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ORIGINAL ARTICLE

Psychological responses and associated factors during the initial lockdown due to the corona disease epidemic (COVID-19) among Norwegian citizens

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ABSTRACT

Background: Ongoing COVID-19 studies pay little attention to the risk or protective factors related to psychological stress.

Aims: This study aims to estimate the prevalence of anxiety, depression and insomnia during the initial phase of the COVID-19 outbreak, and explore factors that might be associated with these outcomes.

Methods: A population-based cross-sectional survey was conducted using snowball-sampling strategy. Participants from 18 years or older filled out an anonymous online questionnaire.

Results: A total of 4527 citizens filled out the questionnaire. Prevalence rates were; insomnia 31.8%, anxiety 17.1% and depression 12.5%. Risk factors associated with anxiety, depression and insomnia were being single (OR = 0.75, OR = 0.57, OR = 0.59), unemployed (OR = 0.47, OR = 0.53, OR = 0.73), financial concerns (OR = 1.66, OR = 2.09, OR = 1.80) at risk for complication from COVID-19 (OR = 1.63, OR = 1.68, OR = 1.60), and being generally worried due to the COVID-19 (OR 0 3.06, OR = 1.41, OR = 1.74).

Conclusion: Being single, unemployed, at risk of health complications, or having concerns because of financial or other consequences of the pandemic are associated with mental health adversities such as anxiety, depression and insomnia during a pandemic lockdown.

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Anxiety; COVID-19; depression; epidemic; insomnia; pandemic; population survey

Introduction

In January 2020, the World Health Organization declared the 2019 coronavirus disease (COVID-19) epidemic to be a public health emergency of international concern (Mahase, 2020). In March 2020, Norway took far-reaching measures to curb the spread of the COVID-19 pandemic. The Norwegian Government implemented stringent lockdown measures, including traveling restrictions and shutting down the ports and airports to contain the expansion of the COVID-19. Excessively stringent measures might be a threat to people's mental health and forces a drastic change in habits and routines. Isolation, loss of social support, risk of infections of friends and families, changes in ways of working, might be crucial to explain alterations on psychological well-being during lockdown.

Evidence of the negative impact of the COVID-19 outbreak and related lockdown measures on psychological well-being has already been reported in early severely affected countries like China (Qiu et al., 2020; Wang et al., 2021) and Italy (Rossi et al., 2020). However, to date, the impact of the current unprecedented crisis on psychological well--being during lockdown on the general population is yet to be established in Norway.

Well-being, life satisfaction and health is generally rated higher in Scandinavia and in particular in Norway, compared with other regions of the world. In addition, every resident taxpayer of Norway (member of the Norwegian National Insurance scheme) has the right to access healthcare services. Among the Organization for Economic Co-operation and Development (OECD) countries, Norway has the highest number of doctors and nurses per capita (OECD and European Observatory on Health Systems and Policies, 2019). Thus, we expect that the average Norwegian would report less anxiety, depression and insomnia than other countries such as China and Italy during the COVID-19 outbreak. Ongoing COVID-19 studies pay little attention to the risk factors or protective factors contributing to psychological stress. However, this is important because this knowledge may assist government agencies and healthcare professionals in safeguarding the psychological wellbeing of

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the population during the COVID-19 outbreak and possible future expansion in Norway and comparable parts of the world.

The aims of the present study were to investigate (i) the prevalence of anxiety, depression and insomnia during the initial state of the COVID-19 outbreak in Norway, (ii) factors associated with anxiety, depression and insomnia during the COVID-19 outbreak.

Methods

Study design and participants

A population-based cross-sectional survey (the CORONAPOP survey) was conducted from 8 April to the 20th of May 2020, using an anonymous online questionnaire. A snowball sampling strategy during the outbreak of the epidemic of COVID-19 was utilized. The online survey was disseminated by several institutions, including Oslo University Hospital, University of Oslo, Oslo Metropolitan University and Sunnaas Rehabilitation Hospital. The link to the survey was further disseminated on social media platforms, such as Facebook, Twitter, LinkedIn and Instagram, by the individual researchers and other individuals who wanted to share the link to the survey. The study was also featured in national and local newspapers with online links.

Norwegian citizens aged 18 years or older were invited to participate in the survey. There were no exclusion criteria. The University of Oslo "nettskjema", which is a tool for designing and conducting online survey, was used and the data was stored using the Services for sensitive data platform, University of Oslo.

Measures

Sociodemographic variables

Sociodemographic (age, gender, education level, employment status before and during COVID-19 outbreak, living with spouse or partner, size of place of residence), and mental health-related data (anxiety, depression, insomnia), were collected as self-report measures via the web-based survey. The survey employed several of the measures used in the Norwegian Population health survey (NORPOP), which was conducted as a postal survey in 2014–2015 (Bonsaksen et al., 2018, 2019).

COVID-19 variables

A questionnaire was developed to assess problems related to the COVID-19 pandemic.

The participants were asked, yes/no questions pertaining to whether they: had been infected with COVID-19, had been quarantined or isolated because of COVID-19, considered themselves to belong to the risk group for experiencing complications from COVID-19, had financial concerns during the COVID-19 outbreak, expected to suffer financial losses due to the pandemic, had friends or family they were concerned about, and whether they were generally worried about the pandemic.

Mental health-related variables

The questionnaire included the question: "Below is a list of health problems: Do you have, or have you had, any of these?" Among the listed problems were anxiety, depression, and difficulties sleeping (insomnia) The response options were: "no", "yes", and "last month" (i.e. during the COVID-19 lockdown). Those who confirmed having anxiety, depression, or insomnia during the last month were classified as currently having a relevant mental health problem.

Ethics

Ethical approval for conducting the study was given by the Regional Committee for Medical and Health Research Ethics (REC) (REC South East no. 130447). Informed consent was not necessary since the questionnaires were answered anonymously.

Statistics

IBM SPSS Statistics (version 24, IBM Corp., Armonk, NY) was used for statistical analyses.

Initial descriptive analyses employed frequencies, percentage, and means with 95% Confidence interval (CI) as appropriate. Employment status was dichotomized as working/in education versus not. For alcohol we distinguished between daily use versus less frequent or no use. Marital status was dichotomized as married/cohabitant or single.

Between-group comparisons were conducted using the chi-squared test in the case of categorical variables or -tests in the case of continuous variables. Single and multiple logistic regression analyses were conducted to assess associations between sociodemographic variables, COVID-19 related worries, and anxiety. The same analyses were conducted with depression and insomnia as the dependent variables. Odd ratio (OR) and 95% CI were obtained from the logistic regression. The significance level was 5%.

Results

A total of 4527 citizens answered the questionnaire. The majority were female (85.0%), between 20 and 59 years of age (88.3%), married/cohabitant (60.0%), and lived in a city (46.3%) with >100,000 inhabitants (Table 1). More were employed (87.8%) before the COVID-19 outbreak than during lockdown (81.0%). Seventy-eight percent reporting having financial concerns and 74.6% suffered financial loss or thought they would suffer financial loss in the future. Very few (1.4%) had been infected by the COVID-19, 28.2% had been in quarantine or isolation and 23.4% considered themselves to be at risk for COVID-19 complications. Altogether, 60.7% reported that they were generally worried because of the COVID-19.

Mental health problems

The most prevalent problem was insomnia 31.8%, followed by anxiety 17.1% and depression 12.5% (Table 2). Females were more worried about the COVID-19 in general (62.6%),

than males (49.2%), $p < 0.001$. Females also reported significantly more anxiety (18.1% vs 11.2%, <0.001) and insomnia (32.5% vs 27.3%, $p = 0.007$) than males. However, there was no significant difference in the prevalence of depression 12.8% vs 11.2%, $p = 0.29$. Anxiety was correlated with depression $r = 0.48$ ($p < 0.001$), and insomnia $r = 0.39$ ($p < 0.001$). Insomnia was correlated with depression $r = 0.37$ ($p < 0.001$). Table 2 shows the prevalence of anxiety, depression and insomnia by age groups and gender.

Factors associated with anxiety

The multivariate analysis showed that younger age, being female, education level < 12 years, being unemployed, not being married or cohabitant, being concerned for friends or family, having financial concerns, being generally worried and considering oneself to be in the risk group of experiencing complication from COVID-19 were associated with anxiety (Table 3).

Table 1. Sociodemographic ($N = 4527$).

Variable	% (*n*)
Gender %	
Female	85.0 (3850)
Male	15.0 (659)
Age groups %	
18–29	25.5 (1156)
30–39	26.9 (1220)
40–49	20.6 (931)
50–59	16.9 (766)
60–69	7.8 (354)
70–79	1.8 (82)
80 and older	0.4 (18)
Place of Residence %	
Rural (<200 inhabitants)	4.4 (187)
Village (200–19,999 inhabitants)	25.2 (1141)
Town (20,000–99,999 inhabitants)	24.1 (1091)
City (≥100,000 inhabitants)	46.3 (2098)
Education level >12 years %	75.5 (3417)
Employed or in education %	
Before COVID-19 pandemic	87.8 (3971)
During COVID-19 pandemic	81.0 (3667)
Civil status %	
Married	60.0 (2716)
Boy/girlfriend	7.0 (318)
Widow	1.1 (48)
Divorced	4.1 (187)
Single	27.8 (1258)
Living situation %	
Living alone	22.0 (994)
With parents	7.0 (319)
Spouse	60.0 (2714)
Person > 18 years	16.1 (730)
Children < 18 years	34.2 (1547)

Missing ranged from 0.00% to 0.64%.

Factors associated with depression

The multivariate analysis showed that younger age, not being married or cohabitant, being unemployed, having financial concerns, considered themselves to be at risk for experiencing complication from the COVID-19, and generally being worried due to the pandemic were associated with depression during the COVID-19 lockdown (Table 4).

Factors associated with insomnia

The multivariate analysis showed that females, not being married or cohabitant, educational level < 12 years, being unemployed, having or being quarantine/isolated, considering oneself to be at risk of experiencing complication from COVID-19, being concerned for friends or family, having financial concerns and generally being worried due to the pandemic were associated with insomnia (Table 5).

Discussion

Mental health during the pandemic lockdown

The Norwegian government introduced various measures to reduce the spread of the virus, such as social distancing, lockdowns, and self-isolation. At the same time, the media gave frequent reports regarding the number of people contracting the disease and death rates. All these factors can have adverse effects on people's mental health. However, the prevalence of anxiety and depression among Norwegian citizens during COVID-19 lockdown appears to be lower than what other countries, such as China, Iran, Japan, India, UK, Spain, Nigeria, Italy, Turkey, and Saudi Arabia have reported (Alkhamees et al., 2020; González-Sanguino et al., 2020; Salari et al., 2020; Özdin & Bayrak Özdin, 2020). There could be several reasons for this. Compared with other countries, Norway had low infection rates and deaths due to COVID-19 during the initial outbreak. Furthermore, there is generally a high level of trust in Norwegian society, which includes trust in the free and accessible public health services. Whereas, the prevalence of insomnia is broadly comparable to the prevalence reported by studies from China, Greek, United States, Canada, Italy, and France

Table 2. The prevalence of anxiety, depression and insomnia by age groups and gender.

			Anxiety		Depression		Insomnia	
	Female *n*	Male *n*	Female % (*n*)	Male % (*n*)	Female % (*n*)	Male % (*n*)	Female % (*n*)	Male % (*n*)
Age groups								
18−29	1052	96	24.3 (257)	18.4 (18)	15.0 (159)	18.4 (18)	35.7 (378)	34.7 (34)
30–39	1071	145	21.3 (228)	12.4 (18)	13.7 (147)	12.4 (18)	29.4 (315)	26.9 (39)
40–49	765	161	13.3 (103)	13.7 (22)	10.5 (80)	13.7 (22)	29.3 (224)	32.3 (52)
50–50	614	147	10.7 (66)	4.8 (7)	10.4 (64)	3.4 (5)	37.0 (227)	23.1 (34)
60–69	275	77	12.4 (34)	9.1 (7)	11.6 (32)	9.1 (7)	32.4 (89)	19.5 (15)
70–79	57	25	14.0 (8)	12.0 (3)	14.0 (8)	12.0 (3)	24.6 (14)	12 (3)
80 +	10	8	20.0 (2)	0.0	20.0 (2)	0.0	60.0 (6)	25.0 (2)
Total	3850	659	18.1 (697)	11.2 (76)	12.8 (492)	11.2 (76)	32.5 (1253)	27.3 (185)

Table 3. Factors associated with anxiety during COVID-19 lockdown.

	Univariate			Multivariate		
Independent variables	OR	95% CI	*p* Value	OR	95% CI	*p* Value
Age	0.76	0.71–0.81	<0.001	0.77	0.71–0.82	<0.001
Gender	1.75	1.36–2.25	<0.001	1.41	1.08–1.84	0.01
Married/cohabitant	0.60	0.52–0.70	<0.001	0.75	0.63–0.89	0.001
Education level > 12 years	0.51	0.43–0.59	<0.001	0.70	0.58–0.85	<0.001
Residence	1.15	0.78–1.71	0.48	1.21	0.79–1.86	0.39
Employment	1.22	1.16–1.28	<0.001	0.47	0.39–0.58	<0.001
Financial worries	2.68	2.27–3.17	<0.001	1.66	1.38–1.99	<0.001
Infected by COVID-19	0.88	0.45–1.74	0.72	0.92	0.45–1.92	0.83
Quarantine or isolation	1.32	1.11–1.55	<0.001	1.11	0.93–1.33	0.25
Risk group	1.53	1.28–1.81	<0.001	1.63	1.34–1.99	<0.001
Worried about friends and family	2.11	1.63–2.73	<0.001	1.33	1.01–1.76	0.04
Generally worried	3.54	2.91–4.29	<0.001	3.06	2.49–3.75	<0.001

Hosmer and Lemeshow goodness of fit test $p = 0.23$.
Age group is 10-year intervals. Gender is coded 1 = female, 0 = male, Residence is rutal district/village (=0) or town/city (=1). All other variables are coded 1 = yes and 0 = no. Employment is being employed or in education during COVID-19 lock down. Risk group is participants that consider themselves to be at risk of experiencing complication from the COVID-19 in the case of contracting the coronavirus.

Table 4. Factors associated with depression during COVID-19 lockdown.

	Univariate			Multivariate		
Independent variables	OR	95% CI	*p* Value	OR	95% CI	*p* Value
Age	0.89	0.83–0.94	<0.001	0.91	0.85–0.98	0.015
Gender	1.16	0.89–1.49	0.26	1.06	0.81–1.38	0.69
Married/cohabitant	0.50	0.42–0.60	<0.001	0.57	0.48–0.69	<0.001
Education level > 12 years	0.58	0.48–0.69	<0.001	0.83	0.67–1.01	0.07
Residence	1.04	0.67–1.60	0.88	1.11	0.70–1.75	0.67
Employment	0.39	0.32–0.47	<0.001	0.53	0.43–0.66	<0.001
Financial worries	2.81	2.34–3.38	<0.001	2.09	1.71–2.57	<0.001
Infected by COVID-19	1.12	0.55–2.28	0.75	1.03	0.49–2.16	0.95
Quarantine or isolation	1.30	1.08–1.57	0.006	1.56	0.95–1.41	0.16
Risk group	1.75	1.45–2.12	<0.001	1.68	1.36–2.09	<0.001
Worried about friends and family	1.48	1.13–1.93	0.004	1.24	0.93–1.65	0.14
Generally worried	1.69	1.40–2.06	<0.001	1.41	1.51–1.74	0.001

Hosmer and Lemeshow goodness of fit test $p = 0.20$.
Age group is 10-year intervals. Gender is coded 1 = female, 0 = male, Residence is rutal district/village (=0) or town/city (=1). All other variables are coded 1 = yes and 0 = no. Employment is being employed or in education during COVID-19 lock down. Risk group is participants that consider themselves to be at risk of experiencing complication from the COVID-19 in the case of contracting the coronavirus.

Table 5. Factors associated with insomnia during COVID-19 lockdown.

	Univariate			Multivariate		
Independent variables	OR	95% CI	*p* Value	OR	95% CI	*p* Value
Age	0.96	0.92–1.00	0.07	1.01	0.96–1.06	0.78
Gender	1.28	1.07–1.54	0.007	1.21	1.00–1.50	0.05
Married/cohabitant	0.56	0.49–0.64	<0.001	0.59	0.51–0.67	<0.001
Education level > 12 years	0.59	0.51–0.68	<0.001	0.73	0.62−0.85	<0.001
Residence	1.18	0.86–1.62	0.30	1.25	0.89–1.75	0.19
Employment	0.52	0.44–0.60	<0.001	0.73	0.61–0.87	<0.001
Financial worries	2.19	1.90–2.54	<0.001	1.79	1.53–2.11	<0.001
Infected by COVID-19	1.03	0.61–1.73	0.94	0.91	0.52–1.59	0.75
Quarantine or isolation	1.31	1.14–1.49	<0.001	1.19	1.03–1.38	0.019
Subjective risk group	1.74	1.51–2.01	<0.001	1.60	1.36–1.88	<0.001
Worried about friends and family	1.78	1.48–2.14	<0.001	1.48	1.21–1.81	<.001
Generally worried	2.03	1.78–2.32	<0.001	1.74	1.50–2.00	<0.001

Hosmer and Lemeshow goodness of fit test $p = 0.78$.
Age group is 10-year intervals. Gender is coded 1 = female, 0 = male, Residence is rutal district/village (=0) or town/city (=1). All other variables are coded 1 = yes and 0 = no. Employment is being employed or in education during COVID-19 lock down. Risk group is participants that consider themselves to be at risk of experiencing complication from the COVID-19 in the case of contracting the coronaviru.

(Chouchou et al., 2021; Gualano et al., 2020; Killgore, Cloonan, Taylor, Fernandez, et al., 2020; Li et al., 2020; Morin & Carrier, 2021; Yuan et al., 2020; Zhang & Ma, 2020). Thus, insomnia appears to be a prominent problem worldwide during a pandemic outbreak. Although the Norwegians reported less anxiety and depression compared to other countries, they shared many of the same worries (i.e. financial, family, contagious) as the other countries which could explain why the prevalence of insomnia being broadly the same as in other countries.

Factors associated with anxiety and depression

Our results could suggest that females are more prone to experience anxiety, but not depression compared to males during the COVID-19 lockdown. However, previously

extensive epidemiological studies have found that women are at higher risk of depression (Lim et al., 2018) and that anxiety and depression disorder are more frequent in women (Albert, 2015). Furthermore, in the NORPOP study the prevalence of anxiety and depression was higher for females than males (Bonsaksen et al., 2018, 2019). In addition, the results for the male population should be interpreted with some caution due to the low participation. Results from similar studies of psychological response to the COVID-19 pandemic, also with low male participation, conducted among a Turkish population (Özdin & Bayrak Özdin, 2020), a Greek population (Voitsidis et al., 2020) and a Chinese population (Wang et al., 2021) found that more females than males reported more depression and anxiety. Thus, it appears that females might be more psychologically affected by the COVID-19 pandemic than males. One explanation for more mental health problems among women could be related to the increased burden of care many women have carried during the pandemic. The COVID-19 pandemic can be considered as a traumatic event and there is some evidence that women are more susceptible to the effects of trauma and report more posttraumatic stress reactions than men (Bonsaksen et al., 2020).

In the present study, younger persons (<40 years of age) reported more anxiety, than older persons did. One might expect older persons (>65 years of age) to report more anxiety and depression. Older persons, especially those who have underlying chronic health conditions, are at greater risk of contracting and experiencing serious illness with COVID-19 (Zhou et al., 2020). However, our findings are consistent with previous research that the younger cohorts presented a larger negative effect on psychological well-being due to COVID-19 (Ahmed et al., 2020; González-Sanguino et al., 2020; Huang & Zhao, 2020). The reason for this could be that young adults are concerned over the future consequences and economic challenges caused by the pandemic, as they are considered the key active working forces in society and are, therefore mostly affected by business closure and redundancies. However, further studies are merited to examine whether and why younger persons might be more vulnerable to the pandemic situation, so that appropriate measures can be adopted to help them cope.

Participants who considered themselves to be in the risk group for experiencing complication from COVID-19 were at more risk for anxiety and depression. This was expected since comorbid chronic disease, in addition to older age has been identified as the most important risk factor for mortality due to the COVID-19 (Zhou et al., 2020).

Other factors associated with anxiety and depression were, being single, unemployment and generally being worried due to the pandemic. In the present study, lower educational level was associated with anxiety, but not depression. Wang et al. (2021) proposed that high educational level might have a protective effect against negative emotions (Wang et al., 2021). According to Zhang et al (2020), individuals with higher educational levels have higher levels of information about and better attitudes towards COVID-1(Zhang & Ma, 2020). However, in contrast, some studies found that higher levels of education was associated with anxiety (Moghanibashi-Mansourieh, 2020; Zhang & Ma, 2020). According to Zhang et al (2020) the higher prevalence of anxiety among the Chinese participants with higher educational levels was probably due to this group's high self-awareness in relation to their own health (Zhang & Ma, 2020).

Approximately 30% of the participants had been in quarantine or isolated during COVID-19 lockdown. In the present study having been in quarantine or isolated was associated with insomnia, but not with anxiety or depression. There is consistent evidence, which showed that social isolation and loneliness are linked to worse mental health outcomes (Banerjee & Rai, 2020; Killgore, Cloonan, Taylor, & Dailey, 2020; Leigh-Hunt et al., 2017); this is particularly salient with government directives for social distancing and isolation.

Many people are coping with job loss caused by the COVID-19 pandemic. Whether it is temporary or permanent, it will affect one's life. In the present study, unemployment was associated with both anxiety and depression. This can be attributed to the lack of daily routine and scheduling which affects the psychosocial functioning as well as income. Approximately 80% reported having financial concerns, and the majority had suffered or thought they would suffer financial loss in the future.

Participants in the present study, who had been infected by the COVID-19, did not report a higher prevalence of anxiety or depression. One might think that people who were infected or who had been infected with COVID-19 were likely to experience anxiety and/or depression. A study conducted on hospitalized patients with COVID-19 found that approximately one third of the patients had experienced anxiety and depression (Zhang et al., 2020). However, people who had been infected might consider themselves immune of the disease, explaining why they did not experience anxiety or depression. Another explanation for our finding, could be due to the small sample that had or had had COVID-19.

Factors associated with insomnia

In the present study, insomnia appears to be a prominent reaction of the outbreak of the pandemic. For many, the COVID-19 has generated significant stress, anxiety and worries about own and family health, employment and finances. Such a major stress event is also likely to impair sleep and circadian rhythms. Furthermore, social isolation and quarantine can affect our daily routine and thus their circadian rhythm causing insomnia, which explains our findings, that isolation and quarantine were associated with insomnia.

Our results suggest that females appear to be more prone to experience insomnia than males during COVID-19 lockdown, which is consistent with Voitsidis et al's (2020) findings (Voitsidis et al., 2020). However, the prevalence of insomnia is higher for females than males in Norway (Uhlig et al., 2014). Thus, the higher prevalence of insomnia among females was not unexpected. Furthermore, women provide

most care to spouses, children and elderly family members, which could contribute to higher levels of anxiety, depression and insomnia.

Addressing a large set of predictor variables the present study confirmed that the factors associated with anxiety and depression, were the same for insomnia. This was expected, since insomnia, anxiety and depression were significantly correlated. The relationship between anxiety, depression and insomnia is complicated. Increased anxiety or depression could result in sleep disturbance and vice versa. As such, insomnia could, maybe be considered an associated factor to anxiety and depression rather than a measure of mental health.

Some of these factors that were associated with anxiety and depression, such as COVID-19 worries, considering oneself to be at risk of experiencing complication from the COVID-19 and educational level have also been identified by others (Kokou-Kpolou et al., 2020; Voitsidis et al., 2020).

Strengths and limitations

To our knowledge, this is the first study in Norway to investigate the immediate psychological responses (i.e. anxiety, depression and insomnia) and associated factors during the outbreak and lockdown of the COVID-19. One particular advantage of this study is that it measure the public psychological state during the initial lockdown due to the pandemic.

The study has some limitations. Given the time-sensitivity of the COVID-19 outbreak, we used the snowball sampling strategy. Thus, the study's population may not be representative for the general population. In addition, there was an under sampling of males, suggesting selection bias. This is in consistence with other studies using the snowball sampling strategy for recruitment during COVID-19. They recruited from 18% to 36% males (Alkhamees et al., 2020; Kokou-Kpolou et al., 2020; Pappa et al., 2020; Wang et al., 2021). In addition, the majority of the participants were between 20 and 59 years of age. Furthermore, self-reported outcomes rely on the respondents as a source of information and therefore are subjective in nature. Self-reported anxiety, depression and insomnia may not always be aligned with assessment by mental health professionals. The single-items measures of anxiety, depression and insomnia may also be considered a limitation. However, single-item self-report measures have been shown to be reliable, as estimated by test-retest correlations (Gardner et al., 1998) and correlations with clinical diagnosis (Littman et al., 2006).

There is also a possibility of selection bias since the study was performed with an online questionnaire. People without internet and unable to use smartphones or e mail could not be included in the study.

Implications

The high prevalence of insomnia, anxiety, and depression in the first phase of a pandemic suggests that the mental health of the population must be considered when measures against epidemics are implemented. Authorities and the media must provide information that balances the severity of the epidemic against concerns in the population, refute rumors in a timely manner, and reduce the impact of misinformation on the public's emotional state. Lockdowns and isolation can have consequences for people's mental health. Measures can be introduced as continuous information and dialogue between authorities and the population, and as gatherings and engagement through social media. An active support and distribution policy can prevent people from suffering large financial losses. In addition to measures taken by the authorities, health care professionals should be aware of the increased rates of anxiety, depression and insomnia and address these issues in their clinical practice. Furthermore, the health services should maintain or strengthen its services, including the mental health service during a pandemic.

Conclusion

The present study shows a high prevalence of mental health adversities such as insomnia, anxiety, and depression during a pandemic. Lockdown of the society, as well as concerns about health complications or financial consequences of the pandemics, may be causal factors. Authorities should consider such outcomes when implementing measures against epidemic. Both authorities and health care professionals should address these issues for prevention and treatment.

Ethical approval

The study was carried out in accordance with the ethical standard of the REC South East and with the 1964 Helsiniki Declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was not required since the questionnaires were answered were answered anonymously.

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Disclosure statement

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