and cultural events. Practically overnight, working from home and attending online classes became the new standard for many workers and students. In this situation, the worldwide use of video-based communication tools peaked exceptionally: in March 2020, Skype was reported to have 100 million monthly users and 40 million users daily, representing a 70 % increase since the preceding month [4]. In April 2020, Zoom experienced 300 million daily meeting participants [5]. It seems fair to assume that a substantial part of the increase in the use of video-based communication tools was related to the communication needs of companies and employees working remotely. However, as the pandemic imposed radical restrictions on face-to-face social contact, video-based communication also became one viable way of maintaining personal contact in a situation where regular contact was difficult or even prohibited [6-9].

Promoting mental health and preventing loneliness through the use of such technologies seems particularly relevant for older people who are at higher risk of severe illness or fatal outcome if exposed to the virus. However, studies have shown that people of older age may have barriers in access to information and communication technologies (ICTs) in general [10], and may be less inclined to use them, regardless of purpose [10-12]. Thus, paradoxically, it appears that those who may experience the most personal benefit from using such communication technologies may be the least likely to adopt them.

Notwithstanding the potential of such technologies to reduce social and health inequities [9,13], previous studies on the use of video-based communication in the delivery of interventions targeting mental health have been ambiguous in their conclusions. While short-term success from remote therapy for mental health problems has been found, older people's poorer access to and competence in using ICTs may hinder its implementation [14]. A review of three studies concerned with nursing home residents showed little to no evidence of improvements in loneliness, depression or quality of life due to the use of video-based communication [15], whereas other studies have concluded in favor of using new technologies (in a broader sense) to tackle social isolation and loneliness among older people [16-18]. Moreover, research on the association between use of ICTs in general and psychological outcomes have suggested that the very old may experience greater benefits, compared to those not so old. For example, Fang and co-workers [19] found that age moderated the association between use of ICTs and psychological well-being among the elderly. Only among those in the oldest age group (75+ years), was use of ICTs was associated with higher well-being, and particularly so where ICTs facilitated contact with family members.

In view of the literature review above, those in the oldest age group may have a particularly restricted social life due to COVID-19. Thus, their use of video-based

communication tools may have the potential to protect against loneliness and promote mental health and quality of life. However, poorer ICT competence and familiarity among the oldest may hinder the realization of this potential. Explorative research on the associations between the use of video-based communication and psychological outcomes in different age groups is therefore warranted. Increased knowledge in this area may inform healthcare workers, policymakers and the general public about the role of video-based communication tools among older people.

### *1.1 Study aim*

The aim of this study was to examine the use of video-based communication and its association with loneliness, mental health and quality of life in older adults aged 60-69 years versus 70+ years during the COVID-19 pandemic.

## **2. Materials and methods**

### *2.1 Procedure*

An invitation to participate in this self-administered survey was distributed via different social media in Norway, USA, UK and Australia during April and May 2020 [20,21]. Each country had a landing site for the survey at the researcher's universities; OsloMet - Oslo Metropolitan University, Norway; University of Michigan, USA; University of Salford, UK; and the University of Queensland, Australia, respectively. The initiator of the project was AØG from OsloMet, but all countries and universities had their own head of the project, due to ethical considerations and permissions. The survey was translated from Norwegian to English by the researchers according to language and cultural contexts. To be included in the study, participants had to be 18 years or older, understand Norwegian or English and live in Norway, USA, UK or Australia. Further, to be included in the analyses of the current substudy, participants were required to be 60 years or older.

## 2.2 Measures

### 2.2.1 Sociodemographic characteristics

Sociodemographic variables included age group (60-69 years versus 70 years and above), sex (male versus female), highest completed education level (high school, associated/technical degree or lower versus bachelor's degree or higher), cohabitation (living with spouse or partner versus not), and employment status (having full-time or part-time employment versus not).

### 2.2.2 Use of video-based communication platforms

The participants were asked to indicate (yes versus no) whether they used any of the following video-based communication platforms: FaceTime, Skype, Zoom, and Teams. A categorical variable was created to distinguish between those who used at least one of these video-based communication platforms, and those who did not.

### 2.2.3 Loneliness

The Loneliness Scale [22] consists of six statements, all of which rated from 0 (totally disagree) to 4 (totally agree). It was designed to measure two different aspects of loneliness, social loneliness (e.g., "There are plenty of people I can rely on when I have problems") and "emotional loneliness" (e.g., "I experience a general sense of emptiness"). Previous studies have suggested that the six statements may be used with two viable factor solutions: a two-factor solution reflecting social and emotional loneliness as two different aspects of loneliness, or with a one-factor solution suggesting that all six items tap into one general construct of loneliness [22,23]. In this study, the one-factor solution was used. Cronbach's  $\alpha$  was 0.74 for the 6-item loneliness scale. Score range is 0-24 with higher scores indicating more loneliness.

### 2.2.4 Mental health

General Health Questionnaire 12 (GHQ-12) is widely used as a self-report measure of mental health [24,25]. A large number of studies in the general adult population, clinical populations, work populations and student populations have provided support for its validity across samples and contexts [25-28]. Six items of the GHQ-12 are phrased positively (e.g. 'able to enjoy day-to-day activities'), while six items are phrased as a negative experience (e.g. 'felt constantly under strain'). On each item, the person indicates the degree to which the item content has been experienced during the two preceding weeks, using four response categories ('less than usual', 'as usual', 'more than usual' or 'much more than usual'). Items are scored between 0 and 3, and positively formulated items are recoded prior to analysis. As a result, the GHQ-12 scale score range is 0-36, with higher scores indicating poorer mental health (more psychological distress). Cronbach's  $\alpha$  was 0.89 in this sample.

#### 2.2.5 Quality of life

Cantril's ladder (CL) is a self-administered overall quality of life (QoL) questionnaire with one question; "How is your life", asking the person to rate his or her present experience of life on a scale anchored by their own identified values [29]. The response alternatives range between 0 and 10 with 0 = worst possible QoL and 10 = best possible QoL. Good QoL is often operationalized as having a CL score of six or above. The CL has been reported to have good validity and stability and reasonable reliability [30,31].

#### 2.3 Statistical analysis

Group proportions within sex, education level, cohabitation, employment status and use of video-based communications were compared by Chi-Square tests. Ratings on loneliness, mental health and quality of life were compared between participants in the two age groups by independent *t*-tests. Adjusted associations between independent variables and each of the outcome variables (loneliness, mental health and quality of life) were assessed with multiple linear regression analyses. Within each of the two age groups, ratings on the

outcome variables were assessed in relationship to use or non-use of video-based communication platforms, while adjusting by sex, education level, cohabitation and employment status. Statistical significance was set at  $p < 0.05$ .

#### 2.4 Ethics

The data in this cross-sectional and cross-country study were collected anonymously. All ethical rules were followed in each country. The study was thereby quality assured and approved by OsloMet (20/03676) and the regional committees for medical and health research ethics (REK; ref. 132066) in Norway, reviewed by the University of Michigan Institutional Review Board for Health Sciences and Behavioral Sciences (IRB HSBS) and designated as exempt (HUM00180296) in USA, by University Health Research Ethics (HSR1920-080) in UK, and (HSR1920-080) 2020000956 in Australia.

### 3. Results

#### 3.1 Participants

The characteristics of the sample are displayed in Table 1, with age groups comparisons. The sample consisted of 836 individuals in total: Norway ( $n = 93$ , 11.1 %), USA ( $n = 417$ , 49.9 %), UK ( $n = 273$ , 32.7 %) and Australia ( $n = 53$ , 6.3 %), and the larger proportion was aged 60-69 years ( $n = 612$ , 73.2 %). The majority (75.7 %) were women, and 70.2 % had education at the bachelor's degree level or higher. Among those aged 60-69 years ( $n = 612$ ), full-time or part-time employment was held among 47.7%. Among those aged 70 years or more ( $n = 224$ ), having employment was less common (16.5 %,  $p < 0.001$ ). Use of video-based communication was more common among those aged 60-69 (60.1 %), compared to those in the oldest age group (51.8 %,  $p < 0.05$ ).

**Table 1. Sample characteristics with age group comparisons**

Characteristics	Age 60-69 years		Age 70 years and above		p
	n	%	n	%	
Sex					0.32
Male	140	23.0	58	26.2	
Female	470	77.0	163	73.8	
Education level					0.64
High school or lower	185	30.2	64	28.6	
Bachelor's degree or higher	427	69.8	160	71.4	
Cohabitation					0.24
Yes	396	74.3	127	69.8	
No	137	25.7	55	30.2	
Employment					< 0.001
Full-time or part-time	292	47.7	37	16.5	
No	320	52.3	187	83.5	
Video-based communication					
FaceTime	280	47.0	79	36.7	< 0.05
Skype	197	33.1	48	22.1	< 0.01
Zoom	87	14.9	27	12.7	0.42
Teams	33	5.7	8	3.8	0.27
At least one of the above	368	60.1	116	51.8	< 0.05
Psychological factors	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Loneliness	9.3	4.4	9.1	4.4	0.58
Mental health	15.1	6.5	14.2	5.7	0.05
Quality of life	6.8	2.2	7.0	2.1	0.09

*Note.* Statistical tests are Chi-Square tests (categorical variables) and independent *t*-tests (continuous variables). Cohabitation refers to 'living with spouse or partner'.

Table 1 also displays the levels of loneliness, mental health and QoL according to age groups. More mental health problems among those aged 60-69 years compared to those aged 70 or older ( $M = 15.1$  versus  $M = 14.2$ , respectively,  $p = 0.05$ ) bordered statistical significance. For loneliness and QoL, the differences were not statistically significant.

### 3.2 Adjusted associations between use of video-based communication and loneliness, mental health and quality of life

The results from the adjusted linear regression analyses are reported in Table 2. Adjustments were made for gender, education, employment and cohabitation status. Among participants aged 60-69 years, use of video-based communication platforms was associated with lower ratings on loneliness ( $\beta = -0.12$ ,  $p < 0.01$ ) and higher QoL ratings ( $\beta = 0.14$ ,  $p < 0.01$ ). Among participants aged 70 years or older, use of video-based communication platforms was not significantly associated with any of the outcome measures.

**Table 2. Adjusted associations between use of video-based communication and loneliness, mental health and quality of life within age groups**

Independent variables	Age 60-69 (n = 612)			Age 70 and above (n = 224)		
	Loneliness	MH	QOL	Loneliness	MH	QOL
Female sex	0.02	0.14**	-0.09*	0.10	0.28***	-0.21**
Having higher education	-0.01	-0.07	0.04	-0.13	0.06	-0.02
Spouse/partner	-0.21***	-0.07	0.16***	-0.16*	-0.03	0.17*
Having employment	-0.08	-0.14***	0.03	-0.06	-0.06	0.14
Use of video-based communication	-0.12**	-0.07	0.14**	-0.03	0.01	-0.04
<b>Explained variance</b>	<b>6.6 %</b>	<b>4.9 %</b>	<b>6.1 %</b>	<b>7.3 %</b>	<b>8.4 %</b>	<b>10.4 %</b>

*Note.* MH is mental health, as measured with the General Health Questionnaire. QOL is quality of life, as measured with Cantril's ladder. Table content is standardized  $\beta$  weights. Higher ratings on loneliness and QOL is more loneliness and higher QOL, while higher ratings on MH is poorer MH. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

Across age groups, female gender was consistently associated with poorer mental health and QoL, while living with a spouse or partner was consistently associated with less loneliness and better QoL. Having employment was associated with better mental health among those aged 60-69 years. Each of the regression models accounted for small proportions of the outcome variance (between 4.9 % and 10.4 %).

#### 4. Discussion

This study examined the use of video-based communication and its association with loneliness, mental health and quality of life in older adults between two different age groups (60-69 years versus 70 years or above) during the COVID-19 pandemic. In summary, more than half of the participants in both groups used video communication, with the older group using video communication less often. Among those aged 70 or more, the use of video-based communications was not related to any of the psychological outcomes. Among those aged 60-69 years, in contrast, the use of video-based communication was significantly related to lower loneliness and higher quality of life, although with small effect sizes. Overall, there were similar levels of loneliness, mental health, and quality of life across the two age groups.

Video-based communication was used by more than half of the participants in each age group, but was more often used among those aged 60-69, compared to their older counterparts. The generally frequent use of video-based communication tools in both age groups may be interpreted as a reflection of the recruitment procedure. Recruitment by social media may have skewed the sample towards having more participants who are familiar with ICTs in general, including the use of video-based communication tools. However, the lower proportion of participants in the oldest age group using video-based communication tools may reflect the findings in prior studies [10-12], suggesting that the inclination to use video-based communication tools, and indeed ICTs in general, decreases in old age. This finding may also

reflect a generational gap in digital competence, as those in the age 70+ are less likely to have been exposed to digital technologies in their previous employment and everyday life than younger generations.

In addition, a higher proportion of the 60-69 age group were still in employment compared to the 70 and older group, which may also account for the differences in use of video-based tools. With the onset of COVID-19 the use of video-based communication tools, such as Skype and Zoom, increased radically [4,5], and a substantial part of the increase was likely related to the communication needs of companies and employees working remotely.

Among those aged 70 years or older, the study showed no significant associations between use of video-based communications and any of the psychological outcome measures. In other words, their variations in loneliness, mental health and quality of life were not dependent on whether or not they used video-based communications. Thus, our findings support the view presented by Noone and co-workers [15], essentially stating no effect of videocall interventions to reduce loneliness in older adults. However, one should take into account the moderation effects found by Fang and co-workers [19], indicating that the association between ICT use in general and personal well-being was present only among those having contact with family members and only among frail participants. Thus, the role of the person with whom there is contact, appears to matter a great deal. In short: if family members count and others do not, this qualification may explain poor effects of telehealth interventions implemented by volunteers or healthcare personnel. Moreover, the moderation effect of frailty status may indicate that video-based contact can be helpful, but only when the option of having face-to-face contact is reduced. Thus, if the oldest participants in our study were still able to have regular contact with other people, this may explain the lack of association between video-based communication and the psychological outcomes.

Among the oldest participants, it could also be that video-based contact needs to be initiated by family members such as children and grandchildren. In support of this reasoning, a qualitative study from Norway found that the sample of very old persons (median age 90.5 years) were predominantly “passive” users of video-based communication solutions – receiving calls, but not necessary themselves making calls [32]. This may be due to lack of confidence and competence with the technological solutions, and fear of doing something wrong. As a consequence, video-based communication may not be experienced as an available option when they feel lonely and in need of support.

Among those aged 60-69 years, using video-based communication tools was significantly associated with lower loneliness and better quality of life. Among participants in this group, almost 50 % still had full-time or part-time employment. Therefore, the association might partly reflect that employed participants were able to use video-based tools to connect with their colleagues, students, collaborators and work partners in job-related activities, which in turn might protect against a sense of loneliness and reduced quality of life. For those in employment, regular video-based job meetings might contribute to cover their need for contact with people outside of their own household. Thus, their use of video-based communication tools may be logically related to better quality of life and less loneliness.

In comparison to the oldest participants, it could also be that participants who were in their sixties would be more comfortable with using ICTs in general [10-12], and were able to use them in a way that served their needs for connecting with the people who were important to them [19]. Moreover, feeling familiar with video-based communication tools may make the technologically mediated interactions feel more ‘real’, as opposed to the somewhat estranged feeling that may come as a result of using technologies that are unfamiliar.

#### *4.1 Study limitations*

The study is a sub-study of a larger cross-national comparative survey concerned with the impact of social distancing on mental health and quality of life during the early stages of the COVID-19 outbreak [20,21]. Recruitment to the study was performed by distributing the link to the web-based survey via social media; thus, participants in the study were likely to be regular social media users. Compared to the general population, the participants were largely female and highly educated. Therefore, the generalizability of the results to the general populations of the involved countries may be questioned. Our study may have missed older adults with lower education who may experience greater barriers with accessing video-based communication to keep connected during these challenging times. The sample size of the age groups analyzed in this study (60-69 years and 70+ years) were too small to allow for rerunning the analyses by country. There may be differences between countries because of different social distancing policies in place, with mental health consequences, to protect older adults as they are at higher risk of severe consequences if they get infected with COVID-19. Future studies in this field of research may preferably ascertain sufficient group sizes to enable the investigation of whether associations vary between countries. They may also assess more specifically how often video-based communication tools was used and for what purposes they were used (e.g., work-related or personal use; contact with co-workers, business partners, family or friends).

The comparisons were between participants in two different age-groups. About 50% of the respondents in the 60-69 age group were still in work, which might have had an impact on the results. A recent systematic review of general population studies found that employment protected against mental distress during the early stage of the pandemic [33]. However, our finding that the use of video-based communication were associated with lower loneliness and better quality of life was still valid (and a better predictor than employment) after adjusting for employment status.

## 5. Conclusion

This study examined the use of video-based communication and its association with loneliness, mental health and quality of life among older adults during the COVID-19 pandemic. A larger proportion of participants aged 60-69 years used video-based communication tools, compared to those aged 70 years or above. Using such tools was associated with less loneliness and higher quality of life among participants in their sixties, whereas no significant associations were found among participants in the oldest age group. The study results support the notion that age may influence the association between use of video-based communication tools and psychological outcomes amongst older people, whereas the nature of this influence was in contrast to previous research. The working mechanism underpinning these results may concern more work participation among participants aged 60-69 years and less familiarity with ICTs among persons in the oldest age group.

## Acknowledgements

The authors acknowledge the time and efforts spent by the participants when responding to the survey.

## Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Regional Committee for Medical and Healthcare Ethics (protocol code 132066, approval date 6 April 2020).

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

## Funding

The study received no funding.

## Conflicts of interest

No conflicts interest is reported.

**Data availability**

The data presented in this study are available on request from the corresponding author by completion of the research project. The data are not publicly available due to ongoing publication from the project.

## References

1. Senft, T.M. Videoconferencing. Available online: <https://www.britannica.com/technology/videoconferencing> (accessed on 16 April, 2021)
2. World Health Organization. Coronavirus disease (COVID-19) advice for the public. Available online: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public> (accessed on 16 April, 2021)
3. Blustein, D.L.; Duffy, R.; Ferreira, J.A.; Cohen-Scali, V.; Cinamon, R.G.; Allan, B.A. Unemployment in the time of COVID-19: A research agenda. *J Voc Behav* **2020**, 119, 103436, doi:10.1016/j.jvb.2020.103436.
4. Reuters. Microsoft says Skype users surge 70% amid coronavirus outbreak. Available online: <https://www.reuters.com/article/us-microsoft-skype-idUSKBN21H2J7> (accessed on 16 April, 2021)
5. BBC. Zoom sees sales boom amid pandemic. Available online: <https://www.bbc.com/news/business-52884782> (accessed on 16 April, 2021)
6. Amsalem, D.; Dixon, L.B.; Neria, Y. The coronavirus disease 2019 (COVID-19) outbreak and mental health: current risks and recommended actions. *JAMA Psychiatry* **2020**, 1730, doi:10.1001/jamapsychiatry.2020.1730.
7. Cudjoe, T.K.M.; Kotwal, A.A. "Social distancing" amid a crisis in social isolation and loneliness. *J Am Geriatr Soc* **2020**, 68, E27-e29, doi:10.1111/jgs.16527.
8. Fiorillo, A.; Gorwood, P. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. *Eur Psychiatry* **2020**, 63, e32, doi:10.1192/j.eurpsy.2020.35.

9. Luiggi-Hernández, J.G.; Rivera-Amador, A.I. Reconceptualizing social distancing: teletherapy and social inequality during the COVID-19 and loneliness pandemics. *J Human Psychol* **2020**, *60*, 626-638, doi:10.1177/0022167820937503.
10. Ihm, J.; Hsieh, Y.P. The implications of information and communication technology use for the social well-being of older adults. *Inform Comm Soc* **2015**, *18*, 1123-1138, doi:10.1080/1369118X.2015.1019912.
11. Kotwal, A.A.; Holt-Lunstad, J.; Newmark, R.L.; Cenzer, I.; Smith, A.K.; Covinsky, K.E.; Escueta, D.P.; Lee, J.M.; Perissinotto, C.M. Social isolation and loneliness among San Francisco Bay Area older adults during the COVID-19 shelter-in-place orders (in press). *J Am Geriatr Soc* **2020**, doi:10.1111/jgs.16865.
12. Talmage, C.A.; Knopf, R.C.; Wu, T.; Winkel, D.; Mirchandani, P.; Candan, K.S. Decreasing loneliness and social disconnectedness among community-dwelling older adults: the potential of information and communication technologies and ride-hailing services. *Activ Adapt Aging* **2020**, *1724584*, 1-29, doi:10.1080/01924788.2020.1724584.
13. Hirko, K.A.; Kerver, J.M.; Ford, S.; Szafranski, C.; Beckett, J.; Kitchen, C.; Wendling, A.L. Telehealth in response to the COVID-19 pandemic: Implications for rural health disparities. *J Am Med Informat Assoc* **2020**, doi:10.1093/jamia/ocaa156.
14. Moreno, C.; Wykes, T.; Galderisi, S.; Nordentoft, M.; Crossley, N.; Jones, N.; Cannon, M.; Correll, C.U.; Byrne, L.; Carr, S., et al. How mental health care should change as a consequence of the COVID-19 pandemic. *The Lancet Psychiatry* **2020**, *7*, 813-824, doi:10.1016/S2215-0366(20)30307-2.
15. Noone, C.; McSharry, J.; Smalle, M.; Burns, A.; Dwan, K.; Devane, D.; Morrissey, E.C. Video calls for reducing social isolation and loneliness in older people: a rapid review. *Cochr Data Sys Rev* **2020**, *013632*, doi:10.1002/14651858.CD013632.

16. Poscia, A.; Stojanovic, J.; La Milia, D.I.; Dupлага, M.; Grysztar, M.; Moscato, U.; Onder, G.; Collamati, A.; Ricciardi, W.; Magnavita, N. Interventions targeting loneliness and social isolation among the older people: An update systematic review. *Exp Gerontol* **2018**, *102*, 133-144, doi:10.1016/j.exger.2017.11.017.
17. Yu, K.; Yu, K.; Wu, S.; Chi, I. Internet use and loneliness of older adults over time: the mediation effect of social contact. *Innov Aging* **2019**, *3*, S194-S194, doi:10.1093/geroni/igz038.697.
18. Zamir, S.; Hennessy, C.H.; Taylor, A.H.; Jones, R.B. Video-calls to reduce loneliness and social isolation within care environments for older people: an implementation study using collaborative action research. *BMC Geriatr* **2018**, *18*, 62, doi:10.1186/s12877-018-0746-y.
19. Fang, Y.; Chau, A.K.C.; Wong, A.; Fung, H.H.; Woo, J. Information and communicative technology use enhances psychological well-being of older adults: the roles of age, social connectedness, and frailty status. *Aging Mental Health* **2018**, *22*, 1516-1524, doi:10.1080/13607863.2017.1358354.
20. Geirdal, A.Ø.; Ruffolo, M.; Leung, J.; Thygesen, H.; Price, D.; Bonsaksen, T.; Schoultz, M. Mental health, quality of life, wellbeing, loneliness and use of social media in a time of social distancing during the COVID-19 outbreak. A cross country comparative study. *J Mental Health* **2021**, 1875413, doi:10.1080/09638237.2021.1875413.
21. Ruffolo, M.; Price, D.; Schoultz, M.; Leung, J.; Bonsaksen, T.; Thygesen, H.; Geirdal, A.Ø. Employment uncertainty and mental health during the COVID-19 pandemic initial social distancing implementation: a cross-national study. *Glob Soc Welfare* **2021**, doi:10.1007/s40609-020-00201-4.

22. de Jong Gierveld, J.; van Tilburg, T. A 6-item scale for overall, emotional, and social loneliness. Confirmatory tests on survey data. *Res Aging* **2006**, *28*, 582-598, doi:10.1177/0164027506289723.

23. Bonsaksen, T.; Opseth, T.M.; Misund, A.; Geirdal, A.Ø.; Fekete, O.R.; Nordli, H. The de Jong Gierveld Loneliness Scale used with Norwegian clubhouse members: Psychometric properties and associated factors. *Int J Psychosoc Rehabil* **2018**, *22*, 88-100.

24. Goldberg, D.P.; Gater, R.; Sartorius, N.; Ustun, T.B.; Piccinelli, M.; Gureje, O.; Rutter, C. The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychol Med* **1997**, *27*, 191-197.

25. Goodwin, L.; Ben-Zion, I.; Fear, N.T.; Hotopf, M.; Stansfeld, S.A.; Wessely, S. Are reports of psychological stress higher in occupational studies? A systematic review across occupational and population based studies. *PLOS ONE* **2013**, *8*, e78693, doi:10.1371/journal.pone.0078693.

26. Aalto, A.-M.; Elovainio, M.; Kivimäki, M.; Uutela, A.; Pirkola, S. The Beck Depression Inventory and General Health Questionnaire as measures of depression in the general population: a validation study using the Composite International Diagnostic Interview as the gold standard. *Psychiatry Res* **2012**, *197*, 163-171, doi:10.1016/j.psychres.2011.09.008.

27. Adlaf, E.M.; Gliksman, L.; Demers, A.; Newton-Taylor, B. The prevalence of elevated psychological distress among Canadian undergraduates: findings from the 1998 Canadian Campus Survey. *J Am Coll Health* **2001**, *50*, 67-72, doi:10.1080/07448480109596009.

28. Gorter, R.; Freeman, R.; Hammen, S.; Murtomaa, H.; Blinkhorn, A.; Humphris, G. Psychological stress and health in undergraduate dental students: fifth year outcomes

compared with first year baseline results from five European dental schools. *Eur J Dent Educ* **2008**, *12*, 61-68, doi:10.1111/j.1600-0579.2008.00468.x.

29. Cantril, H. *Pattern of human concerns*; Rutgers University Press: New Brunswick, NJ, 1965.

30. Atkinson, T. The stability and validity of quality of life measures. *Soc Indicat Res* **1982**, *10*, 113-132, doi:10.1007/BF00302506.

31. The AFFIRM investigators. Quality of life in atrial fibrillation: The atrial fibrillation follow-up investigation of rhythm management (AFFIRM) study. *Am Heart J* **2005**, *149*, 112-120, doi:10.1016/j.ahj.2004.03.065.

32. Håland, C.B. Nettbrett for informasjon og sosial kontakt i Omsorg+ [Tablets for information and social contact in Care Plus]. VID Specialized University: Oslo, 2020.

33. Xiong, J.; Lipsitz, O.; Nasri, F.; Lui, L.M.W.; Gill, H.; Phan, L.; Chen-Li, D.; Iacobucci, M.; Ho, R.; Majeed, A., et al. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *J Affect Disord* **2020**, *277*, 55-64, doi:10.1016/j.jad.2020.08.001.