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Venerable vulnerability or remarkable resilience? A prospective study of the impact of the first wave of the COVID-19 pandemic and quarantine measures on loneliness in Swedish older adults with home care

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ABSTRACT

Objectives To examine the early impact of the pandemic and of quarantine measures targeting older adults introduced in March 2020 on loneliness among older adults in Sweden.

Design Prospective pretest–posttest and controlled interrupted time series designs.

Setting The population of older adults receiving home care before and during the emergence of the first COVID-19 pandemic wave in Sweden in Spring 2020.

Participants Respondents (n=45 123, mean age 85.6 years, 67.6% women) came from two waves of a total population survey targeting all community-dwelling older adults receiving home care for older adults in Sweden in Spring 2019 and 2020.

Outcome Self-reported loneliness.

Results Results estimated 14% (95% CI: 10 to 19) higher loneliness in Spring 2020 compared with 2019, taking covariates into account. No impact of the quarantine measure was found (1% increase, 95% CI: −1 to 4).

Conclusions The results illustrate the broader public health consequences of the COVID-19 pandemic for older adults, but also suggest a relative resilience among older adults in home care to quarantine measures, at least during the first months of the pandemic. Future studies should examine the long-term effects of sustained pandemic and social distancing measures on loneliness among older adults.

INTRODUCTION

The consequences of the COVID-19 pandemic in the form of social isolation and loneliness have been suffered by people across the globe. Academics and practitioners have voiced particular concerns for older adults, for whom loneliness already was a major public health problem[1–4] with established consequences for quality of life, mental and physical health and mortality.[5 6] This worry has been bolstered COVID-19 policies specifically targeting older adults introduced

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The study is based on two waves of a national survey targeting the total population of community-dwelling older adults receiving home care in Sweden during Spring 2019 and Spring 2020.

⇒ Individual linkage of data from 2019 and 2020 and date of returned questionnaire enabled prospective designs including pretest–posttest and controlled interrupted time series designs.

⇒ The sample only includes older adults receiving home care and those who completed the survey 2 years in a row, which limits generalisability and could have resulted in selection bias.

⇒ The study period only captures the months of the first wave of the COVID-19 pandemic and is therefore unable to illustrate longer term effects.

⇒ It is methodologically challenging to isolate the impact of a specific policy during the tumultuous conditions of the COVID-19 pandemic.

by many countries.[7–9] While intended to protect older adults against severe COVID-19 outcomes, such policies may simultaneously have added to a disproportionate burden of social isolation and loneliness in this age group.[10 11]

Despite this widespread concern, empirical evidence on loneliness during the pandemic is surprisingly disparate, both when it comes to older adults[12 13] and in the general population.[14–17] This could partially be explained by the methodological weaknesses, as the relevant literature is dominated by cross-sectional studies and restricted convenience samples, with few studies based on prospective design, with representative samples, including the oldest old and with scarce evidence of the added impact of social distancing measures.[10 12 13 17 18] The handful of

longitudinal studies of community-dwelling older adults, for example, in the USA,[19] Sweden,[20] UK,[21] Norway,[22] Switzerland,[23] and Netherlands,[24] report either no discernable[19–21] or a modest[22–24] increase in loneliness following the emergence of the pandemic. Based on this emerging picture of a heterogeneous impact of the pandemic on loneliness among older adults, the image of the psychosocially vulnerable older adult has been questioned.[12]

In the case of Sweden, the first wave of the COVID-19 pandemic begun in early/mid-March 2020 and ended in the summer of 2020, with a second wave arriving later in October the same year. Sweden lacked legal possibilities to enforce strict lockdown measures implemented by many other countries, and instead opted for a highly controversial[25–27] strategy centering on voluntary recommendations of social distancing,[28 29] without general stay-at-home orders or recommendations to wear facemasks in public, and with schools, public spaces, stores and services mostly kept open. Policies specifically targeting older adults were promptly introduced on 16 March, when the Public Health Agency introduced strict but voluntary recommendations of quarantine for older adults ≥70 years, avoiding all social contacts outside the household. With these restrictions, well-known risk factors for loneliness, such as limited social activities and a narrow social network,[30] became an everyday reality for many older adults overnight. While most older adults in Sweden found the recommendations clear, and acceptance and compliance was generally high,[31 32] they also expressed ambivalent experiences of being labelled as old and vulnerable by the authorities, and of the sudden deprivation of individual responsibility and autonomy.[32] However, to which degree this policy did impact on loneliness among older adults has not been evaluated, and thus represents an example of knowledge gaps when it comes to rigorous evidence on how the plethora of societal responses implemented during the pandemic impacted more broadly on public health and welfare.[33]

Evaluating the impact of the pandemic itself and particularly of pandemic-related policies is however a methodologically challenging venture, both because of the absence of appropriate data and because of the flurry of societal and public health responses implemented in the early phase of the pandemic.[33] Among the designs suitable for evaluating COVID-19 policies, the controlled interrupted time series (ITS) design has been particularly recommended,[33] as it represents the strongest study design to study the causal effect of temporally well-defined policies but where randomisation is prohibitive.[34 35] The basic ITS design is similar to the more common pretest–post-test design but where comparison of time trends, instead of population averages, before and after the intervention protects against biases due to underlying time trends in the outcome. Extending this design to a controlled ITS design by the addition of an unexposed control group enables further comparisons to preintervention and postintervention trends under the counterfactual condition of an absence of the intervention, which

further strengthens the causal attribution of any change in trends in the intervention group to the intervention under study.

The present panel study is based on a total population survey targeting all community-dwelling older adults receiving home care for older adults in Sweden in 2019 and 2020. The study aimed to (1) examine whether loneliness increased among older adults in the first wave of the COVID-19 pandemic compared with the year before the pandemic, using a pre–post design; and (2) assess any additional impact of the age-specific quarantine recommendations introduced on 16 March 2020, using a controlled ITS design.

METHODS
Population and data
The study population came from The Elderly Survey in Home Care, which is conducted by the National Board of Health and Welfare to monitor the quality of home care delivery. The survey targets the total population of Swedish residents 65 years or older who receive home care for older people.[36] Home care in Sweden is a social service that has the purpose to enable older adults to retain their residence even under circumstances where illness or physical limitations makes it difficult to manage day-to-day tasks without help. It is thus an intermediate form of living, between completely independent living and various forms of special residential facilities, such as senior apartments or nursing homes. Home care can be granted based on an assessment of individual needs as regulated by The Social Services Act (1980:620), and assistance can range from support with personal care (eg, dressing and bathing) and service (eg, shopping and cooking), to advanced health and social care at the home of the recipient. The formal responsibility for organisation and provision of home care lies on the 290 municipalities of Sweden, but it can be operated by either public (municipal) or private providers.

The 2020 survey was distributed starting on 9 March, 1 week before the quarantine recommendations were in effect from 16 March. Records were kept of the date each questionnaire was returned. The 2019 survey took place over the same period in 2019, using the same procedure as the 2020 survey. The questionnaire comprises about 25 items covering perceptions of the elderly care as well as self-rated loneliness and health and could be completed in physical (postal) or web form, and on their own or with assistance of other people. Additional information is routinely linked through other registers through the unique Swedish personal identity number.

Questionnaires were distributed to all n=159 527 home care recipients in 2020 and n=160 283 in 2019, with n=82 843 responding in 2020 (57% response rate) and n=88 749 in 2019 (60%). For the present study, all individuals ≥70 years who responded to both the 2020 and 2019 surveys were included in a panel, amounting to n=45 123 individuals with n=90 246 observations. Due

to missing outcome data, main analyses were based on 87818 complete observations.

Patient and public involvement

No patient involved.

Study design

For the first aim, a prospective pretest–post-test design was used, with responses to the 2020 survey comprising the pandemic intervention (coding=1) and the responses to the 2019 survey the prepandemic control (=0) *groups*, respectively.

For the second aim, the simple design above was extended to a controlled ITS design, with the policy of quarantine recommendations for older adults, introduced on 16 March 2020, defined as the intervention. This design comprised, in addition to the *group* design condition as above, also the conditions of *period* and *time*. *Period* comprised categorisation of both intervention and control groups into preintervention (=0) and postintervention (=1) periods, based on the date of return of the completed questionnaire, yielding four comparison groups. While the recommendations were in effect from 16 March 2020, any impact on self-perceived loneliness was likely not immediate. The date of the policy impact was therefore chosen 2 weeks after the policy, with sensitivity analyses also conducted for the date the policy was introduced as well as 1 month after the policy was introduced. To take the time of postal service into account, 3 days adjustment was applied. Thus, the actual dates used as cut-off were 1 April for main analyses, and 19 March and 19 April for sensitivity analyses. Finally, *time* captured loneliness trends within each of the four comparison groups and corresponded to the continuous date of response by 2 day intervals.

Figure 1 shows an overview of the design in the longitudinal sample, including the dates of policy introduction and estimated impact and distinction between the four design conditions, in each of which the time trends of loneliness is estimated and used a basis for the comparisons. The effect of interest is the loneliness trends in t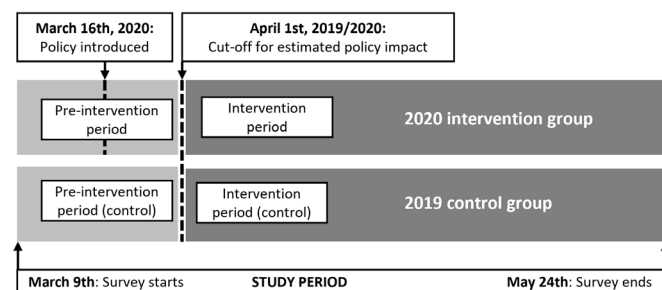he intervention period in 2020, with the trends in the other three groups representing longitudinal control conditions without exposure to the intervention.

Measures

Perceived loneliness

Loneliness was measured by the questionnaire item 'Does it happen that you are troubled by loneliness?', which was constructed for the purpose of this survey. The item has three Likert-scale response options which were dichotomised (1= 'Yes, often', 0= 'Yes, now and then' or 'No') as the analysis requires a dependent variable that is binary, continuous or a count. Additionally, the ambiguous response option 'Don't know/No opinion' was coded as '0' if the questionnaire was completed by the older adult her/himself, and as 'missing' if completed with the aid of another person (eg, a relative or staff). The rationale for this coding was that individuals themselves selecting this option are unlikely to suffer from frequent loneliness, but in cases where the questionnaire is completed with help of another person this response might as likely be chosen for other reasons, for example, unwillingness to disclose loneliness or communication difficulties.

Covariates

Variables that were not of main interest for the aims of the present study, but which potentially could influence date of response and loneliness ratings were considered potential confounders and therefore included in the adjusted analyses as covariates.

Sociodemographic covariates comprised a*ge* continuous, in years; *sex* (0=woman/1=man); *living alone* (0=yes, 1=no) and *area* of residence (0=large city, 1=medium-sized town, 2=smaller town or rural area). Area of residence groups corresponds to the three main groups of the official classification of Sweden's 290 municipalities by the Swedish Associations of Local Authorities and Regions,[37] based on population statistics from Statistics Sweden. The classification considers each municipality's population size, proximity to urban areas and commuting patterns to urban areas. 'Large city' is defined as a municipality with >200000 inhabitants (Stockholm, Gothenburg or Malmö), or in a municipality which is close to a large city and is functionally connected to a large city by a high commuting frequency (>40% of population); 'Medium-sized town' includes a medium-sized municipality of >50000 inhabitants with at least 40000 residing in the largest urban area, or a commuting or non-commuting municipality close to a medium-sized municipality; 'Small town or rural area' are municipalities not meeting the criteria for either of the other two groups, and contains municipalities with smaller towns and rural municipalities.

Service and design-related covariates comprised home care *provider* (0=public, 1=private); *type of questionnaire* (0=postal; 1=web) and *questionnaire respondent* (0=self, 1=with help of other). Questionnaire type and respondent were included as covariates as they may influence the estimate of date of completed questionnaire as well as willingness or ability to disclose loneliness.

Figure 1 Schematic overview of the interrupted time series design illustrating the four design conditions by group (2020 and 2019) and period (preintervention and intervention) in the longitudinal sample. Time trend of loneliness is estimated within each of the four comparison periods.

Statistical analysis

The first aim was addressed by regressing loneliness on *Group* (1=pandemic intervention 2020; 0=prepandemic control 2019) in crude analyses and in adjusted analysis including covariates. Due to the longitudinal design, sex was a constant across the comparison groups, and age differed by 1 year for each individual. Sex and age were therefore not included in the adjusted analysis.

For the second aim, interaction terms corresponding to a controlled ITS analysis were first constructed from the main effect variables *Group* (1=pandemic intervention 2020; 0=prepandemic control 2019), *Period* (0=preintervention; 1=postintervention) and *Time* (date of returned questionnaire in 2-day interval), representing all two-way (*Group×Period; Group×Time; Period×Time*) and the three way (*Group×Period*×Time) interactions, as described by Linden.[38] The binary outcome *loneliness* was regressed on the main and interaction terms, in crude as well as adjusted models including all covariates. In these models, the *Group×Period*×Time effect is the estimate of main interest as it tests the difference-in-difference in loneliness trends between the intervention and control groups; that is, whether the change in loneliness slope from before to after the intervention differs between intervention and control groups.[38] Of the other estimates, the *Group* main effect is the group difference in baseline level of loneliness (intercept) at study start; the *Group×Period* interaction effect signifies the group difference in the level of loneliness in the first postintervention observation and the *Group×Time* effect the group difference in preintervention loneliness trends. The other effects all concern the control group.[38] Results are reported in a crude model as well as a model adjusting for all covariates, age and sex included. Results for postintervention period starting on 1 April are reported in the results section, and sensitivity analyses with starting date 19 March and 19 April in online supplemental file 1. Unadjusted plot of relative frequency of loneliness by time is reported in online supplemental file 2.

All analyses used generalised linear model with binomial family and log link for estimation of risk ratios (RR) using Stata V.15.

RESULTS

Descriptive characteristics reported in table 1 show that two-thirds of the sample were women and the mean age in 2020 was 85.6 years (84.6 years in 2019). There was a numerically higher proportion of respondents who lived alone in 2020 compared with 2019, but little change in area of residence or service provided. As expected, a higher proportion of questionnaires were completed by the respondent herself/himself or by the web in 2020, compared with 2019.

Analyses corresponding to the first aim are showed in table 2. Crude analyses estimated a significant 14% (95% CI: 10 to 19) increase in the prevalence of loneliness from 2019 to 2020, which remained unchanged after

Table 1 Descriptive statistics of the study population in Spring 2020 (during pandemic) and Spring 2019 (before the pandemic)

Variable	Prepandemic survey (2019)	Pandemic survey (2020)
Total sample	45 123 (100%)	
Preintervention period	35 089 (77.76)	33 435 (74.10)
Postintervention period	10 034 (22.24)	11 668 (25.90)
Gender		
Women	30 501 (67.60%)	
Men	14 622 (32.40%)	
Age (years) in 2020		
M (SD)	85.58 (6.99)	
Range	70–109	
Living alone		
No	10 448 (23.73)	9730 (22.08)
Yes	33 708 (76.27)	34 332 (77.92)
Area of residence		
Large city	15 338 (33.99)	15 334 (33.98)
Medium-sized town	16 696 (37.00)	16 708 (37.03)
Small town or rural area	13 089 (29.01)	13 081 (28.99)
Provider		
Public	34 853 (77.27)	34 804 (77.21)
Private	10 255 (22.73)	10 272 (22.79)
Questionnaire		
Postal	43 425 (96.24)	42 689 (94.61)
Web	1698 (3.76)	2434 (5.39)
Respondent		
Self	27 471 (67.99)	29 719 (70.52)
Other	12 935 (32.01)	12 424 (29.48)
Loneliness	4729 (10.67)	5423 (12.20)

Numbers are N (%) if not otherwise noted.

adjustment for covariates. Of the covariates, loneliness was considerably more frequent among those who were living alone, and slightly higher among those living in urban areas or with privately provided home care services. A moderately higher prevalence of loneliness was also reported by those who completed the questionnaire with assistance or by the web.

Corresponding to the second aim, table 3 shows a summary of results from the ITS analyses. In the crude analyses, a borderline significant impact of the intervention was discernable (Group×Period×Time RR=1.02; 95% CI: 1.00 to 1.05) suggesting an additional increase in loneliness following the policy corresponding to a 2% steeper postintervention trend in 2020 than in 2019 and relative to the underlying preintervention trends. This uncertain and small effect of the policy was further attenuated below significance after adjustment for covariates (RR=1.01; 95% CI: 0.99 to 1.04). Supplementary analyses (Supplement 1) varying the date of expected policy impact led to the same main inferences, for both 19 March

Table 2 Relative increase in loneliness from 2019 to 2020

Variable	Crude	Adjusted*
Group (2020 vs 2019)	1.14 (1.10 to 1.19)	1.14 (1.10 to 1.19)
Living alone		
No	1	1
Yes	2.69 (2.52 to 2.87)	3.08 (2.88 to 3.29)
Area of residence		
Large city	1	1
Medium-sized town	0.95 (0.91 to 1.00)	0.94 (0.89 to 0.98)
Small town or rural area	0.95 (0.90 to 0.99)	0.93 (0.89 to 0.98)
Provider		
Public	1	1
Private	1.09 (1.04 to 1.14)	1.09 (1.04 to 1.14)
Questionnaire		
Postal	1	1
Web	1.38 (1.28 to 1.49)	1.36 (1.27 to 1.47)
Respondent		
Self	1	1
Other	1.62 (1.56 to 1.69)	1.87 (1.80 to 1.94)

Numbers are risk ratios with 95% CI.
*Adjusted for living alone, area of residence, provider, type of questionnaire and respondent.

(adjusted Group×Period×Time RR=0.90; 95% CI: 0.81 to 1.01) and 19 April (RR=1.01; 95% CI: 0.99 to 1.03).

DISCUSSION

The present prospective study estimated a clear increase of 14% in self-assessed loneliness among community-dwelling older adults receiving home care in Sweden during the emergence of the COVID-19 pandemic in spring 2020, compared with the same period the year prior. However, no additional increase in loneliness attributable the introduction of a quarantine recommendations targeting older adults was found. The findings add rigorous evidence to the international literature pointing towards a moderate immediate impact of the pandemic on loneliness among older adults and expands the literature by suggesting no additional impact by quarantine

Table 3 Summary results of interrupted time series analyses, in crude and adjusted analyses

	Crude	Adjusted*
Group (2020 vs 2019)	1.21 (1.07 to 1.37)	1.15 (1.01 to 1.31)
Period (post vs pretest)	1.11 (0.99 to 1.25)	1.14 (1.01 to 1.29)
Time (date, 2-day intervals)	1.01 (0.99 to 1.03)	1.00 (0.98 to 1.01)
Group×Period	1.05 (0.89 to 1.24)	1.01 (0.86 to 1.20)
Group×Time	0.98 (0.96 to 1.01)	1.00 (0.97 to 1.02)
Period×Time	1.00 (0.98 to 1.01)	1.01 (0.99 to 1.03)
Group×Period×Time	1.02 (1.00 to 1.05)	1.01 (0.99 to 1.04)

Numbers are risk ratios with 95% CIs.
*Adjusted for living alone, area of residence, provider, type of questionnaire, respondent, sex and age.

measures during the first months of the pandemic, in a setting which did not experience a general lockdown.

The finding of increased loneliness among older adults during the COVID-19 pandemic is an anticipated finding considering the concrete restrictions to social life imposed by the pandemic and related policies.[30] Concerning the magnitude of effect, a population level increase in loneliness of 14% from 1 year to another can be considered a worrisome increase from a public health perspective, particularly considering the potential consequences for older adult's well-being and health.[5 6] Particularly when considering that we did not observe any additional impact on loneliness of the quarantine measures, this could also be seen as a moderately large increase, which does not completely match the widespread concern for older adults' psychosocial vulnerability during the pandemic.[1–4] While findings of a modest change in loneliness during the pandemic among older adults are line with several recent studies,[19 20 22–24] our findings warrant a measured discussion on possible empirical and methodological explanations.

First, while it is reasonable to assume that social isolation, that is objective lack of social contacts,[39] has worsened during the pandemic, interactions with home care staff and compensatory responses can potentially have shielded older adults in home care against severe social isolation. Even though the quality of the eldercare may have been negatively affected by pandemic-related restrictions,[40] the regular contacts the participants of this study had with home care staff could have protected this population against more extreme social isolation faced by older adults without the support from home care during the pandemic. At a more general level, the widespread public awareness of loneliness among older adults in Sweden during the pandemic may also have resulted in compensatory responses; for example adult children taking the initiative calling their parents more often or making extra efforts to meet under safe conditions, for example, outside and with physical distance, or by video calls. It is also important to consider that a significant minority of older adults in Sweden did not fully comply with the recommendations of social distancing (eg, went grocery shopping as normal[31]). It is possible that non-compliance in this context also can reflect a compensatory response whereby older adults who did suffer from loneliness made conscious decisions to prioritise maintaining social life over minimising the risk of infection.

Second, even in the face of manifest social isolation during the pandemic, older adults may not have universally experienced loneliness, that is perceived social isolation,[39] as a consequence. For example, a Swedish longitudinal study found that almost 80% of 70–71-year-old adults practiced social distancing in March–April 2020, but who did not report any increase in loneliness compared with the year prior.[20] With loneliness among older adults being a prevalent public health problem even before the COVID-19 pandemic, many may already have adapted to it emotionally and/or practically

and may thereby have been able to apply and strengthen already developed strategies in the new challenging situation of the pandemic, including engaging their social network as discussed above. This may reflect an underappreciated resilience among older adults to the psychosocial impact of at least the early phase of the pandemic, as suggested by others.[12 41 42]

Third, the dimension of time is likely crucial to interpret the findings. The perception of loneliness may take longer time to develop than captured by this study, which only covered the first 3 months of the pandemic. This is supported by a recent Norwegian study finding little impact on loneliness among older adults during the first few months of the pandemic, but with a substantial increase observable in the end of 2020.[22] Moreover, when the quarantine recommendations were introduced, it was preceded by an increasing awareness of the pandemic creeping closer to Sweden, with the first Swedish COVID-19 case in the beginning of February 2020 widely reported in the media. It is therefore possible that the lack of impact of the policy is a result of many older adults already reducing their social interactions prior to the implementation of the policy. This is supported by the tendency to higher baseline loneliness in 2020 in this study.

Strength and limitations

The main methodological strengths of the study include the use of a large population-based sample including the oldest old and the prospective design, which provides a rigorous control for a range of observed as well as unobserved confounders, for example, individual traits and seasonal variations. Additional covariates were also taken into consideration including established predictors for loneliness such as living alone.[30] The controlled ITS design is also the strongest study design for impact evaluation of public health policies.[34 35] Nevertheless, research on older populations, and particularly evaluative research during the COVID-19 pandemic,[33] faces multiple challenges which also apply to the present study.

First, the target population only covered older adults receiving home care, which limits the generalisability of the findings to similarly aged adults in general. Specifically, interactions with home care staff may represent a protective resource that the general population of older adults do not have access to. Selection bias can also have influenced the findings. While the response rate was the same for women and men, it was lower for younger participants, both in 2020 and 2019.[36] The frailest older adults are generally under-represented in studies involving the oldest old,[10] which is particularly probable for the 2020 survey. The 2020 survey had slightly lower overall response rate (57%) compared with 2019 (60%) but drop-out analyses also showed better self-rated health[36] and a higher fraction responding on their own without aid in 2020, which indicates that the frailest older adults where under-represented in the 2020 survey. It is possible that an under-representation of the frailest older adult

has contributed to an underestimation of the impact of the pandemic and the policy.

Second, the ITS design is sensitive to competing interventions, or changes cooccurring with the studied intervention.[33] The competing impact of the multitude of health and social services and individual behavioural responses during the emergence of the pandemic is impossible to control methodologically. The ITS design is also susceptible to misspecified timing of the policy impact,[33] which was a challenge in this study as the lags between policy introduction, behavioural change and perceived loneliness are uncertain and likely heterogeneous. Sensitivity analyses varying the date of policy impact yielded similar main inferences. However, variation in the delay between completing and returning the questionnaire would be expected to introduce random error. It is also possible that the response delay differs systematically by year or intervention period, which would introduce bias. The extent and direction of this bias is difficult to identify and analytically control for and is thus a remaining potential source of bias.

Third, the single item loneliness measure was constructed for this survey and has not been subject to psychometric evaluation, and its validity and reliability beyond face validity is thus ultimately unknown. Of potential importance is the fact that the item did not specify the time frame of loneliness, which, similarly to variations in the delays in returning questionnaire, may introduce random and possibly systematic error that could bias the ITS analyses.

CONCLUSIONS

The present prospective study of among older adults with home care during the first months of the COVID-19 pandemic in Sweden indicate a distinct but moderate increase in loneliness compared with the year before the pandemic, but with no additional increase following introduction of a national quarantine policy targeting older adults. The public health consequences of this clear and sudden increase in loneliness from 1 year to another are worrisome. At the same time, the results also suggest that, at least during the first months of the pandemic, older adults seemed to display a relative resilience towards the worst consequences of the imposed restrictions to social life. This adds to the literature providing a nuance to the widespread perception of older adults as singularly vulnerable to the psychosocial impacts of the pandemic. Future studies should examine the impact of the sustained pandemic and quarantine on loneliness.

results, commented on the manuscript and approved of the final submission. PEG is responsible for the overall content as guarantor.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Patient consent for publication Not required.

Ethics approval This study involves human participants and was approved by Swedish Ethical Review Authority (Ref. No. 2020-06879). The study is based on a large sample from secondary data routinely collected by Swedish authorities. The data are delivered to the researchers pseudonymised, that is without personal identifier, but with an identity key routinely stored by the register holder. Under these circumstances, individual informed consent is not required or deemed feasible by the Ethical Review Authority of Sweden or by the responsible register holders.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. The study used secondary register data protected by strict secrecy, as regulated by the Public Access to Information and Secrecy Act (2009:400), which however contains an exception for research. After formal application and contingent on vetting by the Ethical Review Authority of Sweden, the responsible authorities can therefore grant access to personal data for research purposes. The URLs to the responsible authority The National Board of Health and Welfare is www.socialstyrelsen.se.

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REFERENCES

1. Douglas M, Katikireddi SV, Taulbut M, *et al*. Mitigating the wider health effects of covid-19 pandemic response. *BMJ* 2020;369:m1557.
2. Razai MS, Oakeshott P, Kankam H, *et al*. Mitigating the psychological effects of social isolation during the covid-19 pandemic. *BMJ* 2020;369:m1904.
3. Khan MSR, Kadoya Y. Loneliness during the COVID-19 pandemic: a comparison between older and younger people. *Int J Environ Res Public Health* 2021;18. doi:10.3390/ijerph18157871. [Epub ahead of print: 25 07 2021].
4. Murayama H, Okubo R, Tabuchi T. Increase in social isolation during the COVID-19 pandemic and its association with mental health: findings from the JACSIS 2020 study. *Int J Environ Res Public Health* 2021;18. doi:10.3390/ijerph18168238. [Epub ahead of print: 04 08 2021].
5. Steptoe A, Shankar A, Demakakos P, *et al*. Social isolation, loneliness, and all-cause mortality in older men and women. *Proc Natl Acad Sci U S A* 2013;110:5797–801.
6. Luo Y, Hawkley LC, Waite LJ, *et al*. Loneliness, health, and mortality in old age: a national longitudinal study. *Soc Sci Med* 2012;74:907–14.
7. Naeim M, Rezaeisharif A, Kamran A. COVID-19 has made the elderly Lonelier. *Dement Geriatr Cogn Dis Extra* 2021;11:26–8.
8. Gupta R, Dhamija RK. Covid-19: social distancing or social isolation? *BMJ* 2020;369:m2399.
9. Cacioppo JT, Cacioppo S. The growing problem of loneliness. *Lancet* 2018;391:426.
10. Dahlberg L. Loneliness during the COVID-19 pandemic. *Aging Ment Health* 2021;25:1161–4.
11. Wu B. Social isolation and loneliness among older adults in the context of COVID-19: a global challenge. *Glob Health Res Policy* 2020;5:27.
12. Parlapani E, Holeva V, Nikopoulou VA, *et al*. A review on the COVID-19-related psychological impact on older adults: vulnerable or not? *Aging Clin Exp Res* 2021;33:1729–43.
13. Lebrasseur A, Fortin-Bédard N, Lettre J, *et al*. Impact of the COVID-19 pandemic on older adults: rapid review. *JMIR Aging* 2021;4:e26474.
14. Buecker S, Horstmann KT, Krasko J, *et al*. Changes in daily loneliness for German residents during the first four weeks of the COVID-19 pandemic. *Soc Sci Med* 2020;265:113541.
15. Philpot LM, Ramar P, Roellinger DL, *et al*. Changes in social relationships during an initial "stay-at-home" phase of the COVID-19 pandemic: A longitudinal survey study in the U.S. *Soc Sci Med* 2021;274:113779.
16. Bu F, Steptoe A, Fancourt D. Loneliness during a strict lockdown: trajectories and predictors during the COVID-19 pandemic in 38,217 United Kingdom adults. *Soc Sci Med* 2020;265:113521.
17. Buecker S, Horstmann KT. Loneliness and social isolation during the COVID-19 pandemic. *Eur Psychol*. In Press 2021;26:272–84.
18. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, *et al*. Impact of social isolation due to COVID-19 on health in older people: mental and physical effects and recommendations. *J Nutr Health Aging* 2020;24:938–47.
19. Peng S, Roth AR. Social isolation and loneliness before and during the COVID-19 pandemic: a longitudinal study of US adults over 50. *J Gerontol B Psychol Sci Soc Sci* 2021. doi:10.1093/geronb/gbab068. [Epub ahead of print: 19 Apr 2021].
20. Kivi M, Hansson I, Bjälkebring P. Up and about: older adults' well-being during the COVID-19 pandemic in a Swedish longitudinal study. *J Gerontol B Psychol Sci Soc Sci* 2021;76:e4–9.
21. Niedzwiedz CL, Green MJ, Benzeval M, *et al*. Mental health and health behaviours before and during the initial phase of the COVID-19 lockdown: longitudinal analyses of the UK household longitudinal study. *J Epidemiol Community Health* 2021;75:224–31.
22. Hansen T, Sevenius Nilsen T, Knapstad M, *et al*. Covid-fatigued? A longitudinal study of Norwegian older adults' psychosocial well-being before and during early and later stages of the COVID-19 pandemic. *Eur J Ageing* 2021:1–11.
23. Seifert A, Hassler B. Impact of the COVID-19 pandemic on loneliness among older adults. *Front Sociol* 2020;5:590935.
24. van Tilburg TG, Steinmetz S, Stolte E. Loneliness and mental health during the COVID-19 pandemic: a study among Dutch older adults. *J Gerontol B Psychol Sci Soc Sci* 2020.
25. Murray J. Has Sweden's controversial covid-19 strategy been successful or not? *BMJ* 2020;370:m3255.
26. Vogel G. Sweden's gamble. *Science* 2020;370:159–63.
27. Irwin RE. Misleading media coverage of Sweden's response to covid-19. *BMJ* 2020;370:m3031.
28. Ludvigsson JF. The first eight months of Sweden's COVID-19 strategy and the key actions and actors that were involved. *Acta Paediatr* 2020;109:2459–71.
29. Kavaliunas A, Ocaya P, Mumper J, *et al*. Swedish policy analysis for Covid-19. *Health Policy Technol* 2020;9:598–612.
30. Dahlberg L, McKee KJ, Frank A. A systematic review of longitudinal risk factors for loneliness in older adults. *Aging Ment Health* 2021:1–25.
31. Gustavsson J, Beckman L. Compliance to recommendations and mental health consequences among elderly in Sweden during the initial phase of the COVID-19 Pandemic-A cross sectional online survey. *Int J Environ Res Public Health* 2020;17. doi:10.3390/ijerph17155380. [Epub ahead of print: 26 07 2020].
32. Nilsson G, Ekstam L, Axmon A. Old overnight: experiences of age-based recommendations in response to the COVID-19 pandemic in Sweden. *J Aging Soc Policy* 2021:1–21. doi:10.1080/08959420.2021.1925042
33. Haber NA, Clarke-Deelder E, Salomon JA. COVID-19 policy impact evaluation: a guide to common design issues. *Am J Epidemiol* 2021. doi:10.1093/aje/kwab185
34. Kontopantelis E, Doran T, Springate DA, *et al*. Regression based quasi-experimental approach when randomisation is not an option: interrupted time series analysis. *BMJ* 2015;350:h2750.
35. Bernal JL, Cummins S, Gasparrini A. Interrupted time series regression for the evaluation of public health interventions: a tutorial. *Int J Epidemiol* 2017;46:348–55.

36 Socialstyrelsen. [Description of methods 2020. What do the elderly think about the elderly care?]. In: *Metodbeskrivning 2020. VaD tycker de äldre Om äldreomsorgen?* 2020.

37 Swedish Association of Local Authorities and Regions. *Classification of Swedish municipalities 2017*. Stockholm, 2016.

38 Linden A. Conducting interrupted time-series analysis for single- and multiple-group comparisons. *Stata J* 2015;15:480–500.

39 Smith ML, Steinman LE, Casey EA. Combatting social isolation among older adults in a time of physical distancing: the COVID-19 social connectivity paradox. *Public Health Front* 2020;8:403.

40 Jones A, Maclagan LC, Schumacher C, *et al*. Impact of the COVID-19 pandemic on home care services among community-dwelling adults with dementia. *J Am Med Dir Assoc* 2021;22:2258–62.

41 Losada-Baltar A, Martinez-Huertas JA, Jimenez-Gonzalo L. Longitudinal correlates of loneliness and psychological distress during the lockdown situation due to COVID-19. Effects of age and self-perceptions of aging. *J Gerontol B Psychol Sci Soc Sci* 2021.

42 Fristedt S, Carlsson G, Kylén M, *et al*. Changes in daily life and wellbeing in adults, 70 years and older, in the beginning of the COVID-19 pandemic. *Scand J Occup Ther* 2021:1–11.