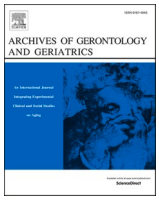
Archives of Gerontology and Geriatrics 108 (2023) 104900



Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger





Utilization of internet for religious purposes and psychosocial outcomes during the COVID-19 pandemic

Benedikt Kretzler, Hans-Helmut König, André Hajek *

Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Martinistraße 52, Hamburg 20251, Germany

ARTICLE INFO

Keywords:
Religion
Depression
Loneliness
COVID-19

ABSTRACT

Background: Prior to the COVID-19 pandemic, research findings pointed towards an alleviating effect of religion on depressive symptoms and loneliness. However, it is not clear whether such a relationship persisted when worships were mostly held as online events. Consequently, this study investigates the link between religion-related internet utilization, particularly for online worships, depressive symptoms, and loneliness during the lockdown period.

Methods: Data were derived from a representative sample of German individuals aged 40 years and above, which was conducted in June and July 2020. Utilization of internet for religious purposes was treated as a dichotomous variable.

Results: Regarding bivariate analysis, individuals that used the internet for religious purposes were significantly older, and more likely to be female or to live in an urban setting. Furthermore, they had significantly more severe depressive symptoms. According to multiple linear regression, internet usage for religious purposes was both associated with more depressive symptoms, $R^2 = .30$, $F(11, 3367) = 113.01$, $\beta = 0.39$, $p = .050$, and higher loneliness levels, $R^2 = .09$, $F(11, 3367) = 25.75$, $\beta = 2.24$, $p = .025$.

Conclusions: It seems possible that the alleviating effect of religion on depressive symptoms and loneliness did not hold during the COVID-19 pandemic, which may imply that online worships are not perfect replacements for traditional worships in terms of their social and health benefits.

1. Introduction

Both loneliness and depressive symptoms are some of the most widespread health issues worldwide, and fighting against them is part of major campaigns of the World Health Organization, such as the UN Decade of Healthy Ageing (World Health Organization, 2020) or the WHO Special Initiative for Mental Health (World Health Organization, 2019). Though there are no global estimates of the prevalence of loneliness worldwide, the prevalence of this condition among older individuals may be between 20% and 45%, with considerable variations across different countries (World Health Organization, 2021b). More precise estimates are available for depression, and according to them, approximately four percent of the global population suffer from this disease (World Health Organization, 2017). Hereby, it should be highlighted that these numbers were reported before the outbreak of the COVID-19 pandemic.

With regard to the individual conditions, loneliness is commonly characterized as a personal feeling that the quality of one's relations to peers is not satisfying (De Jong Gierveld & Van Tilburg, 2006). What is more, it is associated with various adverse health effects: According to previous research, perceiving oneself as lonely is related to reduced health (Ong et al., 2016) and increased risks of mortality (Pantell et al., 2013) and morbidity (Leigh-Hunt et al., 2017). Regarding depression, the World Health Organization detects this disease when symptoms such as a dejected mood or the loss of pleasure in activities occur over a period of at least two weeks (World Health Organization, 2021a). Depressive symptoms are also related to further negative outcomes, for example, reduced quality of life (Sivertsen et al., 2015) or worse overall health (Bretschneider et al., 2018). Consequently, it is also a major burden for public health systems (König et al., 2019).

To tackle these problems, there has been basic research on the determinants of loneliness and depressive symptoms. Hereby, religion has been identified as an alleviating factor with respect to both of them: For example, various research works suggested that especially religious attendance is associated with decreased levels of loneliness (Johnson & Mullins, 1989; Kobayashi et al., 2009; Rote et al., 2013), including a

* Corresponding author.
E-mail address: a.hajek@uke.de (A. Hajek).

https://doi.org/10.1016/j.archger.2022.104900
Received 23 August 2022; Received in revised form 6 December 2022; Accepted 7 December 2022
Available online 8 December 2022
0167-4943/© 2022 Published by Elsevier B.V.

recent longitudinal study from the United States, which used pre-pandemic data from the National Social Life, Health and Aging Project to show that consistent religious attendance was related to reduced loneliness, especially among the elderly (Upenieks, 2022). Concerning depression, two meta-analyses revealed that religiousness is significantly associated with mildly fewer depressive symptoms (Smith et al., 2003; Yonker et al., 2012). These promising results are further supported by a more up-to-date meta-analysis which stated that religion has a positive effect on mental health in general (Garssen et al., 2021). However, this study fully relied on pre-pandemic data as well.

Due to the COVID-19 pandemic, religious practice as well as loneliness and depression in their role as common health problems underwent considerable shifts: Regarding religious culture, lockdown policies forced institutions to close their doors for the public, and many of them started to offer digital formats instead of traditional worships: For example, a survey among evangelical churches in the German Rhineland stated that 73.8% of the local churches held such online gatherings, and that the number of participants approximately doubled or tripled in Summer 2020, compared to traditional worships (Hörsch, 2020). On the other hand, a survey which was mostly taken by Catholic individuals from the United Kingdom indicated that the vast majority would nevertheless have preferred to visit traditional worships (Catholic Voices, 2020). While this may still indicate that religious culture could reasonably well, according to circumstances, be continued, the development of the prevalence rates of loneliness and depression may have been more concerning: Regarding two meta-analyses that compared data about loneliness' prevalence rate before and after the outbreak of the COVID-19 pandemic, both stated that this rate significantly increased from 2020 onwards among older individuals (Su et al., 2022) as well as among the general population (Ernst et al., 2022). Concerning depression, one can even speak of a dramatic increase, as another meta-analysis that was conducted in May 2020 detected a prevalence of 33.7% in general populations (Salari et al., 2020).

Regarding the dimension of these shifts, it seems naïve to assume, without any further investigation, that the health and social benefits that seem to be related to religiousness persisted during the COVID-19 pandemic. However, there is a lack of research which examines how this relationship has developed during these special conditions: In fact, currently, there seem to be only two research works: First, a study from Australia, which compared church goers from regions where the churches were closed and thus mainly online worships were held with church goers from regions where the churches had already opened again, stated that virtual worship engagement was still related to a higher religious and existential well-being, and that there were no significant differences among this factor between the two groups investigated (Martyr, 2022). Second, a report which relied on a sample of young Polish adults stated that individuals who attended worships had a larger social network compared to those who did not when they were questioned in Summer 2020, and that this larger network lead to decreased levels of loneliness among frequent worship attenders as well. However, when the same population was interviewed one year later, both worship attenders and non-worship attenders had higher levels of loneliness, without any significant effect from religious attendance (Okruszek et al., 2022). With respect to depressive symptoms, there does not seem to be any article which referred to a possible link to online worship attendance during the pandemic.

Hence, it is obvious that those two research works alone cannot answer whether the health and social benefits that are associated with religion, and hereby especially religious attendance, continued during the COVID-19 pandemic, and whether the shift to online gatherings may have had an influence on this association. Thus, the aim of this study is to address this knowledge gap by studying the relationship between the utilization of internet for religious purposes, particularly in terms of online worship attendance, depressive symptoms, and loneliness, and to describe socio-demographic, health, and social characteristics of individuals using the internet in this way. Apart from a better understanding of how the shifts in religious culture may have affected health and social outcomes, this could also be useful to acquire knowledge on who was making use of the religious online offer, and who was not: It may enable the identification of a group of individuals who could have lost an important and beneficial part of their life during the COVID-19 pandemic and, as a consequence, be at an increased risk of adverse health and social outcomes.

2. Material and methods

2.1. Sample

The present study relies on cross-sectional data from the German Ageing Survey (DEAS), which is a study including individuals aged 40 years and older. The German Ageing Survey is representative for the middle-aged and older German population, stratified by age, gender, and place of residence (East Germany and West Germany). Since 1996, both previous and new participants are interviewed every three to six years. Though, during the COVID-19 pandemic, it was decided to conduct a special wave focusing on pandemic-related topics. Hereby, only participants from earlier waves were questioned. Regarding inclusion criteria for these former participants, individuals who were at least 4o years old and were in private households were included. In addition, they had to live in Germany. Hence, individuals that were living abroad or not residing in a private household, e.g., in an institutional setting, were excluded.

The wave took place in June and July 2020 as a pen-and-paper interview. In total, 4823 individuals provided answers, which means that the response rate was about 56.5% (Schiel et al., 2020). However, due to missing values, the final sample size of the present study consisted only of 3431 participants. The DEAS did not require an ethics vote, as the criteria for obtaining it were not fulfilled. Written informed consent was obtained from all individual participants included in the study.

More information on the DEAS can be gathered elsewhere (Klaus et al., 2017).

2.2. Dependent variables

Depressive symptoms were assessed using the short form of the German translation of the Center for Epidemiologic Studies Depression Scale (Hautzinger & Bailer, 1993). Its value is the sum over 10 items, and it ranges from 0 to 30. Increased values represent more depressive symptoms. In the past, the scale was shown to possess sufficient psychometric properties (Lehr et al., 2008).

Loneliness was quantified by the De Jong Gierveld Loneliness Scale (De Jong Gierveld & Van Tilburg, 2006), whose value is the mean value of its six items. Higher values point towards an increased level of loneliness. Good psychometric characteristics have been reported for this scale as well (De Jong Gierveld & Van Tilburg, 2010).

In our study, Cronbach's alpha was .83 for the Center for Epidemiologic Studies Depression Scale and .78 for the De Jong Gierveld Loneliness Scale. Hence, it can be assumed that both instruments had a good internal consistency.

2.3. Independent variables

Our main independent variable was use of internet for religious purposes, particularly for online worship attendance. In the DEAS, the concerning question was "How often do you use the Internet for religious purposes (e.g. online worships)?". The answers could range from "daily" to "never" on a five-point scale. In this study, the variable was dichotomized to assess whether an individual had ever used the Internet for religious purposes.

With respect to sociodemographic and health characteristics of the participants, differences in age, sex (male; female), residential form of partnership (single; with partner living in same household; with partner

not living in same household), type of district (cities; other), level of education by the ISCED categories (low; middle; high) (UNESCO United Nations Educational Scientific and Cultural Organization, 1997), (logarithmized) total net monthly income of household, main labor force status (working; retired; other (not employed)) and self-rated health (rated on a five-point scale from 1 = very good to 5 = very bad) were used as covariates in regression analysis.

2.4. Statistical analysis

Firstly, the characteristics of the total sample as well as of the subgroups of individuals using the internet for religion-related motives and those who did not were assessed. In order to reveal differences between them, chi-squared tests and two-sample Student's t-tests (as appropriate) were employed.

Secondly, this study examined the relationship between internet use for religious purposes, depressive symptoms and loneliness using multiple linear regressions. Thereby, it was controlled for age, sex, level of education by ISCED, logarithmized total net monthly income of household, residential form of partnership, main labor force status, and self-rated health.

The level of significance was set at $\alpha = .05$. All statistical analyses were conducted with Stata 17.0.

3. Results

Table 1 provides the sample characteristics of the individuals included in the final sample. Mean age was 67.45 (SD: 9.59, ranging from 46 to 98 years), and 51.38% of the individuals were men. With respect to the two subgroups of those who used the Internet for religious purposes (e.g. online worships) during the COVID-19 pandemic (14.48%) and those who did not (85.52%), significant differences occurred among age, sex, type of district and depressive symptoms: Those who did were the older group, $t(3382) = -5.23$, $p < .001$, $d = -0.26$, and they were more likely to be female, $\chi^2(1) = 5.93$, $p = .015$, $d = -0.12$, and to live in an urban setting, $\chi^2 = 8.61$, $p = .003$, $d = 0.14$. Eventually, individuals who used internet for religious purposes also reported more severe depressive symptoms, $t(3382) = -2.16$, $p = .030$, $d = -0.11$. However, among loneliness, there were no significant differences, $t(3382) = -1.55$, $p = .120$, $d = 0.08$.

The results of the regression analysis with depressive symptoms and

Table 2
Regression coefficients on depressive symptoms and loneliness.

Variable	Depressive symptoms			Loneliness		
	B	ß	SE	B	ß	SE
Age	0.11	0.00	0.01	-5.61***	-0.00	0.00
Sex (reference: male)	4.84***	0.70	0.14	-4.21***	-0.08	0.02
Level of education by ISCED (reference: low)						
Middle	-2.78**	-1.36	0.49	-2.78**	-0.17	0.06
High	-3.03**	-1.48	0.49	-3.22**	-0.20	0.06
Logarithmized total net monthly income of household	-2.51*	-0.34	0.14	-1.31	-0.02	0.02
Residential form of partnership (reference: single)						
With partner living in same household	-2.74**	-0.55	0.20	-4.66***	-0.12	-0.03
With partner not living in same household	-0.93	-0.33	0.36	-1.81	-0.09	0.05
Main labor force status (reference: working)						
Retired	-2.99**	-0.70	0.23	0.56	0.02	0.03
Other (not employed)	-0.05	-0.02	0.40	0.36	0.02	0.05
Self-rated health	32.09***	3.26	0.10	13.28***	0.17	0.01
Using Internet for religious purposes (e.g. online worships) (reference: no)	1.96*	0.39	0.20	2.24*	0.06	0.03

Note. $N = 3384$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 1
Characteristics of participants.

Characteristic	Using internet for religious purposes (e.g. online worships)		Not using internet for religious purposes (e.g. online worships)		Full sample		p
	n/mean	%/SD	n/mean	%/SD	n/mean	%/SD	
Age	69.55	10.36	67.10	9.42	67.45	9.59	< .001
Sex							.015
Male	224	46.19%	1512	52.16%	1736	51.30%	
Female	261	53.81%	1387	47.84%	1648	48.70%	
Residential form of partnership							.381
Single	571	19.70%	108	22.27%	679	20.07%	
With partner living in same household	2194	75.68%	353	72.78%	2547	75.27%	
With partner not living in same household	134	4.62%	24	4.95%	158	4.67%	
Type of district							.003
Cities	347	71.55%	1876	64.71%	2223	65.69%	
Other	138	28.45%	1023	35.29%	1161	34.31%	
Level of education by ISCED							0.413
Low	14	2.89%	72	2.48%	86	2.54%	
Middle	196	40.41%	1262	43.53%	1458	43.09%	
High	275	56.70%	1565	53.98%	1840	54.37%	
Total net monthly income of household	4521.53	10,446.49	4194.79	12,980.18	4241.62	12,647.39	.599
Main labor force status							.161
Working	141	29.07%	962	33.18%	1103	32.59%	
Retired	327	67.42%	1824	62.92%	2151	63.56%	
Other (not employed)	17	3.51%	113	3.90%	130	3.84%	
Self-rated health	2.41	0.77	2.38	0.75	2.38	0.75	.485
CES-D	8.56	5.03	8.07	4.60	8.14	4.67	.030
DJGLS	1.91	0.54	1.87	0.53	1.88	0.53	.120

Note. $N = 3384$ ($n = 485$ using Internet for religious purposes, $n = 2899$ not using Internet for religious purposes). CES-D = Center for Epidemiological Studies Depression Scale; DJGLS = De Jong Gierveld Loneliness Scale.

loneliness as dependent variables are displayed in Table 2. It appears as if using the internet for religious purposes (e.g. online worships) was associated with both increased loneliness, $R^2 = .09$, $F(11, 3367) = 25.75$, $\beta = 2.24$, $p = .025$, and increased depressive symptoms, $R^2 = .30$, $F(11, 3367) = 113.01$, $\beta = 0.39$, $p = .050$.

Besides these two main independent variables, several covariates were significant as well: With regard to depressive symptoms, higher age, $\beta = 0.00$, $p < .001$, being female, $\beta = 0.70$, $p < .001$, and a worse self-rated health, $\beta = 3.26$, $p < .001$, were associated with more severe outcomes. On the other hand, having obtained middle education, $\beta =$ -2.78, $p = .006$, or higher education, $\beta =$ -1.48, $p = .002$, living with one's partner in the same household, $\beta =$ -0.55, $p = .006$, and being retired, $\beta =$ -0.70, $p = .003$, were related to decreased levels of depression. From these variables, a better self-rated health was also associated with decreased loneliness, $\beta = 0.17$, $p < .001$. However, being younger, $\beta =$ -0.00, $p < .001$, female, $\beta =$ -0.08, $p < .001$, middlingly educated, $\beta =$ -0.17, $p = .005$, highly educated, $\beta =$ -0.20, $p = .001$, and living with one's partner in the same household, $\beta =$ -0.12, $p < .001$, was related to decreased feelings of loneliness.

Moreover, we replaced the dichotomous key independent variable (i.e., internet usage for religious purposes) by the frequency (from 1 = never to 6 = daily). The results are displayed in Supplementary Table 1. None of the individual frequencies were significantly related to depressive symptoms. Moreover, a significant association concerning loneliness was solely found among those who used the internet due to religious motives less often than one to three times a month (compared to individuals who never used the internet for religious purposes), $\beta = 0.07$, $p = .040$.

4. Discussion

4.1. Main findings

The aim of this study was to gain information about individuals that used the internet for religious purposes, particularly the attendance of online worships, during the COVID-19 pandemic, and to investigate the relationship between attending such events, depressive symptoms, and loneliness. With regard to the socio-demographic profiles, the group of individuals who used the internet for religious purposes was significantly older, and consisted of a significantly higher share of women and townsmen. Eventually, they also reported increased levels of depression. Concerning the regression analyses with depressive symptoms and loneliness as dependent variables, this kind of internet utilization was significantly associated with worse outcomes among both these factors. However, the significance of that relationship did not hold for the individual frequencies of depressive symptoms and only for those using internet for religious purposes less often than one to three times a month concerning loneliness (compared to individuals who never used the internet due to religious motives).

4.2. Previous research and possible explanations

The finding that religion-related internet usage, particularly for attending online-worships, was associated with both higher depression and loneliness is not in line with previous findings that concern traditional worships, as an alleviating effect of attending the latter events is well-documented for loneliness by several research works (Johnson & Mullins, 1989; Kobayashi et al., 2009; Rote et al., 2013; Upenieks, 2022) as well as for depression by several meta-analyses (Garssen et al., 2021; Smith et al., 2003; Yonker et al., 2012). It may seem nearby to assume that the benefits of religious attendance regarding these two factors vanished as soon as switching to online events was required, and there is quite good reason for this: Firstly, this interpretation fits quite well to the findings of Okruszek et al. (2022) that worship attenders had larger social networks and thereby decreased levels of loneliness at the beginning of the COVID-19 pandemic, but that such a protective effect of religious attendance did not pertain when the same individuals were questioned again one year later. Besides this, this could also mirror reports that most church goers did not find online worships a perfect replacement of traditional worships (Catholic Voices, 2020). Thus, the results of this study could add to evidence about negative perceptions of the switch from traditional worships to online formats. Secondly, it seems probable that the social aspect of attending traditional worships could not be maintained by the online replacements, as direct human contact was not possible anymore. This could be significant as most of the pertinent studies assume that this direct contact plays a crucial role for the association between religious attendance and alleviated depression and loneliness: For example, Rote et al. (2013) argue that religious involvement benefits the social integration of an individual and may thus reduce its feelings of loneliness, and Upenieks (2022) stresses the role of building up social relationships as well, especially concerning her results that an alleviating effect of religious attendance on loneliness does not occur immediately, but seems to develop over time. With regard to depressive symptoms, a protective role of social support is also well-documented (Gariépy et al., 2016). However, in online worships, the possibilities of becoming socially involved or of building up relationships may be limited, compared to traditional worships. Consequently, there is also a reasonable theoretical basis for stating that the alleviating effect of religious attendance on both loneliness and depressive symptoms may not have persisted during the COVID-19 pandemic.

The disappearance of religion-related internet usage's significance for depressive symptoms and loneliness when the particular frequencies were regarded does not need to negate this main result: In total, only 485 individuals (14.33%) reported using the internet for religious purposes. Further dividing them into five different frequency categories is likely to have led to an underpowered investigation that could not detect a significant relationship. Hence, the difference between the results of our study may be explained by the too-small sample size.

Nevertheless, pre-existing differences between those who were likely to use the internet to attend online worships and those who did not can also not be fully precluded. On the one hand, it seems probable that individuals who regularly visited traditional worships before the outbreak of the COVID-19 pandemic were far more likely to attend online worships after the beginning of lockdown and containment policies. Due to the limitations in their religious life, those individuals could have felt more depressed and lonelier than those whose life was not affected by the closure of religious institutions. This, in turn, could explain a great extent of the result that internet utilization for religious purposes was related to higher levels of loneliness and depressive symptoms. On the other hand, regarding the increase in the number of worship attenders after the switch to online formats, it seems possible as well that individuals who felt lonely or emotionally stressed due to the containment measures may been more likely to attend online worships, whether as a way to distract themselves or to find purpose in life during challenging times. Therefore, it seems possible that individuals who began visiting worships during the COVID-19 pandemic had higher initial levels of loneliness and depression, too. Nevertheless, it may be a task of future research to follow individuals who have suffered due to the switch from traditional religious events to online formats, particularly by using longitudinal designs, to assess possible effects that could express themselves both in personal growth and ongoing impairments.

All in all, it seems reasonable to explain the positive association between internet usage for religious purposes, especially for online-worship attendance, and loneliness by the absence of the social benefits due to the switch to online formats, so that a group of individuals who used to attend traditional worships before did not profit any more. In turn, this may also have increased depressive symptoms among this group, as a significant effect of loneliness on depression is well-documented by meta-analyses (Erzen & Çikrikci, 2018; Park et al., 2020). In terms of the alleviating effects on loneliness and depression, online worships may consequently not have been a full replacement of

traditional worships. However, it is not possible to make a secure statement, because this is a cross-sectional study, and because there are not many other studies on the effects of visiting online worships that could give further indications. Other pre-existing differences, such as higher levels of loneliness and depression among individuals who used the internet for religion-related purposes, presumably for online worship participation, during the COVID-19 pandemic, but did not visit traditional worships before, cannot be precluded. Finally, further research is required to assess various potential confounding factors, such as the impact that COVID-19 had on an individual's life, or the importance of religion in life before the outbreak of the pandemic, in the association between religion-related internet use, or online worship attendance, loneliness, and depressive symptoms.

4.3. Strengths and limitations

This study is one of only very few research works that shed light on the association between religion-related internet usage, most certainly to attend online worships, depressive symptoms, and loneliness during the COVID-19 pandemic, and it may also contribute to further understand that link, as the switch from traditional worships to online worships could have changed aspects that had been crucial for an alleviating effect of religious attendance on these two adverse outcomes. Representative data from a high-quality survey was used, and both depressive symptoms and loneliness were assessed with well-established tools.

Notwithstanding that, the present study has several limitations. Most importantly, the instrumentalization of religion-related internet usage, particularly worship attendance, is not very accurate, as the relevant item ("How often do you use the Internet for religious purposes (e.g. online worships)?") may also be understood in terms of other religion-related uses as well, such as personal reflection on one's own belief or searches for local religious communities. However, it could be reasonable to assume that the question was mainly understood in terms of online worships, not only because of the specific naming in the text: Regarding the number of participants that stated that they ever used the Internet for religious purposes during the COVID-19 pandemic, approximately one out of seven, this value does not seem to be extraordinarily high in comparison to other studies which explicitly assessed the participation among online worships: According to a survey that was conducted in Summer 2020 by the Evangelical Church in the Rhineland, online worships that were hosted in this region alone reached a coverage of 2.36 million participants in total, and the number of participants in comparison to traditional worships may have doubled or even tripled (Hörsch, 2020). Hence, though the existence of a methodological bias cannot be denied, it does not seem as if its practical consequences undermine the results of this study.

Ultimately, the German Ageing Survey was not specifically designed for the investigation of religion-related questions and bears some additional limitations: Firstly, it is difficult to establish causal relationships based on cross-sectional data. Particularly, it was not possible to cover scenarios such as individuals who used internet to visit online worships, but stopped it again because it did not alleviate their depressive symptoms or loneliness. What is more, it was not possible to examine the effect of the transition from traditional to online worships directly. Ultimately, other information regarding other religion-related behavior of the participants was not assessed in the questionnaires, particularly measures of religiousness (e.g., Koenig and Büssing (2010)) or spirituality (e.g., Delaney (2005)). Besides that, due to the postal questioning that was necessary for a survey which was carried out during the COVID-19 pandemic, it could not be precluded that individuals who may not have been able to provide fully conscious answers, for example, because of diseases such as dementia, were included. On the other hand, it may be doubted whether this was a severe problem during data collection, as adequately filling out the questionnaire may require a particular level of cognitive functioning. Despite these limitations, the DEAS generally provides a representative sample of the middle-aged and older population, and assesses its variables with established and validated tools. Thus, it may be a reasonable data source despite these limitations.

5. Conclusions

The finding that the utilization of internet for religious purposes was associated with increased levels of loneliness and depression during the COVID-19 pandemic points towards an absence of the alleviating effects of religious practice while religious institutions were closed. Thus, online formats may have failed to replace traditional worships in terms of health and social benefits that are commonly associated with religious attendance. However, the cross-sectional design of this analysis made it impossible to detect any causal relationship. Nevertheless, our results may suggest the arise of an at-risk group in terms of depressive symptoms and loneliness, consisting of individuals for which religion played an important role in both finding purpose in life and maintaining a certain level of social integration before the outbreak of the pandemic. As religious practice is important especially for many older individuals, further research on the outcomes of the switch to online formats is required in order to identify adverse outcomes such as these to which this study may have referred to.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Benedikt Kretzler: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Hans-Helmut König:** Conceptualization, Writing – review & editing. **André Hajek:** Conceptualization, Methodology, Formal analysis.

Declaration of Competing Interest

None.

Acknowledgments

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.archger.2022.104900.

References

Bretschneider, J., Janitza, S., Jacobi, F., Thom, J., Hapke, U., Kurth, T., & Maske, U. E. (2018). Time trends in depression prevalence and health-related correlates: Results from population-based surveys in Germany 1997-1999 vs. 2009-2012. *BMC Psychiatry, 18*(1), 394. https://doi.org/10.1186/s12888-018-1973-7

Catholic Voices. (2020). *Coronavirus, church & you survey: Catholics in the UK: Report of results*. Retrieved 26 June 2022 from https://static1.squarespace.com/static/5d4852755541c10001c7d071/t/5f57527b8063d02159311569/1599558270783/Coronavirus2C+Church+26+You+Survey+Report.pdf.

De Jong Gierveld, J., & Van Tilburg, T. (2006). A 6-item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on Aging, 28*(5), 582–598. https://doi.org/10.1177/0164027506289723

De Jong Gierveld, J., & Van Tilburg, T. (2010). The De Jong Gierveld short scales for emotional and social loneliness: Tested on data from 7 countries in the UN generations and gender surveys. *European Journal of Ageing, 7*(2), 121–130. https://doi.org/10.1007/s10433-010-0144-6

Delaney, C. (2005). The Spirituality scale:development and psychometric testing of a holistic instrument to assess the human spiritual dimension. *Journal of Holistic Nursing, 23*(2), 145–167. https://doi.org/10.1177/0898010105276180

Ernst, M., Niederer, D., Werner, A. M., Czaja, S. J., Mikton, C., Ong, A. D., Rosen, T., Brähler, E., & Beutel, M. E. (2022). Loneliness before and during the COVID-19

pandemic: A systematic review with meta-analysis. *American Psychologist*. https://doi.org/10.1037/amp0001005
Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry, 64*(5), 427–435. https://doi.org/10.1177/0020764018776349
Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, A. (2016). Social support and protection from depression: Systematic review of current findings in Western countries. *British Journal of Psychiatry, 209*(4), 284–293. https://doi.org/10.1192/bjp.bp.115.169094
Garssen, B., Visser, A., & Pool, G. (2021). Does spirituality or religion positively affect mental health? Meta-analysis of longitudinal studies. *International Journal for the Psychology of Religion, 31*(1), 4–20. https://doi.org/10.1080/10508619.2020.1729570
Hautzinger, M., & Bailer, M. (1993). *ADS - allgemeine depressions-skala*. Beltz.
UNESCO United Nations Educational Scientific and Cultural Organization, Hoffmeyer-Zlotnik, J., & Wolf, C. (1997). International standard classification of education, ISCED 1997. *Advances in cross-national comparison* (pp. 195–220). Springer.
Hörsch, D. (2020). *Digitale verkündigungsformate während der corona-krise: Eine ad-hoc-studie im auftrag der evangelischen kirche in Deutschland*. Midi.
Johnson, D. P., & Mullins, L. C. (1989). Religiosity and loneliness among the elderly. *Journal of Applied Gerontology, 8*(1), 110–131. https://doi.org/10.1177/073346488900800109
Klaus, D., Engstler, H., Mahne, K., Wolff, J., Simonson, J., Wurm, S., & Tesch-Römer, C. (2017). Cohort profile: The german ageing survey (DEAS). *International Journal of Epidemiology, 46*(4), 1105. https://doi.org/10.1093/ije/dyw326. -1105g.
Kobayashi, K. M., Cloutier-Fisher, D., & Roth, M. (2009). Making meaningful connections: A profile of social isolation and health among older adults in small town and small city, British Columbia. *Journal of Aging and Health, 21*(2), 374–397. https://doi.org/10.1177/0898264308329022
Koenig, H. G., & Büssing, A. (2010). The duke university religion index (DUREL): A five-item measure for use in epidemological studies. *Religions, 1*(1), 78–85. https://www.mdpi.com/2077-1444/1/1/78.
König, H., König, H. H., & Konnopka, A. (2019). The excess costs of depression: A systematic review and meta-analysis. *Epidemiology and Psychiatric Sciences, 29*, e30. https://doi.org/10.1017/s2045796019000180
Lehr, D., Hillert, A., Schmitz, E., & Sosnowsky, N. (2008). Screening depressiver störungen mittels allgemeiner depressions-skala (ADS-K) und state-trait depressions scales (STDS-T). *Diagnostica, 54*, 61–70. https://doi.org/10.1026/0012-1924.54.2.61
Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health, 152*, 157–171. https://doi.org/10.1016/j.puhe.2017.07.035
Martyr, P. (2022). Worship choices and wellbeing of Australian churchgoing Catholics during COVID-19 church closures. *Mental Health, Religion and Culture*. https://doi.org/10.1080/13674676.2022.2066645
Okruszek, Ł., Piejka, A., & Żurek, K. (2022). Take me to (the Empty) church? Social networks, loneliness and religious attendance in young polish adults during the COVID-19 pandemic. *Journal of Religion & Health, 61*(1), 722–740. https://doi.org/10.1007/s10943-021-01486-1
Ong, A. D., Uchino, B. N., & Wethington, E. (2016). Loneliness and health in older adults: A mini-review and synthesis. *Gerontology, 62*(4), 443–449. https://doi.org/10.1159/000441651
Pantell, M., Rehkopf, D., Jutte, D., Syme, S. L., Balmes, J., & Adler, N. (2013). Social isolation: A predictor of mortality comparable to traditional clinical risk factors. *American Journal of Public Health, 103*(11), 2056–2062. https://doi.org/10.2105/ajph.2013.301261
Park, C., Majeed, A., Gill, H., Tamura, J., Ho, R. C., Mansur, R. B., Nasri, F., Lee, Y., Rosenblat, J. D., Wong, E., & McIntyre, R. S. (2020). The effect of loneliness on distinct health outcomes: A comprehensive review and meta-analysis. *Psychiatry Research, 294*, Article 113514. https://doi.org/10.1016/j.psychres.2020.113514
Rote, S., Hill, T. D., & Ellison, C. G. (2013). Religious attendance and loneliness in later life. *Gerontologist, 53*(1), 39–50. https://doi.org/10.1093/geront/gns063
Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. *Global Health, 16*(1), 57. https://doi.org/10.1186/s12992-020-00589-w
Schiel, S., Ruiz Marcos, J., & Fahrenholz, M. (2020). *Methodenbericht: Deutscher alterssurvey (DEAS) schriftliche panelbefragung 2020*. infas Institut für angewandte Sozialwissenschaft GmbH. Retrieved 19 June 2022 from https://www.dza.de/fileadmin/dza/Dokumente/Forschung/FDZ_DEAS-Doku/DEAS2020_Kurzbefragung_infas_Methodenbericht.pdf.
Sivertsen, H., Bjørkløf, G. H., Engedal, K., Selbæk, G., & Helvik, A. S. (2015). Depression and quality of life in older persons: A review. *Dementia and Geriatric Cognitive Disorders, 40*(5-6), 311–339. https://doi.org/10.1159/000437299
Smith, T. B., McCullough, M. E., & Poll, J. (2003). Religiousness and depression: Evidence for a main effect and the moderating influence of stressful life events. *Psychological Bulletin, 129*(4), 614–636. https://doi.org/10.1037/0033-2909.129.4.614
Su, Y., Rao, W., Li, M., Caron, G., D'Arcy, C., & Meng, X. (2022). Prevalence of loneliness and social isolation among older adults during the COVID-19 pandemic: A systematic review and meta-analysis. *International Psychogeriatrics*, 1–13. https://doi.org/10.1017/s1041610222000199
Upenieks, L. (2022). With you until the end of the age? A longitudinal study of changes in religiosity and loneliness in later life. *Research on Aging.* , Article 1640275221104720. https://doi.org/10.1177/01640275221104720
World Health Organization. (2017). *Depression and other common mental disorders: Global health estimates*. World Health Organization.
World Health Organization. (2019). *The WHO special initiative for mental health (2019-2023): Universal health coverage for mental health*. World Health Organization. Retrieved 26 June 2022 from https://apps.who.int/iris/handle/10665/310981.
World Health Organization. (2020). *Decade of healthy ageing: 2020-2030*. World Health Organization. Retrieved 26 June 2022 from https://cdn.who.int/media/docs/default-source/decade-of-healthy-ageing/final-decade-proposal/decade-proposal-final-apr2020-en.pdf?sfvrsn=b4b75ebc_25&download=true.
World Health Organization. (2021a). *Depression*. World Health Organization. Retrieved 28. Mai 2022 from https://www.who.int/news-room/fact-sheets/detail/depression.
World Health Organization. (2021b). *Social isolation and loneliness among older people: Advocacy brief*. World Health Organization. Retrieved 26 June 2022 from https://www.who.int/publications/i/item/9789240030749.
Yonker, J. E., Schnabelrauch, C. A., & Dehaan, L. G. (2012). The relationship between spirituality and religiosity on psychological outcomes in adolescents and emerging adults: A meta-analytic review. *Journal of Adolescence, 35*(2), 299–314. https://doi.org/10.1016/j.adolescence.2011.08.010