



BMJ Open Impact of COVID-19 on patient health and self-care practices: a mixed-methods 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 four physicians' offices located in urban and rural areas of Bavaria, Germany, between 21 July 2020 and 17 October 2020. A total of 254 patients participated (55% response rate); 57% (262 of 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 one-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.

INTRODUCTION

The COVID-19 pandemic has put enormous strain on healthcare systems and has upended the provision of healthcare. Even for those who were not directly affected by the virus itself, the provision of healthcare services was substantially altered.¹ Concerns have emerged that the postponement of treatment for non-COVID-19 conditions, such as cancer, heart attacks, or stroke, could have significant negative consequences.² Furthermore, with mounting uncertainty, physical and social distancing, job loss and decreased access to support services, the pandemic has increased

Strengths and limitations of this study

- The mixed-methods approach, including validated scales for depression and anxiety, and open-ended qualitative answers on well-being 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.

established risk factors for mental health problems.³ Recent studies suggest rising rates of depression, anxiety, and stress symptoms during the pandemic.^{4–11}

These 'secondary' effects of the pandemic on physical and mental health constitute a significant challenge and require novel approaches given the ongoing course of the pandemic.^{7 12} One prominent approach that has emerged to assist patients—in lieu of routine healthcare or other ways of maintaining health that are not available during the pandemic—is digital self-care.^{13–17} Self-care, defined by the WHO as 'the activities that individuals, families, and communities undertake with the intention of enhancing health, preventing disease, limiting illness, and restoring health',¹⁸ has taken on new forms in the digital era. The growth of the internet and personalised portable devices, such as smartphones, activity trackers, and other digital applications has given rise to emerging forms of digital self-care, a range of practices of maintaining and promoting health without formal medical direction that largely became possible through the datafication and digitisation of patients' bodies and lives.¹³ Many of these practices entail measurements or technologies that were previously only available



under clinical supervision, which have now moved into the hands of patients. Proponents have predicted that digital self-care represents a novel, cost-effective, and empowering way of addressing the mental and physical health needs of patients.¹⁶ Indeed, the current pandemic has given rise to a range of digital self-care tools that can be used at home,^{19–21} and has renewed interest in existing digital tools, such as therapeutic chatbots.²² It remains unclear, however, if patients are engaging in digital self-care practices to address health needs brought about by the pandemic.

Germany, and the state of Bavaria in particular, provides a useful setting to examine these issues. The first confirmed COVID-19 case in Germany occurred in Bavaria in late January 2020.²³ Soon after, Germany began to introduce public health measures to slow the spread and contain the pandemic.²⁴ During March and April 2020, measures began affecting the German health system; dentists' and doctors' offices closed or changed their services, hospitals received orders from the federal government in March 2020 to postpone non-essential operations,^{25 26} and intensive care capacities in hospitals were expanded. During spring 2020, Bavaria was also under a 'strict lockdown' in this period, with a stay-at-home order in place, and non-essential shops and businesses along with schools and daycare centres were closed.²⁷ Furthermore, Germany is one of the world's first countries to approve digital health apps for prescription as part of a new law on digital medical care.²⁸ It is therefore expected that such digital health tools will be increasingly used by German patients. Research conducted before the pandemic indicates that patient-driven digital self-care is currently lagging behind expectations.¹³ Nevertheless, a number of COVID-19 digital tools for patients have emerged in Germany, such as symptom trackers (eg, Data4Life app) and self-help apps for depression.²⁹ This study therefore 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.

METHODS

The methods of the study are presented in accordance with the 'Strengthening the Reporting of Observational Studies in Epidemiology' statement and the 'Standards for Reporting Qualitative Research'.^{30 31} The full length survey is available in the online supplemental appendices 1 and 2.

Survey implementation

A cross-sectional survey was conducted between 21 July 2020 and 17 October 2020. Patients from four general practices in the urban and rural areas of Bavaria were consecutively invited by the practice assistants to participate. Patients were eligible to participate if they were 18 years or older, spoke German, and had access to the internet. Office assistants asked eligible patients who visited in the office during the recruitment period for an

appointment if they would like to participate in the study. A total of 459 individuals were provided with the study information sheet in print form, which included a link to the online survey. Office assistants received a small monetary compensation for their help. The online survey was conducted using the automation software EvaSys (EvaSys Central Evaluation V.8.0). Data were then exported into SPSS V.26 for Windows (IBM Corporation). Participants who completed the survey were eligible to claim a €10 gift certificate for Amazon.

Survey content

In order to assess the overall well-being of the participants during the pandemic, two subscales of the German version of the Patient Health Questionnaire (PHQ-D) were used to assess depression and anxiety as psychological comorbidity.³² The depression severity score of the PHQ, the PHQ-9, ranges from 0 (no depression) to 27 (maximal depression). Superior validity of the PHQ compared with other established self-report questionnaires has been confirmed with respect to the diagnoses of 'major depressive disorder' and 'other depressive disorders' according to the International Classification of Diseases (ICD-10).²⁰ Another module of the PHQ-D, the Generalized Anxiety Disorder Scale (GAD-7), was used as a practical self-report anxiety questionnaire that has been validated in primary care.³³ GAD-7 scores range from 0 to 21, with scores of ≥ 5 , > 10 , and ≥ 15 representing mild, moderate, and severe anxiety symptom levels, respectively. Only moderate and severe scoring were rated as anxiety disorder.

Additionally, a questionnaire was developed to examine the impact of the pandemic on patients' lives and health, and new digital self-care practices. The survey was informed by existing literature on the secondary effects of the pandemic and changing practices of digital self-care,^{13 17 34–36} and combined scaled or yes/no questions, with free-text responses. Demographic questions asked for the participants' age and gender. Two questions asked in the survey were removed due to inconsistent answering patterns.

Data analysis

Baseline data were analysed descriptively. For the analyses, we included all participants who answered the respective question. Associations between the questions regarding the self-estimation of the healthcare situation and depression or anxiety disorder were investigated separately with multivariable logistic regression models. Survey questions were included into the models as predictor variables. We controlled for potential confounding by including age and gender into the models. Hypotheses testing was performed with an exploratory two-sided test using a significance level of 5%. All analyses were performed by SK and AS in SPSS V.26 and R V.4.0.3 (The R Foundation for Statistical Computing). Qualitative data from the open responses were analysed by AF using conventional content analysis, with a focus on conceptual analysis. Initial topics emerging from the responses were identified

using a process of open coding, codes were generated and grouped based on higher order categories.³⁷ Two other investigators (AB, SM) reviewed the initial analysis to ensure consistency and validity, and conversations among the investigators continued until consensus was achieved. Variance and saturation within the responses was analysed and described. Quotes included in this article were translated from German to English.

Patient and public involvement

No patient was involved in the design of this study.

RESULTS

Characteristics of participants

A total of 459 patients were invited to participate. Of these, 57% (262 of 459) identified as female. The average age of invitees was 40.6 years (SD 16.1). Of those invited, 254 eligible patients participated in the survey, corresponding to a 55% (254 of 459) response rate. Of the participants, 56% (144 of 254) identified as female. The average age of the participants was 39.3 years (SD 15.7) and the median age was 37 years, ranging from 18 to 81 years old. The majority of participants had not had any symptoms of COVID-19 during the 3 months prior to the survey (218 of 254; 86%). Only 17% (44 of 254) of participants reported having had conducted a COVID-19 test, but only 9% (4 of 44) of those received a positive result. However, 6% (16 of 254) reported that they presumed they had COVID-19 due to the presence of symptoms, despite not having taken a test. Quarantine was reported by 11% (28 of 254) of respondents. The PHQ results indicated that 17% (45 of 254) of patients suffered from impaired mental health, 6% (17 of 254) suffered from depression, 4% (11 of 254) suffered from anxiety disorder, and 6% (17 of 254) suffered from both depression and anxiety disorder.

Impact of the pandemic on health

One-third of respondents, 30% (75 of 254), indicated that their healthcare was affected by the COVID-19 pandemic (table 1). When asked to specify how their healthcare had been affected, respondents offered examples in the open-ended questions, including changes in appointment availability at their doctor's offices due to closures

or modifications due to the pandemic (table 2; qualitative data with exemplary quotes are included in the online supplemental appendix 3).

One participant noted that 'Normal doctor's visits were no longer possible in the initial period. All appointments were canceled by the doctors. Only emergencies were possible.' Another described unexpected interruptions in care: 'After an operation I was in inpatient rehabilitation. This was planned for 3 weeks. However, after two weeks the [name redacted] clinic was closed to be available for Corona patients.' A few participants noted issues in receiving necessary medications or necessary medical supplies, including for chronic conditions such as diabetes. Some indicated that they had felt increased stress and anxiety, such as one person who wrote that 'One reacts more sensitively to little things that used to be ignored (sneezing, coughing, etc).' Others experienced other changes in their mental health: 'During the lockdown, sleep disturbances, increased restlessness, fears about the future.' Moreover, difficult situations were made more difficult: 'In addition, I am currently unemployed and it is even more difficult for me to find a job, since I have to wear the mask for hours on end practically everywhere during work. My psyche suffers from it. I get scared and sometimes panic, as I am now worried about my health and professional life.'

During the COVID-19 pandemic, some respondents said they had health complaints, unrelated to COVID-19, for which they normally would have gone to see a doctor. The complaints included in the qualitative responses indicated covered a wide range of health problems, from relatively minor issues such as allergies or congestion to more serious conditions such as a slipped disc or a spinal canal stenosis. In the open-ended answers, respondents indicated that their concerns related to going to the doctor during the pandemic dealt with fear of contracting COVID-19, while a few individuals indicated that they felt their concerns were not substantial enough to see their doctor given that medical professionals were dealing with more serious health concerns during the pandemic. Many participants answered with variations on concerns that, 'I could catch it from the next patient in the office.' Others cited 'Risk of infection due to my age and certain pre-existing conditions,' or doubted 'Whether my symptoms

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 healthcare 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 healthcare 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 healthcare? | 60/254 (24%) | 194/254 (76%) |

**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-19 Isolation Worsening of life circumstances Stress |
| Changes to work/home routines | Home office More work Less work Homeschooling/childcare |
| Changes in free time activities with a connection to health | Specific activities not possible Loss of social contact in relation to change in activities Physical problems in relation to change in activities Time for activities changed |
| Changes in relation to COVID-19 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 Orthopaedic Dental Back pain Generalised Spinal Cardiac Preventative |

Continued

Table 2 Continued

| Category | Code |
|--|---|
| Mental or socioemotional health | Sleep problems Depression |
| Treatment forgone | Suspended or cancelled by medical office 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 healthcare | |
| 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 |

Continued

Table 2 Continued

| Category | Code |
|--|---|
| 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 |

were ‘bad enough’ to see a doctor.’ A majority, or 70% (179 of 254) of respondents said that they had not been affected by the changes made to the healthcare system to respond to the needs created by the pandemic, such as postponed doctors’ visits, restricted hours or healthcare services.

Digital self-care practices in the pandemic

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

When asked to specify what kinds of practices, the majority of respondents cited exercise such as different sports, yoga or membership in fitness studios. During the pandemic, 39% of respondents indicated that they had initiated new or additional practices to improve their health. Sixteen per cent (41 of 254) were previously engaged in self-care activities, 23% (59 of 254) of patients started new steps for the first time. The practices listed by respondents included a range of activities, many of which were not digital, such as yoga, healthier eating or new forms of physical activity (table 4). Some

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%) |

noted the advantages of home office: ‘Taking advantage of more flexible work schedule (virtual work) to eat more mindfully and reduce body weight by ~2BMI points into the 25ish range.’ Many described new fitness routines, such as ‘Started jogging/walking more as an alternative to venturing out with friends to at least get out a bit,’ or efforts to relax such as ‘Self-massage of jaw muscles (watched online videos on how to do this), my friend now massages my neck and back more often, yoga exercises, exercises to strengthen arm, back and abdominal muscles, started jogging again, healthier diet, longer showers to relax.’ However, only 11% (27 of 254) indicated that they had become more informed about their health since the start of the pandemic.

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

About one-quarter, or 24% (60 of 254) of individuals had fears with regard to their healthcare in the future.

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 | |
| 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? | |
| Behaviour 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 guidelines | Social distancing |
| | 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 |

The open-ended answers to this question were particularly instructive, with a majority of respondents indicating that they were not concerned because they had faith in the German healthcare system, with participants noting

that ‘Even during the pandemic, I think [the healthcare system] worked much better in Germany than in many other countries around the world,’ or ‘Germany has a very stable and good healthcare system, so I don’t see any reason to worry about it.’ Others noted that their personal connection to their doctors helped to mitigate their concerns, for example, ‘I trust my doctor and the system,’ or ‘Because I have a good general practitioner and everything is actually almost back to normal.’ Approximately a quarter of respondents stated directly that they were not concerned for the future, with many citing their own fitness or lack of risk factors as the reason for their confidence.

Associations with depression and anxiety disorder

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

DISCUSSION

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

Self-care practices have increased during the pandemic, with a relevant number of people reporting the initiation of new activities. More than one-third (39%) of participants indicated that they had started a new or additional self-care practice during the pandemic, such as yoga, meditation, exercise outdoors or a newfound emphasis on healthy eating habits, with 59 (23%) patients who were not previously engaged in self-care practices starting new self-care activities for the first time. That said, while self-care is on the rise, there is no indication that digital self-care practices have taken on a major role during the pandemic in Germany, nor that digital self-care practices are being used in order to directly address problems associated with the pandemic.

Table 5 Association of anxiety, depression and self-rated healthcare, adjusted for age and gender (only significant associations are presented)

| | OR | 95% CI | P value |
|---|-------|----------------|---------|
| Logistic regression for depression | | | |
| COVID-19 positive | 21.41 | 1.98 to 231.12 | 0.012 |
| Quarantine | 5.38 | 2.20 to 13.17 | <0.001 |
| No COVID-19 symptoms | 0.20 | 0.09 to 0.45 | <0.001 |
| Feeling affected by various healthcare changes | 4.33 | 1.88 to 9.99 | 0.001 |
| Healthcare worsened | 3.56 | 1.29 to 9.86 | 0.014 |
| COVID-19 negative | 2.46 | 1.05 to 5.75 | 0.038 |
| Logistic regression for anxiety disorder | | | |
| COVID-19 positive | 3.26 | 0.32 to 33.16 | 0.318 |
| Quarantine | 2.78 | 1.00 to 7.74 | 0.050 |
| Health complaints during COVID-19 pandemic for which participant would normally go to the doctor | 4.39 | 1.92 to 10.04 | <0.001 |
| Feeling affected by various healthcare changes | 5.95 | 2.52 to 14.09 | <0.001 |
| Healthcare worsened | 5.06 | 1.97 to 13.01 | 0.001 |
| Healthcare not changed | 0.24 | 0.10 to 0.59 | 0.002 |
| Healthcare affected by COVID-19 pandemic because of doctor's offices closures, cancelled appointments | 3.52 | 1.56 to 7.95 | 0.002 |
| I cannot assess changes in healthcare delivery | 2.35 | 1.04 to 5.31 | 0.040 |
| Fears with regard to future healthcare delivery | 2.30 | 1.00 to 5.27 | 0.049 |

The pandemic has affected different socioeconomic groups in Germany unequally.³⁸ Given that most digital self-care practices must be paid for out-of-pocket, it is possible that engagement with digital self-care may be stratified along socioeconomic lines. Further, it is possible that digital self-care fills a 'gap' in healthcare provision that may be more appealing for patients in places where basic healthcare needs are not met through universal health insurance. In places like Germany where the healthcare system is based on solidarity and basic needs are, on the whole, met for the majority of the population,³⁹ it is possible that there is less need or incentive to seek out digital self-care practices. Future research on digital self-care in Germany and also internationally can address how changes in self-care practices are related to forms of social and health inequality, and the intersections between major public health events and the need for new or different forms of care that are not available through the standard provision.

The increase in new self-care practices to improve health was not accompanied by an increase in information-seeking about health. A study in Germany found that access to health information could serve as a buffer for increased anxiety during the pandemic,⁴⁰ while another study found that nearly half of participants had difficulty judging if information about the pandemic was accurate or trustworthy.⁴¹ Thus, the relationship between information and anxiety during public health crises remains disputed,^{42 43} and further study is needed to probe the

effects of the lack of reported health information-seeking behaviour during the pandemic.

An unintended finding affirmed in this survey is that there is great confidence in German healthcare system to adapt to changes brought about by the pandemic and address health needs accordingly. This correlates with findings that 85% of individuals surveyed in Germany were optimistic about their future access to healthcare services.⁴⁴ Given that in many cases self-care is taken up to gain a sense of control over one's health, or because a particular health service is not available, is possible that widespread faith in the healthcare system leads to lower levels of digital self-care practice. When patient's needs are, on the whole, met by the healthcare system, there may be lower levels of digital self-care seeking behaviour.

The prevalence of depression and anxiety in our primary care collective was very similar to a previous survey in the same region in 2010.⁴⁵ Therefore, our findings contradict the results from a survey conducted across Germany which found significantly increased symptoms of anxiety, depression, psychological distress and COVID-19-related fear.⁴⁶ Their online survey was performed in the beginning of the pandemic, from March to May 2020. The summer period was significantly calmer with regard to the pandemic in Germany and Europe, which might explain the decreased prevalence of depression and anxiety in our study. However, our study indicates that there is a relatively small but very vulnerable patient group requiring special attention and services. There



was a strong relationship between previous COVID-19 infection and quarantine experience and increased depression. Beyond that, the qualitative analysis suggests important health concerns of many patients which might be difficult to capture with psychometric questionnaires. Therefore, general practitioners should be aware that many patients experience a psychological crisis due to the isolation.

Limitations

A limitation of the study is the response rate of 55.3%. However, there was no conspicuous difference between the consecutively invited patient sample and the responders. The proportion of patients with depression, anxiety and COVID-19 infection, respectively, was comparatively low, which explains the breadth of the 95% CIs. However, the ORs were rather high. Only patients with internet skills could participate. Many patients answered the open-ended questions with relatively short phrases or words, and given the survey format it is not possible to probe for further clarification. No socioeconomic information was recorded. Patients were interviewed before the second lockdown which lasted considerably longer than the lockdown during the 'first wave'. It is thus to be expected that patients suffered from more psychological constraints after the second long-term lockdown period. Finally, due to time constraints and challenges of coordinating a new study while all researchers were working from home during the pandemic, there was no patient involvement in the survey design or data interpretation.

CONCLUSIONS

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

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Contributors AF, AB and AS conceived of the study and designed the survey. AS was responsible for study coordination with the general practice offices. AS and SK completed the statistical analysis of the quantitative data and contributed relevant summaries for the article. AF completed the qualitative analysis of the data and was responsible for the analysing the quantitative results together with the qualitative

data. AF drafted the paper with assistance and feedback of SM and AB. AS helped with writing. All authors reviewed and approved the final version of this article.

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Competing interests None declared.

Patient consent for publication Not required.

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

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

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