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### **Citation**

Vincze, K., Murphy, G., Barker, M. M., González-Hijón, J., Kähler, A. K., Frans, E. M., ... Lovik, A. (2025). Gender, care-seeking behavior, and adverse mental health during the first year of the COVID-19 pandemic in Sweden: an exploratory study. *Journal Of Psychiatric Research*, 190, 235-247. doi:10.1016/j.jpsychires.2025.07.042

Version: Publisher's Version

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**Note:** To cite this publication please use the final published version (if applicable).



# Gender, care-seeking behavior, and adverse mental health during the first year of the COVID-19 pandemic in sweden: an exploratory study

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## ARTICLE INFO

### Keywords:

Gender  
Care-seeking  
Mental health  
COVID-19  
Omtanke2020  
Sweden

## ABSTRACT

This exploratory study aimed to examine whether gender and care-seeking behaviors were associated with the frequency of adverse mental health symptoms during the COVID-19 pandemic based on the longitudinal Omtanke2020 Study in Sweden (N = 27,562). The study was performed using self-reported data from adult volunteers through online surveys. Descriptive network analysis was used to explore the cross-sectional relationships between gender, care-seeking behavior, and symptoms of depression, anxiety, and COVID-19-related distress at baseline as well as 6-month and 12-month follow-ups. Prevalence of adverse mental health symptoms was further compared between individuals with different care-seeking behaviors at the three timepoints using generalized estimating equations. Women reported a higher prevalence of care avoidance and care delay due to COVID-19 as well as adverse mental health symptoms at all timepoints, compared to men. However, avoidance of care and delayed care due to COVID-19 were associated with a higher prevalence of adverse mental health symptoms among both men and women. The results highlight the need for further research into gender differences in care-seeking behavior and the interaction of gender and care-seeking on mental health. Finally, our study underlines the need for gender-sensitive interventions to encourage and facilitate appropriate care-seeking behaviors.

## 1. Introduction

Gender has consistently presented as an important determinant of both physical and mental health (Heise et al., 2019; Riecher-Rössler, 2010; Street and Dardis, 2018). Overall, it is suggested that through the social construction of gender, both expected and performed, men and women experience, interpret, and display stress and mental health conditions in different ways (Street and Dardis, 2018). There are gender differences in risk factors, prevalence, symptomatology, and prognosis of mental health conditions (Riecher-Rössler, 2010; Salk et al., 2017). This can be illustrated through the prevalence of depression from the World Health Organization (WHO) World Mental Health Survey

Initiative (Kessler et al., 2006): the female to male ratio for 12-month major depressive episode ranged between 1.2 and 2.7 among 89,037 individuals from 18 countries (Bromet et al., 2011). The extent of healthcare utilization is another important factor which can impact an individual's mental health trajectory. While many studies have found that women typically seek care for both physical and mental health concerns more often than men (Font et al., 2018; Höhn et al., 2020; Roxo et al., 2021; Thompson et al., 2016), much of this evidence comes from cross-sectional studies, with results varying depending on the setting and outcomes being assessed (Horackova et al., 2019; Khajeh et al., 2019; Pham et al., 2022; Roberts et al., 2018).

The 2019 coronavirus disease (COVID-19) pandemic has had

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<https://doi.org/10.1016/j.jpsychires.2025.07.042>

Received 26 February 2024; Received in revised form 21 July 2025; Accepted 31 July 2025

Available online 5 August 2025

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substantial consequences on both mental health and care-seeking behavior. During the early stages of the pandemic (i.e., February–September 2020), several cross-sectional studies from various settings showed that many adults avoided seeking medical care, either urgent or routine, including care for pre-existing or newly-onset psychological symptoms (Beridze et al., 2022; Czeisler et al., 2020; Ganson et al., 2020; Kitazawa et al., 2021; Zielasek et al., 2021). Data from the United States suggests that delaying care multiple times during the pandemic led to more adverse outcomes than delaying care once or not at all (Rose et al., 2022).

As for the context and setting of this study, Sweden has a decentralized, publicly funded healthcare system with universal coverage for all residents (Anell et al., 2008; Rae, 2005) and existing e-Health mental health solutions (Rozental et al., 2022; Yogarajah et al., 2020). Sweden had very different COVID-19 prevention strategy in the first wave of the pandemic compared to other Nordic and European countries, with a range of recommendations for social distancing rather than strict lockdown measures (Ludvigsson, 2023). The specific timeline of restrictions during the first 8 months of the pandemic in Sweden has been described elsewhere (Ludvigsson, 2020), but examples from this time include temporary school closure for children over 16; visits to nursing facilities were not allowed; and bars and restaurants had to follow physical distancing (Ludvigsson, 2020). Notably though, infected households were not forced to quarantine themselves, nor were there enforced quarantines for specific geographical regions, and facemask recommendations were also limited to healthcare settings (Ludvigsson, 2020). Vaccinations started during the winter of 2020–21, and certain schools were closed during this period, and face masks were recommended on public transport during rush hour, all the while reports about worse mental health were being published (The Swedish Public Health Agency, 2023). Interventions were terminated and reinstated as deemed necessary locally and nationwide, such as during the wave of the winter of 2021–22, social distancing measures at public spaces were implemented again (The Swedish Public Health Agency, 2023). Both praise (Andersson and Jonung, 2024) and criticism (Mens et al., 2021) has been voiced in regard to the Swedish strategy, however, the government-appointed Swedish COVID-19 Commission set up to examine the Swedish COVID-19 strategy has also taken a critical stance to the handling of the first wave, highlighting that earlier adoption of more extensive approaches would have been needed (Ludvigsson, 2023). As mentioned before, there is evidence that Swedish residents suffered from adverse physical and mental health outcomes during the pandemic (Lovik et al., 2023; McCracken et al., 2020; Rozental et al., 2022). For this reason, our study conducted in Sweden can provide useful insights about the potential public mental health consequences of a non-lockdown pandemic response strategy, bearing relevance for planning possible future pandemic measures.

Data on the COVID-19 pandemic and the impact it has had on care-seeking behavior tends to come from cross-sectional studies (Beridze et al., 2022; Czeisler et al., 2020; Ganson et al., 2020; Kitazawa et al., 2021; Zielasek et al., 2021). There is currently a shortage of studies with longitudinal data and studies focusing on potential gender differences in care-seeking. Therefore, in this exploratory study, we aimed to first describe how care-seeking behavior differed between men and women over three time points during the pandemic in Sweden. Secondly, we aimed to describe the relationships between gender, care-seeking, and adverse mental health outcomes at all three time points through three cross-sectional network analyses. Finally, we aimed to investigate the association of care-seeking with adverse mental health outcomes, by gender, both cross-sectionally and longitudinally.

## 2. Methods

### 2.1. Study design

This study used data from the Swedish Omtanke2020 Study, an

ongoing longitudinal cohort study initiated in June 2020 (Lovik et al., 2023). Details of the study design of Omtanke2020 have previously been published, including the participant recruitment process, which consisted of invitations to individuals from pre-existing cohorts and self-recruitment through targeted social media campaigns (Lovik et al., 2023). The Omtanke2020 Study was approved by the Swedish Ethical Review Authority (no. 2020–01785) and all participants provided informed consent (Unnarsdóttir et al., 2022). In the present study, we used data collected at three time points, namely baseline, 6-month follow-up, and 12-month follow-up. Care-seeking variables were not collected during monthly follow-ups, but only during the more detailed surveys sent every 6 months. Baseline data collection was carried out during June 9, 2020–June 8, 2021. The 6-month follow-up occurred during March–November 2021 whereas the 12-month follow-up occurred during December 2021–February 2022 (Unnarsdóttir et al., 2022). The number of participants at baseline and at the two included follow-ups is illustrated in a flowchart in Fig. 1. Participants could choose not to participate in the 6-month follow-up but participate in the 12-month follow-up.

### 2.2. Variables

Age at baseline and gender (male/female) were collected through the unique Swedish personal identity numbers used by participants to access the study questionnaires (Chourpiliadis et al., 2023; Lovik et al., 2023). Sweden currently only recognizes male and female as genders (RFSL, 2022), and in this study legal gender is captured at baseline. Somatic health and mental health were distinguished in the questionnaires, with somatic health referred to as physical health.

Care-seeking was identified by asking participants questions relating to different behaviors and experiences. Five questions were included in the survey through which we operationalized care-seeking. Participants were asked whether they avoided care-seeking for mental health due to worries of getting COVID-19 (yes, no), whether they avoided care-seeking for somatic health due to worries of getting COVID-19 (yes, no), whether they had delayed care (yes, no), how long the delay was (less than a month, one to four months, more than four months, unspecified delay, cancelled), the type of care delayed (cancer treatment, operation, X-ray examination including magnetic resonance and computerized tomography, visit at the general practice, other care), and the level of worry caused by the delay in care (very much, quite a lot, neutral, quite little, not worried at all). These variables were always specified during analyses, as they were not compiled into an aggregate variable.

Depressive symptoms were measured using the Patient Health Questionnaire (PHQ-9), a validated questionnaire consisting of nine items and a total score ranging from 0 (no depressive symptoms) to 27 (Kroenke et al., 2001). Internal consistency for PHQ-9 measurement in the baseline sample of Omtanke2020 was reported to be very good with Cronbach's  $\alpha = 0.88$  (Lovik et al., 2023). In the analyses we treated depressive symptoms as a binary variable, using the recommended score of  $\geq 10$  as a cut-off (Kroenke et al., 2001; Magnúsdóttir et al., 2022), as it has shown to appropriately detect symptoms of depression (Kroenke et al., 2001).

The Generalized Anxiety Disorder 7-item scale (GAD-7) was used to measure anxiety (Spitzer et al., 2006). GAD-7 has been validated in Sweden and uses a total score ranging from 0 (no anxiety symptoms) to 21. Cronbach's alpha for the GAD-7 measurement in the baseline sample of Omtanke2020 was reported to be  $\alpha = 0.90$  (Lovik et al., 2023). In the analyses, we treated anxiety symptoms as a binary variable with the recommended cut-off score of  $\geq 10$  (Magnúsdóttir et al., 2022; Spitzer et al., 2006), as it has demonstrated to be able to detect generalized anxiety disorder symptoms in a primary care setting (Spitzer et al., 2006).

COVID-19-related distress symptoms were measured using a modified, five-item version of the Primary Care PTSD Screen for DSM-5 (PC-

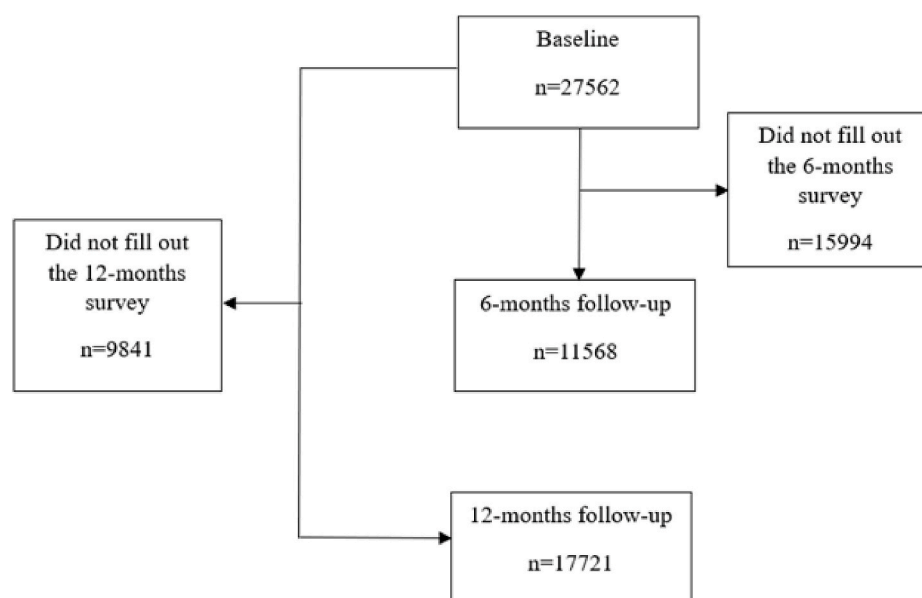


Fig. 1. Flowchart of participants.

PTSD-5) scale (Prins et al., 2016) where unspecified events were exchanged to refer to COVID-19 (for more information see Unnarsdóttir et al., 2022; Lovik et al., 2023). Internal consistency for this measure in the baseline Omtanke2020 sample was  $\alpha = 0.77$  (Lovik et al., 2023). The cut-off value of  $\geq 4$  was adopted based on the analogy principle from previous literature (Magnúsdóttir et al., 2022; Prins et al., 2016) to generate a binary outcome variable.

As for covariates, disease history, both somatic health (number of somatic diseases with “yes”, “no” or “cannot/do not want to answer” options for high blood pressure, heart disease, respiratory illnesses including asthma, chronic kidney failure, cancer, diabetes, and impaired immune system due to other reasons than COVID-19) and mental health (“Have you ever been diagnosed with some sort of mental illness, such as depression, anxiety, bipolarity or something else by a doctor or psychologist?” with answer options: yes, no, cannot/do not want to answer) were investigated. General self-reported somatic and mental health questions were also asked (“How do you rate your physical health in general?”, “How do you rate your mental health in general?”), with response options on a four-point Likert scale with options corresponding to very good (1), good (2), decent (3), or bad (4). Cumulative COVID-19 status was also measured through self-report with questions inquiring about if the infection was confirmed by antigen or PCR test, a healthcare professional, or if the participants think they had the infection due to contacts, antibody tests, symptoms, etc.). Additional covariates used in the analysis included excessive drinking (for women: four or more drinks consumed in one occasion; for men: five or more drinks consumed in one occasion) (CDC, 2019), smoking, Body Mass Index (BMI), relationship status (in a relationship or not, cannot/do not want to answer), and self-recruitment into the study (yes, no, or cannot/do not want to answer).

Participants always had the response option “I cannot/do not want to answer” when filling out the questionnaires, resulting in missing values. These values were then included in the same group as missingness due to question not asked for logical reasons (e.g., individuals who did not report having experienced delayed care were not asked which type of care was delayed/cancelled). Missing data on depression, anxiety, and COVID-19-related distress was on the other hand handled using the R *mice* package (van Buuren and Groothuis-Oudshoorn, 2011) to impute data with  $<20\%$  missingness, generating 20 complete datasets per iteration in a maximum of 10 iterations. These datasets were then pooled using the mode value.

## 2.3. Statistical analysis

All sociodemographic, mental health and care-seeking variables were first summarized using mean (standard deviation) for continuous variables or frequencies (percentages) for categorical variables. Group differences between men and women at baseline were assessed using independent t-tests or chi-square tests depending on the variable, as presented in Table 1.

### 2.3.1. Mixed graphical models

A network analysis was performed to visualize the relationships between the following variables at baseline, 6-month follow-up, and 12-month follow-up: age, gender, avoidance of care-seeking for somatic health, avoidance of care-seeking for mental health, delayed care, presence of somatic comorbidities, previous mental health diagnosis, cumulative COVID-19 status, and adverse mental health symptoms (depression, anxiety, COVID-19-related distress). Mixed graphical models (MGMs) were plotted using the *mgm* package in R (Haslebeck & Waldorp, 2020). MGMs allow for appropriate correlations to be run between variables of different types (count, categorical, continuous) (Haslebeck & Waldorp, 2016; 2020). Further network evaluations were conducted using the *bootnet* (Epskamp et al., 2023a), *qgraph* (Epskamp et al., 2023b) and *NetworkComparisonTest* (van der Bergh, 2023) R packages to check node centralities, network stability and accuracy, as well as to compare networks.

### 2.3.2. Prevalence ratios of depression, anxiety, and COVID-19-related distress

To investigate the association of care-seeking behavior with adverse mental health (latter being the dependent variable), prevalence ratios, with 95 % confidence intervals (CIs), were calculated using modified robust Poisson regression for binary outcomes. We performed three different models at each timepoint (Chen et al., 2018; Zou, 2004; Zou and Donner, 2013). The default model included the independent variables of age, previous mental health diagnosis, cumulative COVID-19 status, experience of delayed care, avoidance of care-seeking for mental health, and avoidance of care-seeking for somatic health. Model 1 additionally included an interaction between avoidance of care-seeking for mental health and gender. Model 2 included an interaction between avoidance of care-seeking for somatic health and gender. Model 3 included an interaction between delayed care and gender.

**Table 1**

Baseline characteristics of the participants.

Baseline characteristics	Total (n = 27562)	Male (n = 5107)	Female (n = 22455)	Test statistic (p value)
<b>Age, years</b>				
Mean (SD)	48.76 (15.73)	47.53 (16.46)	49.04 (15.55)	t = 6.189 (p < 0.001)
<b>Age group, N (%)</b>				
18–29	3769 (13.67)	793 (15.53)	2976 (13.25)	$\chi^2 = 160.6$ (p < 0.005)
30–39	5016 (18.20)	1097 (21.48)	3919 (17.45)	
40–49	5274 (19.14)	1024 (20.05)	4250 (18.93)	
50–59	5932 (21.52)	843 (16.51)	5089 (22.66)	
60–69	4404 (15.98)	695 (13.61)	3709 (16.52)	
70+	3167 (11.49)	655 (12.83)	2512 (11.9)	
<b>Relationship status, N (%)</b>				
In a relationship	19966 (72.44)	3793 (74.27)	16173 (72.02)	$\chi^2 = 10.661$ (p = 0.005)
Single	7459 (27.06)	1292 (25.30)	6167 (27.46)	
Missing	137 (0.50)	22 (0.43)	115 (0.51)	
<b>Body Mass Index, N (%)</b>				
Underweight (<18.5)	1660 (6.02)	147 (2.88)	1513 (6.74)	$\chi^2 = 335.89$ (p < 0.005)
Normal weight (18.5–25)	13972 (50.69)	2457 (48.11)	11515 (51.28)	
Overweight (25–30)	8162 (29.61)	1871 (36.64)	6291 (28.02)	
Obese (>30)	3768 (13.67)	632 (12.38)	3136 (13.97)	
Missing	1208 (4.38)	82 (1.61)	1126 (5.01)	
<b>Smoking or snuff, N (%)</b>				
Never	14287 (51.84)	2442 (47.82)	11845 (52.75)	$\chi^2 = 328.9$ (p < 0.005)
Formerly	4645 (16.85)	1295 (25.36)	3350 (14.92)	
Current	8456 (30.68)	1341 (26.26)	7115 (31.69)	
Missing	174 (0.63)	29 (0.57)	145 (0.65)	
<b>Excessive drinking, N (%)</b>				
No	14943 (54.22)	2838 (55.57)	12105 (53.91)	$\chi^2 = 17.764$ (p < 0.005)
Yes	7268 (26.37)	1385 (27.12)	5883 (26.20)	
Missing	5351 (19.41)	884 (17.31)	4467 (19.89)	
<b>Previous mental health diagnosis, N (%)</b>				
No	17760 (64.44)	3831 (75.01)	13929 (62.03)	$\chi^2 = 308.22$ (p < 0.005)
Yes	9438 (34.24)	1218 (23.85)	8220 (36.61)	
Missing	364 (1.32)	58 (1.14)	306 (1.36)	
<b>Mental and physical health characteristics</b>				
<b>Mental health scales, mean (SD)</b>				
PHQ-9	5.793 (5.49)	5.156 (5.34)	5.938 (5.51)	t = 9.2 (p < 0.005)
GAD-7	4.405 (4.77)	3.67 (4.40)	4.572 (4.84)	t = 12.189 (p < 0.005)
Modified PC-PTSD-5	2.388 (1.59)	1.885 (1.52)	2.503 (1.58)	t = 25.75 (p < 0.005)
General mental health	2.147 (0.916)	2.09 (0.94)	2.16 (0.91)	t = 5 (p < 0.001)
General physical health	2.094 (0.84)	2.050 (0.85)	2.100 (0.84)	t = 3.846 (p < 0.001)
<b>Symptoms of depression, N (%)</b>				
Below cut-off	21749 (78.9)	4213 (82.49)	17536 (78.09)	$\chi^2 = 48.151$ (p < 0.005)
Above cut-off	5813 (21.09)	894 (17.51)	4919 (21.91)	
<b>Symptoms of anxiety, N (%)</b>				

**Table 1 (continued)**

Baseline characteristics	Total (n = 27562)	Male (n = 5107)	Female (n = 22455)	Test statistic (p value)
Below cut-off	23478 (85.18)	4531 (88.72)	18947 (84.38)	$\chi^2 = 61.853$ (p < 0.005)
Above cut-off	4084 (14.82)	576 (11.28)	3508 (15.62)	
Symptoms of COVID-19-related distress, Ns (%)				
Below cut-off	18758 (68.06)	4060 (79.50)	14698 (65.46)	$\chi^2 = 365.72$ (p < 0.005)
Above cut-off	8248 (29.93)	973 (19.05)	7275 (32.40)	
General mental health, N (%)				
Very good	7531 (27.32)	1602 (31.37)	5929 (26.40)	$\chi^2 = 8670$ (p < 0.005)
Quite good	10728 (38.92)	1895 (37.11)	8833 (39.34)	
Decent	6996 (25.38)	1158 (22.67)	5838 (26.00)	
Bad	2295 (8.33)	452 (8.85)	1843 (8.21)	
Missing	12 (0.04)	0	12 (0.05)	
Number of somatic diseases, N (%)				
0	18259 (66.25)	3334 (65.28)	14925 (66.47)	$\chi^2 = 17143$ (p < 0.005)
1	6473 (23.49)	1154 (22.60)	5319 (23.69)	
2	1724 (6.25)	380 (7.44)	1344 (5.99)	
≥3	480 (1.74)	104 (2.04)	376 (1.67)	
Missing	626 (2.27)	135 (2.64)	491 (2.19)	
General physical health, N (%)				
Very good	7079 (25.68)	1457 (28.53)	5622 (25.04)	$\chi^2 = 8810.6$ (p < 0.005)
Quite good	12234 (44.39)	2186 (42.80)	10048 (44.75)	
Decent	6825 (24.76)	1215 (23.79)	5610 (24.98)	
Bad	1416 (5.14)	247 (4.84)	1169 (5.21)	
Missing	8 (0.03)	2 (0.04)	6 (0.03)	
Cumulative positive COVID-19 status, N (%)				
Baseline	1428 (5.18)	305 (5.97)	1123 (5)	$\chi^2 = 468.57$ (p < 0.005)
Self-recruitment, N (%)				
No	12052 (43.73)	2373 (46.47)	9679 (43.10)	$\chi^2 = 263.09$ (p < 0.005)
Yes	11353 (41.19)	2336 (45.74)	9017 (40.16)	
Missing	4157 (15.08)	398 (7.79)	3759 (16.74)	

Note: SD = Standard deviation, PHQ-9 = Patient Health Questionnaire (measuring symptoms of depression), GAD-7 = Generalized Anxiety Disorder 7-item scale, PC-PTSD-5 = Primary Care PTSD Screen for DSM-5 (measuring COVID-19-related distress through modification). The cut-offs for depression and anxiety were  $\geq 10$  each, while for COVID-19-related distress it was  $\geq 4$ .

Stratification by gender was performed for models with a significant interaction effect. The *glm* function from the R *stats* package was used to perform the models (R Core Team, 2022).

### 2.3.3. Generalized estimating equations

Longitudinal analysis was carried out using generalized estimating equations (GEE) using a binomial link function which allow estimating the population average log odds while accounting for within-subject clustering. This method assumes that data is missing at random (i.e., missing data only depends on observed data). We calculated prevalence estimates with the 95 % CIs per timepoint for the three adverse mental health outcomes depression, anxiety, and COVID-19-related distress) among individuals with different care-seeking behaviors (repeated measure per timepoint) and gender. To perform this analysis, we used the *geeglm* and *emmeans* functions from the *geepack* (Halekoh et al., 2006) and *emmeans* (Lenth, 2020) R packages, respectively. Models were adjusted for timepoint, the other care-seeking variables, age, previous



mental health diagnosis, COVID-19 status, and gender (when not stratified). Forest plot visualizations were carried out using the *meta* (Schwarzer et al., 2024) and *dmetar* (Harrer, 2023) R packages.

All analyses were conducted using R (version 4.2.3) (R Core Team, 2022).

### 3. Results

#### 3.1. Descriptive analyses

Table 1 summarizes sociodemographic characteristics and mental and physical health of the participants at baseline. Most of the participants (81.5 %) were female, and the mean age of the sample was 48.8

**Table 2**  
Care-seeking and delayed care at 3 timepoints, by gender.

	Baseline			6 months			12 months		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Participants (row-wise %)	27562	5107 (18.53)	22455 (81.47)	11568	1986 (17.17)	9582 (82.83)	17721	3211 (18.12)	14510 (81.88)
Dropout (% of original sample)	–	–	–	15994 (58.03)	3121 (61.11)	12873 (57.33)	9841 (35.7)	1896 (37.13)	7945 (35.38)
Avoid care-seeking for mental health, N (%)									
Yes	1069 (3.88)	174 (3.41)	895 (3.99)	350 (3.03)	36 (1.81)	314 (3.28)	337 (1.9)	54 (1.68)	283 (19.5)
No	23010 (83.48)	4603 (90.13)	18407 (81.97)	11048 (95.5)	1927 (97.03)	9121 (95.19)	17051 (0.96)	3097 (96.45)	13954 (96.17)
Missing	3483 (12.64)	330 (6.46)	3153 (14.04)	170 (1.47)	23 (1.16)	147 (1.53)	333 (1.88)	60 (1.87)	273 (1.88)
Avoid care-seeking for somatic health, N (%)									
Yes	3751 (13.61)	537 (10.51)	3214 (14.31)	1381 (11.94)	139 (7.00)	1242 (12.96)	1161 (6.55)	158 (4.92)	1003 (6.91)
No	20476 (74.29)	4267 (83.55)	16209 (72.18)	10099 (87.3)	1830 (92.15)	8269 (86.3)	16314 (92.06)	3004 (93.55)	13310 (91.73)
Missing	3335 (12.10)	303 (5.93)	3032 (13.50)	88 (0.76)	17 (0.86)	71 (0.74)	246 (1.39)	49 (1.53)	197 (1.36)
Delayed care, N (%)									
Yes	4342 (15.75)	648 (12.69)	3694 (16.45)	1421 (12.28)	186 (9.37)	1235 (12.89)	2167 (12.23)	310 (9.65)	1857 (12.8)
No	19866 (72.08)	4147 (81.20)	15719 (70)	10073 (87.08)	1788 (90.03)	8285 (86.46)	15270 (86.17)	2849 (88.73)	12421 (85.6)
Missing	3354 (12.17)	312 (6.11)	3042 (13.55)	74 (0.64)	12 (0.6)	62 (0.65)	284 (1.6)	52 (1.62)	232 (1.6)
Extent of delay, N (% of those who had delayed care)									
Less than a month	690 (15.89)	128 (19.75)	561 (15.19)	199 (14)	23 (12.37)	176 (14.25)	512 (23.63)	70 (22.58)	442 (23.8)
1–4 months	1378 (31.74)	201 (31.02)	1177 (31.86)	365 (25.69)	57 (30.65)	308 (24.94)	559 (25.79)	93 (30)	466 (25.09)
More than 4 months	681 (15.68)	109 (16.82)	572 (15.48)	271 (19.07)	37 (19.89)	234 (18.95)	428 (19.75)	57 (18.39)	371 (19.98)
Unspecified delay	1202 (27.68)	143 (22.07)	1059 (28.67)	464 (32.65)	53 (28.49)	411 (33.28)	466 (21.5)	64 (20.65)	402 (21.65)
Cancelled	270 (6.22)	50 (7.72)	220 (5.96)	77 (5.42)	10 (5.38)	67 (5.43)	133 (6.14)	15 (4.84)	118 (6.35)
Missing	121 (2.79)	17 (2.62)	104 (2.82)	45 (3.17)	6 (3.23)	39 (3.16)	69 (3.18)	11 (3.5)	58 (3.12)
Type of care delayed, N (% of those who had delayed care)									
Cancer treatment	29 (0.67)	7 (1.08)	22 (0.6)	9 (0.63)	2 (1.08)	7 (0.57)	16 (0.74)	2 (0.65)	14 (0.75)
Operation	541 (12.46)	89 (13.73)	452 (12.24)	237 (16.68)	30 (16.13)	207 (17.6)	360 (16.61)	52 (16.77)	308 (16.59)
X-ray, MR, DT	285 (6.56)	44 (6.79)	241 (6.52)	119 (8.37)	14 (7.53)	105 (8.5)	183 (8.44)	23 (7.42)	160 (8.62)
Primary care	1121 (25.82)	174 (26.85)	947 (25.64)	312 (21.96)	45 (24.19)	267 (0.216)	527 (24.32)	84 (27.1)	443 (23.86)
Other care	2724 (62.74)	392 (60.49)	2332 (63.13)	853 (60.03)	100 (53.76)	753 (60.97)	1248 (57.59)	172 (5.48)	1076 (57.94)
Missing	121 (2.79)	17 (2.62)	104 (2.82)	45 (3.17)	6 (3.23)	39 (3.16)	69 (3.18)	11 (3.5)	58 (3.12)
Worry about delayed care, N (% of those who had delayed care)									
Very much	63 (1.45)	8 (1.23)	55 (1.49)	84 (5.91)	7 (3.76)	77 (6.23)	153 (7.06)	13 (4.19)	140 (7.54)
Quite a lot	151 (3.48)	24 (3.7)	127 (3.44)	231 (16.26)	17 (9.14)	214 (17.33)	354 (16.33)	44 (14.19)	310 (16.69)
Neutral	178 (4.1)	32 (4.94)	146 (3.95)	264 (18.58)	32 (17.20)	232 (18.79)	387 (17.86)	52 (16.77)	335 (18.04)
Very little	221 (5.9)	37 (5.71)	184 (4.98)	409 (28.78)	62 (33.33)	347 (28.1)	603 (27.83)	80 (25.8)	523 (28.16)
Not at all	243 (5.6)	63 (9.72)	180 (4.87)	386 (27.16)	62 (33.33)	324 (26.23)	597 (27.55)	110 (35.48)	487 (26.22)
Missing	–	–	–	47 (3.31)	6 (3.23)	41 (3.32)	73 (3.37)	11 (3.5)	62 (3.33)
Worry about delayed care, (% of those who had delayed care) *									
Very worried to quite worried (1–2)	694 (15.98)	80 (12.35)	614 (16.62)	–	–	–	–	–	–
Neither or (2.5–3.5)	598 (13.77)	80 (12.35)	518 (14.02)	–	–	–	–	–	–
Little worried to not at all (4–5)	2059 (47.42)	304 (46.91)	1755 (47.51)	–	–	–	–	–	–
Missing also from later version of the question	126 (2.9)	18 (2.78)	108 (2.92)	–	–	–	–	–	–

Note: “Missing” refers to participants that chose the option “cannot/do not want to answer”, while “dropout” refers to participants that did not participate at all in the given follow-up survey. Participants who said they did not experience delayed care were not asked about follow-up questions about delayed care. Participants could choose more than one option for what type of care was delayed. \*Answer options to this question were changed later during answer period of the baseline survey, thus the additional version. The question marked with the asterisk is the first version of the question.

years ( $SD = 15.7$ ). Most participants (72.4 %) reported being in a relationship. Approximately half of the participants (50.7 %) reported a BMI in the normal range. Over half of the participants did not engage in excessive drinking, and 51.8 % had never smoked. Most participants reported no previous mental health diagnosis (66.4 %). However, adverse mental health symptoms were reported by a substantial proportion of the participants at baseline, with higher prevalence among women (21.9 % vs. 17.5 % for depressive symptoms, 15.6 % vs. 11.3 % for anxiety symptoms, and 32.4 % vs 19.1 % for COVID-19-related distress). Most participants reported no somatic disease (66.3 %). At baseline, 5.2 % of participants reported that they had been diagnosed with COVID-19, which increased to 43 % at 12-month follow-up.

A higher percentage of women, compared to men, avoided seeking care due to COVID-19, both for mental (4.0 % vs. 3.4 % at baseline, 1.4 % vs. 0.7 % at 6-month follow-up, 1.3 % vs. 1.1 % at 12-month follow-up) and somatic (14.3 % vs. 10.5 % at baseline, 5.5 % vs. 2.7 % at 6-month follow-up, and 4.5 % vs. 3.1 % at 12-month follow-up) health (Table 2). Women also reported more delayed care (16.5 % vs 12.7 % at baseline, 5.5 % vs 3.6 % at 6-month follow-up, 8.3 % vs 6.1 % at 12-month follow-up). However, at both 6-month and 12-month follow-ups, men more frequently had missing responses. A small proportion of participants reported worries about delayed care, with less than 1 % of participants reporting that they worried ‘very much’.

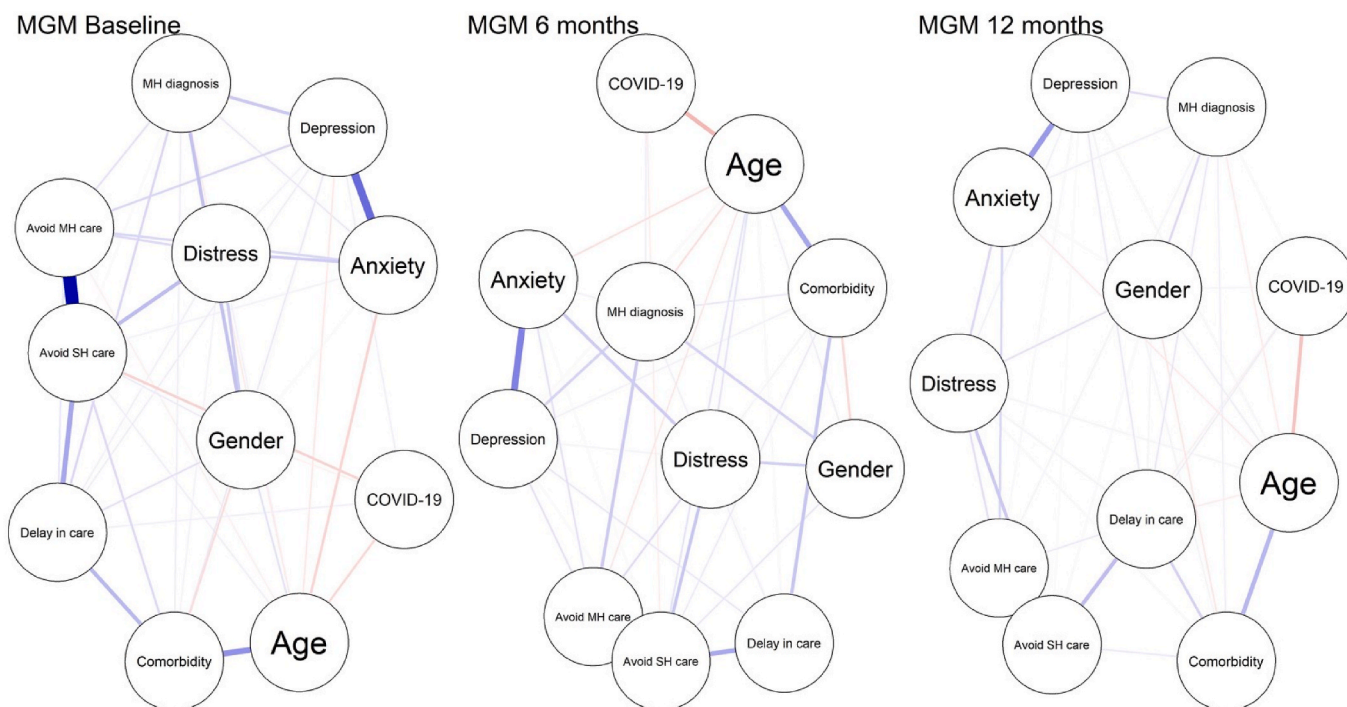
### 3.2. Results of the mixed graphical models (MGM)

The networks shown in Fig. 2 illustrate that anxiety and depression were highly positively correlated at all three time points. Furthermore, female gender exhibited a consistent positive association with COVID-19-related distress and previous mental health diagnosis at all three time points. Throughout the study period, avoidance of seeking care for mental health due to COVID-19 and avoidance of seeking care for somatic health due to COVID-19 were strongly positively correlated.

Moreover, care delay and comorbidities were positively correlated whereas comorbidities were positively correlated with age. The positive association between avoidance of care-seeking for mental health and previous mental health diagnosis was observed at the first two time points. In contrast, COVID-19 and age were negatively correlated whereas comorbidities were negatively correlated with female gender at all three timepoints. A negative correlation was also noted between age and anxiety. Further analyses on node centralities, network stability and accuracy were deemed satisfactory, with the least robust results coming from the 6-months follow-up network, likely due to low sample size. The results of these analyses can be found in the Supplementary Materials (S1–6). Additional comparative analyses were carried out that can be found in the Supplementary Materials (S7).

### 3.3. Prevalence ratios from the cross-sectional analyses

Female gender was associated with higher prevalence, whereas age was associated with a slightly lower prevalence, of depression, anxiety, and COVID-19-related distress at all three timepoints (Table 3). Previous mental health diagnosis, experience of delayed care, avoidance of care-seeking for mental health, and avoidance of care-seeking for somatic health were associated with a higher prevalence of adverse mental health outcomes throughout the study period. COVID-19 status was positively associated with a higher prevalence of anxiety and depression but not COVID-19-related distress. In the gender-stratified analyses, we found stronger associations between a previous mental health diagnosis and the presence of depression, anxiety, or COVID-19-related distress at the time of data collection among men, compared to women. Similarly, the associations of avoidance of care-seeking for mental health and somatic health, as well as experiencing delayed care, with the presence of depression, anxiety, and COVID-19-related distress were also generally more pronounced among men, compared to women.



**Fig. 2.** Mixed graphical models (MGMs)

Note: ‘Avoid MH care’ stands for having previously avoided care-seeking for mental health due to the COVID-19 pandemic, ‘Avoid SH care’ stands for the same but with somatic health, ‘Comorbidity’ stands for presence of (at least one) somatic comorbidity, ‘COVID-19’ stands for cumulative COVID-19 diagnosis, ‘Distress’ stands for COVID-19-related distress and ‘MH diagnosis’ stands for previous mental health diagnosis. Blue lines (edges) represent a positive relationship, while red ones represent an inverse association. The strength of the association is illustrated by thickness of the edge connecting the nodes. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

**Table 3**

Prevalence ratios of depression, anxiety, and COVID-19-related distress in relation to gender and care-seeking and delayed care.

		Baseline			6 months			12 months		
		Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress
Model 1	Gender (female vs. male)	1.12 (1.03–1.22)	1.29 (1.16–1.44)	1.63 (1.51–1.76)	1.17 (1.01–1.37)	1.30 (1.08–1.59)	1.88 (1.65–2.15)	1.15 (1.03–1.29)	1.30 (1.13–1.51)	1.61 (1.44–1.82)
	Age, per year increase	0.97 (0.97–0.97) Men: 0.97 (0.97–0.98) Women: 0.97 (0.97–0.97)	0.96 (0.96–0.97) Men: 0.97 (0.96–0.97) Women: 0.96 (0.96–0.97)	1.00 (1.00–1.00) (NS) Men: 1.00 (1.00–1.00) (NS) Women: 1.00 (1.00–1.00) (NS)	0.98 (0.98–0.99)	0.98 (0.97–0.98)	1.01 (1.00–1.01) (NS)	0.98 (0.98–0.98)	0.97 (0.97–0.98)	1.00 (1.00–1.00) (NS)
	Previous mental health diagnosis	2.47 (2.33–2.63) Men: 3.06 (2.64–3.54) Women: 2.36 (2.21–2.53)	2.45 (2.28–2.64) Men: 3.12 (2.59–3.77) Women: 2.34 (2.16–2.54)	1.28 (1.22–1.35) Men: 1.47 (1.26–1.70) Women: 1.26 (1.19–1.33)	2.93 (2.63–3.27)	2.83 (2.49–3.23)	1.49 (1.37–1.61)	2.86 (2.63–3.12)	2.99 (2.69–3.31)	1.43 (1.33–1.55)
	Experienced delayed care	1.33 (1.24–1.42) Men: 1.36 (1.14–1.62) Women: 1.32 (1.23–1.42)	1.34 (1.24–1.45) Men: 1.47 (1.18–1.82) Women: 1.32 (1.21–1.43)	1.23 (1.16–1.30) Men: 1.33 (1.12–1.59) Women: 1.22 (1.14–1.29)	1.60 (1.41–1.81)	1.52 (1.31–1.76)	1.23 (1.11–1.36)	1.60 (1.46–1.76)	1.40 (1.25–1.58)	1.37 (1.24–1.50)
	Avoided care-seeking for mental health	2.24 (1.81–2.75) Men: 2.03 (1.58–2.58) Women: 1.80 (1.62–2.00)	2.64 (2.06–3.35) Men: 2.34 (1.75–3.12) Women: 1.97 (1.75–2.22)	2.08 (1.65–2.59) Men: 1.91 (1.47–2.46) Women: 1.52 (1.38–1.68)	1.87 (1.54–2.25)	2.30 (1.87–2.83)	1.57 (1.34–1.83)	1.70 (1.40–2.05)	2.52 (2.04–3.10)	1.85 (1.56–2.19)
	Avoided care-seeking for somatic health	1.24 (1.15–1.34) Men: 1.31 (1.06–1.59) Women: 1.23 (1.13–1.33)	1.41 (1.29–1.54) Men: 1.45 (1.13–1.85) Women: 1.40 (1.27–1.54)	1.68 (1.58–1.79) Men: 1.74 (1.44–2.10) Women: 1.67 (1.57–1.78)	1.46 (1.26–1.69)	1.63 (1.37–1.93)	1.86 (1.68–2.05)	1.36 (1.18–1.56)	1.29 (1.08–1.54)	2.07 (1.84–2.33)
	Had COVID-19	1.24 (1.11–1.38) Men: 1.12 (0.85–1.45) (NS) Women: 1.26 (1.12–1.42)	1.19 (1.04–1.35) Men: 1.07 (0.74–1.48) (NS) Women: 1.21 (1.05–1.39)	1.01 (0.90–1.12) (NS) Men: 1.10 (0.83–1.43) (NS) Women: 0.99 (0.88–1.11) (NS)	1.00 (0.90–1.11) (NS)	1.05 (0.92–1.19) (NS)	0.93 (0.86–1.01) (NS)	0.99 (0.90–1.08) (NS)	0.96 (0.86–1.08) (NS)	0.95 (0.87–1.03) (NS)
	Avoided care-seeking for mental health <sup>a</sup> gender	0.79 (0.64–1.00) <sup>a</sup>	0.74 (0.57–0.96)	0.73 (0.58–0.92)	NS	NS	NS	NS	NS	NS
	Gender (female vs. male)	1.09 (1.01–1.18)	1.23 (1.12–1.36)	1.58 (1.47–1.70)	Not significant, model corresponds to Model 1	1.46 (1.18–1.84)	2.06 (1.78–2.41)			
	Age, per year increase	0.97 (0.97–0.97)	0.96 (0.96–0.97)	1.00 (1.00–1.00) (NS)		0.98 (0.97–0.98) Men: 0.98 (0.96–0.99) Women: 0.98 (0.97–0.98)	1.01 (1.00–1.01) (NS) Men: 1.00 (1.00–1.01) (NS) Women: 1.01 (1.00–1.01) (NS)			
	Previous mental health diagnosis	2.48 (2.33–2.63)	2.46 (2.29–2.65)	1.28 (1.22–1.35)		2.82 (2.48–3.22) Men: 3.27 (2.25–4.75) Women:	1.49 (1.37–1.61) Men: 1.74 (1.31–2.30) Women:			

(continued on next page)



Table 3 (continued)

		Baseline			6 months			12 months		
		Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress
Model 3	Experienced delayed care	1.33 (1.25–1.42)	1.34 (1.24–1.45)	1.23 (1.16–1.31)		2.77 (2.42–3.19) 1.52 (1.31–1.76) Men: 1.43 (0.87–2.27) (NS) Women: 1.53 (1.31–1.79)	1.47 (1.35–1.59) 1.23 (1.11–1.36) Men: 1.35 (0.93–1.90) (NS) Women: 1.22 (1.09–1.35)			
	Avoided care-seeking for mental health	1.84 (1.67–2.02)	2.03 (1.82–2.26)	1.57 (1.43–1.71)		2.30 (1.86–2.82) Men: 1.61 (0.79–3.16) (NS) Women: 2.38 (1.91–2.96)	1.56 (1.33–1.82) Men: 1.54 (0.87–2.65) (NS) Women: 1.56 (1.33–1.84)			
	Avoided care-seeking for somatic health	1.24 (1.15–1.34)	1.41 (1.29–1.54)	1.68 (1.58–1.79)		2.67 (1.72–4.05) Men: 3.12 (1.82–5.10) Women: 1.52 (1.27–1.82)	2.95 (2.14–3.98) Men: 2.83 (1.94–4.02) Women: 1.80 (1.61–2.00)			
	Had COVID-19	1.24 (1.11–1.38)	1.19 (1.04–1.35)	1.01 (0.90–1.12) (NS)		1.05 (0.93–1.20) (NS) Men: 1.08 (0.74–1.58) (NS) Women: 1.05 (0.91–1.21) (NS)	0.93 (0.86–1.01) (NS) Men: 0.94 (0.72–1.22) (NS) Women: 0.93 (0.86–1.01) (NS)			
	Avoided care-seeking for somatic health*gender	NS	NS	NS		0.58 (0.38–0.91)	0.61 (0.45–0.84)			
	Gender (female vs male)	Not significant, model corresponds to Model 2	1.30 (1.17–1.47)	Not significant, model corresponds to Model 2	NS	NS	NS			
	Age, per year increase		0.97 (0.96–0.97) Men: 0.97 (0.96–0.97) Women: 0.96 (0.96–0.97)							
	Previous mental health diagnosis		2.45 (2.28–2.64) Men: 3.12 (2.59–3.77) Women: 2.34 (2.16–2.54)							
	Experienced delayed care		1.64 (1.33–2.00) Men: 1.47 (1.18–1.82) Women: 1.32 (1.21–1.43)							
	Avoided care-seeking for mental health		2.02 (1.81–2.26) Men: 2.34 (1.75–3.12) Women: 1.97 (1.75–2.22)							

(continued on next page)

Table 3 (continued)

	Baseline			6 months			12 months		
	Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress	Depression	Anxiety	COVID-19-related distress
Avoided care-seeking for somatic health		1.41 (1.29–1.54) Men: 1.45 (1.13–1.85) Women: 1.40 (1.27–1.54)							
Had COVID-19		1.19 (1.04–1.35) Men: 1.07 (0.74–1.48) (NS) Women: 1.21 (1.05–1.39)							
Experienced delayed care <sup>a</sup> gender		0.796 (0.64–0.99)							

Note: CI = Confidence interval, NS = not significant. The default model included variables of age, previous mental health diagnosis, cumulative COVID-19 status, experience of delayed care, avoidance of care-seeking for mental health and avoidance of care-seeking for somatic health. Model 1 additionally includes the interaction between avoidance of care-seeking for mental health and gender, Model 2 includes the interaction between avoidance of care-seeking for somatic health and gender, while Model 3 had the interaction between delayed care and gender. The default model without the interaction was used in case the interaction did not have a significant effect on the outcome. In case the interaction had a significant effect, the model was also fitted stratified by gender – without the interaction. Data presented as PR (95 % CI).

<sup>a</sup> Significant result: PR = 0.793 (0.637–0.995).

3.4. Results from the longitudinal analyses

We used Generalized Estimating Equations (GEEs) to calculate prevalence estimates of depression, anxiety, and COVID-19-related distress at 6-month or 12-month follow-up, considering different care-seeking behaviors and gender. Fig. 3 displays the prevalence of depression and anxiety in different groups of care-seeking (i.e., avoided care-seeking for mental health, avoided care-seeking for somatic health, experienced delayed care), adjusted for timepoint, the other care-seeking variables, age, previous mental health diagnosis, COVID-19 status, and gender. The prevalence for depression ranged between 16.0 % and 31.2 %, while the prevalence for anxiety ranged between 10.0 % and 22.4 %. Throughout the study, a higher prevalence of

depression and anxiety was observed among individuals that avoided care-seeking (for mental or somatic health), or experienced delayed care, compared to others. Fig. 4 presents the prevalence of COVID-19-related distress per care-seeking subgroup, stratified by gender. The prevalence range between 16.1 % and 43.4 % for men, and between 23.9 % and 54.5 % for women. In both Figs. 3 and 4, the most pronounced differences were observed by avoidance of care-seeking for mental health. The Supplementary materials show the gender-stratified analyses on depression and anxiety (S8–S11), as well as the overall analysis on COVID-19-related distress (S12). The time and care-seeking variable interaction was also checked per timepoint, significant results stratified by the relevant care-seeking variable (and gender) are also provided in the Supplementary materials (S13).

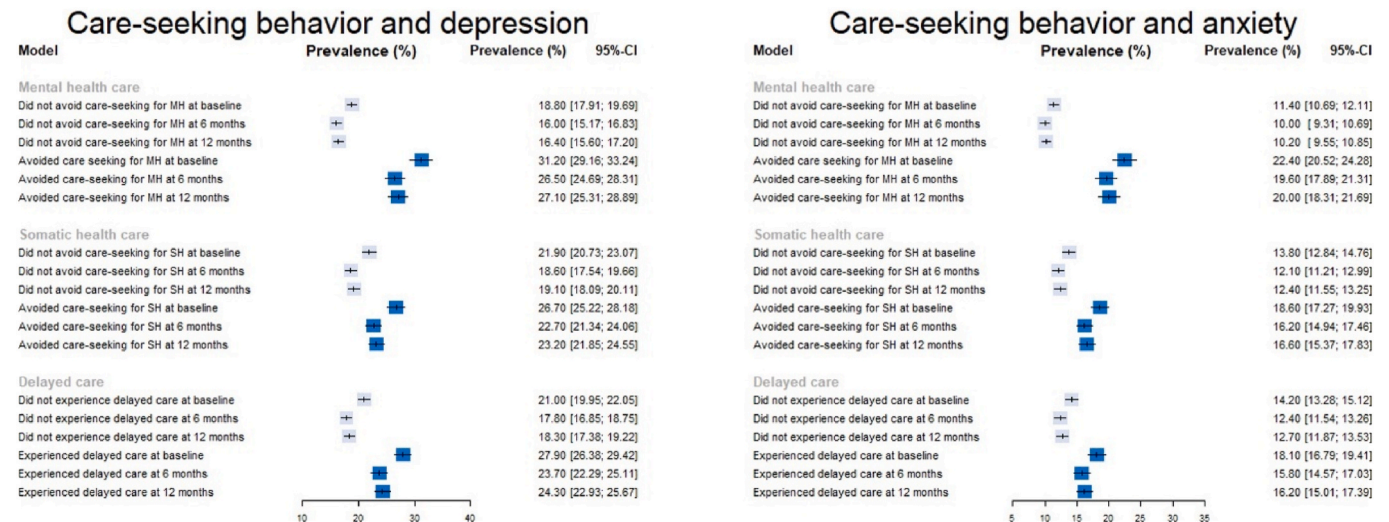
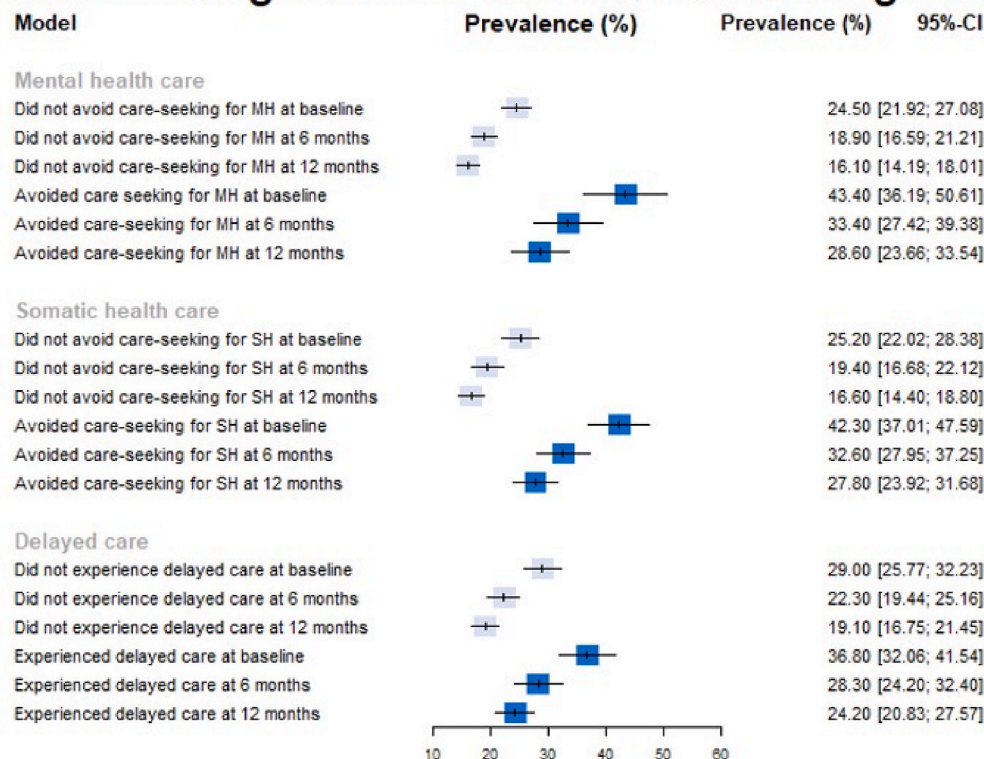
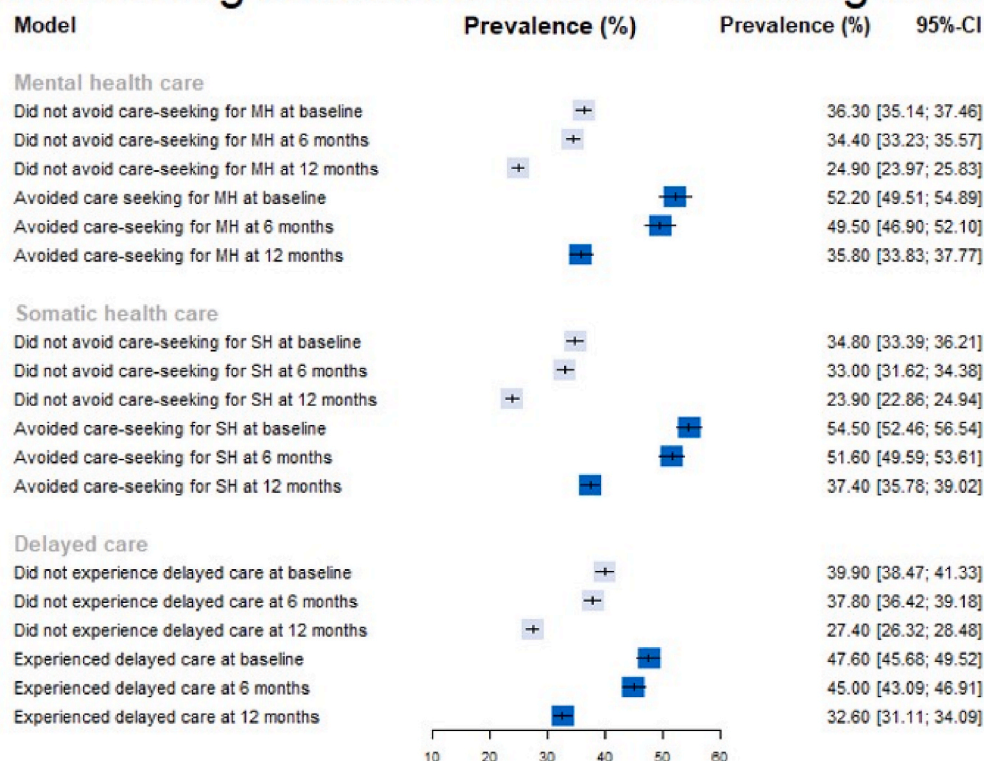


Fig. 3. Forest plots, Depression, and anxiety prevalence (gender non-stratified) among different care-seeking behaviors, across three timepoints Note: X Axes differ between depression and anxiety plots, as we are not aiming to directly compare depression and anxiety prevalence. Estimate range for depression prevalence: 16.00 %–31.20 %. Estimate range for anxiety prevalence: 10.00 %–22.40 %. Note: ‘Avoid MH care’ stands for having previously avoided care-seeking for mental health due to reasons related to the COVID-19 pandemic, ‘Avoid SH care’ stands for the same but with somatic health.

## Care-seeking behavior and distress among men



## Care-seeking behavior and distress among women



**Fig. 4.** Forest plots, COVID-19-related distress prevalence (gender-stratified) among different care-seeking behaviors, across three timepoints  
 Note: As the measure used is a modified iteration of the PC-PTSD-5, meaning that values cannot be equated to PTSD prevalence. Estimate range among men: 16.10 %–43.40 %. Estimate range among women: 23.90 %–54.50 %. Note: ‘Avoid MH care’ stands for having previously avoided care-seeking for mental health due to reasons related to the COVID-19 pandemic, ‘Avoid SH care’ stands for the same but with somatic health.

#### 4. Discussion

The aim of this study was to describe how care-seeking behavior differed between men and women over three time points during the pandemic in Sweden. Additionally, we mapped the relationships between gender, care-seeking behavior, and adverse mental health outcomes at all three time points through three cross-sectional network analyses. Finally, we investigated the association between care-seeking and adverse mental health outcomes, by gender, both cross-sectionally and longitudinally.

In this study, we observed higher levels of depression, anxiety, and COVID-19-related distress as well as avoidance of care-seeking among women, compared to men. We however observed stronger associations between avoidance of care-seeking (for mental or somatic health) and depression, anxiety, and COVID-19-related distress among men than women. When comparing care-seeking behavior across the three time-points, through repeated cross-sectional analyses and longitudinal investigation, a higher prevalence of depression, anxiety and COVID-19 distress was observed among participants that avoided care-seeking or had delayed care, compared to participants that did not.

One of the important findings of this study is that women were more likely to report avoidance in seeking health care services for mental and somatic health problems due to COVID-19. Prior to the pandemic, research suggested that men were more likely to avoid seeking care, but conflicting results have also been reported (Font et al., 2018; Höhn et al., 2020; Roxo et al., 2021; Thompson et al., 2016). In line with our findings, some studies found that women avoided seeking care more often than men during the pandemic (Beridze et al., 2022; Lee and You, 2021), although other studies suggested however that men utilized care less than women (Czeisler et al., 2020; Huang et al., 2022; Rozental et al., 2022). Nonetheless, a recent review indicated a decrease in healthcare utilization for non-COVID-19 conditions almost universally, across genders, income levels, and countries during the COVID-19 pandemic, most likely due to a combination of factors, such as lockdown measures and fears of contracting the virus (Roy et al., 2021).

Network analysis showed that female gender was positively associated with depression, anxiety, and COVID-19-related distress as well as a previous mental health diagnosis at all three timepoints. The latter likely reflects the gender difference in the prevalence of mental health conditions (Riecher-Rössler, 2010). Anxiety was strongly positively correlated to depression at all time points, providing further evidence for the comorbidity of anxiety and depression (Afifi, 2007; Pollack, 2005; Riecher-Rössler, 2010). Age and COVID-19 status were negatively correlated at all three timepoints, potentially due to sampling bias, although evidence also shows higher frequency of COVID-19 among younger cohorts (Rosengren et al., 2022; Romain et al., 2021; Schneiderman et al., 2022).

Previous mental health diagnosis was shown as a predictor of symptoms of depression, anxiety, and COVID-19-related distress, before and after stratification by gender. In the gender-stratified analyses, the associations of previous mental health diagnosis with symptoms of adverse mental health were stronger among men, compared to women. Similar patterns were noted for avoidance of care-seeking for mental or physical health, as well as experiencing delayed care. This suggests that the mental health impact of avoiding care-seeking and delayed care due to COVID-19 was greater among men than women, a finding that complements research on delayed and missed care leading to worse health outcomes (Boonstra et al., 2012; Dell'Osso et al., 2012; Rose et al., 2022). We also observed a higher risk of depression and anxiety after COVID-19 infection, providing further evidence to the mental health impact of COVID-19 (Wang et al., 2021; Zielasek et al., 2021).

In terms of identified risk groups, our findings are largely in line with a systematic review of previous gender-sensitive mental health research during the pandemic (Tibubos et al., 2021). However, our five variables capturing different aspects of care-seeking provide detailed data for determining target groups for future public mental health interventions,

as gender-sensitive mental health interventions during a pandemic have been called for (Comacchio et al., 2022; Tibubos et al., 2021).

The strengths of this study lie in its longitudinal nature that complements the existing evidence base using classical cross-sectional studies (McCracken et al., 2020; Rondung et al., 2021) and analysis of baseline data from longitudinal studies (Lovik et al., 2023; Rozental et al., 2022). The data collection period for this study spanned over nearly two years and therefore allows for comparison over time. Additionally, the large sample size and use of validated mental health instruments should also be acknowledged. Limitations of our study must be noted, too. Firstly, selection bias could have arisen from the voluntary nature of participation, meaning that the sample is unlikely representative of the general Swedish population. Specifically, our analytical sample was over-represented by women which was partly because we invited participants of the Karma study which is a study of women undergoing mammography screening (Karma - Karolinska Mammography Project for Risk Prediction of Breast Cancer, 2018). Despite the comprehensive questionnaire, data on socioeconomic characteristics are missing currently, and they have proven to be relevant determinants for health outcomes during the pandemic (Barboza et al., 2021; Drefahl et al., 2020). The low proportion of male participants (18.5 %) limits our ability to draw robust conclusions regarding gender difference. As such gender disparities have also been observed in survey research previously (Becker, 2022), further studies are needed to understand its potential underlying reasons. Although this study had more female participants than male, the percentage of women not responding at baseline is around double of that of men, which should be noted. Furthermore, given the observed rate of loss-to-follow up, the longitudinal analyses should be interpreted with caution. Related to that, we are also unable to make claims about trends before the COVID-19 pandemic due to the nature of this study; that is: being set up during the pandemic. Additionally, the results of this study may have limited applicability to pandemic settings in other countries, as the Swedish mitigating approaches have often been interpreted as different, with more relaxed recommendations rather than strict policies (Ludvigsson, 2023; Ritchie et al., 2022). Furthermore, all the care-seeking variables are based on self-reporting, meaning that they are unvalidated, and different reporting biases might be at play. Finally, levels of actual care-seeking in this study could not be assessed, as data was only available on avoided or delayed care. Therefore, this represents an important area for future research that can then inform public health policy and clinical practice.

In conclusion, this study showed that gender and different care-seeking behaviors (avoidance of care-seeking for mental or somatic health, delayed care) were associated with frequency of adverse mental health outcomes (symptoms of depression, anxiety, and COVID-19-related distress) during the COVID-19 pandemic in Sweden, providing rationale for further research on targeted, gender-sensitive public mental health interventions during a possible future pandemic.

#### CRedit authorship contribution statement

**Katalin Vincze:** Writing – review & editing, Writing – original draft, Software, Methodology, Formal analysis, Conceptualization. **Gillian Murphy:** Writing – review & editing, Writing – original draft, Software, Conceptualization. **Mary Barker:** Writing – review & editing, Methodology, Conceptualization. **Juan González-Hijón:** Writing – review & editing, Software, Data curation, Conceptualization. **Anna K. Kähler:** Writing – review & editing, Resources, Project administration, Investigation, Funding acquisition, Conceptualization. **Emma M. Frans:** Writing – review & editing, Resources, Investigation, Funding acquisition, Conceptualization. **Patrick F. Sullivan:** Writing – review & editing, Resources, Investigation, Funding acquisition, Conceptualization. **Unnur A. Valdimarsdóttir:** Writing – review & editing, Resources, Investigation, Conceptualization. **Fang Fang:** Writing – review & editing, Resources, Methodology, Investigation, Funding acquisition, Conceptualization. **Anikó Lovik:** Writing – review & editing,



Validation, Methodology, Data curation, Conceptualization.

## Disclosures

The authors declare no conflict of interest. Omtanke2020 received ethical approval (no. 2020–01785) from the Swedish Ethical Review Authority on June 3, 2020.

## Funding

This work was supported with grants from Nordforsk (COVIDMENT, 105668 and 138929) and the Swedish Research Council for Health, Working life and Welfare (grant No. 2022-00579).

## Declaration of competing interest

The authors declare no conflict of interest. Omtanke2020 received ethical approval (no. 2020–01785) from the Swedish Ethical Review Authority on June 3, 2020.

## Acknowledgements

We are grateful to all Omtanke2020 participants and researchers.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpsychires.2025.07.042>.

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