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The Impact of COVID-19 on German Patient's Health and Self-Care Strategies: A mixed methods survey

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Abstract

Objective: This study aimed to examine German patients': 1) self-estimation of the impact of the pandemic on their health and healthcare; and 2) use of digital self-care practices during the pandemic.

Design: Data analysis from a cross-sectional, mixed-methods survey was conducted.

Setting and Participants: General practice patients from 4 physicians' offices located in urban and rural areas of Bavaria, Germany, between 21 July 2020 to 17 October 2020. A total of 254 patients participated (55% response rate), and 57% (262/459) identified as female. The average age of invitees was 40.6 years. Patients were eligible to participate if they were 18 years or older and had sufficient knowledge of the German language.

Results: 1) Healthcare for patients was affected by the pandemic, and the mental health of a small group of respondents was particularly affected. The risk of depression and anxiety disorder was significantly increased in patients with quarantine experience. 2) Self-care practices have increased, with more than a third (39%) of participants indicated that they had started a new self-care practice during the pandemic, however such practices were not necessarily digital.

Conclusions: Further investigation is required to understand the relationship between digital self-care and public health events such as the COVID-19 pandemic, and to develop strategies to alleviate the burden of the quarantine experience for patients.

Keywords: COVID-19, pandemic, health care, digital self-care, depression, anxiety, Germany

Strengths and limitations of this study

- The survey elicits self-reported impacts of the pandemic on health and healthcare provision.
- The mixed methods approach, including validated scales for depression and anxiety, and open-ended qualitative answers on wellbeing and new health promotion practices, enabled breadth and depth of insight of the study.
- Results are limited to the period after the “first wave” of the pandemic in Germany and prior to the second lockdown and thus may underestimate the psychological constraints experienced during the second long-term lockdown period.

1 Introduction

2 In 2020, the COVID-19 pandemic upended the provision of healthcare. The first confirmed
3 COVID-19 case in Germany occurred in Bavaria in late January 2020 (1). Soon after,
4 Germany began to introduce public health measures to slow the spread and contain the
5 pandemic (2). During March and April 2020, measures began affecting the German health
6 system; dentist and doctor's offices closed or changed their services, hospitals received orders
7 from the federal government in March 2020 to postpone non-essential operations (3,4), and
8 intensive care capacities in hospitals were expanded. The "lockdown" during Spring 2020
9 also led to non-essential shops and businesses closing, schools and daycares shuttering, and
10 the public being encouraged to limit contact with others beyond their own household. Bavaria
11 was under a "strict lockdown" in this period, with a stay-at-home order in place (5).

12 Even for those who were not directly affected by the virus itself, the provision of
13 healthcare services was substantially altered. Concerns have emerged that the postponement
14 of treatment for non-COVID conditions, such as cancer, heart attacks or stroke could have
15 significant negative consequences (6). Furthermore, with mounting uncertainty, physical and
16 social distancing, job loss, and decreased access to support services, the pandemic has
17 increased established risk factors for mental health problems (7). Existing surveys from
18 various countries, including Germany, demonstrate rising rates of depression, anxiety and
19 stress symptoms during the pandemic (8–15).

20 These 'secondary' effects of the pandemic on physical and mental health constitute a
21 significant challenge and require novel approaches given the ongoing course of the pandemic
22 (11,16). One prominent approach that has emerged to assist patients – in lieu of routine
23 healthcare or other ways of maintaining health that are not available during the pandemic – is
24 "digital self-care" (17–21). Self-care, which involves practices that are undertaken to protect
25 or promote health without formal medical direction, has gained new traction in the digital era.
26 The growth of the Internet and personalized portable devices, such as smartphones, activity

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3 27 trackers, and other digital applications have given rise to emerging forms of “digital self-
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5 28 care,” a range of practices of maintaining and promoting health that largely became possible
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7 29 through the datafication and digitization of patients’ bodies and lives (17). Many of these
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9 30 practices entail measurements or technologies that were previously only available under
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11 31 clinical supervision, which have now moved into the hands of patients. Proponents have
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13 32 predicted that digital self-care represents a novel, cost-effective, and empowering way of
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15 33 addressing the mental and physical health needs of patients (20). Indeed, the current pandemic
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17 34 has given rise to a range of digital self-care tools that can be used at home (22–24), and has
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19 35 renewed interest in existing digital tools, such as therapeutic chatbots (25).

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24 36 Germany is one of the world’s first countries to approve digital health apps for
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26 37 prescription as part of a new law on digital medical care (26). It is therefore expected that
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28 38 such digital health tools will be increasingly used by German patients. Research conducted
29
30 39 before the pandemic indicates that patient-driven digital self-care is currently lagging behind
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32 40 expectations in expert literature (17). Nevertheless, a number of COVID-19 digital tools for
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34 41 patients have emerged in Germany, such as symptom trackers (e.g. Data4Life app) and self-
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36 42 help apps for depression (27). It remains unclear, however, if patients are engaging in digital
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38 43 self-care practices to address health needs brought about by the pandemic. This study
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40 44 therefore sought to examine German patients’: 1) self-estimation of the impact of the
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42 45 pandemic on their health and healthcare; and 2) use of digital self-care practices during the
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44 46 pandemic.

47

48 **Methods**

49 This study was approved by the Technical University of Munich’s Ethics commission on the
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51 19th of May 2020 (311/20 S). All participants gave consent to proceed before initiating the
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survey.

52 *Survey implementation*

53 A cross-sectional survey was conducted between 21 July 2020 to 17 October 2020. Patients
54 from four general practices in the urban and rural areas of Bavaria were consecutively invited
55 by the practice assistants to participate. Patients were eligible to participate if they were 18
56 years or older and had sufficient knowledge of the German language. Office assistants asked
57 eligible patients if they would like to participate in the study. A total of 459 individuals were
58 provided with the study information sheet, which included a link to the online survey. Office
59 assistants received a small monetary compensation for their help. The online survey was
60 conducted using the automation software EvaSys (EvaSys Central Evaluation version 8.0).
61 Data were then exported into Statistical Package for the Social Sciences (SPSS version 26 for
62 Windows, IBM Corporation). Participants who completed the survey were eligible to claim a
63 10-euro gift certificate for Amazon.

65 *Survey content*

66 In order to assess the overall wellbeing of the participants during the pandemic, two subscales
67 of the German version of the Patient Health Questionnaire (PHQ-D) were used to assess
68 depression and anxiety as psychological comorbidity (28). The depression severity score of
69 the PHQ, the PHQ-9, ranges from 0 (no depression) to 27 (maximal depression). Superior
70 validity of the PHQ compared to other established self-report questionnaires has been
71 confirmed with respect to the diagnoses of 'major depressive disorder' and 'other depressive
72 disorders' (20). Another module of the PHQ-D, the Generalized Anxiety Disorder Scale
73 (GAD-7), was used as a practical self-report anxiety questionnaire that has been validated in
74 primary care (29). GAD-7 scores range from 0 to 21, with scores of ≥ 5 , ≥ 10 , and ≥ 15
75 representing mild, moderate, and severe anxiety symptom levels, respectively. Only moderate
76 and severe scoring were rated as anxiety disorder.

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3 77 Additionally, a questionnaire was developed to examine the impact of the pandemic
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5 78 on patients' lives and health, and new digital self-care practices. The survey was informed by
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7 79 existing literature on the secondary effects of the pandemic, and changing practices of digital
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9 80 self-care (17,21,30–32), and combined scaled or yes/no questions, with free-text responses.
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12 81 Demographic questions asked for the participants' age and gender.
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16 17 83 *Data Analysis*

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19 84 Baseline data were analyzed descriptively. Associations between the questions regarding the
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21 85 self-estimation of the health care situation and depression or anxiety were calculated with
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23 86 multivariable logistic regression analysis, with adjustment for age and gender. Qualitative
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25 87 data was analyzed using an inductive, content analysis approach. Questions with open
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27 88 responses were coded thematically and grouped based on higher order themes. Variance and
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29 89 saturation within the responses was then analyzed and described. Hypotheses testing was
30
31 90 performed with an exploratory two-sided test using a significance level of 5%. All analyses
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33 91 were performed in SPSS version 26 and R version 4.0.3 (The R Foundation for Statistical
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35 92 Computing).
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42 94 *Patient and Public Involvement*

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44 95 No patient was involved in the design of this study.
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49 97 **Results**

50 51 98 *Characteristics of participants*

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53 99 A total of 459 patients were invited to participate. Of these, 57% (262/459) identified as
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55 100 female. The average age of invitees was 40.6 years (standard deviation 16.1). Of those
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57 101 invited, 254 eligible patients participated in the survey, corresponding to a 55% (254/459)
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59 102 response rate. Of the participants, 56% (144/254) identified as female. The average age of the
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3 103 participants was 39.3 years (standard deviation 15.7) and the median age was 37, ranging
4
5 104 from 18 to 81 years old. The majority of participants had not had any symptoms of COVID
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7 105 during the 3 months prior to the survey (218/254; 86%). Only 17% (44/254) of participants
8
9 106 reported having had conducted a COVID test, but only 9% (4/44) of those received a positive
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11 107 result. However, 6% (16/254) reported that they presumed they had COVID due to the
12
13 108 presence of symptoms. Quarantine was reported by 11% (28/254) of respondents. The PHQ
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15 109 results indicated that 17% (45/254) patients suffered from impaired mental health, 6%
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17 110 (17/254) suffered from depression, 4% (11/254) suffered from anxiety disorder, and 6%
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19 111 (17/254) suffered from both depression and anxiety disorder.
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26 113 *Impact of the pandemic on health*

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28 114 The majority of participants reported that their health was not affected by the COVID-19
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30 115 pandemic in any meaningful way: 79% (200/254) said that their health was affected very little
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32 116 or little, only 7% (20/254) said their health was very much or much affected. Regarding the
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34 117 aforementioned question there was no significant difference between gender ($\chi^2_{(4)}=3.2$,
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36 118 $P=.53$) or age ($\chi^2_{(4)}=0.7$, $P=.58$).
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40 119 A third of respondents, 30% (75/254), indicated that their health care was affected by
41
42 120 the COVID 19 pandemic (Table 1). When asked to specify how their healthcare had been
43
44 121 affected, respondents cited examples such as changes in appointment availability at their
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46 122 doctor's offices due to closures or modifications due to the pandemic, with a few people
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48 123 noting issues in receiving necessary medications. Some indicated that they had felt increased
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50 124 stress and anxiety or experienced other changes in their mental health.
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54 125 During the COVID pandemic, 29% (73/254) of respondents said they had health
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56 126 complaints, unrelated to COVID, for which they normally would have gone to see a doctor.
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58 127 The complaints indicated covered a wide range of health problems, from relatively minor
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60 128 issues such as allergies or congestion to more serious conditions such as a slipped disc or a

129 spinal canal stenosis. Of those who had health complaints, 65% (132/202) said they went to
 130 the doctor as usual. Approximately one-third, or 35% (64/183) of respondents indicated that
 131 they had concerns about going to the doctor during the COVID 19 pandemic. Many of the
 132 concerns indicated dealt with fear of contracting COVID-19, while a few individuals
 133 indicated that they felt their concerns were not substantial enough to see their doctor while
 134 medical professionals were dealing with more serious health concerns during the pandemic. A
 135 majority, or 70% (179/254) of respondents said that they had not been affected by the changes
 136 made to the health care system to respond to the needs created by the pandemic, such as
 137 postponed doctors' visits, restricted hours, or healthcare services.

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139 **Table 1. Impact of the pandemic on health**

Question	Yes	No
Did you experience any health complaints during the COVID-19 pandemic (unrelated to the coronavirus) for which you would normally go to the doctor?	73/254 (29%)	181/254 (71%)
If you had any complaints, did you go to the doctor as usual?	132/202 (65%)	70/202 (35%)
If yes, did you have any concerns about going to the doctor during the COVID-19 pandemic?	64/183 (35%)	119/183 (65%)
Was your health care affected by the COVID 19 pandemic, such as because a doctor's office was closed, appointments were rescheduled, or for other reasons?	75/254 (30%)	179/254 (70%)
At the beginning of the pandemic, several changes were made in health care delivery to respond to the new needs created by the COVID-19 outbreak. Many physician visits were postponed, office hours	63/254 (25%)	191/254 (75%)

1 2 3 4 5 6 7 8	were curtailed, scheduled surgeries were postponed to a later date, etc. Do you feel that you were affected by this?		
9 10 11	Do you have any fears with regard to your future health care?	60/254 (24%)	194/254 (76%)

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141 *Digital self-care practices in the pandemic*

142 More than a third of respondents (38%; 97/254), indicated that prior to the pandemic they
143 engaged in practices to promote and maintain their health, such as the use of health apps,
144 participation in online support groups or sports exercises, meditation or other activities for
145 relaxation (Table 2). When asked to specify what kinds of practices, the majority of
146 respondents cited exercise such as different sports, yoga, or membership in fitness studios.
147 During the pandemic, 39% (100/254) of respondents indicated that they had initiated new or
148 additional practices to improve their health. These practices included a range of activities,
149 many of which were not digital, such as yoga, healthier eating, or new forms of physical
150 activity. However, initiating new practices to improve health was not correlated with a rise in
151 information seeking, as only 11% (27/254) indicated that they had become more informed
152 about their health since the start of the pandemic.

153 Respondents were asked what the greatest challenge was for them in relation to their
154 health during the COVID-19 pandemic. The most common response involved challenges in
155 following the COVID-19 guidelines such as wearing masks or keeping social distance from
156 family and friends. Other challenges included not contracting COVID-19, heightened anxiety
157 or concern over personal health risks, and concerns surrounding getting health needs met.

158 About one-quarter, or 24% (60/254) of individuals had fears with regard to their
159 health care in the future. The open-ended answers to this question were instructive, with a
160 majority of respondents indicating that they were not concerned because they had faith in the
161 German health care system, and others noting that their personal connection to their doctors

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3 162 helped to mitigate their concerns. Approximately a quarter of respondents stated directly that
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5 163 they were not concerned for the future, with many citing their own fitness or lack of risk
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8 164 factors as the reason for their confidence.
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12 166 **Table 2: Impact of pandemic on digital self-care practices**

Question	Yes	No
Before the pandemic, did you engage in any self-care measures to maintain your health, such as use of health apps, participation in online support groups, or exercise, meditation, or other activities for relaxation?	97/254 (38%)	157/254 (62%)
During/since the pandemic, have you taken new or additional steps to improve your health?	100/254 (39%)	154/254 (61%)
Since the pandemic, have you sought more information about your health?	27/254 (11%)	227/254 (89%)

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32 16733
34 168 *Associations with depression and anxiety*

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36 169 Patients with depression or anxiety disorder showed more adverse estimation of their health
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39 170 care situation (Table 3). There was a strong association with previous Covid-19 infection and
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41 171 depression in the regression analysis (OR 21.41; 95%CI 2.44-464.56). We observed increased
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43 172 risk of anxiety disorder for individuals with previous Covid-19 infection (OR 3.26; 95%CI
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45 173 0.32-33.16; not in Table), however this effect was not significant. Additionally, the
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48 174 multivariable logistic regression analysis revealed a strong association between previous
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50 175 quarantine and depression (OR 5.38; 95%CI 2.17-13.15) and a strong but not significant
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52 176 association with anxiety disorder (OR 2.78; 95%CI 0.93-7.46). Survey responses regarding
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55 177 self-care practices were not significantly associated with depression or anxiety.
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180 **Table 3. Association of anxiety, depression, and self-rated health care, adjusted for age**
 181 **and gender (only significant associations are presented)**

Logistic Regression for depression	Odds Ratio	CI 95%	p-Value
No Covid-19 symptoms	0.20	0.09 - 0.46	< 0.001
Quarantine	5.38	2.17 - 13.15	< 0.001
Feeling affected by changes in health care delivery	4.33	1.88 - 10.13	0.001
Covid-19 positive	21.41	2.44 - 464.56	0.012
Health care worsened	3.56	1.23 - 9.73	0.014
Covid-19 negative	2.46	1.02 - 5.65	0.038
Logistic Regression for anxiety disorder			
Health complaints during COVID-19 pandemic for which participant would normally go to the doctor	4.39	1.94 - 10.3	< 0.001
Feeling affected by various health care changes	5.95	2.55 - 14.49	< 0.001
Health care worsened	5.06	1.91 - 12.91	0.001
Health care not changed	0.24	0.10 - 0.60	0.002
Health care affected by COVID-19 pandemic because of doctor's offices closures, cancelled appointments	3.52	1.57 - 8.10	0.002
I cannot assess changes in health care delivery	2.35	1.02 - 5.3	0.040
Fears with regard to future health care delivery	2.30	0.98 - 5.22	0.049
Quarantine	2.78	0.93- 7.46	0.050

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183 Discussion

184 The self-estimation of the impact of the pandemic on their health showed that health was
 185 affected for many patients in only relatively minor ways. However, the provision of
 186 healthcare was affected for a greater number of people. The open-ended responses indicated
 187 that some people had significant health concerns, unrelated to COVID-19, for which they
 188 were unable to receive the necessary treatment, e.g. medications for diabetes patients that
 189 were undeliverable, or not receiving treatment for a slipped disc. The health of this group of
 190 individuals was considerably affected by the pandemic. We found no increased depression
 191 and anxiety rates. However, the risk of depression and anxiety disorder was significantly
 192 increased in patients with quarantine experience.

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3 193 Self-care practices have increased during the pandemic, with a relevant number of
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5 194 people reporting the initiation of new activities. More than a third (39%) of participants
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7 195 indicated that they had started a new self-care practice during the pandemic, such as yoga,
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9 196 meditation, exercise outdoors, or a newfound emphasis on healthy eating habits. That said,
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11 197 while self-care is on the rise there is no indication that *digital* self-care practices have taken
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13 198 on a major role during the pandemic, nor that digital self-care practices are being used in
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15 199 order to directly address problems associated with the pandemic.
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19 200 The pandemic has affected different socio-economic groups in Germany unequally
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21 201 (33). Given that most digital self-care practices must be paid for out-of-pocket, it is possible
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23 202 that engagement with digital self-care may be stratified along socio-economic lines. Further, it
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25 203 is possible that digital self-care fills a ‘gap’ in health care provision that may be more
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27 204 appealing for patients in places where basic health care needs are not met through universal
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29 205 health insurance. In places like Germany where the health care system is based on solidarity
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31 206 and basic needs are, on the whole, met for the majority of the population (34), it is possible
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33 207 that there is less need or incentive to seek out digital self-care practices. Future research can
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35 208 address how changes in self-care practices are related to forms of social and health inequality,
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37 209 and the intersections between major public health events and the need for new or different
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39 210 forms of care that are not available through the standard provision.
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44 211 The increase in new self-care practices to improve health was not accompanied by an
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46 212 increase in information-seeking about health. A study in Germany found that access to health
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48 213 information could serve as a buffer for increased anxiety during the pandemic (35), while
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50 214 another study found that nearly half of participants had difficulty judging if information about
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52 215 the pandemic was accurate or trustworthy (36). Thus, the relationship between information
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54 216 and anxiety during public health crises remains disputed (37,38), and further study is needed
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56 217 to probe the effects of the lack of reported health information-seeking behavior during the
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58 218 pandemic.
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3 219 An unintended finding affirmed in this survey is that there is great confidence in
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5 220 German healthcare system to adapt to changes brought about by the pandemic and address
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7 221 health needs accordingly. This correlates with findings that 85% of individuals surveyed in
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9 222 Germany were optimistic about their future access to healthcare services (39). Given that in
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11 223 many cases self-care is taken up to gain a sense of control over one's health, or because a
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13 224 particular health service is not available, is possible that widespread faith in the healthcare
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15 225 system leads to lower levels of digital self-care practice. When patient's needs are, on the
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17 226 whole, met by the health-care system, there may be lower levels of digital self-care seeking
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19 227 behavior.

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23 228 The prevalence of depression and anxiety in our primary care collective was very
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25 229 similar to a previous survey in the same region in 2010 (40). Therefore, our findings
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27 230 contradict the results from a survey conducted across Germany which found significantly
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29 231 increased symptoms of anxiety, depression, psychological distress and COVID-related fear
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31 232 (41). Their online survey was performed in the beginning of the pandemic, from March to
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33 233 May 2020. The summer period was significantly calmer with regard to the pandemic in
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35 234 Germany and Europe, which might explain the decreased prevalence of depression and
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37 235 anxiety in our study. However, our study indicates that there is a relatively small but very
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39 236 vulnerable patient group requiring special attention and services. There was a strong
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41 237 relationship between previous COVID infection and quarantine experience and increased
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43 238 depression and anxiety (15,42). Therefore, general practitioners should be aware that many
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45 239 patients experience a psychological crisis due to the isolation.

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52 241 **Limitations**

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54 242 A limitation of the study is the response rate of 55.3%. However, there was no conspicuous
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56 243 difference between the consecutively invited patient sample and the responders. Beyond that,
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58 244 only patients with internet skills could participate. Many patients answered the open-ended
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3 245 questions with relatively short phrases or words, and given the survey format it is not possible
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5 246 to probe for further clarification. No socio-economic information was recorded. Finally,
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7 247 patients were interviewed before the second lockdown which lasted considerably longer than
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9 248 the lockdown during the “first wave.” It is thus to be expected that the patients are suffering
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11 249 from more psychological constraints after the second long-term lockdown period.
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16 251 **Conclusions**

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19 252 Healthcare was affected for participants during the pandemic. There was a marked increase in
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21 253 self-care practices during the pandemic to promote and maintain health, however these do not
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23 254 appear to be predominantly digital in nature. Our findings show that patients with quarantine
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25 255 experience suffer significantly more from anxiety and depression. Further research is
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27 256 necessary to develop strategies to help alleviate the burden of the quarantine experience,
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29 257 which can be particularly challenging for patients. Whether or not digital self-care tools could
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31 258 also be a means of alleviating some of the additional stress and isolation posed by a
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33 259 quarantine during a public health event can be further investigated.
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39 261 **Declarations**

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42 262 **Ethics Approval:** This study was approved by the Technical University of Munich’s Ethics
43
44 263 commission on the 19th of May 2020 (311/20 S). All participants gave consent to proceed
45
46 264 before initiating the survey.

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49 265 **Consent for publication:** Consent to participate in the survey was obtained prior to initiation
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51 266 of the survey.

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269 **Data availability:** The quantitative dataset generated and analyzed during the current study
270 are available from the corresponding author on reasonable request. Due to privacy concerns,
271 the qualitative data cannot be made publicly available.

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273 **Author contributions:** AF, AB, and AS conceived of the study and designed the survey. AS
274 was responsible for study coordination with the general practice offices. AS and SK
275 completed the statistical analysis of the quantitative data and contributed relevant summaries
276 for the article. AF completed the qualitative analysis of the data and was responsible for the
277 analyzing the quantitative results together with the qualitative data. AF drafted the paper with
278 assistance and feedback of SM and AB. AS helped with writing. All authors reviewed and
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References

- 283 1. Wjst M. [The early phase of the COVID-19 pandemic in Bavaria, Germany]. Dtsch Med
284 Wochenschr 1946. 2021 Jan;146(1):e1–9.
- 285 2. Zimmermann BM, Fiske A, Prainsack B, Hangel N, McLennan S, Buyx A. Early
286 Perceptions of COVID-19 Contact Tracing Apps in German-Speaking Countries:
287 Comparative Mixed Methods Study. J Med Internet Res. 2021;23(2):e25525.
- 288 3. Le Ker H. Hospitals in Germany Ready Themselves for the Worst. Der Spiegel
289 [Internet]. 2020 Mar 18 [cited 2020 Nov 6]; Available from:
290 [https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
291 [for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
- 292 4. Fegert JM, Schulze UME. COVID-19 and its impact on child and adolescent psychiatry
293 - a German and personal perspective. Ir J Psychol Med. 2020 Sep;37(3):243–5.
- 294 5. Bayerisches Ministerialblatt. Bayerische Verordnung über Infektionsschutzmaßnahmen
295 anlässlich der Corona-Pandemie (Bayerische Infektionsschutzmaßnahmenverordnung –
296 BayIfSMV). BayMBl. 2020 Nr. 158. 2020.
- 297 6. Ellyatt H. “Collateral damage”: Germany has limited its coronavirus death toll, but it
298 hasn’t escaped criticism. CNBC [Internet]. 2020 Sep 23 [cited 2020 Nov 5]; Available

- 1
2
3 299 from: [https://www.cnn.com/2020/09/23/germany-has-limited-its-coronavirus-death-](https://www.cnn.com/2020/09/23/germany-has-limited-its-coronavirus-death-toll-but-faces-criticism.html)
4 300 [toll-but-faces-criticism.html](https://www.cnn.com/2020/09/23/germany-has-limited-its-coronavirus-death-toll-but-faces-criticism.html)
5
6 301 7. Moreno C, Wykes T, Galderisi S, Nordentoft M, Crossley N, Jones N, et al. How mental
7 302 health care should change as a consequence of the COVID-19 pandemic. *Lancet*
8 303 *Psychiatry*. 2020 Sep 1;7(9):813–24.
9
10 304 8. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J*
11 305 *Psychiatry*. 2020 Aug 1;52:102066.
12
13 306 9. Jung S, Kneer J, Kruger THC. The German COVID-19 Survey on Mental Health:
14 307 Primary Results. *medRxiv*. 2020 May 12;2020.05.06.20090340.
15
16 308 10. González-Sanguino C, Ausín B, Castellanos MÁ, Saiz J, López-Gómez A, Ugidos C, et
17 309 al. Mental health consequences during the initial stage of the 2020 Coronavirus
18 310 pandemic (COVID-19) in Spain. *Brain Behav Immun*. 2020 Jul;87:172–6.
19
20 311 11. Peters A, Rospleszcz S, Greiser KH, Dallavalle M, Berger K. The Impact of the
21 312 COVID-19 Pandemic on Self-Reported Health. *Dtsch Arztebl*. 2020 Dec 11;117:861–7.
22
23 313 12. Arendt F, Markiewitz A, Mestas M, Scherr S. COVID-19 pandemic, government
24 314 responses, and public mental health: Investigating consequences through crisis hotline
25 315 calls in two countries. *Soc Sci Med* 1982. 2020 Nov;265:113532.
26
27 316 13. Schweda A, Weismüller B, Bäuerle A, Dörrie N, Musche V, Fink M, et al. Phenotyping
28 317 mental health: Age, community size, and depression differently modulate COVID-19-
29 318 related fear and generalized anxiety. *Compr Psychiatry*. 2021 Jan;104:152218.
30
31 319 14. Liu S, Heinzl S, Haucke MN, Heinz A. Increased Psychological Distress, Loneliness,
32 320 and Unemployment in the Spread of COVID-19 over 6 Months in Germany. *Med*
33 321 *Kaunas Lith*. 2021 Jan 9;57(1).
34
35 322 15. Riedel-Heller S, Richter D. [COVID-19 Pandemic and Mental Health of the General
36 323 Public: Is there a Tsunami of Mental Disorders?]. *Psychiatr Prax*. 2020 Nov;47(8):452–
37 324 6.
38
39 325 16. Fullana MA, Hidalgo-Mazzei D, Vieta E, Radua J. Coping behaviors associated with
40 326 decreased anxiety and depressive symptoms during the COVID-19 pandemic and
41 327 lockdown. *J Affect Disord*. 2020 Oct 1;275:80–1.
42
43 328 17. Fiske A, Buyx A, Prainsack B. The double-edged sword of digital self-care: Physician
44 329 perspectives from Northern Germany. *Soc Sci Med*. 2020 Sep 1;260:113174.
45
46 330 18. Ruckenstein M, Dow Schüll N. The Datafication of Health. *Annu Rev Anthropol*. 2017
47 331 Oct 23;46(1):261–78.
48
49 332 19. Prainsack B. *Personalized Medicine: Empowered Patients in the 21st Century?* New
50 333 York: NYU Press; 2017. 288 p. (Biopolitics).
51
52 334 20. Topol E. *The Patient Will See You Now: The Future of Medicine Is in Your Hands*.
53 335 Reprint edition. New York, N.Y: Basic Books; 2016. 384 p.
54
55
56
57
58
59
60

- 1
2
3 336 21. Lupton D. The digitally engaged patient: Self-monitoring and self-care in the digital
4 337 health era. *Soc Theory Health Lond.* 2013 Aug;11(3):256–70.
- 6 338 22. Ming LC, Untong N, Aliudin NA, Osili N, Kifli N, Tan CS, et al. Mobile Health Apps
7 339 on COVID-19 Launched in the Early Days of the Pandemic: Content Analysis and
8 340 Review. *JMIR MHealth UHealth.* 2020 Sep 16;8(9):e19796.
- 11 341 23. Iegroju. Digital health technologies addressing the pandemic [Internet]. Shaping
12 342 Europe's digital future - European Commission. 2020 [cited 2021 Feb 15]. Available
13 343 from: [https://ec.europa.eu/digital-single-market/en/digital-health-technologies-](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
14 344 [addressing-pandemic](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
- 16 345 24. Coronavirus Support App [Internet]. Expert Self Care. [cited 2021 Feb 15]. Available
17 346 from: <https://www.expertselfcare.com/health-apps/coronavirus-support-app-uk/>
- 20 347 25. Finch S. 5 Mental Health Apps to Help Manage Coronavirus Anxiety [Internet].
21 348 Healthline. 2020 [cited 2021 Feb 15]. Available from:
22 349 [https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
23 350 [coronavirus-anxiety](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
- 25 351 26. Gerke S, Stern AD, Minssen T. Germany's digital health reforms in the COVID-19 era:
26 352 lessons and opportunities for other countries. *Npj Digit Med.* 2020 Jul 10;3(1):1–6.
- 29 353 27. Rövekamp M. Hilfe bei Depressionen: „Es ist Wahnsinn, was gerade in Deutschland
30 354 passiert“. *Der Tagesspiegel* [Internet]. 2021 Jan 26 [cited 2021 Jan 27]; Available from:
31 355 [https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
32 356 [gerade-in-deutschland-passiert-92552.html](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
- 34 357 28. Löwe B, Spitzer R, Gräfe K, Kroenke K, Quenter A, Zipfel S, et al. Comparative
35 358 validity of three screening questionnaires for DSM-IV depressive disorders and
36 359 physicians' diagnoses. *J Affect Disord.* 2004;78(2):131–40.
- 39 360 29. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and
40 361 standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general
41 362 population. *Med Care.* 2008;46(3):266–74.
- 43 363 30. Lupton D. *Digital Health : Critical and Cross-Disciplinary Perspectives.* First edition.
44 364 London: Taylor and Francis; 2017.
- 46 365 31. Topol E. Digital medicine: empowering both patients and clinicians. *The Lancet.* 2016
47 366 Aug 20;388(10046):740–1.
- 50 367 32. Gabriels K, Moerenhout T. Exploring Entertainment Medicine and Professionalization
51 368 of Self-Care: Interview Study Among Doctors on the Potential Effects of Digital Self-
52 369 Tracking. *J Med Internet Res.* 2018 12;20(1):e10.
- 54 370 33. Wachtler B, Hoebel J. [Social Inequalities and COVID-19: Social-Epidemiological
55 371 Perspectives on the Pandemic]. *Gesundheitswesen Bundesverb Ärzte Öffentlichen*
56 372 *Gesundheitsdienstes Ger.* 2020 Sep;82(8–09):670–5.
- 58 373 34. Institute for Quality and Efficiency in Health Care. Health care in Germany: The
59 374 German health care system [Internet]. *InformedHealth.org* [Internet]. Cologne,

- 1
2
3 375 Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2015 [cited 2021
4 376 Feb 26]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK298834/>
- 5
6 377 35. Jungmann SM, Witthöft M. Health anxiety, cyberchondria, and coping in the current
7 378 COVID-19 pandemic: Which factors are related to coronavirus anxiety? *J Anxiety*
8 379 *Disord.* 2020 Jun;73:102239.
- 9
10 380 36. Okan O, Bollweg TM, Berens E-M, Hurrelmann K, Bauer U, Schaeffer D. Coronavirus-
11 381 Related Health Literacy: A Cross-Sectional Study in Adults during the COVID-19
12 382 Infodemic in Germany. *Int J Environ Res Public Health.* 2020 Jul 30;17(15).
- 13
14 383 37. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak:
15 384 Amplification of public health consequences by media exposure. *Health Psychol Off J*
16 385 *Div Health Psychol Am Psychol Assoc.* 2020 May;39(5):355–7.
- 17
18 386 38. Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S, et al. Mental health problems and social
19 387 media exposure during COVID-19 outbreak. *PloS One.* 2020;15(4):e0231924.
- 20
21 388 39. Hajek A, De Bock F, Wieler LH, Sprengholz P, Kretzler B, König H-H. Perceptions of
22 389 Health Care Use in Germany during the COVID-19 Pandemic. *Int J Environ Res Public*
23 390 *Health.* 2020 Dec 14;17(24).
- 24
25 391 40. Schneider A, Wartner E, Schumann I, Hörlein E, Henningsen P, Linde K. The impact of
26 392 psychosomatic co-morbidity on discordance with respect to reasons for encounter in
27 393 general practice. *J Psychosom Res.* 2013 Jan;74(1):82–5.
- 28
29 394 41. Bäuerle A, Teufel M, Musche V, Weismüller B, Kohler H, Hetkamp M, et al. Increased
30 395 generalized anxiety, depression and distress during the COVID-19 pandemic: a cross-
31 396 sectional study in Germany. *J Public Health Oxf Engl.* 2020 Nov 23;42(4):672–8.
- 32
33 397 42. Hahad O, Gilan DA, Daiber A, Münzel T. [Public Mental Health as One of the Key
34 398 Factors in Dealing with COVID-19]. *Gesundheitswesen Bundesverb Ärzte Öffentlichen*
35 399 *Gesundheitsdienstes Ger.* 2020 May;82(5):389–91.
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The Impact of COVID-19 on Patient Health and Self-Care Practices: A mixed methods survey with German patients

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4 survey with German patients
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Abstract

Objective: This study aimed to examine German patients': 1) self-estimation of the impact of the pandemic on their health and healthcare; and 2) use of digital self-care practices during the pandemic.

Design: Cross-sectional mixed-methods survey.

Setting and Participants: General practice patients from 4 physicians' offices located in urban and rural areas of Bavaria, Germany, between 21 July 2020 to 17 October 2020. A total of 254 patients participated (55% response rate); 57% (262/459) identified as female and participants had an average age of 39.3 years. Patients were eligible to participate if they were 18 years or older and spoke German, and had access to the internet.

Results: 1) Healthcare for patients was affected by the pandemic, and the mental health of a small group of respondents was particularly affected. The risk of depression and anxiety disorder was significantly increased in patients with quarantine experience. 2) Self-care practices have increased, with more than a third (39%) of participants indicated that they had started a new or additional self-care practice during the pandemic, and about a quarter (23%) of patients who were not previously engaged in self-care practices starting new self-care activities for the first time, however such practices were not necessarily digital.

Conclusions: Further investigation is required to understand the relationship between digital self-care and public health events such as the COVID-19 pandemic, and to develop strategies to alleviate the burden of the quarantine experience for patients.

Keywords: COVID-19, pandemic, health care, digital self-care, depression, anxiety, Germany

Strengths and limitations of this study

- The mixed methods approach, including validated scales for depression and anxiety, and open-ended qualitative answers on wellbeing and new health promotion practices, enabled breadth and depth of insight of the study.
- Results are limited to the period after the “first wave” of the pandemic in Germany and prior to the second lockdown and thus may underestimate the psychological constraints experienced during the second long-term lockdown period.
- Patient involvement in study design and data interpretation was not feasible.

1 Introduction

2 The COVID-19 pandemic has put enormous strain on health care systems and has upended
3 the provision of healthcare. Even for those who were not directly affected by the virus itself,
4 the provision of healthcare services was substantially altered (1). Concerns have emerged that
5 the postponement of treatment for non-COVID conditions, such as cancer, heart attacks or
6 stroke could have significant negative consequences (2). Furthermore, with mounting
7 uncertainty, physical and social distancing, job loss, and decreased access to support services,
8 the pandemic has increased established risk factors for mental health problems (3). Recent
9 studies suggest rising rates of depression, anxiety and stress symptoms during the pandemic
10 (4–11).

11 These ‘secondary’ effects of the pandemic on physical and mental health constitute a
12 significant challenge and require novel approaches given the ongoing course of the pandemic
13 (7,12). One prominent approach that has emerged to assist patients – in lieu of routine
14 healthcare or other ways of maintaining health that are not available during the pandemic – is
15 “digital self-care” (13–17). Self-care, defined by the World Health Organization as “the
16 activities that individuals, families, and communities undertake with the intention of
17 enhancing health, preventing disease, limiting illness, and restoring health” (18), has taken on
18 new forms in the digital era. The growth of the Internet and personalized portable devices,
19 such as smartphones, activity trackers, and other digital applications have given rise to
20 emerging forms of “digital self-care,” a range of practices of maintaining and promoting
21 health without formal medical direction that largely became possible through the datafication
22 and digitization of patients’ bodies and lives (13). Many of these practices entail
23 measurements or technologies that were previously only available under clinical supervision,
24 which have now moved into the hands of patients. Proponents have predicted that digital self-
25 care represents a novel, cost-effective, and empowering way of addressing the mental and
26 physical health needs of patients (16). Indeed, the current pandemic has given rise to a range

1
2
3 27 of digital self-care tools that can be used at home (19–21), and has renewed interest in
4
5 28 existing digital tools, such as therapeutic chatbots (22). It remains unclear, however, if
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7 29 patients are engaging in digital self-care practices to address health needs brought about by
8
9 30 the pandemic.

11
12 31 Germany, and the state of Bavaria in particular, provides a useful setting to examine
13
14 32 these issues. The first confirmed COVID-19 case in Germany occurred in Bavaria in late
15
16 33 January 2020 (23). Soon after, Germany began to introduce public health measures to slow
17
18 34 the spread and contain the pandemic (24). During March and April 2020, measures began
19
20 35 affecting the German health system; dentist and doctor's offices closed or changed their
21
22 36 services, hospitals received orders from the federal government in March 2020 to postpone
23
24 37 non-essential operations (25,26), and intensive care capacities in hospitals were expanded.
25
26 38 During Spring 2020, Bavaria was also under a "strict lockdown" in this period, with a stay-at-
27
28 39 home order in place, and non-essential shops and businesses along with schools and daycares
29
30 40 were closed. (27). Furthermore, Germany is one of the world's first countries to approve
31
32 41 digital health apps for prescription as part of a new law on digital medical care (28). It is
33
34 42 therefore expected that such digital health tools will be increasingly used by German patients.
35
36 43 Research conducted before the pandemic indicates that patient-driven digital self-care is
37
38 44 currently lagging behind expectations (13). Nevertheless, a number of COVID-19 digital tools
39
40 45 for patients have emerged in Germany, such as symptom trackers (e.g. Data4Life app) and
41
42 46 self-help apps for depression (29). This study therefore aimed to examine German patients':
43
44 47 1) self-estimation of the impact of the pandemic on their health and healthcare; and 2) use of
45
46 48 digital self-care practices during the pandemic.

49

50 **Methods**

51 This study was approved by the Technical University of Munich's Research Ethics
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60 52 Committee on the 19th of May 2020 (311/20 S). All participants gave consent to proceed

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3 53 before initiating the survey. The methods of the study are presented in accordance with the
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5 54 “Strengthening the Reporting of Observational Studies in Epidemiology” (STROBE)
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8 55 statement and the “Standards for reporting qualitative research” (SRQR) (30,31).
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10 56

11 12 57 *Survey implementation*

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14 58 A cross-sectional survey was conducted between 21 July 2020 to 17 October 2020. Patients
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16
17 59 from four general practices in the urban and rural areas of Bavaria were consecutively invited
18
19 60 by the practice assistants to participate. Patients were eligible to participate if they were 18
20
21 61 years or older, spoke German, and had access to the internet. Office assistants asked eligible
22
23 62 patients who visited in the office during the recruitment period for an appointment if they
24
25 63 would like to participate in the study. A total of 459 individuals were provided with the study
26
27 64 information sheet in print form, and included a link to the online survey. Office assistants
28
29 65 received a small monetary compensation for their help. The online survey was conducted
30
31 66 using the automation software EvaSys (EvaSys Central Evaluation version 8.0). Data were
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33 67 then exported into Statistical Package for the Social Sciences (SPSS version 26 for Windows,
34
35 68 IBM Corporation). Participants who completed the survey were eligible to claim a 10-euro
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37 69 gift certificate for Amazon.
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41 42 43 44 71 *Survey content*

45
46 72 In order to assess the overall wellbeing of the participants during the pandemic, two subscales
47
48 73 of the German version of the Patient Health Questionnaire (PHQ-D) were used to assess
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50 74 depression and anxiety as psychological comorbidity (32). The depression severity score of
51
52 75 the PHQ, the PHQ-9, ranges from 0 (no depression) to 27 (maximal depression). Superior
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54 76 validity of the PHQ compared to other established self-report questionnaires has been
55
56 77 confirmed with respect to the diagnoses of ‘major depressive disorder’ and ‘other depressive
57
58 78 disorders’ according to ICD-10 (20). Another module of the PHQ-D, the Generalized Anxiety
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3 79 Disorder Scale (GAD-7), was used as a practical self-report anxiety questionnaire that has
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5 80 been validated in primary care (33). GAD-7 scores range from 0 to 21, with scores of ≥ 5 , \geq
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7 81 10, and ≥ 15 representing mild, moderate, and severe anxiety symptom levels, respectively.
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10 82 Only moderate and severe scoring were rated as anxiety disorder.

11
12 83 Additionally, a questionnaire was developed to examine the impact of the pandemic
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14 84 on patients' lives and health, and new digital self-care practices. The survey was informed by
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16 85 existing literature on the secondary effects of the pandemic, and changing practices of digital
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18 86 self-care (13,17,34–36), and combined scaled or yes/no questions, with free-text responses.
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20 87 Demographic questions asked for the participants' age and gender. Two questions asked in
21
22 88 the survey were removed due to inconsistent answering patterns.
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28 90 *Data Analysis*

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30 91 Baseline data were analyzed descriptively. For the analyses, we included all participants who
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32 92 answered the respective question. Associations between the questions regarding the self-
33
34 93 estimation of the health care situation and depression or anxiety disorder were investigated
35
36 94 separately with multivariable logistic regression models. Survey questions were included into
37
38 95 the models as predictor variables, separately. We controlled for potential confounding by
39
40 96 including age and gender into the models. Hypotheses testing was performed with an
41
42 97 exploratory two-sided test using a significance level of 5%. All analyses were performed by
43
44 98 S.K. and A.S. in SPSS version 26 and R version 4.0.3 (The R Foundation for Statistical
45
46 99 Computing). Qualitative data from the open responses were analyzed by A.F. using
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50 100 conventional content analysis, with a focus on conceptual analysis. Initial themes identified
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52 101 common across participants as well as those unique to individuals were labelled using a
53
54 102 process of open coding and grouped based on higher order themes (37). Two other
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56 103 investigators [A.B, S.M.] reviewed the initial analysis to ensure consistency and validity, and
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58 104 conversations among the investigators continued until consensus was achieved. Variance and
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3 105 saturation within the responses was analyzed and described. All quotes included in this article
4
5 106 were translated from German to English.
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10 108 *Patient and Public Involvement*

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12 109 No patient was involved in the design of this study.
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16
17 111 **Results**

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19 112 *Characteristics of participants*

20
21 113 A total of 459 patients were invited to participate. Of these, 57% (262/459) identified as
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23 114 female. The average age of invitees was 40.6 years (standard deviation 16.1). Of those
24
25 115 invited, 254 eligible patients participated in the survey, corresponding to a 55% (254/459)
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27 116 response rate. Of the participants, 56% (144/254) identified as female. The average age of the
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29 117 participants was 39.3 years (standard deviation 15.7) and the median age was 37, ranging
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31 118 from 18 to 81 years old. The majority of participants had not had any symptoms of COVID
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33 119 during the 3 months prior to the survey (218/254; 86%). Only 17% (44/254) of participants
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35 120 reported having had conducted a COVID test, but only 9% (4/44) of those received a positive
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37 121 result. However, 6% (16/254) reported that they presumed they had COVID due to the
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39 122 presence of symptoms, despite not having taken a test. Quarantine was reported by 11%
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41 123 (28/254) of respondents. The PHQ results indicated that 17% (45/254) patients suffered from
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43 124 impaired mental health, 6% (17/254) suffered from depression, 4% (11/254) suffered from
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45 125 anxiety disorder, and 6% (17/254) suffered from both depression and anxiety disorder.
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54 127 *Impact of the pandemic on health*

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56 128 A third of respondents, 30% (75/254), indicated that their health care was affected by the
57
58 129 COVID 19 pandemic (**Table 1**). When asked to specify how their healthcare had been
59
60 130 affected, respondents offered examples in the open-ended questions, including changes in

131 appointment availability at their doctor's offices due to closures or modifications due to the
 132 pandemic.

133 **Table 1. Impact of the pandemic on health**

Question	Yes	No
Did you experience any health complaints during the COVID-19 pandemic (unrelated to the coronavirus) for which you would normally go to the doctor?	73/254 (29%)	181/254 (71%)
Was your health care affected by the COVID 19 pandemic, such as because a doctor's office was closed, appointments were rescheduled, or for other reasons?	75/254 (30%)	179/254 (70%)
At the beginning of the pandemic, several changes were made in health care delivery to respond to the new needs created by the COVID-19 outbreak. Many physician visits were postponed, office hours were curtailed, scheduled surgeries were postponed to a later date, etc. Do you feel that you were affected by this?	63/254 (25%)	191/254 (75%)
Do you have any fears with regard to your future health care?	60/254 (24%)	194/254 (76%)

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136 One participant noted that "Normal doctor's visits were no longer possible in the initial
 137 period. All appointments were canceled by the doctors. Only emergencies were possible."

138 Another described unexpected interruptions in care: "After an operation I was in inpatient
 139 rehabilitation. This was planned for 3 weeks. However, after two weeks the [name redacted]

140 clinic was closed to be available for Corona patients." A few participants noted issues in

141 receiving necessary medications or necessary medical supplies, including for chronic

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3 142 conditions such as diabetes. Some indicated that they had felt increased stress and anxiety,
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5 143 such as one person who wrote that “One reacts more sensitively to little things that used to be
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7 144 ignored (sneezing, coughing, etc.)” Others experienced other changes in their mental health:
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9 145 “During the lockdown, sleep disturbances, increased restlessness, fears about the future.”
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11 146 Moreover, difficult situations were made more difficult: “In addition, I am currently
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13 147 unemployed and it is even more difficult for me to find a job, since I have to wear the mask
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15 148 for hours on end practically everywhere during work. My psyche suffers from it. I get scared
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17 149 and sometimes panic, as I am now worried about my health and professional life.”
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21 150 During the COVID-19 pandemic, some respondents said they had health complaints,
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23 151 unrelated to COVID, for which they normally would have gone to see a doctor. The
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25 152 complaints included in the qualitative responses indicated covered a wide range of health
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27 153 problems, from relatively minor issues such as allergies or congestion to more serious
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29 154 conditions such as a slipped disc or a spinal canal stenosis. In the open-ended answers,
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31 155 respondents indicated that their concerns of going to the doctor during the pandemic dealt
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33 156 with fear of contracting COVID-19, while a few individuals indicated that they felt their
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35 157 concerns were not substantial enough to see their doctor while medical professionals were
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37 158 dealing with more serious health concerns during the pandemic. Many participants answered
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39 159 with variations on concerns that, “I could catch it from the next patient in the office,” while
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41 160 others cited “Risk of infection due to my age and certain pre-existing conditions,” or doubted
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43 161 “Whether my symptoms were ‘bad enough’ to see a doctor.” A majority, or 70% (179/254) of
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45 162 respondents said that they had not been affected by the changes made to the health care
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47 163 system to respond to the needs created by the pandemic, such as postponed doctors’ visits,
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49 164 restricted hours, or healthcare services.
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166 *Digital self-care practices in the pandemic*

167 More than a third of respondents (38%; 97/254), indicated that prior to the pandemic they
 168 engaged in practices to promote and maintain their health, such as the use of health apps,
 169 participation in online support groups or sports exercises, meditation or other activities for
 170 relaxation (Table 2).

171

172 **Table 2: Impact of pandemic on digital self-care practices**

Question	Yes	No
Before the pandemic, did you engage in any self-care measures to maintain your health, such as use of health apps, participation in online support groups, or exercise, meditation, or other activities for relaxation?	97/254 (38%)	157/254 (62%)
During/since the pandemic, have you started new or additional steps to improve your health?	100/254 (39%)	154/254 (61%)
Since the pandemic, have you sought more information about your health?	27/254 (11%)	227/254 (89%)

173

174 When asked to specify what kinds of practices, the majority of respondents cited exercise
 175 such as different sports, yoga, or membership in fitness studios. During the pandemic, 39% of
 176 respondents indicated that they had initiated new or additional practices to improve their
 177 health. 16% (41/254) were previously engaged in self-care activities, 23% (59/254) patients
 178 started new steps for the first time. The practices listed by respondents included a range of
 179 activities, many of which were not digital, such as yoga, healthier eating, or new forms of
 180 physical activity. Some noted the advantages of home office: “Taking advantage of more
 181 flexible work schedule (virtual work) to eat more mindfully and reduce body weight by ~2
 182 BMI points into the 25ish range.” Many described new fitness routines, such as “Started

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3 183 jogging / walking more as an alternative to venturing out with friends to at least get out a bit,”
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5 184 or efforts to relax such as “Self-massage of jaw muscles (watched online videos on how to do
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7 185 this), my friend now massages my neck and back more often, yoga exercises, exercises to
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10 186 strengthen arm, back and abdominal muscles, started jogging again, healthier diet, longer
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12 187 showers to relax.” However, only 11% (27/254) indicated that they had become more
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14 188 informed about their health since the start of the pandemic.

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17 189 Respondents were asked what the greatest challenge was for them in relation to their
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19 190 health during the COVID-19 pandemic. The most common response in the qualitative data
20
21 191 involved challenges in following the COVID-19 guidelines such as wearing masks or keeping
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23 192 social distance from family and friends, such as one participant who wrote: “Keeping a
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25 193 distance, even from people you like very much!” Another described the difficulties of
26
27 194 “Dealing with everyday life with the social-distance regulations. Since not all people adhere
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29 195 to it, it makes shopping more difficult and also in professional life getting together with
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31 196 others.” Other challenges included not contracting COVID-19, heightened anxiety or concern
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33 197 over personal health risks, and concerns surrounding getting health needs met, for example,
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35 198 “It’s more of a psychological problem for me to have to deal with anxiety all the time because
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37 199 you don’t know how badly the virus will hit you.” Some participants cited specific concerns
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39 200 with their own health: “As a smoker with moderate obesity, I’m basically in the risk group,”
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41 201 and “Since I’m 35 weeks pregnant, the impact on the pregnancy, the baby, the birth was one
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43 202 thing to deal with.”

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49 203 About one-quarter, or 24% (60/254) of individuals had fears with regard to their
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51 204 health care in the future. The open-ended answers to this question were particularly
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53 205 instructive, with a majority of respondents indicating that they were not concerned because
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55 206 they had faith in the German health care system, with participants noting that “Even during
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57 207 the pandemic, I think [the healthcare system] worked much better in Germany than in many
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59 208 other countries around the world,” or “Germany has a very stable and good health care

209 system, so I don't see any reason to worry about it." Others noting that their personal
 210 connection to their doctors helped to mitigate their concerns, for example, "I trust my doctor
 211 and the system," or "Because I have a good general practitioner and everything is actually
 212 almost back to normal." Approximately a quarter of respondents stated directly that they were
 213 not concerned for the future, with many citing their own fitness or lack of risk factors as the
 214 reason for their confidence.

215

216 *Associations with depression and anxiety disorder*

217 Patients with depression or anxiety disorder showed more adverse estimation of their health
 218 care situation (Table 3). There was a strong association with previous Covid-19 infection and
 219 depression in the regression analysis (OR 21.41; 95%CI 1.98-231.12). The association
 220 between anxiety disorder and previous Covid-19 infection was not significant. Additionally,
 221 the multivariable logistic regression analysis revealed a strong association between previous
 222 quarantine and depression (OR 5.38; 95%CI 2.20-13.17). The association with anxiety
 223 disorder was borderline significant (OR 2.78; 95%CI 1.00-7.74). Survey responses regarding
 224 self-care practices were not significantly associated with depression or anxiety.

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226

227 **Table 3. Association of anxiety, depression, and self-rated health care, adjusted for age**
 228 **and gender (only significant associations are presented)**

Logistic Regression for depression	Odds Ratio	CI 95%	p-Value
Covid-19 positive	21.41	1.98-231.12	0.012
Quarantine	5.38	2.20 - 13.17	< 0.001
No Covid-19 symptoms	0.20	0.09 - 0.45	< 0.001
Feeling affected by various health care changes	4.33	1.88 - 9.99	0.001
Health care worsened	3.56	1.29 - 9.86	0.014
Covid-19 negative	2.46	1.05 - 5.75	0.038
Logistic Regression for anxiety disorder			
Covid-19 positive	3.26	0.32-33.16	0.318
Quarantine	2.78	1.00- 7.74	0.050

Health complaints during COVID-19 pandemic for which participant would normally go to the doctor	4.39	1.92 - 10.04	< 0.001
Feeling affected by various health care changes	5.95	2.52 - 14.09	< 0.001
Health care worsened	5.06	1.97 - 13.01	0.001
Health care not changed	0.24	0.10 - 0.59	0.002
Health care affected by COVID-19 pandemic because of doctor's offices closures, cancelled appointments	3.52	1.56 - 7.95	0.002
I cannot assess changes in health care delivery	2.35	1.04 - 5.31	0.040
Fears with regard to future health care delivery	2.30	1.00 - 5.27	0.049

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230 Discussion

231 The self-estimation of the impact of the pandemic on their health showed that health was
 232 affected for many patients in only relatively minor ways. However, the provision of
 233 healthcare was affected for a greater number of people. The open-ended responses indicated
 234 that some people had significant health concerns, unrelated to COVID-19, for which they
 235 were unable to receive the necessary treatment, e.g. medications that were undeliverable, or
 236 not receiving treatment for a slipped disc. The health of this group of individuals was
 237 considerably affected by the pandemic. We found no increased depression and anxiety rates.
 238 However, the risk of depression was significantly increased in patients with quarantine
 239 experience.

240 Self-care practices have increased during the pandemic, with a relevant number of
 241 people reporting the initiation of new activities. More than a third (39%) of participants
 242 indicated that they had started a new or additional self-care practice during the pandemic,
 243 such as yoga, meditation, exercise outdoors, or a newfound emphasis on healthy eating habits,
 244 with 59 (23%) patients who were not previously engaged in self-care practices starting new
 245 self-care activities for the first time. That said, while self-care is on the rise there is no
 246 indication that *digital* self-care practices have taken on a major role during the pandemic in

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3 247 Germany, nor that digital self-care practices are being used in order to directly address
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5 248 problems associated with the pandemic.
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8 249 The pandemic has affected different socio-economic groups in Germany unequally
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10 250 (38). Given that most digital self-care practices must be paid for out-of-pocket, it is possible
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12 251 that engagement with digital self-care may be stratified along socio-economic lines. Further, it
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14 252 is possible that digital self-care fills a 'gap' in health care provision that may be more
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16 253 appealing for patients in places where basic health care needs are not met through universal
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18 254 health insurance. In places like Germany where the health care system is based on solidarity
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20 255 and basic needs are, on the whole, met for the majority of the population (39), it is possible
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22 256 that there is less need or incentive to seek out digital self-care practices. Future research on
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24 257 digital self-care in Germany and also internationally can address how changes in self-care
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26 258 practices are related to forms of social and health inequality, and the intersections between
27
28 259 major public health events and the need for new or different forms of care that are not
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30 260 available through the standard provision.
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35 261 The increase in new self-care practices to improve health was not accompanied by an
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37 262 increase in information-seeking about health. A study in Germany found that access to health
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39 263 information could serve as a buffer for increased anxiety during the pandemic (40), while
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41 264 another study found that nearly half of participants had difficulty judging if information about
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43 265 the pandemic was accurate or trustworthy (41). Thus, the relationship between information
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45 266 and anxiety during public health crises remains disputed (42,43), and further study is needed
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47 267 to probe the effects of the lack of reported health information-seeking behavior during the
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49 268 pandemic.
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53 269 An unintended finding affirmed in this survey is that there is great confidence in
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55 270 German healthcare system to adapt to changes brought about by the pandemic and address
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57 271 health needs accordingly. This correlates with findings that 85% of individuals surveyed in
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59 272 Germany were optimistic about their future access to healthcare services (44). Given that in
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3 273 many cases self-care is taken up to gain a sense of control over one's health, or because a
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5 274 particular health service is not available, is possible that widespread faith in the healthcare
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7 275 system leads to lower levels of digital self-care practice. When patient's needs are, on the
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9 276 whole, met by the health-care system, there may be lower levels of digital self-care seeking
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11 277 behavior.

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14 278 The prevalence of depression and anxiety in our primary care collective was very
15
16 279 similar to a previous survey in the same region in 2010 (45). Therefore, our findings
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18 280 contradict the results from a survey conducted across Germany which found significantly
19
20 281 increased symptoms of anxiety, depression, psychological distress and COVID-related fear
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22 282 (46). Their online survey was performed in the beginning of the pandemic, from March to
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24 283 May 2020. The summer period was significantly calmer with regard to the pandemic in
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26 284 Germany and Europe, which might explain the decreased prevalence of depression and
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28 285 anxiety in our study. However, our study indicates that there is a relatively small but very
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30 286 vulnerable patient group requiring special attention and services. There was a strong
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32 287 relationship between previous COVID infection and quarantine experience and increased
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34 288 depression. Beyond that, the qualitative analysis suggests important health concerns of many
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36 289 patients which might be difficult to capture with psychometric questionnaires. Therefore,
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38 290 general practitioners should be aware that many patients experience a psychological crisis due
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40 291 to the isolation.

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48 49 293 **Limitations**

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51 294 A limitation of the study is the response rate of 55.3%. However, there was no conspicuous
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53 295 difference between the consecutively invited patient sample and the responders. The
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55 296 proportion of patients with depression, anxiety, and COVID-19 infection respectively, was
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57 297 comparatively low, which explains the breadth of the 95% confidence intervals. However, the
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59 298 odds ratios were rather high. Only patients with internet skills could participate. Many
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3 299 patients answered the open-ended questions with relatively short phrases or words, and given
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5 300 the survey format it is not possible to probe for further clarification. No socio-economic
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7 301 information was recorded. Patients were interviewed before the second lockdown which
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9 302 lasted considerably longer than the lockdown during the “first wave.” It is thus to be expected
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11 303 that the patients are suffering from more psychological constraints after the second long-term
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13 304 lockdown period. Finally, due to time constraints and challenges of coordinating a new study
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15 305 while all researchers were working from home during the pandemic, there was no patient
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17 306 involvement in the survey design or data interpretation.
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307

308 **Conclusions**

309 Healthcare was affected for participants during the pandemic. There was a marked increase in
310 self-care practices during the pandemic to promote and maintain health, however these do not
311 appear to be predominantly digital in nature. Given that important differences have already
312 been seen between digital self-care practices in the literature and in Germany (13), further
313 research on self-directed health promotion during the pandemic will help to illuminate how
314 these findings from Germany compare to other locales. Our findings show that patients with
315 quarantine experience suffer significantly more from anxiety and depression. Further research
316 is necessary to develop strategies to help alleviate the burden of the quarantine experience,
317 which can be particularly challenging for patients. Whether or not digital self-care tools could
318 also be a means of alleviating some of the additional stress and isolation posed by a
319 quarantine during a public health event can be further investigated.

320

321 **Declarations**

322 **Ethics Approval:** This study was approved by the Technical University of Munich’s Research
323 Ethics Committee on the 19th of May 2020 (311/20 S). All participants gave consent to
324 proceed before initiating the survey.

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3 325 **Consent for publication:** Consent to participate in the survey was obtained prior to initiation
4
5 326 of the survey.

6
7 327 **Funding:** This work was supported by the Institute of History and Ethics in Medicine (TUM)
8
9 328 and the Department of General Medicine (TUM).

10 329 **Data availability:** The quantitative dataset generated and analyzed during the current study
11
12 330 are available from the corresponding author on reasonable request. Due to privacy concerns,
13
14 331 the qualitative data cannot be made publicly available.

15
16 332 **Competing Interests:** The authors declare no competing interests.

17
18 333 **Author contributions:** AF, AB, and AS conceived of the study and designed the survey. AS
19
20 334 was responsible for study coordination with the general practice offices. AS and SK
21
22 335 completed the statistical analysis of the quantitative data and contributed relevant summaries
23
24 336 for the article. AF completed the qualitative analysis of the data and was responsible for the
25
26 337 analyzing the quantitative results together with the qualitative data. AF drafted the paper with
27
28 338 assistance and feedback of SM and AB. AS helped with writing. All authors reviewed and
29
30 339 approved the final version of this article.

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- 343 1. Die Bundesregierung. Besprechung der Bundeskanzlerin mit den Regierungschefinnen
344 und Regierungschefs der Länder am 12. März 2020 [Internet]. 2020 [cited 2021 May
345 21]. Available from: <https://www.bundesregierung.de/breg->
346 [de/themen/coronavirus/beschluss-zu-corona-1730292](https://www.bundesregierung.de/breg-)
- 347 2. Ellyatt H. “Collateral damage”: Germany has limited its coronavirus death toll, but it
348 hasn’t escaped criticism. CNBC [Internet]. 2020 Sep 23 [cited 2020 Nov 5]; Available
349 from: <https://www.cnbc.com/2020/09/23/germany-has-limited-its-coronavirus-death->
350 [toll-but-faces-criticism.html](https://www.cnbc.com/2020/09/23/germany-has-limited-its-coronavirus-death-)
- 351 3. Moreno C, Wykes T, Galderisi S, Nordentoft M, Crossley N, Jones N, et al. How mental
352 health care should change as a consequence of the COVID-19 pandemic. *Lancet*
353 *Psychiatry*. 2020 Sep 1;7(9):813–24.

- 1
2
3 354 4. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J*
4 355 *Psychiatry*. 2020 Aug 1;52:102066.
- 5
6 356 5. Jung S, Kneer J, Kruger THC. The German COVID-19 Survey on Mental Health:
7 357 Primary Results. *medRxiv*. 2020 May 12;2020.05.06.20090340.
- 8
9
10 358 6. González-Sanguino C, Ausín B, Castellanos MÁ, Saiz J, López-Gómez A, Ugidos C, et
11 359 al. Mental health consequences during the initial stage of the 2020 Coronavirus
12 360 pandemic (COVID-19) in Spain. *Brain Behav Immun*. 2020 Jul;87:172–6.
- 13
14 361 7. Peters A, Rospleszcz S, Greiser KH, Dallavalle M, Berger K. The Impact of the
15 362 COVID-19 Pandemic on Self-Reported Health. *Dtsch Arztebl*. 2020 Dec 11;117:861–7.
- 16
17 363 8. Arendt F, Markiewitz A, Mestas M, Scherr S. COVID-19 pandemic, government
18 364 responses, and public mental health: Investigating consequences through crisis hotline
19 365 calls in two countries. *Soc Sci Med* 1982. 2020 Nov;265:113532.
- 20
21
22 366 9. Schweda A, Weismüller B, Bäuerle A, Dörrie N, Musche V, Fink M, et al. Phenotyping
23 367 mental health: Age, community size, and depression differently modulate COVID-19-
24 368 related fear and generalized anxiety. *Compr Psychiatry*. 2021 Jan;104:152218.
- 25
26 369 10. Liu S, Heinzl S, Haucke MN, Heinz A. Increased Psychological Distress, Loneliness,
27 370 and Unemployment in the Spread of COVID-19 over 6 Months in Germany. *Med*
28 371 *Kaunas Lith*. 2021 Jan 9;57(1).
- 29
30
31 372 11. Riedel-Heller S, Richter D. [COVID-19 Pandemic and Mental Health of the General
32 373 Public: Is there a Tsunami of Mental Disorders?]. *Psychiatr Prax*. 2020 Nov;47(8):452–
33 374 6.
- 34
35 375 12. Fullana MA, Hidalgo-Mazzei D, Vieta E, Radua J. Coping behaviors associated with
36 376 decreased anxiety and depressive symptoms during the COVID-19 pandemic and
37 377 lockdown. *J Affect Disord*. 2020 Oct 1;275:80–1.
- 38
39
40 378 13. Fiske A, Buyx A, Prainsack B. The double-edged sword of digital self-care: Physician
41 379 perspectives from Northern Germany. *Soc Sci Med*. 2020 Sep 1;260:113174.
- 42
43 380 14. Ruckenstein M, Dow Schüll N. The Datafication of Health. *Annu Rev Anthropol*. 2017
44 381 Oct 23;46(1):261–78.
- 45
46 382 15. Prainsack B. *Personalized Medicine: Empowered Patients in the 21st Century?* New
47 383 York: NYU Press; 2017. 288 p. (Biopolitics).
- 48
49
50 384 16. Topol E. *The Patient Will See You Now: The Future of Medicine Is in Your Hands*.
51 385 Reprint edition. New York, N.Y: Basic Books; 2016. 384 p.
- 52
53 386 17. Lupton D. The digitally engaged patient: Self-monitoring and self-care in the digital
54 387 health era. *Soc Theory Health Lond*. 2013 Aug;11(3):256–70.
- 55
56 388 18. World Health Organization. *Health Education in Self-Care: Possibilities and Limitations*
57 389 [Internet]. 1983 [cited 2021 May 17]. Available from:
58 390 http://apps.who.int/iris/bitstream/10665/70092/1/HED_84.1.pdf

- 1
2
3 391 19. Ming LC, Untong N, Aliudin NA, Osili N, Kifli N, Tan CS, et al. Mobile Health Apps
4 392 on COVID-19 Launched in the Early Days of the Pandemic: Content Analysis and
5 393 Review. *JMIR MHealth UHealth*. 2020 Sep 16;8(9):e19796.
- 7 394 20. Ilegroju. Digital health technologies addressing the pandemic [Internet]. Shaping
8 395 Europe's digital future - European Commission. 2020 [cited 2021 Feb 15]. Available
9 396 from: [https://ec.europa.eu/digital-single-market/en/digital-health-technologies-](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
11 397 [addressing-pandemic](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
- 13 398 21. Coronavirus Support App [Internet]. Expert Self Care. [cited 2021 Feb 15]. Available
14 399 from: <https://www.expertselfcare.com/health-apps/coronavirus-support-app-uk/>
- 16 400 22. Finch S. 5 Mental Health Apps to Help Manage Coronavirus Anxiety [Internet].
17 401 Healthline. 2020 [cited 2021 Feb 15]. Available from:
18 402 [https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
20 403 [coronavirus-anxiety](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
- 22 404 23. Wjst M. [The early phase of the COVID-19 pandemic in Bavaria, Germany]. *Dtsch Med*
23 405 *Wochenschr* 1946. 2021 Jan;146(1):e1–9.
- 25 406 24. Zimmermann BM, Fiske A, Prainsack B, Hangel N, McLennan S, Buyx A. Early
26 407 Perceptions of COVID-19 Contact Tracing Apps in German-Speaking Countries:
27 408 Comparative Mixed Methods Study. *J Med Internet Res*. 2021;23(2):e25525.
- 30 409 25. Le Ker H. Hospitals in Germany Ready Themselves for the Worst. *Der Spiegel*
31 410 [Internet]. 2020 Mar 18 [cited 2020 Nov 6]; Available from:
32 411 [https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
33 412 [for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
- 35 413 26. Fegert JM, Schulze UME. COVID-19 and its impact on child and adolescent psychiatry
36 414 - a German and personal perspective. *Ir J Psychol Med*. 2020 Sep;37(3):243–5.
- 38 415 27. Bayerisches Ministerialblatt. Bayerische Verordnung über Infektionsschutzmaßnahmen
40 416 anlässlich der Corona-Pandemie (Bayerische Infektionsschutzmaßnahmenverordnung –
41 417 BayIfSMV). *BayMBL*. 2020 Nr. 158. 2020.
- 43 418 28. Gerke S, Stern AD, Minssen T. Germany's digital health reforms in the COVID-19 era:
44 419 lessons and opportunities for other countries. *Npj Digit Med*. 2020 Jul 10;3(1):1–6.
- 46 420 29. Rövekamp M. Hilfe bei Depressionen: „Es ist Wahnsinn, was gerade in Deutschland
47 421 passiert“. *Der Tagesspiegel* [Internet]. 2021 Jan 26 [cited 2021 Jan 27]; Available from:
48 422 [https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
49 423 [gerade-in-deutschland-passiert-92552.html](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
- 51 424 30. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP.
52 425 Strengthening the reporting of observational studies in epidemiology (STROBE)
53 426 statement: guidelines for reporting observational studies. *BMJ*. 2007 Oct
54 427 20;335(7624):806–8.
- 57 428 31. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting
58 429 qualitative research: a synthesis of recommendations. *Acad Med J Assoc Am Med Coll*.
59 430 2014 Sep;89(9):1245–51.

- 1
2
3 431 32. Löwe B, Spitzer R, Gräfe K, Kroenke K, Quenter A, Zipfel S, et al. Comparative
4 432 validity of three screening questionnaires for DSM-IV depressive disorders and
5 433 physicians' diagnoses. *J Affect Disord.* 2004;78(2):131–40.
- 7 434 33. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and
8 435 standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general
9 436 population. *Med Care.* 2008;46(3):266–74.
- 12 437 34. Lupton D. *Digital Health : Critical and Cross-Disciplinary Perspectives.* First edition.
13 438 London: Taylor and Francis; 2017.
- 15 439 35. Topol E. Digital medicine: empowering both patients and clinicians. *The Lancet.* 2016
16 440 Aug 20;388(10046):740–1.
- 18 441 36. Gabriels K, Moerenhout T. Exploring Entertainment Medicine and Professionalization
20 442 of Self-Care: Interview Study Among Doctors on the Potential Effects of Digital Self-
21 443 Tracking. *J Med Internet Res.* 2018 12;20(1):e10.
- 23 444 37. Hsieh H-F, Shannon SE. Three Approaches to Qualitative Content Analysis. *Qual*
24 445 *Health Res.* 2005 Nov 1;15(9):1277–88.
- 26 446 38. Wachtler B, Hoebel J. [Social Inequalities and COVID-19: Social-Epidemiological
27 447 Perspectives on the Pandemic]. *Gesundheitswesen Bundesverb Ärzte Öffentlichen*
28 448 *Gesundheitsdienstes Ger.* 2020 Sep;82(8–09):670–5.
- 31 449 39. Institute for Quality and Efficiency in Health Care. Health care in Germany: The
32 450 German health care system [Internet]. *InformedHealth.org* [Internet]. Cologne,
33 451 Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2015 [cited 2021
34 452 Feb 26]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK298834/>
- 36 453 40. Jungmann SM, Witthöft M. Health anxiety, cyberchondria, and coping in the current
37 454 COVID-19 pandemic: Which factors are related to coronavirus anxiety? *J Anxiety*
38 455 *Disord.* 2020 Jun;73:102239.
- 41 456 41. Okan O, Bollweg TM, Berens E-M, Hurrelmann K, Bauer U, Schaeffer D. Coronavirus-
42 457 Related Health Literacy: A Cross-Sectional Study in Adults during the COVID-19
43 458 Infodemic in Germany. *Int J Environ Res Public Health.* 2020 Jul 30;17(15).
- 45 459 42. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak:
46 460 Amplification of public health consequences by media exposure. *Health Psychol Off J*
47 461 *Div Health Psychol Am Psychol Assoc.* 2020 May;39(5):355–7.
- 49 462 43. Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S, et al. Mental health problems and social
50 463 media exposure during COVID-19 outbreak. *PloS One.* 2020;15(4):e0231924.
- 53 464 44. Hajek A, De Bock F, Wieler LH, Sprengholz P, Kretzler B, König H-H. Perceptions of
54 465 Health Care Use in Germany during the COVID-19 Pandemic. *Int J Environ Res Public*
55 466 *Health.* 2020 Dec 14;17(24).
- 57 467 45. Schneider A, Wartner E, Schumann I, Hörlein E, Henningsen P, Linde K. The impact of
58 468 psychosomatic co-morbidity on discordance with respect to reasons for encounter in
59 469 general practice. *J Psychosom Res.* 2013 Jan;74(1):82–5.

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470 46. Bäuerle A, Teufel M, Musche V, Weismüller B, Kohler H, Hetkamp M, et al. Increased
471 generalized anxiety, depression and distress during the COVID-19 pandemic: a cross-
472 sectional study in Germany. *J Public Health Oxf Engl.* 2020 Nov 23;42(4):672–8.

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Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

Title and abstract

<p>Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended</p>	1
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4-5/lines 2-48
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	5/lines 46-48

Methods

<p>Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**</p>	7/lines 83-88; 99-106
<p>Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	N/A
<p>Context - Setting/site and salient contextual factors; rationale**</p>	6/lines 58-69
<p>Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	6/lines 58-69
<p>Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	17/lines 322-324
<p>Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**</p>	6-7

1 2 3 4 5	Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	6-7
6 7 8	Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	6/lines 58-69
9 10 11 12	Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	7/lines 91-106
13 14 15 16	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	7/lines 91-106
17 18 19 20	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	7/lines 102-104

Results/findings

23 24 25 26	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-14
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	8-14

Discussion

32 33 34 35 36 37 38	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	14-16
39 40	Limitations - Trustworthiness and limitations of findings	16-17 /lines 294-306

Other

43 44 45	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	17/line 334
46 47 48	Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	17/line 327-330

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: [10.1097/ACM.0000000000000388](https://doi.org/10.1097/ACM.0000000000000388)

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STROBE Statement—Checklist of items that should be included in reports of *cohort studies*

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract [title page] (b) Provide in the abstract an informative and balanced summary of what was done and what was found [pg. 2]
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported [pg 4-5]
Objectives	3	State specific objectives, including any prespecified hypotheses [pg 5; lines 46-48]
Methods		
Study design	4	Present key elements of study design early in the paper [pg 6-7]
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection [pg 6]
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up [pg 6] (b) For matched studies, give matching criteria and number of exposed and unexposed [n/a]
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable [pg 7]
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group [pg 6]
Bias	9	Describe any efforts to address potential sources of bias [n/a]
Study size	10	Explain how the study size was arrived at [pg 6, 8]
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why [n/a]
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding [pg 7] (b) Describe any methods used to examine subgroups and interactions: [n/a] (c) Explain how missing data were addressed: [pg 7] (d) If applicable, explain how loss to follow-up was addressed: [n/a] (e) Describe any sensitivity analyses: [n/a]
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed [pg 6] (b) Give reasons for non-participation at each stage [n/a] (c) Consider use of a flow diagram [n/a]
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders [pg 8] (b) Indicate number of participants with missing data for each variable of interest [n/a]: [Table 1, pg 9] (c) Summarise follow-up time (eg, average and total amount) [n/a]
Outcome data	15*	Report numbers of outcome events or summary measures over time [pg 8]
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were

		adjusted for and why they were included [Table 3, pg 13-14]
		(b) Report category boundaries when continuous variables were categorized [pg 6-7]
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period [n/a]
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses [pg 7-8]
Discussion		
Key results	18	Summarise key results with reference to study objectives [pg 8-14]
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias [pg 16-17]
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence [pg 14-17]
Generalisability	21	Discuss the generalisability (external validity) of the study results [pg 17]
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based [pg 18]

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at <http://www.strobe-statement.org>.

BMJ Open

The Impact of COVID-19 on Patient Health and Self-Care Practices: A mixed methods survey with German patients

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Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Public health, General practice / Family practice
Keywords:	GENERAL MEDICINE (see Internal Medicine), MENTAL HEALTH, PUBLIC HEALTH, COVID-19, Depression & mood disorders < PSYCHIATRY

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3 **Title:** The Impact of COVID-19 on Patient Health and Self-Care Practices: A mixed methods
4 survey with German patients
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Abstract

Objective: This study aimed to examine German patients': 1) self-estimation of the impact of the pandemic on their health and healthcare; and 2) use of digital self-care practices during the pandemic.

Design: Cross-sectional mixed-methods survey.

Setting and Participants: General practice patients from 4 physicians' offices located in urban and rural areas of Bavaria, Germany, between 21 July 2020 to 17 October 2020. A total of 254 patients participated (55% response rate); 57% (262/459) identified as female and participants had an average age of 39.3 years. Patients were eligible to participate if they were 18 years or older and spoke German, and had access to the internet.

Results: 1) Healthcare for patients was affected by the pandemic, and the mental health of a small group of respondents was particularly affected. The risk of depression and anxiety disorder was significantly increased in patients with quarantine experience. 2) Self-care practices have increased; more than a third (39%) of participants indicated that they started a new or additional self-care practice during the pandemic, and about a quarter (23%) of patients who were not previously engaged in self-care practices started new self-care activities for the first time, however such practices were not necessarily digital.

Conclusions: Further investigation is required to understand the relationship between digital self-care and public health events such as the COVID-19 pandemic, and to develop strategies to alleviate the burden of the quarantine experience for patients.

Keywords: COVID-19, pandemic, health care, digital self-care, depression, anxiety, Germany

Strengths and limitations of this study

- The mixed methods approach, including validated scales for depression and anxiety, and open-ended qualitative answers on wellbeing and new health promotion practices, enabled breadth and depth of insight of the study.
- Results are limited to the period after the “first wave” of the pandemic in Germany and prior to the second lockdown and thus may underestimate the psychological constraints experienced during the second long-term lockdown period.
- Patient involvement in study design and data interpretation was not feasible.

1 Introduction

2 The COVID-19 pandemic has put enormous strain on health care systems and has upended
3 the provision of healthcare. Even for those who were not directly affected by the virus itself,
4 the provision of healthcare services was substantially altered (1). Concerns have emerged that
5 the postponement of treatment for non-COVID conditions, such as cancer, heart attacks or
6 stroke could have significant negative consequences (2). Furthermore, with mounting
7 uncertainty, physical and social distancing, job loss, and decreased access to support services,
8 the pandemic has increased established risk factors for mental health problems (3). Recent
9 studies suggest rising rates of depression, anxiety and stress symptoms during the pandemic
10 (4–11).

11 These ‘secondary’ effects of the pandemic on physical and mental health constitute a
12 significant challenge and require novel approaches given the ongoing course of the pandemic
13 (7,12). One prominent approach that has emerged to assist patients – in lieu of routine
14 healthcare or other ways of maintaining health that are not available during the pandemic – is
15 “digital self-care” (13–17). Self-care, defined by the World Health Organization as “the
16 activities that individuals, families, and communities undertake with the intention of
17 enhancing health, preventing disease, limiting illness, and restoring health” (18), has taken on
18 new forms in the digital era. The growth of the Internet and personalized portable devices,
19 such as smartphones, activity trackers, and other digital applications have given rise to
20 emerging forms of “digital self-care,” a range of practices of maintaining and promoting
21 health without formal medical direction that largely became possible through the datafication
22 and digitization of patients’ bodies and lives (13). Many of these practices entail
23 measurements or technologies that were previously only available under clinical supervision,
24 which have now moved into the hands of patients. Proponents have predicted that digital self-
25 care represents a novel, cost-effective, and empowering way of addressing the mental and
26 physical health needs of patients (16). Indeed, the current pandemic has given rise to a range

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3 27 of digital self-care tools that can be used at home (19–21), and has renewed interest in
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5 28 existing digital tools, such as therapeutic chatbots (22). It remains unclear, however, if
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7 29 patients are engaging in digital self-care practices to address health needs brought about by
8
9 30 the pandemic.

11
12 31 Germany, and the state of Bavaria in particular, provides a useful setting to examine
13
14 32 these issues. The first confirmed COVID-19 case in Germany occurred in Bavaria in late
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16 33 January 2020 (23). Soon after, Germany began to introduce public health measures to slow
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18 34 the spread and contain the pandemic (24). During March and April 2020, measures began
19
20 35 affecting the German health system; dentist and doctor's offices closed or changed their
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22 36 services, hospitals received orders from the federal government in March 2020 to postpone
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24 37 non-essential operations (25,26), and intensive care capacities in hospitals were expanded.
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26 38 During Spring 2020, Bavaria was also under a "strict lockdown" in this period, with a stay-at-
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28 39 home order in place, and non-essential shops and businesses along with schools and daycares
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30 40 were closed (27). Furthermore, Germany is one of the world's first countries to approve
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32 41 digital health apps for prescription as part of a new law on digital medical care (28). It is
33
34 42 therefore expected that such digital health tools will be increasingly used by German patients.
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36 43 Research conducted before the pandemic indicates that patient-driven digital self-care is
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38 44 currently lagging behind expectations (13). Nevertheless, a number of COVID-19 digital tools
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40 45 for patients have emerged in Germany, such as symptom trackers (e.g. Data4Life app) and
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42 46 self-help apps for depression (29). This study therefore aimed to examine German patients':
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44 47 1) self-estimation of the impact of the pandemic on their health and healthcare; and 2) use of
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46 48 digital self-care practices during the pandemic.

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56 **Methods**

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58 51 This study was approved by the Technical University of Munich's Research Ethics
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60 52 Committee on the 19th of May 2020 (311/20 S). All participants gave consent to proceed

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3 53 before initiating the survey. The methods of the study are presented in accordance with the
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5 54 “Strengthening the Reporting of Observational Studies in Epidemiology” (STROBE)
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7 55 statement and the “Standards for reporting qualitative research” (SRQR) (30,31). The full
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9 56 length survey is available in the supplemental material (Appendix 1, 2).
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15 58 *Survey implementation*

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17 59 A cross-sectional survey was conducted between 21 July 2020 to 17 October 2020. Patients
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19 60 from four general practices in the urban and rural areas of Bavaria were consecutively invited
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21 61 by the practice assistants to participate. Patients were eligible to participate if they were 18
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23 62 years or older, spoke German, and had access to the internet. Office assistants asked eligible
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25 63 patients who visited in the office during the recruitment period for an appointment if they
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27 64 would like to participate in the study. A total of 459 individuals were provided with the study
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29 65 information sheet in print form, and included a link to the online survey. Office assistants
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31 66 received a small monetary compensation for their help. The online survey was conducted
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33 67 using the automation software EvaSys (EvaSys Central Evaluation version 8.0). Data were
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35 68 then exported into Statistical Package for the Social Sciences (SPSS version 26 for Windows,
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37 69 IBM Corporation). Participants who completed the survey were eligible to claim a 10-euro
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39 70 gift certificate for Amazon.
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48 72 *Survey content*

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50 73 In order to assess the overall wellbeing of the participants during the pandemic, two subscales
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52 74 of the German version of the Patient Health Questionnaire (PHQ-D) were used to assess
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54 75 depression and anxiety as psychological comorbidity (32). The depression severity score of
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56 76 the PHQ, the PHQ-9, ranges from 0 (no depression) to 27 (maximal depression). Superior
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58 77 validity of the PHQ compared to other established self-report questionnaires has been
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60 78 confirmed with respect to the diagnoses of ‘major depressive disorder’ and ‘other depressive

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3 79 disorders' according to ICD-10 (20). Another module of the PHQ-D, the Generalized Anxiety
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5 80 Disorder Scale (GAD-7), was used as a practical self-report anxiety questionnaire that has
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8 81 been validated in primary care (33). GAD-7 scores range from 0 to 21, with scores of ≥ 5 , \geq
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10 82 10, and ≥ 15 representing mild, moderate, and severe anxiety symptom levels, respectively.
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12 83 Only moderate and severe scoring were rated as anxiety disorder.

14 84 Additionally, a questionnaire was developed to examine the impact of the pandemic
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17 85 on patients' lives and health, and new digital self-care practices. The survey was informed by
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19 86 existing literature on the secondary effects of the pandemic, and changing practices of digital
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21 87 self-care (13,17,34–36), and combined scaled or yes/no questions, with free-text responses.
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24 88 Demographic questions asked for the participants' age and gender. Two questions asked in
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26 89 the survey were removed due to inconsistent answering patterns.
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30 91 *Data Analysis*

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33 92 Baseline data were analyzed descriptively. For the analyses, we included all participants who
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35 93 answered the respective question. Associations between the questions regarding the self-
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37 94 estimation of the health care situation and depression or anxiety disorder were investigated
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40 95 separately with multivariable logistic regression models. Survey questions were included into
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42 96 the models as predictor variables. We controlled for potential confounding by including age
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44 97 and gender into the models. Hypotheses testing was performed with an exploratory two-sided
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47 98 test using a significance level of 5%. All analyses were performed by S.K. and A.S. in SPSS
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49 99 version 26 and R version 4.0.3 (The R Foundation for Statistical Computing). Qualitative data
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51 100 from the open responses were analyzed by A.F. using conventional content analysis, with a
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54 101 focus on conceptual analysis. Initial topics emerging from the responses were identified using
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56 102 a process of open coding, codes were generated and grouped based on higher order categories
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58 103 (37). Two other investigators [A.B, S.M.] reviewed the initial analysis to ensure consistency
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60 104 and validity, and conversations among the investigators continued until consensus was

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3 105 achieved. Variance and saturation within the responses was analyzed and described. All
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5 106 quotes included in this article were translated from German to English.
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10 108 *Patient and Public Involvement*

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12 109 No patient was involved in the design of this study.
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17 111 **Results**

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19 112 *Characteristics of participants*

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21 113 A total of 459 patients were invited to participate. Of these, 57% (262/459) identified as
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23 114 female. The average age of invitees was 40.6 years (standard deviation 16.1). Of those
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25 115 invited, 254 eligible patients participated in the survey, corresponding to a 55% (254/459)
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27 116 response rate. Of the participants, 56% (144/254) identified as female. The average age of the
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29 117 participants was 39.3 years (standard deviation 15.7) and the median age was 37, ranging
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31 118 from 18 to 81 years old. The majority of participants had not had any symptoms of COVID
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33 119 during the 3 months prior to the survey (218/254; 86%). Only 17% (44/254) of participants
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35 120 reported having had conducted a COVID test, but only 9% (4/44) of those received a positive
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37 121 result. However, 6% (16/254) reported that they presumed they had COVID due to the
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39 122 presence of symptoms, despite not having taken a test. Quarantine was reported by 11%
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41 123 (28/254) of respondents. The PHQ results indicated that 17% (45/254) patients suffered from
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43 124 impaired mental health, 6% (17/254) suffered from depression, 4% (11/254) suffered from
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45 125 anxiety disorder, and 6% (17/254) suffered from both depression and anxiety disorder.
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49 127 *Impact of the pandemic on health*

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51 128 A third of respondents, 30% (75/254), indicated that their health care was affected by the
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53 129 COVID 19 pandemic (**Table 1**). When asked to specify how their healthcare had been
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55 130 affected, respondents offered examples in the open-ended questions, including changes in

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3 131 appointment availability at their doctor's offices due to closures or modifications due to the
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5 132 pandemic (**Table 2**; Qualitative data with exemplary quotes is included in the supplemental
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8 133 material as Appendix 3).
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10 134 **Table 1. Impact of the pandemic on health, quantitative data**

Question	Yes	No
Did you experience any health complaints during the COVID-19 pandemic (unrelated to the coronavirus) for which you would normally go to the doctor?	73/254 (29%)	181/254 (71%)
Was your health care affected by the COVID 19 pandemic, such as because a doctor's office was closed, appointments were rescheduled, or for other reasons?	75/254 (30%)	179/254 (70%)
At the beginning of the pandemic, several changes were made in health care delivery to respond to the new needs created by the COVID-19 outbreak. Many physician visits were postponed, office hours were curtailed, scheduled surgeries were postponed to a later date, etc. Do you feel that you were affected by this?	63/254 (25%)	191/254 (75%)
Do you have any fears with regard to your future health care?	60/254 (24%)	194/254 (76%)

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141 **Table 2. Impact of pandemic on health, summary of qualitative data**

Category	Code
How health was affected by COVID-19	
Due to COVID	Symptoms of COVID Self or relative tested positive
Due to change in care	Appointments Cancelled Hard to get necessary supplies Personal concern about going to doctor
Changes in health due to increased anxiety, fear, stress	Depression Concern that one might have COVID Isolation Worsening of life circumstances Stress
Changes to work/home routines	Home office More work Less work Homeschooling/childcare
Changes to free time activities with a connection to health	Specific activities not possible Loss of social contact in relation to activities Physical problems in relation to change in activities Time for activities changed
Changes in relation to COVID guidelines	Difficulty with specific precautions Changes due to increased precautions
Changes in health	Weight gain Sleep changes Less physical activity New patterns of food/drink consumption Mental health changes Improvements
Not affected/no changes	Healthy No risks/low risk Carefully following preventative measures
Effects of quarantine	
No problems	Easy or necessary Made one appreciate non-quarantine time more Enjoyable
Mental health problems	Isolation Depression Stress
Health problems experienced during the pandemic for which one would normally go to the doctor	
Physical health problems	Allergy Infection Orthopedic Dental Back pain Generalized Spinal Cardiac Preventative
Mental or socio-emotional health	Sleep problems Depression
Treatment forgone	Suspended or cancelled by praxis Suspended or cancelled by patient Self-treatment
Concerns about going to the doctor during the pandemic	
Contagion concerns	Catching COVID-19 Getting others sick with COVID-19 Quarantine

Additional hassle during pandemic	Wait times
	Uncertainty
	New COVID-19 rules
	Burden for Doctors
None	No concerns
Effects of COVID-19 pandemic on health care	
Difficulty getting care	Closed medical offices
	Scheduling difficulties
	Appointments moved/ cancelled
	Only virtual or phone care
Materials availability issues	Medication not available
Medical office concerns	Turned away due to COVID-19 concerns
Biggest challenges relating to health during the pandemic	
Healthcare concerns	Knowing when to get tested/care
	In relation to care for children
	In relation to care for self
	Getting medications or healthcare supplies
Concern related to COVID-19 virus	Personal risk
	Fear of contagion
	Anxiety
	Remaining healthy
COVID-19 guidelines	Keeping distance
	Mask wearing
	Information
	Quarantine
None	None
Things that would make self-care easier during the pandemic	
Nothing	None
Changes in relation to home life	Rural/Urban
	Services
	Personal relationships
	Habits
Medical system changes	COVID-19 Testing
	Remote care
	Scheduling
	Information
Occupational changes	In relation to employer
	Work load
Public life	Delivery services
	Material needs
	Changes in restrictions in relation to COVID-19
	Compliance with COVID-19 restrictions by others
Personal impact of changes to healthcare delivery due to pandemic	
Medical system changes	Appointments cancelled
	Waiting time
	Medical services redirected for COVID-19 care
	Difficulty getting care
Concerns with regard to healthcare provision in the future	
Health – concerns	Mental health
	Physical health
	Personal Risk
Health – no concerns	Mental health
	Physical health
	Personal Risk
	Personal contacts with care providers
Institutional	German healthcare- specific response
	Local healthcare-specific response
	Political institutions
	Economic concerns
COVID-19 specific concerns	Restrictions
	Vaccination
	Long-haul COVID-19
	Tunnel vision
	Healthcare System concerns

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5 144 One participant noted that “Normal doctor’s visits were no longer possible in the initial
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7 145 period. All appointments were canceled by the doctors. Only emergencies were possible.”
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10 146 Another described unexpected interruptions in care: “After an operation I was in inpatient
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12 147 rehabilitation. This was planned for 3 weeks. However, after two weeks the [name redacted]
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14 148 clinic was closed to be available for Corona patients.” A few participants noted issues in
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16 149 receiving necessary medications or necessary medical supplies, including for chronic
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18 150 conditions such as diabetes. Some indicated that they had felt increased stress and anxiety,
19
20 151 such as one person who wrote that “One reacts more sensitively to little things that used to be
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22 152 ignored (sneezing, coughing, etc.).” Others experienced other changes in their mental health:
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24 153 “During the lockdown, sleep disturbances, increased restlessness, fears about the future.”
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26 154 Moreover, difficult situations were made more difficult: “In addition, I am currently
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28 155 unemployed and it is even more difficult for me to find a job, since I have to wear the mask
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30 156 for hours on end practically everywhere during work. My psyche suffers from it. I get scared
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32 157 and sometimes panic, as I am now worried about my health and professional life.”
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37 158 During the COVID-19 pandemic, some respondents said they had health complaints,
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39 159 unrelated to COVID, for which they normally would have gone to see a doctor. The
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41 160 complaints included in the qualitative responses indicated covered a wide range of health
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43 161 problems, from relatively minor issues such as allergies or congestion to more serious
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45 162 conditions such as a slipped disc or a spinal canal stenosis. In the open-ended answers,
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47 163 respondents indicated that their concerns of going to the doctor during the pandemic dealt
48
49 164 with fear of contracting COVID-19, while a few individuals indicated that they felt their
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51 165 concerns were not substantial enough to see their doctor given that medical professionals
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53 166 were dealing with more serious health concerns during the pandemic. Many participants
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55 167 answered with variations on concerns that, “I could catch it from the next patient in the
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57 168 office.” Others cited “Risk of infection due to my age and certain pre-existing conditions,” or
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169 doubted “Whether my symptoms were ‘bad enough’ to see a doctor.” A majority, or 70%
 170 (179/254) of respondents said that they had not been affected by the changes made to the
 171 health care system to respond to the needs created by the pandemic, such as postponed
 172 doctors’ visits, restricted hours, or healthcare services.

173

174 *Digital self-care practices in the pandemic*

175 More than a third of respondents (38%; 97/254), indicated that prior to the pandemic they
 176 engaged in practices to promote and maintain their health, such as the use of health apps,
 177 participation in online support groups or sports exercises, meditation or other activities for
 178 relaxation (**Table 3**).

179

180 **Table 3: Impact of pandemic on digital self-care practices, quantitative data**

Question	Yes	No
Before the pandemic, did you engage in any self-care measures to maintain your health, such as use of health apps, participation in online support groups, or exercise, meditation, or other activities for relaxation?	97/254 (38%)	157/254 (62%)
During/since the pandemic, have you started new or additional steps to improve your health?	100/254 (39%)	154/254 (61%)
Since the pandemic, have you sought more information about your health?	27/254 (11%)	227/254 (89%)

181

182 When asked to specify what kinds of practices, the majority of respondents cited exercise
 183 such as different sports, yoga, or membership in fitness studios. During the pandemic, 39% of
 184 respondents indicated that they had initiated new or additional practices to improve their
 185 health. 16% (41/254) were previously engaged in self-care activities, 23% (59/254) patients
 186 started new steps for the first time. The practices listed by respondents included a range of

187 activities, many of which were not digital, such as yoga, healthier eating, or new forms of
 188 physical activity (**Table 4**). Some noted the advantages of home office: “Taking advantage of
 189 more flexible work schedule (virtual work) to eat more mindfully and reduce body weight by
 190 ~2 BMI points into the 25ish range.” Many described new fitness routines, such as “Started
 191 jogging / walking more as an alternative to venturing out with friends to at least get out a bit,”
 192 or efforts to relax such as “Self-massage of jaw muscles (watched online videos on how to do
 193 this), my friend now massages my neck and back more often, yoga exercises, exercises to
 194 strengthen arm, back and abdominal muscles, started jogging again, healthier diet, longer
 195 showers to relax.” However, only 11% (27/254) indicated that they had become more
 196 informed about their health since the start of the pandemic.

198 **Table 4. Impact of pandemic on digital self-care practices, summary of qualitative data**

Category	Code
Use of medical self-care measures to maintain health prior to the pandemic	
Category	Code
Sport	Fitness studio courses
	Group sports
	Walking/ Jogging
	Biking
Relaxation	Meditation
	Yoga
Nutrition	Eating well
	Supplements
Getting outside	Garden work
	Fresh air
Treatment with professionals	Alternative treatments
	Standard treatments
Use of new or additional measures to maintain health during or since the pandemic; If none, why not?	
Behavior changes	Smoking
Activity changes	Jogging/ walking
	Fitness studio activities
	Biking
	Online digital options
Nutrition	Eating well
	Supplements
Relaxation	Meditation
	Massage
	Yoga
Treatment with professionals	Standard treatments
Outside	Fresh air
Changes in relation to COVID-19	Social distancing

guidelines	Hygiene
	Staying home
	Mask use
	COVID-Warn App
None	Not necessary
	No risk
	Same as before
	No interest
Motivations for seeking out health information	
Increased concern	Fear
Prevention	Personal precaution
	Occupational precaution
	Precaution for others
To be better informed	In relation to COVID-19 risk
	In relation to personal health knowledge

199

200 Respondents were asked what the greatest challenge was for them in relation to their
 201 health during the COVID-19 pandemic. The most common response in the qualitative data
 202 involved challenges in following the COVID-19 guidelines such as wearing masks or keeping
 203 social distance from family and friends, such as one participant who wrote: “Keeping a
 204 distance, even from people you like very much!” Another described the difficulties of
 205 “Dealing with everyday life with the social-distance regulations. Since not all people adhere
 206 to it, it makes shopping more difficult and also in professional life getting together with
 207 others.” Other challenges included not contracting COVID-19, heightened anxiety or concern
 208 over personal health risks, and concerns surrounding getting health needs met, for example,
 209 “It’s more of a psychological problem for me to have to deal with anxiety all the time because
 210 you don’t know how badly the virus will hit you.” Some participants cited specific concerns
 211 with their own health: “As a smoker with moderate obesity, I’m basically in the risk group,”
 212 and “Since I’m 35 weeks pregnant, the impact on the pregnancy, the baby, the birth was one
 213 thing to deal with.”

214 About one-quarter, or 24% (60/254) of individuals had fears with regard to their
 215 health care in the future. The open-ended answers to this question were particularly
 216 instructive, with a majority of respondents indicating that they were not concerned because
 217 they had faith in the German health care system, with participants noting that “Even during
 218 the pandemic, I think [the healthcare system] worked much better in Germany than in many

219 other countries around the world,” or “Germany has a very stable and good health care
 220 system, so I don’t see any reason to worry about it.” Others noting that their personal
 221 connection to their doctors helped to mitigate their concerns, for example, “I trust my doctor
 222 and the system,” or “Because I have a good general practitioner and everything is actually
 223 almost back to normal.” Approximately a quarter of respondents stated directly that they were
 224 not concerned for the future, with many citing their own fitness or lack of risk factors as the
 225 reason for their confidence.

226

227 *Associations with depression and anxiety disorder*

228 Patients with depression or anxiety disorder showed more adverse estimation of their health
 229 care situation (**Table 5**). There was a strong association with previous Covid-19 infection and
 230 depression in the regression analysis (OR 21.41; 95%CI 1.98-231.12). The association
 231 between anxiety disorder and previous Covid-19 infection was not significant. Additionally,
 232 the multivariable logistic regression analysis revealed a strong association between previous
 233 quarantine and depression (OR 5.38; 95%CI 2.20-13.17). The association with anxiety
 234 disorder was borderline significant (OR 2.78; 95%CI 1.00-7.74). Survey responses regarding
 235 self-care practices were not significantly associated with depression or anxiety.

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237

238 **Table 5. Association of anxiety, depression, and self-rated health care, adjusted for age**
 239 **and gender (only significant associations are presented)**

Logistic Regression for depression	Odds Ratio	CI 95%	p-Value
Covid-19 positive	21.41	1.98-231.12	0.012
Quarantine	5.38	2.20 - 13.17	< 0.001
No Covid-19 symptoms	0.20	0.09 - 0.45	< 0.001
Feeling affected by various health care changes	4.33	1.88 - 9.99	0.001
Health care worsened	3.56	1.29 - 9.86	0.014
Covid-19 negative	2.46	1.05 - 5.75	0.038
Logistic Regression for anxiety disorder	Odds Ratio	CI 95%	p-Value
Covid-19 positive	3.26	0.32-33.16	0.318
Quarantine	2.78	1.00- 7.74	0.050

Health complaints during COVID-19 pandemic for which participant would normally go to the doctor	4.39	1.92 - 10.04	< 0.001
Feeling affected by various health care changes	5.95	2.52 - 14.09	< 0.001
Health care worsened	5.06	1.97 - 13.01	0.001
Health care not changed	0.24	0.10 - 0.59	0.002
Health care affected by COVID-19 pandemic because of doctor's offices closures, cancelled appointments	3.52	1.56 - 7.95	0.002
I cannot assess changes in health care delivery	2.35	1.04 - 5.31	0.040
Fears with regard to future health care delivery	2.30	1.00 - 5.27	0.049

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241 Discussion

242 The self-estimation of the impact of the pandemic on their health showed that health was
 243 affected for many patients in only relatively minor ways. However, the provision of
 244 healthcare was affected for a greater number of people. The open-ended responses indicated
 245 that some people had significant health concerns, unrelated to COVID-19, for which they
 246 were unable to receive the necessary treatment, e.g. medications that were undeliverable, or
 247 not receiving treatment for a slipped disc. The health of this group of individuals was
 248 considerably affected by the pandemic. We found no increased depression and anxiety rates.
 249 However, the risk of depression was significantly increased in patients with quarantine
 250 experience.

251 Self-care practices have increased during the pandemic, with a relevant number of
 252 people reporting the initiation of new activities. More than a third (39%) of participants
 253 indicated that they had started a new or additional self-care practice during the pandemic,
 254 such as yoga, meditation, exercise outdoors, or a newfound emphasis on healthy eating habits,
 255 with 59 (23%) patients who were not previously engaged in self-care practices starting new
 256 self-care activities for the first time. That said, while self-care is on the rise there is no
 257 indication that *digital* self-care practices have taken on a major role during the pandemic in

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3 258 Germany, nor that digital self-care practices are being used in order to directly address
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5 259 problems associated with the pandemic.

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7 260 The pandemic has affected different socio-economic groups in Germany unequally
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10 261 (38). Given that most digital self-care practices must be paid for out-of-pocket, it is possible
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12 262 that engagement with digital self-care may be stratified along socio-economic lines. Further, it
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14 263 is possible that digital self-care fills a 'gap' in health care provision that may be more
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16 264 appealing for patients in places where basic health care needs are not met through universal
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18 265 health insurance. In places like Germany where the health care system is based on solidarity
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20 266 and basic needs are, on the whole, met for the majority of the population (39), it is possible
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22 267 that there is less need or incentive to seek out digital self-care practices. Future research on
23
24 268 digital self-care in Germany and also internationally can address how changes in self-care
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26 269 practices are related to forms of social and health inequality, and the intersections between
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28 270 major public health events and the need for new or different forms of care that are not
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30 271 available through the standard provision.

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35 272 The increase in new self-care practices to improve health was not accompanied by an
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37 273 increase in information-seeking about health. A study in Germany found that access to health
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39 274 information could serve as a buffer for increased anxiety during the pandemic (40), while
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41 275 another study found that nearly half of participants had difficulty judging if information about
42
43 276 the pandemic was accurate or trustworthy (41). Thus, the relationship between information
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45 277 and anxiety during public health crises remains disputed (42,43), and further study is needed
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47 278 to probe the effects of the lack of reported health information-seeking behavior during the
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49 279 pandemic.

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53 280 An unintended finding affirmed in this survey is that there is great confidence in
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55 281 German healthcare system to adapt to changes brought about by the pandemic and address
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57 282 health needs accordingly. This correlates with findings that 85% of individuals surveyed in
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59 283 Germany were optimistic about their future access to healthcare services (44). Given that in
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3 284 many cases self-care is taken up to gain a sense of control over one's health, or because a
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5 285 particular health service is not available, is possible that widespread faith in the healthcare
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7 286 system leads to lower levels of digital self-care practice. When patient's needs are, on the
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9 287 whole, met by the health-care system, there may be lower levels of digital self-care seeking
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11 288 behavior.

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14 289 The prevalence of depression and anxiety in our primary care collective was very
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16 290 similar to a previous survey in the same region in 2010 (45). Therefore, our findings
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18 291 contradict the results from a survey conducted across Germany which found significantly
19
20 292 increased symptoms of anxiety, depression, psychological distress and COVID-related fear
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22 293 (46). Their online survey was performed in the beginning of the pandemic, from March to
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24 294 May 2020. The summer period was significantly calmer with regard to the pandemic in
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26 295 Germany and Europe, which might explain the decreased prevalence of depression and
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28 296 anxiety in our study. However, our study indicates that there is a relatively small but very
29
30 297 vulnerable patient group requiring special attention and services. There was a strong
31
32 298 relationship between previous COVID infection and quarantine experience and increased
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34 299 depression. Beyond that, the qualitative analysis suggests important health concerns of many
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36 300 patients which might be difficult to capture with psychometric questionnaires. Therefore,
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38 301 general practitioners should be aware that many patients experience a psychological crisis due
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40 302 to the isolation.

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48 49 304 **Limitations**

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51 305 A limitation of the study is the response rate of 55.3%. However, there was no conspicuous
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53 306 difference between the consecutively invited patient sample and the responders. The
54
55 307 proportion of patients with depression, anxiety, and COVID-19 infection respectively, was
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57 308 comparatively low, which explains the breadth of the 95% confidence intervals. However, the
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59 309 odds ratios were rather high. Only patients with internet skills could participate. Many

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3 310 patients answered the open-ended questions with relatively short phrases or words, and given
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5 311 the survey format it is not possible to probe for further clarification. No socio-economic
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7 312 information was recorded. Patients were interviewed before the second lockdown which
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10 313 lasted considerably longer than the lockdown during the “first wave.” It is thus to be expected
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12 314 that the patients are suffering from more psychological constraints after the second long-term
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14 315 lockdown period. Finally, due to time constraints and challenges of coordinating a new study
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16 316 while all researchers were working from home during the pandemic, there was no patient
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18 317 involvement in the survey design or data interpretation.
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23 319 **Conclusions**

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26 320 Healthcare was affected for participants during the pandemic. There was a marked increase in
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28 321 self-care practices during the pandemic to promote and maintain health, however these do not
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30 322 appear to be predominantly digital in nature. Given that important differences have already
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32 323 been seen between digital self-care practices in the literature and in Germany (13), further
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34 324 research on self-directed health promotion during the pandemic will help to illuminate how
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36 325 these findings from Germany compare to other locales. Our findings show that patients with
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38 326 quarantine experience suffer significantly more from anxiety and depression. Further research
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40 327 is necessary to develop strategies to help alleviate the burden of the quarantine experience,
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42 328 which can be particularly challenging for patients. Whether or not digital self-care tools could
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44 329 also be a means of alleviating some of the additional stress and isolation posed by a
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46 330 quarantine during a public health event can be further investigated.
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52 332 **Declarations**

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56 333 **Ethics Approval:** This study was approved by the Technical University of Munich’s Research
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58 334 Ethics Committee on the 19th of May 2020 (311/20 S). All participants gave consent to
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60 335 proceed before initiating the survey.

336 **Consent for publication:** Consent to participate in the survey was obtained prior to initiation
337 of the survey.

338 **Funding:** This work was supported by the Institute of History and Ethics in Medicine (TUM)
339 and the Department of General Medicine (TUM).

340 **Data availability:** The quantitative dataset generated and analyzed during the current study
341 are available from the corresponding author on reasonable request. Due to privacy concerns,
342 the qualitative data cannot be made publicly available.

343 **Competing Interests:** The authors declare no competing interests.

344 **Author contributions:** AF, AB, and AS conceived of the study and designed the survey. AS
345 was responsible for study coordination with the general practice offices. AS and SK
346 completed the statistical analysis of the quantitative data and contributed relevant summaries
347 for the article. AF completed the qualitative analysis of the data and was responsible for the
348 analyzing the quantitative results together with the qualitative data. AF drafted the paper with
349 assistance and feedback of SM and AB. AS helped with writing. All authors reviewed and
350 approved the final version of this article.

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353

References

- 354 1. Die Bundesregierung. Besprechung der Bundeskanzlerin mit den Regierungschefinnen
355 und Regierungschefs der Länder am 12. März 2020 [Internet]. 2020 [cited 2021 May
356 21]. Available from: <https://www.bundesregierung.de/breg->
357 [de/themen/coronavirus/beschluss-zu-corona-1730292](https://www.bundesregierung.de/themen/coronavirus/beschluss-zu-corona-1730292)
- 358 2. Ellyatt H. “Collateral damage”: Germany has limited its coronavirus death toll, but it
359 hasn’t escaped criticism. CNBC [Internet]. 2020 Sep 23 [cited 2020 Nov 5]; Available
360 from: [https://www.cnbc.com/2020/09/23/germany-has-limited-its-coronavirus-death-](https://www.cnbc.com/2020/09/23/germany-has-limited-its-coronavirus-death-toll-but-faces-criticism.html)
361 [toll-but-faces-criticism.html](https://www.cnbc.com/2020/09/23/germany-has-limited-its-coronavirus-death-toll-but-faces-criticism.html)
- 362 3. Moreno C, Wykes T, Galderisi S, Nordentoft M, Crossley N, Jones N, et al. How mental
363 health care should change as a consequence of the COVID-19 pandemic. *Lancet*
364 *Psychiatry*. 2020 Sep 1;7(9):813–24.

- 1
2
3 365 4. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J*
4 366 *Psychiatry*. 2020 Aug 1;52:102066.
- 5
6 367 5. Jung S, Kneer J, Kruger THC. The German COVID-19 Survey on Mental Health:
7 368 Primary Results. *medRxiv*. 2020 May 12;2020.05.06.20090340.
- 8
9
10 369 6. González-Sanguino C, Ausín B, Castellanos MÁ, Saiz J, López-Gómez A, Ugidos C, et
11 370 al. Mental health consequences during the initial stage of the 2020 Coronavirus
12 371 pandemic (COVID-19) in Spain. *Brain Behav Immun*. 2020 Jul;87:172–6.
- 13
14 372 7. Peters A, Rospleszcz S, Greiser KH, Dallavalle M, Berger K. The Impact of the
15 373 COVID-19 Pandemic on Self-Reported Health. *Dtsch Ärztebl*. 2020 Dec 11;117:861–7.
- 16
17 374 8. Arendt F, Markiewitz A, Mestas M, Scherr S. COVID-19 pandemic, government
18 375 responses, and public mental health: Investigating consequences through crisis hotline
19 376 calls in two countries. *Soc Sci Med* 1982. 2020 Nov;265:113532.
- 20
21
22 377 9. Schweda A, Weismüller B, Bäuerle A, Dörrie N, Musche V, Fink M, et al. Phenotyping
23 378 mental health: Age, community size, and depression differently modulate COVID-19-
24 379 related fear and generalized anxiety. *Compr Psychiatry*. 2021 Jan;104:152218.
- 25
26 380 10. Liu S, Heinzl S, Haucke MN, Heinz A. Increased Psychological Distress, Loneliness,
27 381 and Unemployment in the Spread of COVID-19 over 6 Months in Germany. *Med*
28 382 *Kaunas Lith*. 2021 Jan 9;57(1).
- 29
30
31 383 11. Riedel-Heller S, Richter D. [COVID-19 Pandemic and Mental Health of the General
32 384 Public: Is there a Tsunami of Mental Disorders?]. *Psychiatr Prax*. 2020 Nov;47(8):452–
33 385 6.
- 34
35 386 12. Fullana MA, Hidalgo-Mazzei D, Vieta E, Radua J. Coping behaviors associated with
36 387 decreased anxiety and depressive symptoms during the COVID-19 pandemic and
37 388 lockdown. *J Affect Disord*. 2020 Oct 1;275:80–1.
- 38
39
40 389 13. Fiske A, Buyx A, Prainsack B. The double-edged sword of digital self-care: Physician
41 390 perspectives from Northern Germany. *Soc Sci Med*. 2020 Sep 1;260:113174.
- 42
43 391 14. Ruckenstein M, Dow Schüll N. The Datafication of Health. *Annu Rev Anthropol*. 2017
44 392 Oct 23;46(1):261–78.
- 45
46 393 15. Prainsack B. *Personalized Medicine: Empowered Patients in the 21st Century?* New
47 394 York: NYU Press; 2017. 288 p. (Biopolitics).
- 48
49
50 395 16. Topol E. *The Patient Will See You Now: The Future of Medicine Is in Your Hands*.
51 396 Reprint edition. New York, N.Y: Basic Books; 2016. 384 p.
- 52
53 397 17. Lupton D. The digitally engaged patient: Self-monitoring and self-care in the digital
54 398 health era. *Soc Theory Health Lond*. 2013 Aug;11(3):256–70.
- 55
56 399 18. World Health Organization. *Health Education in Self-Care: Possibilities and Limitations*
57 400 [Internet]. 1983 [cited 2021 May 17]. Available from:
58 401 http://apps.who.int/iris/bitstream/10665/70092/1/HED_84.1.pdf

- 1
2
3 402 19. Ming LC, Untong N, Aliudin NA, Osili N, Kifli N, Tan CS, et al. Mobile Health Apps
4 403 on COVID-19 Launched in the Early Days of the Pandemic: Content Analysis and
5 404 Review. *JMIR MHealth UHealth*. 2020 Sep 16;8(9):e19796.
- 7 405 20. Ilegroju. Digital health technologies addressing the pandemic [Internet]. Shaping
8 406 Europe's digital future - European Commission. 2020 [cited 2021 Feb 15]. Available
9 407 from: [https://ec.europa.eu/digital-single-market/en/digital-health-technologies-](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
11 408 [addressing-pandemic](https://ec.europa.eu/digital-single-market/en/digital-health-technologies-addressing-pandemic)
- 13 409 21. Coronavirus Support App [Internet]. Expert Self Care. [cited 2021 Feb 15]. Available
14 410 from: <https://www.expertselfcare.com/health-apps/coronavirus-support-app-uk/>
- 16 411 22. Finch S. 5 Mental Health Apps to Help Manage Coronavirus Anxiety [Internet].
17 412 Healthline. 2020 [cited 2021 Feb 15]. Available from:
18 413 [https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
20 414 [coronavirus-anxiety](https://www.healthline.com/health/mental-health/5-mental-health-apps-to-help-manage-coronavirus-anxiety)
- 22 415 23. Wjst M. [The early phase of the COVID-19 pandemic in Bavaria, Germany]. *Dtsch Med*
23 416 *Wochenschr* 1946. 2021 Jan;146(1):e1–9.
- 25 417 24. Zimmermann BM, Fiske A, Prainsack B, Hangel N, McLennan S, Buyx A. Early
26 418 Perceptions of COVID-19 Contact Tracing Apps in German-Speaking Countries:
27 419 Comparative Mixed Methods Study. *J Med Internet Res*. 2021;23(2):e25525.
- 30 420 25. Le Ker H. Hospitals in Germany Ready Themselves for the Worst. *Der Spiegel*
31 421 [Internet]. 2020 Mar 18 [cited 2020 Nov 6]; Available from:
32 422 [https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
33 423 [for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a](https://www.spiegel.de/international/germany/hospitals-in-germany-ready-themselves-for-the-worst-a-3fe76172-b3f4-4332-9261-561d049b151a)
- 35 424 26. Fegert JM, Schulze UME. COVID-19 and its impact on child and adolescent psychiatry
36 425 - a German and personal perspective. *Ir J Psychol Med*. 2020 Sep;37(3):243–5.
- 38 426 27. Bayerisches Ministerialblatt. Bayerische Verordnung über Infektionsschutzmaßnahmen
40 427 anlässlich der Corona-Pandemie (Bayerische Infektionsschutzmaßnahmenverordnung –
41 428 BayIfSMV). *BayMBL*. 2020 Nr. 158. 2020.
- 43 429 28. Gerke S, Stern AD, Minssen T. Germany's digital health reforms in the COVID-19 era:
44 430 lessons and opportunities for other countries. *Npj Digit Med*. 2020 Jul 10;3(1):1–6.
- 46 431 29. Rövekamp M. Hilfe bei Depressionen: „Es ist Wahnsinn, was gerade in Deutschland
47 432 passiert“. *Der Tagesspiegel* [Internet]. 2021 Jan 26 [cited 2021 Jan 27]; Available from:
48 433 [https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
49 434 [gerade-in-deutschland-passiert-92552.html](https://plus.tagesspiegel.de/wirtschaft/hilfe-bei-depressionen-es-ist-wahnsinn-was-gerade-in-deutschland-passiert-92552.html)
- 52 435 30. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP.
53 436 Strengthening the reporting of observational studies in epidemiology (STROBE)
54 437 statement: guidelines for reporting observational studies. *BMJ*. 2007 Oct
55 438 20;335(7624):806–8.
- 57 439 31. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting
58 440 qualitative research: a synthesis of recommendations. *Acad Med J Assoc Am Med Coll*.
59 441 2014 Sep;89(9):1245–51.

- 1
2
3 442 32. Löwe B, Spitzer R, Gräfe K, Kroenke K, Quenter A, Zipfel S, et al. Comparative
4 443 validity of three screening questionnaires for DSM-IV depressive disorders and
5 444 physicians' diagnoses. *J Affect Disord.* 2004;78(2):131–40.
- 7 445 33. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and
8 446 standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general
9 447 population. *Med Care.* 2008;46(3):266–74.
- 12 448 34. Lupton D. *Digital Health : Critical and Cross-Disciplinary Perspectives.* First edition.
13 449 London: Taylor and Francis; 2017.
- 15 450 35. Topol E. Digital medicine: empowering both patients and clinicians. *The Lancet.* 2016
16 451 Aug 20;388(10046):740–1.
- 18 452 36. Gabriels K, Moerenhout T. Exploring Entertainment Medicine and Professionalization
19 453 of Self-Care: Interview Study Among Doctors on the Potential Effects of Digital Self-
20 454 Tracking. *J Med Internet Res.* 2018 12;20(1):e10.
- 23 455 37. Hsieh H-F, Shannon SE. Three Approaches to Qualitative Content Analysis. *Qual*
24 456 *Health Res.* 2005 Nov 1;15(9):1277–88.
- 26 457 38. Wachtler B, Hoebel J. [Social Inequalities and COVID-19: Social-Epidemiological
27 458 Perspectives on the Pandemic]. *Gesundheitswesen Bundesverb Ärzte Öffentlichen*
28 459 *Gesundheitsdienstes Ger.* 2020 Sep;82(8–09):670–5.
- 31 460 39. Institute for Quality and Efficiency in Health Care. Health care in Germany: The
32 461 German health care system [Internet]. *InformedHealth.org* [Internet]. Cologne,
33 462 Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2015 [cited 2021
34 463 Feb 26]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK298834/>
- 36 464 40. Jungmann SM, Witthöft M. Health anxiety, cyberchondria, and coping in the current
37 465 COVID-19 pandemic: Which factors are related to coronavirus anxiety? *J Anxiety*
38 466 *Disord.* 2020 Jun;73:102239.
- 41 467 41. Okan O, Bollweg TM, Berens E-M, Hurrelmann K, Bauer U, Schaeffer D. Coronavirus-
42 468 Related Health Literacy: A Cross-Sectional Study in Adults during the COVID-19
43 469 Infodemic in Germany. *Int J Environ Res Public Health.* 2020 Jul 30;17(15).
- 45 470 42. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak:
46 471 Amplification of public health consequences by media exposure. *Health Psychol Off J*
47 472 *Div Health Psychol Am Psychol Assoc.* 2020 May;39(5):355–7.
- 49 473 43. Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S, et al. Mental health problems and social
50 474 media exposure during COVID-19 outbreak. *PloS One.* 2020;15(4):e0231924.
- 53 475 44. Hajek A, De Bock F, Wieler LH, Sprengholz P, Kretzler B, König H-H. Perceptions of
54 476 Health Care Use in Germany during the COVID-19 Pandemic. *Int J Environ Res Public*
55 477 *Health.* 2020 Dec 14;17(24).
- 57 478 45. Schneider A, Wartner E, Schumann I, Hörlein E, Henningsen P, Linde K. The impact of
58 479 psychosomatic co-morbidity on discordance with respect to reasons for encounter in
59 480 general practice. *J Psychosom Res.* 2013 Jan;74(1):82–5.

- 1
2
3 481 46. Bäuerle A, Teufel M, Musche V, Weismüller B, Kohler H, Hetkamp M, et al. Increased
4 482 generalized anxiety, depression and distress during the COVID-19 pandemic: a cross-
5 483 sectional study in Germany. *J Public Health Oxf Engl.* 2020 Nov 23;42(4):672–8.
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17
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For peer review only

1. Information zur Studie "Umfrage über ethische Einstellungen und veränderte Gesundheitspraktiken zur Zeit der COVID-19 Pandemie"

Sehr geehrte Patienten,

In der beispiellosen Zeit der COVID-19-Pandemie liegt unser Interesse darin, zu verstehen, wie sich Erfahrungen mit Gesundheit und Gesundheitsmaßnahmen verändern. Um Sie als Patienten besser zu verstehen und Ihnen damit zukünftig auch besser helfen zu können, wollen wir herausfinden, ob und wie Sie von der Pandemie beeinflusst wurden.

Bitte beschränken Sie Ihre Antworten nicht nur darauf, ob Sie direkt von der COVID-19 Erkrankungen betroffen waren oder noch sind, sondern gehen Sie auch auf andere Veränderungen ein, wie etwa Änderungen bei Arztbesuchen oder bei gesundheitlicher Selbstversorgung.

Bitte antworten Sie spontan, ohne viel Nachdenken. In die freien Felder können Sie Antworten eintippen. Es gibt keine richtigen oder falschen Antworten.

Wir danken Ihnen sehr für Ihre Mitarbeit!

1.1 Bitte tragen Sie hier ein, ob Sie an der Befragung im Rahmen unserer Studie teilnehmen möchten.

- Ja, ich möchte an der Studie teilnehmen.
- (Falls nein, schließen Sie bitte dieses Fenster)

2. Umfrage über Einstellungen und Gesundheitsverhalten in der COVID-19 Pandemie

2.1 Meine Gesundheit wurde von der COVID-19-Pandemie beeinflusst:

- Sehr stark Sehr gering

2.2 In welcher Weise?

2.3 Bitte kreuzen Sie **alle** Antworten an, die zutreffen:

- Bei mir wurde eine Infektion mit dem neuartigen Coronavirus ärztlich bestätigt (etwa über ein positives Testergebnis)
- Bei mir wurde/n ein (oder mehrere) Test auf Infektion mit dem neuartigen Coronavirus vorgenommen, der/die aber negativ war/
- Ich vermute, dass ich die COVID-19-Erkrankung in den letzten Monaten hatte, weil ich dazugehörige Symptome hatte (etwa Geruchsverlust, Geschmacksverlust, trockenen Husten, Fieber, Abgeschlagenheit)
- Ich hatte in den letzten drei Monaten keine Symptome der COVID-19-Erkrankung

2.4 **NUR** wenn Sie Symptome der COVID-19-Erkrankung hatten: Haben Sie einen Arzt aufgesucht?

- Ja
- Nein

2.5 Mussten Sie sich in der letzten Zeit in Quarantäne begeben?

- Ja
- Nein

1
2
3 2.6 Wenn ja, wie erging es Ihnen damit?
4

5 2.7 Haben Sie während der COVID-19-Pandemie gesundheitliche Beschwerden gehabt
6 (unabhängig vom Coronavirus), bei denen Sie normalerweise zum Arzt gehen würden?
7

- 8 - Ja
9 - Nein
10

11 2.8 Wenn ja: welche?
12

13 2.9 Wenn Sie Beschwerden hatten, sind Sie wie gewohnt zum Arzt gegangen?
14

- 15 - Ja
16 - Nein
17

18 2.10 Wenn ja, hatten Sie Bedenken, während der COVID-19-Pandemie zum Arzt zu gehen?
19

20 2.11 Wenn ja, welche? 
21

22 2.12 Im Vergleich zu **vor** der COVID-19-Pandemie, hat sich Ihre Gesundheitsversorgung
23

- 24 - verbessert
25 - nicht verändert
26 - verschlechtert
27

28 2.13 War Ihre Gesundheitsversorgung von der COVID 19-Pandemie beeinträchtigt, etwa weil
29 eine Arztpraxis geschlossen war, Termine verschoben wurden, oder aus anderen Gründen:
30

- 31 - Ja
32 - Nein
33

34 2.14 Wenn ja, wie wurde die Gesundheitsversorgung beeinträchtigt:
35

36 2.15 **Vor** der Pandemie, haben Sie Maßnahmen der medizinischen Selbstversorgung
37 ergriffen, um ihre Gesundheit aufrechtzuerhalten, wie etwa Benutzung von Gesundheits-
38 Apps, Teilnahme an Online-Selbsthilfegruppen oder sportliche Übungen, Meditation oder
39 andere Aktivitäten zur Entspannung?
40

- 41 - Ja
42 - Nein
43

44 2.16 Wenn ja, welche?
45

46 2.17 **Während/seit** der Pandemie ergreifen Sie neue oder zusätzliche Maßnahmen, um ihre
47 Gesundheit zu verbessern?
48

- 49 - Ja
50 - Nein
51

52 2.18 Wenn ja, welche?
53

54 **ODER**

55 Wenn nein, warum?
56

57 2.19 Infomieren Sie sich **seit der Pandemie** mehr über Ihre Gesundheit?
58

- 59 - Ja
60 - Nein

1
2
3 2.20 Wenn ja, warum?
4

5 2.21 Was war/ist während der COVID-19-Pandemie für Sie die größte Herausforderung im
6 Hinblick auf Ihre Gesundheit?
7

8
9 2.22 Was hätte es Ihnen erleichtert, in dieser Zeit gesundheitlich für sich selbst zu sorgen?
10

11 2.23 Zu Beginn der Pandemie wurden verschiedene Veränderungen in der
12 Gesundheitsversorgung vorgenommen, um auf die neuen Bedürfnisse zu reagieren, die durch
13 den Ausbruch von COVID-19 entstanden sind. Viele Arztbesuche wurden verschoben, der
14 Praxisbetrieb wurde eingeschränkt, geplante Operationen wurden auf einen späteren
15 Zeitpunkt verschoben usw. Haben Sie das Gefühl, dass Sie davon betroffen waren?
16

17 - Ja

18 - Nein
19

20 2.24 Wenn ja, wie: 
21

22 2.25 Würden Sie diese Veränderungen in der Gesundheitsversorgung beschreiben als
23 (Kreuzen Sie alle zutreffenden Antworten an):
24

25 - Notwendig

26 - Nicht notwendig

27 - Fair

28 - Unfair

29 - Andere

30 - Ich kann es nicht einschätzen
31

32
33 2.26 Haben Sie erlebt, dass Menschen während der Zeit der Pandemie anderen bei der
34 Gesundheitsversorgung geholfen haben? Können Sie ein Beispiel nennen?
35

36 2.27 Haben Sie Ängste mit Blick auf Ihre zukünftige Gesundheitsversorgung?
37

38 - Ja

39 - Nein
40

41 2.28 Wenn ja, welche? **ODER** Wenn nein, warum? 
42

43 **3. Fragebogen zu seelischen Beschwerden: Wie oft fühlten Sie sich im Verlauf der letzten**
44 **2 Wochen durch die folgenden Beschwerden beeinträchtigt?**
45

46 3.1 Nervosität, Ängstlichkeit oder Anspannung

47 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag
48

49 3.2 Nicht in der Lage sein, Sorgen zu stoppen oder zu kontrollieren

50 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag
51

52 3.3 Übermäßige Sorgen bezüglich verschiedener Angelegenheiten

53 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag
54

55 3.4 Schwierigkeiten zu entspannen

56 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag
57

58 3.5 Rastlosigkeit, so dass Stillsitzen schwerfällt
59
60

1
2
3 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

4
5 3.6 Schnelle Verärgerung oder Gereiztheit

6 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

7
8
9 3.7 Gefühl der Angst, so als würde etwas Schlimmes passieren

10 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

11
12 **4. Wie oft fühlten Sie sich im Verlauf der letzten 2 Wochen durch die folgenden**
13 **Beschwerden beeinträchtigt?**

14
15 4.1 Wenig Interesse oder Freude an Ihren Tätigkeiten

16 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

17
18 4.2 Niedergeschlagenheit, Schwermut oder Hoffnungslosigkeit

19 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

20
21 4.3 Schwierigkeiten, ein- oder durchzuschlafen, oder vermehrter Schlaf

22 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

23
24 4.4 Müdigkeit oder Gefühl, keine Energie zu haben

25 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

26
27 4.5 Verminderter Appetit oder übermäßiges Bedürfnis zu essen

28 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

29
30 4.6 Schlechte Meinung von sich selbst; Gefühl, ein Versager zu sein oder die Familie
31 enttäuscht zu haben

32 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

33
34 4.7 Schwierigkeiten, sich auf etwas zu konzentrieren, z.B. beim Zeitunglesen oder Fernsehen

35 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

36
37 4.8 Waren Ihre Bewegungen oder Ihre Sprache so verlangsamt, dass es auch anderen
38 auffallen würde? Oder waren Sie im Gegenteil „zappelig“ oder ruhelos und hatten dadurch
39 einen stärkeren Bewegungsdrang als sonst?

40 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

41
42 4.9 Gedanken, dass Sie lieber tot wären oder sich Leid zufügen möchten?

43 Überhaupt nicht; An einzelnen Tagen; An mehr als der Hälfte der Tage; Beinahe jeden Tag

44
45
46
47 **5. Persönliche Fragen**

48
49 5.1 Ihr Geschlecht

- 50 - Weiblich
51 - Männlich
52 - Anderes

53
54 5.2 Ihr Geburtsjahr (z.B. 1991)

1
2
3 **1. Information on the study “Survey of ethical attitudes and changing health practices**
4 **during the COVID-19 pandemic.”**
5

6 Dear Patients,
7

8
9 In this unprecedented time of the COVID-19 pandemic, we are interested in understanding
10 how experiences of health and health care are changing. In order to better understand you as a
11 patient, and thus better serve you in the future, we want to find out if and how you have been
12 impacted by the pandemic.
13

14 Please do not limit your answers to if you have been affected by the COVID-19 virus
15 specifically, but include any other changes as a result of maintaining your health, such as
16 changes in doctor visits or self-care.
17

18
19 Please answer spontaneously, without much thought. You may type answers in the blank
20 spaces provided. There are no right or wrong answers.
21

22 Thank you very much for your cooperation!
23

24
25 1.1 Please check yes if you would like to participate in the survey as part of our study.
26 - Yes, I would like to participate in the study.
27 - (If no, please close this window)
28

29 **2. Survey on attitudes and health behaviors in the COVID-19 pandemic**
30

31
32 2.1 My health has been affected by the COVID-19 pandemic:
33 - Very much Very little
34

35 2.2 In what way?
36

37 2.3 Please check all answers that apply:
38

- 39 - I have received medical confirmation of a novel coronavirus infection (for example, via a
40 positive test result)
41 - I have been tested for the novel coronavirus infection, but it was negative
42 - I suspect that I have had COVID-19 in the past month(s) because I have had associated
43 symptoms (such as loss of smell, loss of taste, dry cough, fever, fatigue)
44 - I have not had any symptoms of COVID-19 in the past three months
45

46 2.4 ONLY if you have had symptoms of COVID-19 disease: Have you seen a doctor?
47

- 48 - Yes
49 - No
50

51 2.5 Have you had to quarantine recently?
52

- 53 - Yes
54 - No
55

56 2.6 If yes, how did this affect you?
57

58 2.7 During the COVID-19 pandemic, did you experience any health conditions (unrelated to
59 coronavirus) for which you would normally see a doctor?
60

- Yes

1
2
3 - No

4
5 2.8 If yes: which ones?

6
7 2.9 If you had any health complaints, did you go to the doctor as usual?

8 - Yes

9 - No

10
11
12 2.10 If yes, did you have any concerns about going to the doctor during the COVID-19
13 pandemic?

14
15 2.11 If yes, what were they?

16
17 2.12 Compared to before the COVID-19 pandemic, has your health care

18 - improved

19 - stayed the same

20 - worsened

21
22
23 2.13 Was your health care affected by the COVID 19 pandemic, for instance because a
24 doctor's office was closed, appointments were postponed, or for other reasons?

25 - Yes

26 - No

27
28
29 2.14 If yes, how was your health care affected?:

30
31 2.15 Before the pandemic, did you engage in any self-care measures to maintain your health,
32 such as using health apps, participating in online support groups, or exercising, meditating, or
33 other activities to relax?

34 - Yes

35 - No

36
37 2.16 If yes, which ones?

38
39 2.17 During/since the pandemic, did you engage in any new or additional activities to
40 improve your health?

41 - Yes

42 - No

43
44 2.18 If yes, which ones?

45 OR

46 If no, why?

47
48 2.19 Do you inform yourself more about your health since the pandemic?

49 - Yes

50 - No

51
52 2.20 If yes, why?

53
54 2.21 During the COVID-19 pandemic, what was/is the most challenging thing for you in
55 terms of your health?

1
2
3 2.22 What would have made it easier for you to take care of yourself health-wise during this
4 time?
5

6 2.23 At the beginning of the pandemic, several changes were made in healthcare delivery to
7 respond to the new needs created by the COVID-19 outbreak. Many doctor visits were
8 postponed, office hours were changed, scheduled surgeries were postponed to a later date, etc.
9 Do you feel that you have been affected?

10
11 - Yes

12 - No
13

14 2.24 If yes, how:
15

16 2.25 Would you describe these changes in health care as (Check all that apply):
17

18 - Necessary

19 - Not necessary

20 - Fair

21 - Unfair

22 - Other

23 - I can't say
24
25

26 2.26 Did you experience people helping others in relation to their health during the pandemic?
27 Can you give an example?
28

29 2.27 Do you have any fears with regard to your future health care?
30

31 - Yes

32 - No
33

34 2.28 If yes, what are they?
35

36 OR If no, why?
37

38 **3. Survey on mental health complaints: During the last 2 weeks, how often did you feel**
39 **affected by the following complaints?**
40

41 3.1 Nervousness, anxiety or tension

42 Not at all; On single days; On more than half of the days; Almost every day
43

44 3.2 Not being able to stop or control worrying

45 Not at all; On single days; On more than half of the days; Almost every day
46
47

48 3.3 Excessive worry about various matters

49 Not at all; On single days; On more than half of the days; Almost every day
50

51 3.4 Difficulty relaxing

52 Not at all; On single days; On more than half of the days; Almost every day
53
54

55 3.5 Restlessness, making it difficult to sit still

56 Not at all; On individual days; On more than half of the days; Almost every day
57

58 3.6 Quick temper or irritability

59 Not at all; On some days; On more than half of the days; Almost every day
60

1
2
3 3.7 Feeling anxious, as if something bad is going to happen
4 Not at all; On some days; On more than half of the days; Almost every day
5

6
7 **4. During the last 2 weeks, how often did you feel affected by the following complaints?**
8

9 4.1 Little interest or pleasure in activities
10 Not at all; On single days; On more than half of the days; Almost every day
11

12 4.2 Dejection, melancholy or hopelessness
13 Not at all; On individual days; On more than half of the days; Almost every day
14

15 4.3 Difficulty falling asleep or staying asleep, or increased sleep
16 Not at all; On single days; On more than half of the days; Almost every day
17

18 4.4 Fatigue or feeling of having no energy
19 Not at all; On single days; On more than half of the days; Almost every day
20

21 4.5 Decreased appetite or excessive need to eat
22 Not at all; On individual days; On more than half of the days; Almost every day
23

24 4.6 Poor self opinion; feeling like a failure or having let family down
25 Not at all; On single days; On more than half of the days; Almost every day
26

27 4.7 Difficulty concentrating on something, such as reading the newspaper or watching
28 television
29 Not at all; On single days; On more than half of the days; Almost every day
30

31 4.8 Were your movements or speech slowed down in a way that others would notice? Or, on
32 the contrary, were you “fidgety” or restless and thus had a stronger urge to move than usual?
33 Not at all; On single days; On more than half the days; Almost every day.
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35 4.9 Thoughts that you would rather be dead or want to cause yourself suffering?
36 Not at all; On single days; On more than half of the days; Almost every day
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42 **5. Personal questions**
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44 5.1 Your gender
45 - Female
46 - Male
47 - Other
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50 5.2 Your year of birth (e.g. 1991)
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Appendix 3. Summary of qualitative data, with examples, by question

2.2 Meine Gesundheit wurde von der COVID-19-Pandemie beeinflusst. In welche Weise?		
Category	Code	Example Quote
Due to COVID	Symptoms of COVID	<i>Hab eine zeitlang nichts geschmeckt und hatte die selben Symptome wie bei einem Schnupfen. (Nebenbei: Mein Vater konnte sich gratis testen lassen und es zeigte sich er hat eine große Menge Antikörper. Bei mir weis Ichs net.)</i>
	Self or relative tested positive	<i>Frau positiv getestet (wir hatten beide die selben Symptome) mein Test war lt. Ärzten daher nicht mehr notwendig (ein Test reicht)</i>
Due to change in care	Appointments Cancelled	<i>Bevorstehende Operation verschoben</i>
	Hard to get necessary supplies	<i>Ich habe Diabetes und mein Verbrauchsmaterial war nicht lieferbar</i>
	Personal concern about going to doctor	<i>Man überlegt zweimal, ob man wirklich zum Arzt muss und wartet länger, damit die Symptome wieder verschwinden.</i>
Changes in health due to increased anxiety, fear, stress	Depression	<i>Man wird ständig mit Infos über die Krankheit belagert. Das drückt das allgemeine Wohlbefinden und Gemüt und macht eine gewisse betrübliche Stimmung.</i>
	Concern that one might have COVID	<i>Bei leidlichem Schnupfen, erster Gedanke: Covid-19</i>
	Isolation	<i>Sorge, Angst, Isolation</i>
	Worsening of life circumstances	<i>Umgang mit Erkältungskrankheiten (eigene und fremde) wurde stark Sensibilisiert. Erhöhtes Stresslevel im direkten Umgang mit Menschen Außerdem, bin zur Zeit arbeitslos und es ist für mich noch schwieriger eine Stelle zu finden, da praktisch überall während der Arbeit stundenlang die Maske tragen muss. Meine Psyche leidet darunter. Ich become Angst und manchmal Panik, da ich mir jetzt Sorgen mache über meine Gesundheit und Berufsleben.</i>
	Stress	<i>Psychische Belastung am Arbeitsplatz durch die Ungewissheit, die im Umgang mit COVID 19 herrscht.</i>
Changes to work/home routines	Home office	<i>Etwas weniger Bewegung durch Homeoffice</i>
	More work	<i>große Veränderungen am Arbeitsplatz, umständlicher Arbeitsablauf</i>
	Less work	<i>Arbeit stark verdünnt</i>
	Homeschooling/ childcare	<i>Extrem Stress durch Homeschooling.</i>
Changes to free time activities with a connection to health	Specific activities not possible	<i>Die Teilnahme an der Gymnastik im Sportverein war nicht möglich. Ich war vorher einmal wöchentlich in der Gymnastik um meinen Rücken zu stärken. Ich hatte vor Jahren einen Bandscheibenvorfall.</i>
	Loss of social contact in relation to activities	<i>Durch das viele alleine daheim sein war die psychische Verfassung etwas betroffen und keine Sportkurse, konnte mich schwer alleine auffressen etwas zu machen und viel süßes (Gewichtszunahme)</i>
	Physical problems in relation to change in activities	<i>Ich habe Knie und Rückenprobleme. Ich konnte weder ins Schwimmbad noch ins Fitness Center. Die Bewegung hat mir immer geholfen.</i>

	Time for activities changed	<i>Ich hatte mehr Zeit für täglichen Sport und gesündere Ernährung, die ich auf der Arbeit nicht habe. Ich bin täglich zwischen 25-50 km gewandert.</i>
Changes in relation to COVID guidelines	Difficulty with specific precautions	<i>Probleme mit der Maskenpflicht (nach kurzer Zeit total durchgeschwitzt, das tragen empfinde ich als äusserst unangenehm)</i>
	Changes due to increased precautions	<i>Tragen von Masken und bewusstes Hände waschen</i>
Changes in health	Weight gain	<i>Gewichtszunahme</i>
	Sleep changes	<i>Schlafstörungen</i>
	Less physical activity	<i>Weniger Bewegung weil ich nicht mehr so oft aus der Wohnung gegangen bin</i>
	New patterns of food/drink consumption	<i>erhöhter Alkoholkonsum, erhöhter Zigarettenkonsum; mehr Bewegung/Sport an der frischen Luft + bewusste und gesunde Ernährung (selbst gekocht, viel Bio); Streit in der Partnerschaft; neuartige Schmerzen (Rücken-, Nacken-, Kiefer-, Kopf-)</i>
	Mental health changes	<i>Eher die geistige Gesundheit, da so gut wie kein Sozialleben mehr möglich war.</i>
	Improvements	<i>Eigentlich eher positiv, da weniger Ansteckungen von üblichen Krankheiten wie grippale Infekte, etc.</i>
Not affected/no changes	Healthy	<i>Bin gesund</i>
	No risks/low risk	<i>Bin kein Risikopatient</i>
	Carefully following preventative measures	<i>Ich habe mich an die Maßnahmen, die das Bundesministerium an die Medien gegeben hat, gehalten, sodass ich nicht in irgendeiner Art und Weise mit dem Virus in Kontakt komme</i>

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2.2 Mussten Sie sich in der letzten Zeit in Quarantäne begeben? Wenn ja, wie erging es Ihnen damit?

Category	Code	Example Quote
No problems	Easy or necessary	<i>Kein Problem, ich konnte mich zuhause sehr gut beschäftigen.</i>
	Made one appreciate non-quarantine time more	<i>Soweit war es kein Problem. Anfangs ungewohnt aber man erkennt dann die Welt von einer anderen Seite und weiß die Freiheit mehr zu schätzen.</i>
	Enjoyable	<i>Ich habe die Zeit mit meinem Partner sehr genossen! Wir hatten endlich mal richtig Zeit für uns und man war viel entspannter als in einer normalen Arbeitswoche!</i>
Mental health problems	Isolation	<i>Ich kam mir wie eine Aussätzige vor, fühlte mich auch so behandelt von meiner Ärztin</i>
	Depression	<i>Ich finde es nicht menschlich, man bekommt Depressionen</i>
	Stress	<i>Stress durch Ungewissheit</i>

2.8 Haben Sie während der COVID-19-Pandemie gesundheitliche Beschwerden gehabt (unabhängig vom Coronavirus), bei denen Sie normalerweise zum Arzt gehen würden? Wenn ja: welche?

Category	Code	Example Quote
Physical health problems	Allergy	<i>Allergische Erkrankungen</i>
	Infection	<i>Blasenentzündung</i>
	Orthopedic	<i>Künstliches Knie</i>
	Dental	<i>Zahnarzt und HNO</i>
	Back pain	<i>Rückenprobleme - LWS und HWS</i>
	Generalized	<i>Schwindel, Übelkeit</i>
	Spinal	<i>Bandscheibenvorfall</i>
	Cardiac	<i>Angina pectoris</i>
	Preventative	<i>Impfungen, Vorsorge Frauenarzt</i>
Mental or socio-emotional health	Sleep problems	<i>Schlafstörungen</i>
	Depression	<i>Panikattacken, Depression</i>
Treatment forgone	Suspended or cancelled by praxis	<i>Hatte einen Termin beim Orthopäden bzgl eines Bänderrisses. Dieser wurde verlegt</i>
	Suspended or cancelled by patient	<i>Die hautärztliche Behandlung habe ich ausgesetzt.</i>
	Self-treatment	<i>selbst versorgt und nicht gleich zum Arzt gegangen</i>
None	None	<i>Keine</i>

2.11 Wenn ja, hatten Sie Bedenken, während der COVID-19-Pandemie zum Arzt zu gehen? Wenn ja, welche?

Category	Code	Example Quote
Contagion concerns	Catching COVID-19	<i>Ansteckung von Personen die infiziert sind jedoch keine typischen Anzeichen haben und daher covid 19 nicht erkannt wurde</i>
	Getting others sick with COVID-19	<i>Auf rücksichtslose und unvorsichtige andere Patienten zu treffen. Oder selbst unbewusst Überträger des Virus zu sein.</i>
	Quarantine	<i>Ansteckung, Quarantäne</i>
Additional hassle during pandemic	Wait times	<i>übervolle Wartezimmer und lange Wartezeiten, sowie unzureichender Schutz vor Ansteckung</i>
	Uncertainty	<i>Ob überhaupt Termine frei sind. Wie ich mich verhalten muss. Ob ich überhaupt hin sollte, da andere es bestimmt eher nötig hätten.</i>
	New COVID-19 rules	<i>Kein einheitliches Hygienekonzept.</i>
	Burden for Doctors	<i>Die Ärzte haben ja derzeit genug zu tun (während der ersten Welle)</i>
None	No concerns	<i>Hatte keine Bedenken, ganz im Gegenteil, Situation beim Hausarzt war entspannter als sonst, da man einen festen Termin hatte und nicht</i>

2.14 War Ihre Gesundheitsversorgung von der COVID 19-Pandemie beeinträchtigt, etwa weil eine Arztpraxis geschlossen war, Termine verschoben wurden, oder aus anderen Gründen? Wenn ja, wie wurde die Gesundheitsversorgung beeinträchtigt?

Category	Code	Example Quote
Difficulty getting care	Closed medical offices	<i>Zahnarzt hatte zu, musste bei Notfall anderen aufsuchen</i>
	Scheduling difficulties	<i>Arztpraxen hatten auch nur noch Vormittags geöffnet. Das erschwert einen regelmäßigen Arztbesuch sehr, da man als berufstätige Person immer freinehmen muss.</i>
	Appointments moved/ cancelled	<i>Operation wurde verschoben</i>
	Only virtual or phone care	<i>Kein persönlicher Kontakt zum Hausarzt. Abfertigung vor der Praxistür. Nur telefonische Betreuung.</i>
Materials availability issues	Medication not available	<i>die Abgabemengen meiner Medikamente wurde gekürzt</i>
Medical office concerns	Turned away due to COVID-19 concerns	<i>Selbst mit harmlosen erkältungssymptomen wurde man lieber abgewiesen aufgrund der Angst wegen covid</i>

2.16 Vor der Pandemie, haben Sie Maßnahmen der medizinischen Selbstversorgung ergriffen, um ihre Gesundheit aufrechtzuerhalten, wie etwa Benutzung von Gesundheits-Apps, Teilnahme an Online-Selbsthilfegruppen oder sportliche Übungen, Meditation oder andere Aktivitäten zur Entspannung? Wenn ja, welche?

Category	Code	Example Quote
Sport	Fitness studio courses	<i>regelmäßiger Sport in einem Fitnessstudio: NordicWalking; Rückentraining; Spinning; Gruppenradfahren; Kraft- und Ausdauertraining; Salzgrotte; Sauna.</i>
	Group sports	<i>Fußball, Tanzen</i>
	Walking/Jogging	<i>Laufen mit einer Laufgruppe, Fitnesstraining</i>
	Biking	<i>Radfahren</i>
Relaxation	Meditation	<i>Spazieren, Meditation</i>
	Yoga	<i>Ab und zu Yoga</i>
Nutrition	Eating well	<i>Gesündere Ernährung</i>
	Supplements	<i>Nahrungsergänzungsmittel genommen schon seit 8 Jahren</i>
Getting outside	Garden work	<i>Gartenarbeit zum Ausgleich der Bürotätigkeit</i>
	Fresh air	<i>wöchentlicher Sport, halbwegs gesunde Ernährung, frische Luft</i>
Treatment with professionals	Alternative treatments	<i>Osteopathie</i>
	Standard treatments	<i>Physiotherapie</i>

2.18 Während/seit der Pandemie ergreifen Sie neue oder zusätzliche Maßnahmen, um ihre Gesundheit zu verbessern? Wenn ja, welche? ODER Wenn nein, warum?

Category	Code	Example Quote
Behavior/ Activity changes	Quitting smoking	<i>Veränderung vom Gelegenheitsraucher zum absoluten Nichtraucher.</i>
	Jogging/ walking	<i>Aufgrund des ausgefallenen Trainings im Verein bin ich öfter joggen gewesen als gewöhnlich</i>
	Fitness studio activities	<i>Fitnessstudio</i>
	Biking	<i>Ernährungsumstellung und Sport ein bis zweimal die Woche Fahrrad fahren</i>
	Online digital options	<i>Sportvideos auf YouTube, da ich endlich die zeit dazu hatte</i>
Nutrition	Eating well	<i>Achte mehr auf gesunde Ernährung und körperliche Fitness, damit ich Falle einer Erkrankung nicht so schlimm erkrankte.</i>
	Supplements	<i>Allgemeine Einnahme von Vitaminen etc</i>
Relaxation	Meditation	<i>Meditation wegen zu vielen Gedanken</i>
	Massage	<i>Selbstmassage der Kiefermuskulatur (online Videos dazu angesehen), Freund massiert mir jetzt öfter den Nacken und Rücken, Yogaübungen, Übungen zur Kräftigung der Arm-, Rücken- und Bauchmuskulatur, habe wieder mit dem Joggen angefangen, gesündere Ernährung, längeres Duschen zur Entspannung</i>
	Yoga	<i>Yoga, um mentale und physische Gesundheit zu fördern</i>
Treatment with professionals	Standard treatments	<i>Physiobehandlung</i>
Outside	Fresh air	<i>Regelmäßige Spaziergänge / Sporttreiben an frischer Luft</i>
Changes in relation to COVID-19 guidelines	Social distancing	<i>Abstand halten</i>
	Hygiene	<i>Abstand halten, Hände regelmäßig waschen bzw. Desinfizieren</i>
	Staying home	<i>Ich halte mich strikt an die Abstandsregelung und fahre nicht in den Urlaub.</i>
	Mask use	<i>Maske tragen, Menschaufläufe meiden</i>
	COVID-Warn App	<i>Ich habe nur die Corona-Warn-App installiert. Ich versuche generell schon mein Immunsystem zu stärken. Deshalb habe ich keine zusätzlichen Maßnahmen ergriffen.</i>
None	Not necessary	<i>Es geht mir gut und ich bin gesund. Gibt nichts was ich verbessern müsste außer meiner Psyche</i>
	No risk	<i>Bin kein risikopatient</i>
	Same as before	<i>Ich mache alles wie davor, es würde ja eh nichts helfen, wenn ich Covid19 bekommen sollte.</i>
	No interest	<i>Keine Lust</i>

2.20 Informieren Sie sich seit der Pandemie mehr über Ihre Gesundheit? Wenn ja, warum?

Category	Code	Example Quote
Increased concern	Fear	<i>Angst vor der Pandemie bzw vor einer Erkrankung</i>
Prevention	Personal precaution	<i>Weil ich eine Vorerkrankungen habe und somit zur Risikogruppe gehöre.</i>
	Occupational precaution	<i>Berufsbedingte Vorsichtsmassnahme</i>
	Precaution for others	<i>Zur sicherheit und zum schutz anderer</i>
To be better informed	In relation to COVID-19 risk	<i>um über die aktuelle Pandemiesituation informiert zu bleiben</i>
	In relation to personal health knowledge	<i>um Schmerzen selbst lindern zu können, um meinen Körper fitter machen zu können (Immunsystem) --> das fängt ja mit dem Wissen</i>

2.21 Was war/ist während der COVID-19-Pandemie für Sie die größte Herausforderung im Hinblick auf Ihre Gesundheit?

Category	Code	Example Quote
Healthcare concerns	Knowing when to get tested/care	<i>Nicht wegen jedem kleinen Husten oder Niesen zum Test zu laufen.</i>
	In relation to care for children	<i>Bei den Kindern zu erkennen, wann es nötig ist einen Test zu machen</i>
	In relation to care for self	<i>Verfügbarkeit von Arztterminen</i>
	Getting medications or healthcare supplies	<i>Ausreichend versorgt zu sein mit Insulin, das ist leider sehr wichtig für mich</i>
Concern related to COVID-19 virus	Personal risk	<i>Da ich in der 35. Woche schwanger bin, war die Auswirkung auf die Schwangerschaft, das Kind, die Geburt eine Sache mit der man sich natürlich intensiver beschäftigt hat.</i>
	Fear of contagion	<i>Ständige Angst vor einer Infektion und die Gefahr das Virus in den eigenen Haushalt zu schleppen</i>
	Anxiety	<i>Es ist für mich eher ein psychische Problem, ständig mit Angst umgehen zu müssen, da man nicht weiß, sie stark einen der Virus trifft.</i>
	Remaining healthy	<i>Fit zu bleiben, obwohl Fitnessstudios geschlossen waren</i>
COVID-19 guidelines	Keeping distance	<i>Abstand zu halten zu Familie, Freunden, Kollegen.</i>
	Mask wearing	<i>Das Tragen der Maske auf der Arbeit (meist bis zu 12 Stunden)</i>
	Information	<i>Man wusste nicht was man überhaupt den Medien über das Virus glauben kann. Somit wusste man auch nicht welche Maßnahmen wirklich helfen.</i>
	Quarantine	<i>6 Wochen Quarantäne waren für uns beide eine Herausforderung, ohne hilfsbereite Nachbarn und Freunde wäre es äuserst schwierig geworden.</i>
None	None	<i>Es gibt keine Herausforderungen deren ich mich stellen müsste</i>

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4 **2.22 Was hätte es Ihnen erleichtert, in dieser Zeit gesundheitlich für sich selbst zu sorgen?**

5 Category	6 Code	7 Example Quote
8 Nothing	9 None	10 <i>Nichts. Ich bin gesund und brauche keine Hilfe.</i>
11 Changes in 12 relation to home 13 life	14 Rural/Urban	15 <i>Das Leben auf dem Land.</i>
	16 Services	17 <i>Besseres Internet (auf dem Dorf), da auch Kurse über das Internet nur 18 eingeschränkt genutzt werden konnten</i>
	19 Personal 20 relationships	21 <i>Mit meiner Familie zusammen zu sein</i>
	22 Habits	23 <i>Mental, weniger Nachrichten schauen, denn das belastet einen ja viel 24 mehr.</i>
25 Medical system 26 changes	27 COVID-19 28 Testing	29 <i>Wenn Selbsttests möglich gewesen wären</i>
	30 Remote care	31 <i>Online Sprechstunden - ggf. auch außerhalb der üblichen Öffnungszeiten 32 von Praxen</i>
	33 Scheduling	34 <i>Normale Öffnungszeiten der Arztpraxis</i>
	35 Information	36 <i>Einheitliche Informationspolitik der öffentlichen Stellen</i>
37 Occupational 38 changes	39 In relation to 40 employer	41 <i>Mehr Rücksicht des Arbeitgebers</i>
	42 Work load	43 <i>weniger Stress im Beruf und im Homeoffice.</i>
44 Public life	45 Delivery 46 services	47 <i>Lieferdienst für Medikamente und Lebensmittel</i>
	48 Material needs	49 <i>Verfügbares Material (Nasen-Mund-Schutz, Fieberthermometer, 50 Hygieneartikel)</i>
	51 Changes in 52 restrictions in 53 relation to 54 COVID-19	55 <i>Bestimmte Uhrzeiten zu denen ausschließlich ältere Personen einkaufen 56 gehen können</i>
	57 Compliance 58 with COVID-19 59 restrictions by 60 others	61 <i>Wenn alle Bürger sich anständig an regeln halten</i>

2.24 Zu Beginn der Pandemie wurden verschiedene Veränderungen in der Gesundheitsversorgung vorgenommen, um auf die neuen Bedürfnisse zu reagieren, die durch den Ausbruch von COVID-19 entstanden sind. Viele Arztbesuche wurden verschoben, der Praxisbetrieb wurde eingeschränkt, geplante Operationen wurden auf einen späteren Zeitpunkt verschoben usw. Haben Sie das Gefühl, dass Sie davon betroffen waren? Wenn ja, wie?

Category	Code	Example Quote
Medical system changes	Appointments cancelled	<i>OP abgesagt</i>
	Waiting time	<i>Sehr lange Wartezeiten. Überforderte Praxen</i>
	Medical services redirected for COVID-19 care	<i>Nach einer OP war ich in stationärer Rehabilitation. Diese war für 3 Wochen geplant. Nach zwei Wochen wurde aber die [Name]-Klinik geschlossen, um für Corona-Patienten zur Verfügung zu stehen.</i>
	Difficulty getting care	<i>eingeschränkter Praxisbetrieb</i>

2.26 Haben Sie erlebt, dass Menschen während der Zeit der Pandemie anderen bei der Gesundheitsversorgung geholfen haben? Können Sie ein Beispiel nennen?

Category	Code	Example Quote
Providing services for neighbors or family	Errands	<i>Alltagsgeschäfte, wie z.B. Einkäufe für weniger mobile und ältere Menschen.</i>
	Transportation	<i>Eine Bekannte hat eine Frau zur Untersuchung gebracht</i>
	Social support	<i>Zuspruch, vermehrte Telefongespräche</i>
	Supplies	<i>Ja, nähen von Masken.</i>
	New networks	<i>Im Dorf wurde eine Gruppe gegründet, um Hilfsbedürftige zu versorgen.</i>
Taking additional precautions	COVID-19 regulations	<i>Aufmerksam gemacht zwecks Mund-Nasen Schutz und Hygiene</i>
	Institutional precautions	<i>Arztpraxen haben wichtige Maßnahmen eingehalten um andere Menschen zu schützen.</i>
None	None	<i>Nein da es in unserem Ort keine Fälle gab.</i>

2.28 Haben Sie Ängste mit Blick auf Ihre zukünftige Gesundheitsversorgung? Wenn ja, welche? ODER Wenn nein, warum?

Category	Code	Example Quote
Health – concerns	Mental health	<i>Sozialleben leidet, das heißt - Psyche von vielen Menschen fällt immer weiter in tiefen Loch!!!</i>
	Physical health	<i>Falls ich mich nicht selbst versorgen kann helfen mir meine Kinder</i>
	Personal Risk	<i>Ich habe nicht Angst um mich, sondern um Familienmitglieder, die zur Risikogruppe gehören</i>
Health – no concerns	Mental health	<i>Weil ich keine Angst habe</i>
	Physical health	<i>Ich bin jung und fit und habe deshalb keine Angst.</i>
	Personal Risk	<i>Kein risikopatient bin und die maßnahmen gut dagegen sind</i>
	Personal contacts with care providers	<i>Weil ich von meinem Hausarzt gut versorgt bin</i>
Institutional	German healthcare-specific response	<i>Das deutsche Gesundheitssystem ist glaube ich stark genug und gut durchplant bzw. organisiert.</i>
	Local healthcare-specific response	<i>Gute Gesundheitsversorgung in Bayern</i>
	Political institutions	<i>Vertrauen auf Regierung</i>
	Economic concerns	<i>Ich vermute, dass die Gesundheitsversorgung schon allein aus finanzieller Sicht zukünftig schwieriger werden wird</i>
COVID-19 specific concerns	Restrictions	<i>Man setzt alles um, was während der Pandemie gelernt wurde, nur manche Menschen verschlimmer dies durch nichtbeachtung der Regeln</i>
	Vaccination	<i>Das mann corona nicht komplett heilen/impfen kann</i>
	Long-haul COVID-19	<i>Langzeitschäden nach Infizierung mit covid 19</i>
	Tunnel vision	<i>Nur Covid -19 ist derzeit anscheinend wichtig.</i>
	Healthcare System concerns	<i>Extrem steigende Infektionszahlen und nicht genügend Kapazitäten in den Kliniken</i>

Standards for Reporting Qualitative Research (SRQR)*

<http://www.equator-network.org/reporting-guidelines/srqr/>

Page/line no(s).

Title and abstract

<p>Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended</p>	1
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	2

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	4-5/lines 2-48
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	5/lines 46-48

Methods

<p>Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**</p>	7/lines 83-88; 99-106
<p>Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability</p>	N/A
<p>Context - Setting/site and salient contextual factors; rationale**</p>	6/lines 58-69
<p>Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**</p>	6/lines 58-69
<p>Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues</p>	17/lines 322-324
<p>Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**</p>	6-7

1 2 3 4 5	Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	6-7
6 7 8	Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	6/lines 58-69
9 10 11 12	Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	7/lines 91-106
13 14 15 16	Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	7/lines 91-106
17 18 19 20	Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	7/lines 102-104

Results/findings

23 24 25 26	Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	8-14
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	8-14

Discussion

32 33 34 35 36 37 38	Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	14-16
39 40	Limitations - Trustworthiness and limitations of findings	16-17 /lines 294-306

Other

43 44 45	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	17/line 334
46 47 48	Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	17/line 327-330

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

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**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Reference:
O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
DOI: 10.1097/ACM.0000000000000388

For peer review only

STROBE Statement—Checklist of items that should be included in reports of *cohort studies*

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract [title page] (b) Provide in the abstract an informative and balanced summary of what was done and what was found [pg. 2]
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported [pg 4-5]
Objectives	3	State specific objectives, including any prespecified hypotheses [pg 5; lines 46-48]
Methods		
Study design	4	Present key elements of study design early in the paper [pg 6-7]
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection [pg 6]
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up [pg 6] (b) For matched studies, give matching criteria and number of exposed and unexposed [n/a]
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable [pg 7]
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group [pg 6]
Bias	9	Describe any efforts to address potential sources of bias [n/a]
Study size	10	Explain how the study size was arrived at [pg 6, 8]
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why [n/a]
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding [pg 7] (b) Describe any methods used to examine subgroups and interactions: [n/a] (c) Explain how missing data were addressed: [pg 7] (d) If applicable, explain how loss to follow-up was addressed: [n/a] (e) Describe any sensitivity analyses: [n/a]
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed [pg 6] (b) Give reasons for non-participation at each stage [n/a] (c) Consider use of a flow diagram [n/a]
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders [pg 8] (b) Indicate number of participants with missing data for each variable of interest [n/a]: [Table 1, pg 9] (c) Summarise follow-up time (eg, average and total amount) [n/a]
Outcome data	15*	Report numbers of outcome events or summary measures over time [pg 8]
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were

		adjusted for and why they were included [Table 3, pg 13-14]
		(b) Report category boundaries when continuous variables were categorized [pg 6-7]
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period [n/a]
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses [pg 7-8]
Discussion		
Key results	18	Summarise key results with reference to study objectives [pg 8-14]
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias [pg 16-17]
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence [pg 14-17]
Generalisability	21	Discuss the generalisability (external validity) of the study results [pg 17]
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based [pg 18]

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at <http://www.strobe-statement.org>.