Associations Between Demographic Variables, Psychosocial Health, Quality of Life, and Happiness in the Context of COVID-19

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Abstract

Purpose The purpose was to examine the association between demographic variables, psychosocial health, quality of life, and happiness in the context of COVID. The hypothesis was that psychosocial health variables have mediating roles between demographic variables and experienced quality of life (QoL) and happiness.

Methods Cross-sectional surveys were conducted across four countries: Norway, USA, UK, and Australia among 1649 individuals. Multiple regression analysis identified those variables that made independent statistically contributions onto the QoL and happiness outcome variables, and the analysis of psychological distress, fatigue and loneliness as mediational variables was performed.

Results Not having a spouse/ partner was associated with poorer QoL, and older age was associated with lower happiness. The psychosocial health variables made the highest variance in QoL (R^2 change=0.51) and happiness (R^2 change=0.46) and poorer psychosocial health had a mediating role between civil status and QoL ($p<0.001$) and between age and happiness outcomes ($p<0.001$).

Conclusion Psychosocial health is of considerable importance in individuals in the time of COVID-19.

Keywords COVID-19 · Psychosocial Health · QoL · Happiness · Mediation

Background

The COVID-19 pandemic has had a significant impact on the psychosocial health and quality of life (QoL) of individuals around the world (Onyeaka et al., 2021) and the changes to daily life have for many led to reduced QoL and less happiness, higher levels of psychological distress and more loneliness (Bonsaksen et al., 2021).

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Research has shown that sociodemographic variables have played a significant role when determining the impact of the COVID-19 pandemic on QoL and happiness and psychosocial health. For example, on an overall level women report poorer QoL (Aldhahi et al., 2021; Epifanio et al., 2021; Ferreira et al., 2021; Geirdal et al., 2021; Hung et al., 2021; Lindahl et al., 2022; Pieh et al., 2020) and less happiness (Giurge et al., 2021; Lepinteur et al., 2022) when compared to men across nationalities and time. When it comes to age, researchers have reported mixed results: Some have found that the oldest individuals are most vulnerable and at higher risk and are more affected by the COVID-19 pandemic when it comes to reduced QoL and wellbeing (Burlacu et al., 2021; Yang & Ma, 2020), whereas other studies have shown that older people report more happiness and wellbeing when compared to younger people (Carson et al., 2020; Geirdal et al., 2021). Having a partner or spouse, living in rural areas, higher levels of education and having employment are other sociodemographic variables associated with better psychosocial health and QoL across countries during the time of the COVID-19 pandemic (Geirdal et al., 2021; Ruffolo et al., 2021; Xiong et al., 2020). In terms of QoL, studies have found that people already suffering from economic burdens before the COVID-19 pandemic, or who have lost their job or otherwise faced financial insecurity during the pandemic, are more likely to experience a decline in their QoL (Andrea et al., 2022; Perry et al., 2021; Sinclair et al., 2021). Closures of schools and businesses have also affected people's daily routines, social activities and normal life which are important for psychosocial health, wellbeing and QoL across the lifespan (Cheng et al., 2021; Epifanio et al., 2021; Natilli et al., 2022; Ravens-Sieberer et al., 2022). Uncertainty about the future and job insecurity has led to increased psychological distress (Wilson et al., 2020) and associated loneliness, in particular emotional loneliness (Bonsaksen et al., 2021). Overall, the ongoing COVID-19 pandemic has had a profound impact on the psychological health, QoL and happiness of individuals around the world. In response, the World Health Organization has declared COVID-19 a global emergency until it is over. People are still getting affected by the disease, and there is evidence of new mutations and sickness from it. For this reason, this is an important topic of research because it contributes to establishing a scientific basis for the current pandemic situation as well as potential unforeseen crisis in the future.

Cohen-Louck and Lewy (2022) found that anxiety, stress, function, and emotion-focused coping predicted levels of happiness during the COVID-19 pandemic using structural equation modeling. Apart from this study, we have found no other study examining psychosocial variables as either mediator or moderator variables between demographic variables and QoL and happiness. Such studies of mediated relationships are needed to better understand the mechanisms that can contribute to explain associations between demographic variables and QoL and happiness which justifies the necessity of this study.

The aim of this study was to examine the role of psychosocial health as putative mediational variables between demographic variables and QoL and happiness. The hypothesis was that psychosocial health, in this case psychological distress, loneliness and fatigue, mediate associations between demographic variables and QoL and happiness.

Methods

Design and procedures

A cross-sectional survey design was distributed through social media in each of the involved countries (Norway, UK, USA, and Australia) in November 2021. A landing site for the survey was established at the researchers' universities; OsloMet - Oslo Metropolitan University, Norway; Northumbria University and University of Central Lancashire, UK; University of Michigan, USA; and the University of Queensland, Australia. The initiator of the project was AØG from OsloMet. Due to ethical considerations and permissions in each of the countries, each country had their own project lead (JL, MR, GL). The survey was simultaneously co-developed by the researchers in two languages: Norwegian and English. Language and cultural differences were considered during the survey development process, meaning that the countries phrasing of each item conveyed the same meaning content when considered cultural embedded meanings of words and phrases.

Inclusion and exclusion

To be included in the study, participants had to be 18 years or older, understand and read Norwegian or English and live in Norway, USA, UK, or Australia, and be able to access the electronic survey.

Measures

Predictors

Demographic variables

Age groups (18–29, 30–39, 40–49, 50–59, 60–69 and 70 years and above), having a spouse or partner (yes/ no), being a parent or guardian (yes/ no), work-status (employed/ unemployed), education level (high school or below/ college – university degree), area of living (rural/ remote area, town/ suburb, city/ metropolitan zone) and residency (Norway, UK, USA, Australia) were all included.

Criteria Variables

Cantril's self-anchoring ladder (CL) is a self-administered overall 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 (Cantril, 1965). It is frequently used when comparing satisfaction with life between groups and populations and translated to use across countries (GallupWorldPoll, 2017; Mazur et al., 2018; Ortiz-Ospina & Roser, 2017; Steptoe et al., 2015; Aasprang et al., 2015). The response alternatives are between 0 and 10 with 0=worst possible QoL and 10=best possible QoL (Cantril, 1965). Studies have reported good validity and stability and

reasonable reliability (Atkinsen, 1982; Geirdal et al., 2012; Jenkins et al., 2005; Levin & Currie, 2014).

Happiness (PSW-Happiness) assesses an individual's experience of happiness and consists of one item, asking "When you see everything together, how happy are you?" The scores ranging between 1 (=happy) and 5 (=unhappy) (Kaasa et al., 1988) with the highest score as most unhappy.

Mediators

Psychosocial health measures

General Health Questionnaire 12 (GHQ-12) is widely used as a self-report measure of mental health (Goldberg et al., 1997; Goodwin et al., 2013; Hankins, 2008). A large number of studies in the general adult, clinical,- work and student populations have provided support for its validity across samples and contexts (Adlaf et al., 2001; Donath, 2001; Firth, 1986; Goodwin et al., 2013; Gorter et al., 2008; Malt, 1989; Nerdrum et al., 2006; Aalto et al., 2012) and translated from English to several other language, among these Norwegian (Hystad & Johnsen, 2020; Malt et al., 1989). Six items of the GHQ-12 are phrased positively (e.g., 'able to enjoy day-to-day activities'), and six negatively (e.g., 'felt constantly under strain'). 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' (0), 'as usual' (1), 'more than usual' (2) or 'much more than usual' (3), score range 0–36. Positively formulated items are recoded prior to analysis. Higher scores indicating poorer mental health (more psychological distress). Case-level scores (the person indicating 'more than usual' or 'much more than usual' on at least four of the 12 items) indicate a level of emotional distress where treatment may be needed (Goldberg et al., 1998). Cronbach's alpha ranging between 0.88 and 0.92 in the current samples across the countries.

The 14-item *Chalder Fatigue Scale* (CFS) was used to measure fatigue (Chalder et al., 1993). Example items include 'Recently, are you lacking in energy?' and 'Recently, do you have difficulty concentrating?' All items are rated on a 4-point Likert scale (0=better than usual, 1=no more than usual, 2=worse than usual, 3=much worse than usual), with higher scores indicating greater fatigue. The scale has been used in several studies and translated in several languages. It has often been used with the initially proposed two-factor solution, separating between physical and mental aspects of fatigue, or even with three or four factors (Fong et al., 2015; Morriss et al., 1998; Tanaka et al., 2008). However, an overall measure of fatigue was required in this study, so we constructed each participant's fatigue score as the sum of all item scores, in line with Chilcot and co-workers (Chilcot et al., 2016). In the current sample, Cronbach's α was 0.93.

The Loneliness Scale (de Jong Gierveld & van Tilburg, 2006) is comprised by six statements, each rated on a discrete scale from 0 (totally disagree) to 4 (totally agree). It measures two aspects of loneliness, namely 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"). For both scales, score range is

0–12 with higher scores indicating more loneliness. However, an overall measure of loneliness is also often established by combining all six items in one scale (score range 0–24) (Bonsaksen et al., 2021). In this study the overall measure of loneliness is used. Cronbach's α in this study was 0.80 for overall loneliness.

Sample

A total sample of 1649 individuals responded on the survey. Among these 242 were Norwegians, 255 from UK while 915 and 237 came from USA and Australia, respectively. The different number of participants between the four countries may initially seem to contribute to bias the material but considering the different size of the total population in each country this concern is reduced but is discussed more in the discussion-section.

The Medium age was between 40 and 45 years (variance 18–85 years), 1062 respondents (60%) had a spouse/ partner, 1186 (72%) were employed, 1242 (75%) female, 884 (54%) were parent/ guardian, 1258 (76%) had a bachelor degree or higher education, and 249 (15%), 815 (49%) and 585 (36%) lived in rural area, town/ suburb and city/metropolitan zone respectively (Data not shown in table).

Data analyses

Hierarchical multiple regression analysis

Hierarchical multiple regression analysis was used to examine the associations between the demographic and psychosocial variables on QoL and happiness and examine whether the psychosocial health variables mediate the relationship between demographic variables and QoL and happiness.

Analysis of psychosocial health variables as mediation variables

The analysis of psychological distress, fatigue and loneliness as mediational variables was performed after multiple regression analysis identified those demographic variables and psychosocial health variables that made independent statistically contributions onto the QoL and happiness outcome variables. The following algorithm was employed: (i) the first regression was performed with the demographic variables (spouse/ partner, area of living and age) as predictors and the QoL and happiness as criteria (dependent) variables; (ii) a second regression with the same variables, i.e. spouse/ partner, area of living and age as predictors and the mediator variables psychological distress, fatigue and loneliness as outcome variables; and finally, (iii) demographic variables, in addition to the mediator variables, were considered as the predictor (independent) variables, while the QoL and happiness measures were considered as outcome (dependent) variables. The regressions and estimation of the statistical significance of associations in mediation analysis were performed following the model of Baron and Kenny (1986). The mediational role of psychological distress, fatigue and loneliness was accepted if the associations between the predictor variables and criteria (dependent) variables were reduced in the third regression

(iii) when compared with the associations revealed in the first regression (i), and if the associations between the criteria variables and the putative mediational variables remained significant.

Results

Participants had a spread of ages. The majority had a spouse or partner, about half was a parent or guardian, most were employed, most had higher education and a minority were from rural areas.

Multiple Regression Analyses

Series of hierarchical multiple regressions were completed to examine possible associations between demographics and psychosocial health variables as independent variables and QoL and happiness. All variables correlating significantly with QoL (i.e., age, having a spouse/partner, being a parent, being employed and area of living) and happiness (i.e., age, having a spouse/partner, being a parent) in the correlation analyses were entered.

Two separate equations were evaluated to examine possible contribution of each single demographic variable and psychosocial health variables (GHQ, CFS, Loneliness) onto QoL and happiness. In both equations demographics were entered in step 1, psychosocial health in step 2. In the analysis of QoL, β values for having a spouse/partner and area of living remained significant, as well as all psychosocial health variables. In similar analysis of happiness, the β values of age and all psychosocial health variables remained significant. Overall, both demographics and psychosocial health variables made independent statistically significant contribution to both QoL and happiness, but psychosocial health variables was responsible for the highest variance of both QoL and happiness, 50% and 46% respectively (Table 1).

Analyses of psychological distress, fatigue, and loneliness as mediational variables

Based on the independent contribution of demographic variables and psychosocial health variables, the variables were then entered into the mediation analyses. In the first regression (i) the relationship between QoL having a spouse/ partner and area of living were significant and the relationship between happiness and age was significant. In the second (ii) regression, having a spouse/partner, area of living and age were significantly associated with happiness on the three mediator variables (Table 2). The predictor of having a spouse/partner made the strongest unique contribution to explaining QoL and happiness on the psychosocial health variables (the mediators).

In the third regression (iii), the β value for having a spouse/partner according to QoL was reduced compared to the values in regression one (i), and the β values for GHQ, CFS and Loneliness remained significant. The β value for age according to happiness was reduced compared to the β value in regression one, β values for

Table 1 Multivariable hierarchical linear regression analysis to determine additional variance accounted for overall QoL and happiness by demographic variables and psychological distress, fatigue, and loneliness

	Beta	P	R^2	R^2 change	P	F
Independent variables						
QoL						
Step 1. Demographic variables						
Age	−0.025	0.17	0.043	0.043	<0.001	14.63***
No spouse/ partner	−0.55	<0.01				
Not a parent	0.01	0.97				
Unemployed	−0.20	0.25				
Urban area of living	−0.58	<0.01				
Step 2. Psychosocial health						
Psychological distress (GHQ)	−0.40	<0.001	0.547	0.505	<0.01	247.78***
Fatigue (CFS)	−0.13	<0.001				
Loneliness (Loneliness scale)	−0.31	<0.001				
Happiness						
Step 1. Demographic variables						
Age	−0.06	<0.01	0.02	0.02	<0.001	13.26***
No spouse/ partner	−0.02	0.23				
Not a parent	−0.30	0.15				
Step 2. Psychosocial health						
Psychological distress (GHQ)	−0.41	<0.001	0.486	0.462	<0.001	258.39***
Fatigue (CFS)	−0.07	<0.01				
Loneliness (Loneliness scale)	−0.31	<0.001				

GHQ, CFS and Loneliness, the mediators, remained significant, which means that psychosocial health had a mediating role between civil status and QoL ($p < 0.01$) and between age and happiness ($p < 0.01$) outcomes. Overall, the same pattern was found when we analyzed the four countries separately.

Discussion

Findings of this study were that living together with a spouse or partner, and the area of living were of importance to QoL during the COVID-19 pandemic, as well as younger age was associated with higher level of happiness. Other findings were that psychosocial health plays an important role in QoL and happiness and contribute to explain substantial portions of the outcome variance. Further, psychosocial health, in this study psychological distress, fatigue and loneliness, independently have mediating roles between having a spouse/ partner and QoL as well as between age and happiness. This can be understood as those without a spouse or partner may experience lower QoL, and those of younger age experience less happiness because they also experience more psychosocial distress, more fatigue, and more loneliness than their counterparts.

The COVID-19 pandemic have had a significant impact on peoples QoL and happiness, and the results are in line with former studies (Aldhahi et al., 2021; Burlacu et al., 2021; Giurge et al., 2021; Onyeaka et al., 2021; Ruffolo et al., 2021), which all shows an association between reduced QoL and happiness and demographics.

	B	SE	p
Table 2 Regression equations examining mediation by psychological distress, fatigue, and loneliness on the relationship between demographic variables and QoL and happiness			
Regression of demographics onto QoL and happiness (X on Y)			
a) QoL			
No spouse/ partner	−0.792	0.111	<0.001
Urban area of living	−0.106	0.078	0.17
b) Happiness			
Age	−0.045	0.018	<0.001
Regression of demographics onto psychosocial distress, fatigue, and loneliness (X on M)			
a) GHQ			
No spouse/ partner	−1.419	0.325	<0.001
Urban area of living	−0.046	0.228	0.84
Age	−0.740	0.111	<0.001
b) CFS			
No spouse/ partner	1.041	0.363	<0.01
Urban area of living	0.115	0.255	0.65
Age	−0.797	0.123	<0.001
c) Loneliness			
No spouse/ partner	2.064	0.270	<0.001
Urban area of living	−0.464	0.189	<0.01
Age	−0.250	0.092	<0.01
Regression of predictor and mediator variables onto QoL and happiness (X+M on Y)			
a) QoL			
No spouse/ partner	−0.024	0.077	<0.01
Urban area of living	−0.193	0.054	<0.001
GHQ	−0.135	0.009	<0.001
CFS	−0.039	0.007	<0.001
Loneliness	−0.130	0.009	<0.001
b) Happiness			
Age	−0.034	0.013	<0.01
GHQ	−0.064	0.004	<0.001
CFS	−0.011	0.004	<0.01
Loneliness	−0.061	0.004	<0.001

CFS (Chalder Fatigue Scale); GHQ (General Health Questionnaire 12) for levels of emotional distress

Not least this is applying to age and happiness. Carson et al. (2020) found the same pattern as we did in our study. However, except of one other paper (Geirdal et al., 2021) we have not found any previous studies measuring area of living (rural versus urban areas) in association with QoL or happiness. The finding is of interest and indicate that living in rural areas during the COVID-19 pandemic are associated with better QoL. An explanation for this might be the infection pressure has been most extensive in the big cities and interventions and austerity have been more noticeable there. Account has of course been taken in the rural areas, as well, but it has possibly not been tightened to the same extent, and it might have been easier to meet with family and friends more to a normal extent. Other studies have also underscored the

importance of social support as a buffer in order to maintain good health during the COVID-19 (Li et al., 2021), while others, like Szkody et al. (2021) did not find that social support would buffer the effect between for example worry about COVID-19 and psychological health to a significant level. In contrast to this, when controlled for other demographic variables and psychosocial variables, living with a spouse or partner showed an increased QoL.

Overall, QoL was low and psychological distress was high during the COVID-19 pandemic. Psychological distress, fatigue and loneliness are to be seen as psychosocial health factors indicating high levels of stress or suffering and being result of various factors such as mental health disorders, life events and, as in this case the COVID-19 pandemic. Research has shown that age, gender, education, income and employment status can be related to the likelihood of experiencing reduced psychosocial health (Aldhahi et al., 2021; Burlacu et al., 2021; Carson et al., 2020; Geirdal et al., 2021; Giurge et al., 2021; Ruffolo et al., 2021). Also, COVID-19 has disrupted many aspects of individuals lives, including social connections and financial stability, it has led to significant changes in daily routines, as remote work, online schooling social distancing measures. Associated loneliness (Bonsaksen et al., 2021), and in line with this, intolerance about uncertainty of the future may be of importance for mental health (McCarty et al., 2022; Price et al., 2021; Wilson et al., 2020). Psychosocial variables in general, and increased psychological distress in particular, have shown to be associated with reduced QoL and happiness. In light of this it is not a big surprise that psychosocial variables accounted for a proportion of the outcome variance than demographics in both QoL and happiness in this particular study.

In the time of COVID-19 some individuals have experienced increased level of psychological distress to a level that professional help may be needed (Geirdal et al., 2021). It is, however, important to underscore that this is in the context of COVID-19, and just a few of those who are very distressed during the pandemic will be unhealthy afterwards. It is however of interest that psychosocial factors like psychological distress, fatigue and loneliness all have a mediating role between living together with a spouse or partner and QoL. The buffer effect of having a spouse/partner according to QoL is reduced when the experience of either psychological distress, fatigue or loneliness is increased. The same pattern is between age and happiness. It seems like it still is an advantage with younger age, but it is reduced with increased psychological distress, more fatigue and loneliness.

Psychological distress, fatigue and loneliness is normally seen as negative aspects of health. It is therefore important to underscore that psychological distress, fatigue and loneliness has been absent in many individuals, also through the time of COVID-19. The impact of the pandemic on QoL and happiness is not universal, and some people has been able to adapt to the changes brought by the COVID-19. They have maintained their QoL and happiness, some people even experienced improvements in certain aspects as being closer to family and friends, experience new sides of life and newfound appreciation for different pleasures. This might be associated with individual coping-strategies, as for example described by Carver et al. (1989), coping resources (Taylor & Stanton, 2007) and individual resilience (Herrman et al., 2011). The COVID-19 has highlighted the importance of QoL and happiness, as well as need for support and resources to maintain individuals QoL and happiness in time of

crisis. In conclusion, in line with previous research this study found that sociodemographic variables as living together with a spouse/ partner, area of living and age play a significant role when determining the impact of the ongoing COVID-19 pandemic for people's QoL and happiness. It also underscores how elevated psychological distress, fatigue and loneliness may have negative associations with QoL and happiness, and how these factors mediate the association between demographic variables and QoL and happiness.

Strengths and limitation

The study has some strengths. This is the first study to our knowledge that examined the role of psychosocial health factor as putative mediation variables between demographic variables and QoL and happiness in the context of COVID-19. The data was collected almost two years after the initial phase of the pandemic, which means that the mental health issues including QoL and happiness was not only associated with the shock according to changed society and daily living, but the long run potential impact of COVID-19. The total sample of 1649 participant was high compared to several other studies, and the study used well-known and validated questionnaires. It is also a strength that the same pattern of results was found across the four countries when we analyzed them separately, and we therefor decided to treat the four subpopulation as a whole in this study.

The study has however some limitations. Even a high total number of participants a possible critique may be the un-equal number of participants from each country. Taking into account the total number of inhabitants in the different countries, for example approximately 6 million inhabitants in Norway compared to the 350 million inhabitants in USA the participation rate in the Norwegian population of the total sample in percentage is higher than USA, and even UK and Australia. The recruitment was through social media and the respondents was thereby "self-recruited" which could impact the number who responded positively to participate. It may be that individuals with very poor QoL and happiness were underrepresented. A limitation might as well be that online surveys have more mismatch between self-report and actual behavior, but this is difficult to decide if it so or not. There was no indication that participant completed the survey too quickly. However, the survey was voluntary and there were no incentives for completing it, therefore we would not expect anyone to complete it quickly to provide false responses. As this is a cross-sectional study, and no testing of psychological processes unfolding over time, no conclusion regarding causality can be made, only associations as described. This might be reason not to examine mediation as we have done, as some authors, for example Maxwell et al. (2011) emphasize that cross-sectional analyses can imply the existence of a substantial indirect effect even when the true longitudinal indirect effect is zero. We have, however, leaned on Baron and Kenny (1986) who emphasize associations. The one question QoL is thoroughly used and undergone psychometric evaluation, while the one question happiness measure has not undergone the same rigorous psychometric evaluation.

Conclusion

To our knowledge this is the first study that examined the mediating role of psychosocial factors between demographic variables and QoL and happiness. Psychological distress, fatigue and loneliness should be considered important variables in understanding the relationship between living with a spouse/ partner and age with QoL and happiness.

Areas for further research

Research that focuses on the ongoing impacts of COVID-19 will be necessary to observe if the wellbeing of individuals improves of continues to decline. A review of interventions to improve psychosocial health and the impact on QoL and happiness would provide support on what has been effective or what is still needed.

Declarations

Ethics approval and consent to participate The study was performed in line with the principles of the Declaration of Helsinki. The researchers adhered to all relevant regulations in their respective countries concerning ethics and data protection. Ethical approval was granted y by OsloMet (20/03676) and the regional committees for medical and health research ethics (REK; ref. 132,066) in Norway, by the University of Michigan Institutional Review Board for Health Sciences and Behavioral Sciences (IRB HSBS) and designated as exempt (HUM00180296) in USA, University of Central Lancashire (Health Ethics Review Panel) (HEALTH 0246) in UK, and (HSR1920-080 2,020,000,956) in Australia. The data collected in this study were anonymous.

Consent to participate and publish The participation was anonymous, but in the information-letter following the invitation to participate the potential respondent were informed that answering the survey was equal to give an informed consent to participate. The information-letter informed, as well, that the results would be published in scientific papers.

Competing Interests The authors have no relevant financial or non-financial interests to disclose.

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