TITLE

The psychological impact of the COVID-19 pandemic on Dutch people with and without an inflammatory rheumatic disease

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ABSTRACT

Objectives To determine the psychological impact of the COVID-19 pandemic on people with and without an inflammatory rheumatic disease and establish whether psychological flexibility buffers this impact.

Methods From online surveys in the general Dutch population in 2018 and during the peak of the COVID-19 pandemic in 2020, we analysed data of people with (index group, n=239) and without (control group, n=1821) an inflammatory rheumatic disease. Worry, stress, mental well-being (SF-36) and psychological flexibility levels were subjected to covariate-adjusted analyses of variance or linear regression analyses.

Results During the peak of the COVID-19 pandemic in 2020, as compared to the control group, the index group was more worried about getting infected with the virus (partial η^2=.098; medium effect) and more stressed (partial η^2= .040; small effect). However, as compared to data acquired in 2018, the level of mental well-being during the COVID-19 pandemic peak was not lower in both groups. Levels of psychological flexibility did not moderate associations of group or year with mental well-being.

Conclusions Although patients with an inflammatory rheumatic disease were more worried and stressed during the peak of the COVID-19 pandemic, their level of mental well-being was not reduced, which may have prevented us from finding a buffering effect of psychological flexibility. Overall, our results suggest that the psychological impact of the COVID-19 pandemic in patients with inflammatory rheumatic disease is modest, which could imply that common education and health care will do for most patients.

KEY WORDS

COVID-19, inflammation, mental health, psychological stress, rheumatoid arthritis, SARS-CoV-2 infection

KEY MESSAGES

- People with an inflammatory rheumatic disease were worried and somewhat stressed during the COVID-19 pandemic.
- Their mental well-being was not reduced during the peak of the pandemic.
- These results could imply that common education and health care will do for most patients.

INTRODUCTION

During its peak months, the outbreak of the SARS-CoV-2 virus and measures that were taken to prevent the illness COVID-19 may have had a particularly high psychological impact on people with inflammatory rheumatic disease, who were considered a high risk group by some national governments [1] and who may have been worried that their disease or immunosuppressive medication increased the risk of getting infected by SARS-Cov-2 [2, 3]. After the peak period, some worry will have been taken away. Preliminary findings after the peak period showed there is little to no evidence that patients with rheumatic and musculoskeletal diseases (RMD) compared to people without RMD, face more risk of contracting COVID-19, nor that they have a worse prognosis when they contract it [4, 5]. Besides the worry of getting infected, other consequences of the pandemic may have had a psychological impact on patients, such as social distance procedures, the lower accessibility of outpatient clinics and health care in some regions, and less outpatient visits because of concern for contagion that may have affected the management of their disease [6].

Researchers expected an increase of anxiety as a consequence of the COVID-19 pandemic among the general population [7]. Indeed, with the outbreak in China, about 50% of the respondents rated the psychological impact of the epidemic as moderate or severe [8]. Another study in China showed that almost 35% of the respondents experienced psychological distress, especially women and elderly [9]. However, psychological consequences will differ between people, because people differ in terms of personality and skills that help dealing with a mental setback [10].

Psychological flexibility[11] is considered key to adapt to challenging circumstances [12, 13]. It refers to the ability to be open to adapt to new situational demands, while being committed to behaviour that is in line with one's own chosen values [10, 11]. Longitudinal findings suggest that psychological flexibility impacts subsequent mental health, and not the reverse [11]. In patients with chronic diseases, psychological flexibility has been shown a resilience factor protecting against the mental burden of the disease [14]. A flexible attitude towards setbacks, like the consequences of a pandemic, aids in adapting to these new situational demands [15]. If psychological flexibility is also shown to buffer the impact of the pandemic, then training of psychological flexibility skills, with procedures derived from acceptance and commitment therapy, may be of use [12, 16]. Therefore, the aim of our study was to determine the psychological impact of the peak of the COVID-19 pandemic on patients with chronic inflammatory rheumatic disease and establish whether psychological flexibility buffers this impact.

METHODS

Participants

Data from two online surveys in the general population were analysed. The first data collection was from November 2018 to May 2019 (year 2018). The second collection started on March, 24th 2020, one day after the Dutch government introduced strict rules and regulations to prevent further spread of COVID-19, and ended at May, 2nd (year 2020). This

latter period was the peak period in the Netherlands in terms of number of hospitalizations, patients on the intensive care, and deaths due to COVID-19 [17]. In the questionnaire, respondents could indicate, among other diseases, whether they had a chronic rheumatic disease other than osteoarthritis or fibromyalgia. In the current study, we compared the last group (index group) to all other participants (control group). We use the label "inflammatory rheumatic disease" to describe the index group that includes the whole spectrum of chronic rheumatic diseases other than osteoarthritis and fibromyalgia. Many patients in this group will have an inflammatory rheumatic disease and use immunosuppressive medications. A patient having osteoarthritis or fibromyalgia next to another rheumatic disease (e.g., rheumatoid arthritis or systemic vasculitis) was also included in the group "inflammatory rheumatic disease". The control group consisted of participants who were healthy or had osteoarthritis, fibromyalgia or any other disease apart from index diseases.

Procedure

Participants were acquired via e-mail and social media, e.g. Facebook, Instagram, LinkedIn, local internet sites, and sites of associations including patient associations for rheumatic diseases and other diseases. The hyperlink to the online survey on individual and group sites was shared by other individuals and groups. Participants filled out the online survey at a secure university website. They self-reported their medical conditions and diseases. Before starting, all participants were informed on the content of the study and their voluntary participation, and signed an informed consent. Adult age (≥18) was the only inclusion criterion. Data collection was anonymous; it is theoretically possible that some persons participated both in 2018 and 2020. This study complies with the Declaration of Helsinki. The online questionnaire studies in 2018 (FETC17-120) and 2020 (FETC20-190) were approved by the Ethics Committee of the Faculty of Social and Behavioural Sciences of Utrecht University.

Materials

Participants of the 2020 sample reported their current level of being worried about getting infected by the virus on a 4-point Likert scale (1 = 'not worried', 2 = 'a little worried', 3 = 'worried', 4 = 'very worried') and their current stress level compared to their normal stress level, on a 5-point Likert scale with the answering categories 1 = 'less stressed', 2 = 'just a little less stressed', 3 = 'not less nor more stressed', 4 = 'just a little more stressed' and 5 = 'more stressed'.

Mental well-being was assessed with the Dutch version of the RAND 36-Item Short Form Health Survey (RAND SF-36) [18]. The SF-36 measures eight aspects of health, of which four reflect mental well-being: Mental health, Role emotional, Social functioning, and Vitality. The scoring method of Hays was used to derive a mental health composite score [19]. This is a normalized score with an average of 50 and a standard deviation of 10 in the general population, the theoretical range is from 11 to 60; a higher mental health composite score reflects better mental well-being [19]. The internal reliability in the current sample was

good; Cronbach's alphas of the four contributing scales was .81.

The FIT-60[20] was used to measure psychological flexibility, which consists of six processes that are presented in a *hexaflex* model [11]. The questionnaire is based on a literature review of psychological flexibility and on four existing questionnaires. The Acceptance and Action Questionnaire (AAQ-II) [21] and the Cognitive Fusion Questionnaire (CFQ-13)[22] were used to assess the committed action and diffusion scales of the hexaflex model, the Five Facet Mindfulness Questionnaire (FFMQ)[23] to assess the contact with the present moment subscale, and the Valued Living Questionnaire (VLQ-2) [24] to assess values. The FIT-60 comprises sixty statements, ten for each component of the hexaflex model. Participants can indicate to what extent this statement applies to them on a 7-point Likert scale, ranging from 0 ('totally disagree') to 6 ('totally agree'). The theoretical range is from 0 to 360 [20]. Higher scores denote more flexibility. The initial psychometric qualities of the FIT-60 showed that the internal reliability was acceptable to good, with Cronbach's alphas ranging from .69 to .87 on the six subscales and an alpha of .95 for the total scale [20]. In the current study we use the total scale score with a Cronbach's alpha of .90.

Statistical analyses

We compared the psychological status of the index and control groups during the two peak months (March and April 2020) of COVID-19 in the Netherlands to examine the hypothesis that the index group was more worried about becoming infected with the virus as well as more stressed by the current situation. The hypothesis was tested using analysis of covariance, while controlling for gender, age, education level, and number of diseases other than an inflammatory rheumatic disease.

In the total population including both samples from 2018 and 2020, we examined whether higher levels of psychological flexibility protect against a reduction of mental well-being, especially in hard times. Four interaction hypotheses were studied. Mental well-being was hypothesized to be extra low 1) in the index group in 2020, because they were told at that time to have a higher risk of getting infected (group × year interaction), 2) in people with lower levels of psychological flexibility in the 2020 sample , because they probably have more difficulty dealing with the more stressful and uncontrollable current situation (psychological flexibility × year interaction), 3) in patients of the index group with lower levels of psychological flexibility, because they are disadvantaged in coping with their disease (group × psychological flexibility interaction), and 4) in patients from the index group having lower levels of psychological flexibility in 2020, because they probably have more difficulty coping with their disorder during a crisis (group × psychological flexibility × year interaction). To examine the associations of mental well-being with *group* (index and control), year of measurement (the years 2018 and 2020) and *psychological flexibility*, linear regression analyses with bootstrapping were performed. In the first model, gender, age, education, and number of diseases were entered as covariates, together with group, year, and psychological flexibility (i.e., total FIT-60 score). To the second model, the two-way interactions year × group, year × psychological flexibility and group × psychological flexibility

were added. In the final model, also the three-way interaction year × group × psychological flexibility was added. Statistical analyses were done using IBM SPSS statistics version 25.0. P-values <.05 were considered statistically significant; all tests were two-sided.

RESULTS

Description of the samples

The study data consisted of cross-sectional assessments in 2018 (n=531) and in 2020 (n=1529), in the index group (n=239) and the control group (n=1821). Only people with complete measurements of mental well-being and psychological flexibility were included. Table 1 shows the demographic characteristics of the samples. Marital status did not significantly differ between the index and control groups (p=.702), but the index group was older (p<.0001), included more women (p=.0002) and more people with lower education (p=.0002), and had a higher mean number of diseases (p<.0001); the occurrence of a skin disease was higher in the index group (p<.0001) and neurological disease (p=.050) and obesity had a higher occurrence in the control group (p=.035).

As compared to the 2018 sample, the 2020 sample was older (p<.0001). The differences in gender was just not significant, with less women (p=.056) in 2020. There were no significant differences in education level (p=.602), marital status (p=.198) or number of diseases (p=.619).

Levels of concern and stress about COVID-19

The top of figure 1 shows the levels of worry about getting infected by the virus in the index and control groups during the peak of COVID-19. About half of the participants in the index group and one third of the control group was worried or very worried. While controlling for gender, age, education and number of diseases, the levels of worrying differed between the index group (estimated marginal mean (M_e)=2.521, SE=.065) and the control group (M_e =2.244, SE=.022, p<.0001), the effect size was medium (partial η^2=.098). Also, the stress levels (Figure 1, bottom) differed between the groups with somewhat more patients of the index group reporting to experience more stress (Figure 1). The covariate-adjusted levels of stress differed between the index (M_e=3.757, SE=.074) and the control groups (M_e=3.703, p<.0001), the effect size was small (partial η^2=.040).

Levels of mental well-being

The covariate-adjusted mean scores of mental well-being per group and year are shown in supplementary file Table S1. The differences with the unadjusted mean scores (table 1) were small. In the first regression model, female gender (p<.0001), higher age (p=.041), having more concomitant diseases (p<.0001), having an inflammatory rheumatic disease (p<.0001), and having a lower level of psychological flexibility (p < .0001) were associated with lower mental well-being (F=367.258, p<.0001, Adjusted R^2=.556). In the second multiple regression model (table 2), the two-way interactions added significant variance to the model (F-change = 2.885, p=.034, Adjusted R^2=.557). The year × psychological flexibility interaction (p=.023)

indicated that the group with high psychological flexibility scored somewhat higher on mental well-being in 2018 than in 2020. Having an inflammatory rheumatic disease approximated significance in this model (p=.079). In the third model (not shown), the added three-way interaction year × group × psychological flexibility was not significant (F-change = 2.456, p=.117, Adjusted R^2=.557).

DISCUSSION

During the two peak months of the COVID-19 outbreak in the Netherlands in 2020, people with an inflammatory rheumatic disease were more worried about getting infected (large effect) and more stressed (small effect) than people without an inflammatory rheumatic disease. However, as compared to scores collected in 2018, the level of mental well-being during the peak of COVID-19 was neither lower for patients with an inflammatory rheumatic disease, nor for those without. Moreover, all analyses rejected the hypothesis that higher levels of psychological flexibility protect against a reduction of mental well-being in hard times and in the group with an inflammatory rheumatic disease that was considered to be more at risk.

About half of the group with an inflammatory rheumatic disease and one quarter of the control group was worried or very worried about the risk of getting infected. For the first group, this could be considered an adaptive reaction to a realistic threat at that time, because it was communicated that people with an inflammatory rheumatic disease had an overall higher risk of getting infected due to their drug-induced suppressed immune system [2, 3]. Worry makes people more cautious, which may cause them to pay more attention to hygienic behaviour including social distancing. In line with earlier findings during the COVID-19 outbreak in China [8, 9], both groups were more stressed than usual, but the index group was only a little bit more stressed than the control group. In the current study, mental well-being of no group was clearly reduced during the COVID-19 peak as compared to the sample of 2018. Thus, it appears that patients with an inflammatory rheumatic disease, on average, show a realistic level of concern without being overly stressed or distressed.

Based on previous studies [11, 15], we hypothesized that psychological flexibility skills would protect against a reduction of mental well-being, especially in hard times (2020 vs. 2018) and in groups that are more at risk, and that particularly the index group in 2020 would have lower mental well-being, because of the consequences of the COVID-19 pandemic. However, not one of these hypotheses was confirmed and one interaction even showed a small, but statistically significant opposite pattern. Overall, our findings do not confirm the notion that psychological flexibility acts as a buffer against impeding consequences of COVID-19 in patients with an inflammatory rheumatic disease.

During the initial outbreak of the coronavirus, people with inflammatory rheumatic disease were considered to be at high risk for getting COVID-19. They should, even more than other people, be aware of the risks and should stay home as much as possible, avoid contact with people with a cold or fever and should contact their general practitioner when showing viral symptoms [25]. Worry is a normal reaction to the threat of contamination. It makes people cautious and prevents them from getting infected. However, in some (very)

worried people, the worry may become excessive and lead to an anxiety disorder. For them a doctor can help in finding appropriate professional help, such as cognitive-behavioural therapy [26]. To prevent excessive worry, people are advised to read and watch trustworthy, fact-based information in the media, instead of the much more common anxiety-provoking information [27]. It is also important to seek and cherish positive social contacts, because it may protect against anxiety [28], to try to adapt to the new situation and to accept it and seek professional help when needed, e.g., by going to the doctor when the disease changes.

A strength of the current study is the time frame in which data were collected. People participated during the two peak months (March and April) of the virus outbreak in the Netherlands. At that time strict safety measurements were set by the government, many people got infected and died, and there was uncertainty about the development of the virus outbreak. Our sample size was large enough to have small margins of error and quite evenly distributed on age and various regions in the Netherlands. It is a limitation that diseases were self-reported and that we did not ask to specify the inflammatory rheumatic diseases. Moreover, instead of a representative sample, our sample was a convenience sample with an overrepresentation of highly educated women. Therefore, caution is needed in generalizing these results. However, analyses were adjusted for differences in demographic variables and number of diseases. Finally, our study only targeted the first peak period of the pandemic in the Netherlands. A third data collection will give us more information about the long-term effects of the pandemic.

This is perhaps the first and only study that examined the psychological impact of the peak of the COVID-19 crisis on people with an inflammatory rheumatic disease. In the media and professional literature, we often hear that the psychological impact of the crisis is huge. We indeed observed that respondents, and especially those with inflammatory rheumatic disease, are worried about getting infected by the coronavirus, and we also observed that respondents experienced more stress than usual at the time of the COVID-19 outbreak. However, we did not observe a lower mental well-being during this peak period of the outbreak of the virus, neither in the index group nor in controls, which may also have prevented us from finding a buffering effect of psychological flexibility, contrary to our expectation. Overall, our results suggest that the psychological impact of the COVID-19 pandemic in patients with inflammatory rheumatic disease is modest, which might imply that common education and health care will do for most patients.

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Figure legend

Figure 1. Percentages of worry and stress levels during the peak period of COVID-19.

Table 1. Characteristics of the index and control groups of the two sample years

Year	Index group n = 239		Control group n = 1821		
	2018 n = 74	2020 n = 165	2018 n = 457	2020 n = 1364	All n = 2060
Age (years)					
Mean (SD)	52.3 (11.7)	51.8 (12.1)	38.8 (14.7)	45.8 (14.7)	45.6 (14.8)
Range	23 - 74	26 - 76	18 - 75	18 - 79	18 - 79
Gender, n (%)					
Men	5 (6.8)	21 (12.7)	86 (18.8)	300 (22.0)	412 (20.0)
Women	69 (93.2)	144 (87.3)	371 (81.2)	1064 (78.0)	1648 (80.0)
Education level*, n (%)					
Low	32 (43.2)	82 (49.7)	159 (34.8)	489 (35.9)	762 (37.0)
High	41 (55.4)	81 (49.1)	295 (64.6)	870 (63.8)	1287 (62.5)
Missing	1 (1.4)	2 (1.2)	3 (0.7)	5 (0.4)	11 (0.5)
Marital status, n (%)					
Single	22 (29.7)	50 (30.3)	132 (28.9)	414 (30.4)	618 (30.0)
In a relation	52 (70.3)	111 (67.3)	303 (66.3)	920 (66.4)	1386 (67.3)
Unknown	0 (0.0)	4 (2.4)	22 (4.8)	30 (2.2)	56 (2.7)
Number of diseases other than an inflammatory rheumatic disease					
Mean (SD)	1.47 (1.45)	1.53 (1.67)	1.14 (1.24)	1.13 (1.22)	1.17 (1.27)
Range	0 - 7	0 - 6	0 - 6	0 - 7	0 - 7
Type of other disease, n (%)					
Osteoarthritis	11 (14.9)	26 (15.8)	58 (12.7)	146 (10.7)	241 (11.7)
Pulmonary	8 (10.8)	29 (17.6)	37 (8.1)	200 (14.7)	274 (13.3)
Skin	11 (14.9)	17 (10.3)	26 (5.7)	46 (3.4)	100 (4.9)
Cancer	2 (2.7)	7 (4.2)	6 (1.3)	31 (2.3)	46 (2.2)
Cardiovascular	13 (17.6)	27 (16.4)	35 (7.7)	211 (15.5)	286 (13.9)
Psychiatric	11 (14.9)	23 (13.9)	60 (13.1)	172 (1.6)	266 (12.9)
Persistent physical symptoms	27 (36.5)	52 (31.5)	167 (36.5)	376 (27.6)	622 (30.2)
Neurological	10 (13.5)	17 (10.3)	48 (10.5)	91 (6.7)	166 (8.1)
Obesity	11 (14.9)	21 (12.7)	36 (7.9)	13.0 (19.5)	198 (9.6)
One concomitant disease	7 (9.5)	20 (12.1)	48 (10.5)	125 (9.2)	200 (9.7)

Two or three concomitant diseases	1 (1.4)	1 (0.6)	0 (0.0)	3 (0.2)	5 (0.2)
Self-report measures, Mean (SD)					
Mental health	37.8 (11.0)	39.5 (10.9)	43.7 (11.4)	43.6 (11.7)	43.1 (11.6)
Psychological flexibility	220.1 (47.5)	220.7 (51.9)	227.1 (45.7)	230.5 (49.8)	228.6 (49.1)

*Education level: low: lower general secondary education or lower; high: higher general secondary education or higher.

Table 2. Linear regression analysis of mental well-being associated with demographics, group[*], year[†] and psychological flexibility[‡].

	B	(SE)	β	t	p Value	95% CI
Constant	10.648	(2.056)		5.650	<.0001	[7.297, 15.578]
Demographics						
Gender	-2.658	(.412)	-.092	-6.063	<.0001	[-3.742, -1.662]
Age	.028	(.012)	.035	2.211	.027	[0.005, 0.045]
Education	-.378	(.388)	-.016	-1.010	.313	[-1.105, 0.416]
Disease number	-2.109	(.161)	-.230	-14.374	<.0001	[-2.443, -1.728]
Group[*]	-4.500	(2.382)	-.124	-1.755	.079	[-9.695, 1.165]
Year[†]	3.426	(1.821)	.129	1.753	.080	[-0.955, 6.645]
FIT-60[‡]	.162	(.008)	.685	21.115	<.0001	[0.143, 0.176]
Year × Group	1.995	(1.044)	.047	1.704	.089	[-0.007, 3.454]
Year × FIT-60	-.019	(.008)	-.180	-2.282	.023	[-0.033, 0.000]
Group × FIT-60	.003	(.010)	.016	.236	.813	[-0.014, 0.021]

*0=control group, 1=index group (people with an inflammatory rheumatic disease
†0=2018, 1=2020
‡FIT-60, Flexibility Index Test
B, unstandardized beta, SE, Standard Error; β, standardized beta; t, t-test statistic; CI, confidence interval of unstandardized beta.
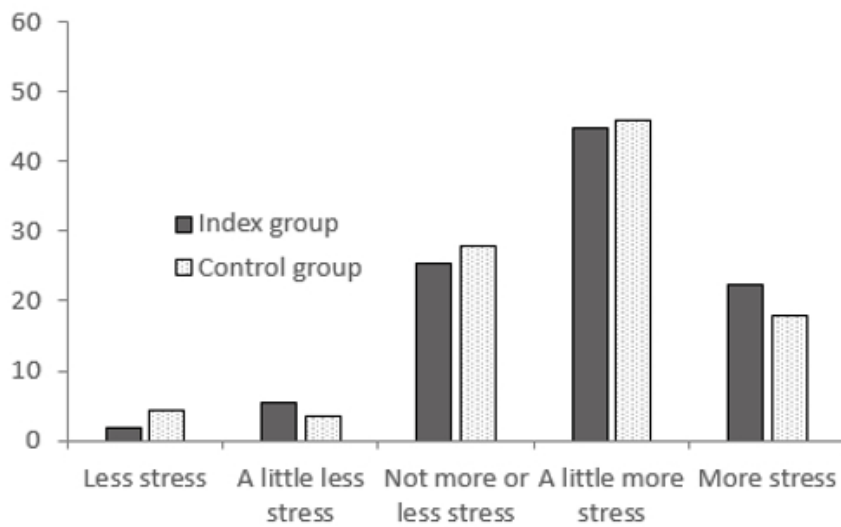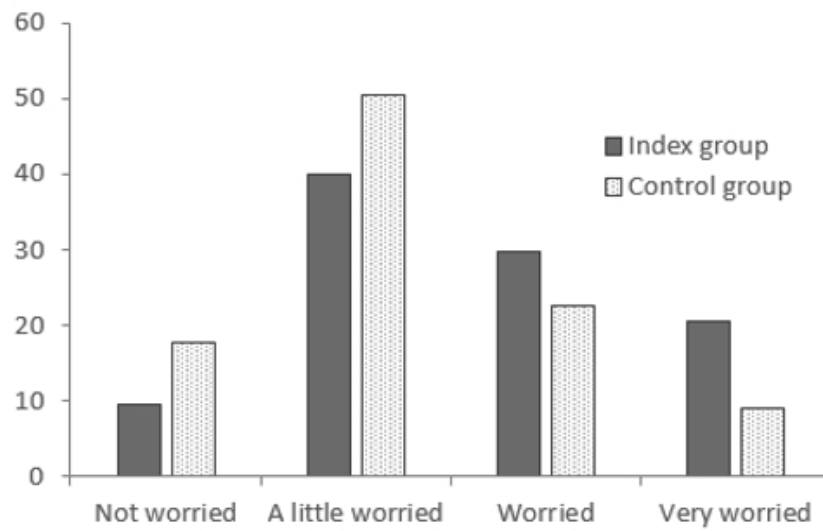
Figure 1. Percentages of worry and stress levels during the peak period of COVID-19.