Chronic Pain Has Little Effect on Physical Condition During the COVID-19 Pandemic in Japan: A Web-based Cross-Sectional Survey

Tomoko Tetsunaga

Department of Orthopaedics, Okayama University Hospital

Tomonori Tetsunaga (✉ tomonori_t31@yahoo.co.jp)

Okayama University <https://orcid.org/0000-0003-4348-9806>

Haruo Misawa

Department of Orthopaedics, Okayama University Hospital

Hironori Tsuji

Department of Orthopaedics, Okayama University

Toshifumi Ozaki

Department of Orthopaedics, Okayama University

Takahiro Tabuchi

Center for Cancer Control and Statistics, Osaka Medical Center for Cancer and Cardiovascular Diseases

Research article

Keywords: Chronic pain, COVID-19, anxiety, insomnia, physical condition

Posted Date: January 5th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-138931/v1>

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Abstract

Background Chronic pain affects people negatively, both mentally and physically. It is unclear how chronic pain affects people during social isolation and remote work due to the COVID-19 pandemic. The aim of this study was to analyze the effect of chronic pain on life during the COVID-19 pandemic.

Methods This retrospective study included 4,972 matched-participants with or without chronic pain (2,311 males, 2,661 females; mean age, 53.8 years). The participants were divided into a chronic pain group ($n=2,486$) and a control group ($n=2,486$). Participants with chronic pain for three months or more were classified into the chronic pain group. All participants completed self-reported questionnaires. Factors related to physical condition during the COVID-19 pandemic were identified by univariate and multivariate analyses.

Results Significant differences were found between participants with and without chronic pain for the pain that developed during the COVID-19 pandemic, lifestyle, interpersonal relationships, psychological factors related to COVID-19, and deterioration of physical condition. Multiple logistic regression analysis identified insomnia, poor work/study/housework performance, and anxiety/depression as factors related to deterioration of physical condition. Chronic pain was not identified as factor related to deterioration of physical condition.

Conclusions The effect of chronic pain on lifestyle and physical condition during the COVID-19 pandemic was limited. The factors related to deterioration of the physical condition were insomnia, poor work/study/housework performance, and anxiety/depression.

Background

As of the end of 2020, more than 80 million people have been diagnosed with Coronavirus disease 2019 (COVID-19) worldwide, and more than 200,000 people have been diagnosed in Japan [1]. Like influenza and tuberculosis, it spreads rapidly through social contact as people move from place to place. Similar to other pandemics that occurred in the past, COVID-19 has negative aspects apart from the disease itself. However, its effects are thought to be even larger in increasingly prosperous and highly productive, urbanized, and interconnected modern societies. The COVID-19 pandemic has led to the need for lifestyle changes, such as social distancing and remote work, with potential effects on both mental and physical. In fact, it is not known what has actually occurred as a result of behavioral changes with the widespread calls for people to restrict their activities due to the spread of COVID-19.

Chronic pain is the leading cause of disability and diminishes quality of life [2]. Chronic lower back pain (LBP) is one of the most common musculoskeletal disorders causing significant limitations of activities of daily living [3]. A lack of ability to continue to cope due to persistent symptoms is a major reason for medical consultation and leads to reduced productivity, work absence, early retirement, and economic losses [4]. Psychological factors play a role in the transition to chronic pain [4–6]. During the COVID-19 pandemic, people have been forced into social isolation, which is reported to have major psychological

impacts [7]. Despite the ongoing need for chronic pain patients to receive medical treatment during the COVID-19 pandemic, there is a possibility that some will not be able to visit a clinic for such treatment. The various mental and physical effects from social isolation and remote work during the COVID-19 pandemic are thought to be large. Although there are many reports about COVID-19, the effect of chronic pain on daily life during the COVID-19 pandemic has not been fully evaluated. In the present study, whether chronic pain affects physical condition during the COVID-19 pandemic was evaluated using data from a large cross-sectional internet survey.

Methods

The internet survey

Participants in the Japan COVID-19 and Society Internet Survey (JACSIS) were recruited by e-mail invitation from panelists who had been registered with a Japanese internet survey agency (Rakuten Insight, Inc., Tokyo, Japan <https://in.m.aipsurveys.com>). This internet research agency has been used in previous studies [8, 9]. The invitation was sent to candidates who were randomly selected from approximately 2.2 million panelists using a computer algorithm from August 25, 2020 to September 30, 2020 (37 days); the selection was consistent with the official Japanese demographic composition as of October 1, 2019 as reported in the Japanese Vital Statistics for each category of age, sex, and living area (i.e., prefecture) [10]. Candidates responded to the web-based questionnaire if they agreed to provide web-based informed consent and intended to participate in the JACSIS. A credit point known as “Epoints”, which could be used for internet shopping and cash conversion, was provided to the participants as an incentive. All procedures were conducted in accordance with the ethical standards of the Helsinki Declaration of 1975, as revised in 2013. Ethical approval was obtained from our institution’s Institutional Review Board. The internet survey agency respected the Act on the Protection of Personal Information in Japan.

Detailed sampling method and participation rate

The targeted final sample size ($n = 28,000$) in the present internet survey was determined based on a statistical presumption (sufficient numbers in each age and sex stratum were needed to estimate the proportion of events) and the available budget for the survey.

The participation rate is defined as the number of respondents who have provided an eligible response divided by the total number of initial personal invitations requesting participation [11]. In the JACSIS, the participation rate was defined as the proportion of the number of participants relative to the final number of invitations. A total of 224,389 invitations were delivered; thus, the participation rate in the JACSIS was $28,000/224,389$ (12.5%). A total of 2,518 individuals showing invalid responses were excluded using the algorithm we developed. This retrospective study recruited 25,482 participants (12,673 males, 12,809 females, 91.0% of the total survey respondents). Of the 25,482 participants in the JACSIS, this retrospective study included participants with chronic pain and a control group. Chronic pain was defined as pain lasting more than three months.

Main outcome measures

Prevalence of chronic pain

Participants were asked if they had experienced chronic pain for three months or more; the responses were based on the following categorical options: “none,” “I have a history of chronic pain but have already recovered”, “yes, receiving treatment”, or “yes, without treatment.” The latter two categories (having chronic pain with or without treatment) were considered as indicating the presence of chronic pain, and the participants were classified into the following two categories: those without chronic pain and those with chronic pain.

Demographic factors

Data on age, sex, body mass index (BMI), and comorbidities (hypertension, diabetes, asthma, cardiovascular disease, stroke, chronic obstructive pulmonary disease, cancer, and depression) were collected.

Socioeconomic factors

Data on the level of education (junior high school, high school, vocational school, junior college, professional school, university, graduate school, or other), family members (living alone, marital partner, children, grandchildren, parents, grandparents, brother and sister, or other), and employment status (independent business, company employee, contract employee, dispatched employee, part-timer, student, or unemployed) were also collected.

Prevalence and incidence of pain

Participants were asked if they had neck or shoulder pain, upper limb pain, back pain, low back pain, or hip or knee pain; for each type of pain, the responses were categorized as follows: “none”, “yes, it developed before the COVID-19 outbreak”, or “yes, it developed during the COVID-19 pandemic.” Based on these responses, the participants were classified based on one of the following two categories: pain beginning during the COVID-19 pandemic and others.

Lifestyle

Data on body weight, sleep hours, insomnia, excluding breakfast, nutritionally balanced meal, disciplined life, sports viewing, going to a gym, and outdoor sports before and after the COVID-19 pandemic were collected.

Psychological factors related to COVID-19

The following were investigated as psychological factors related to COVID-19: whether respondents were afraid of COVID-19; whether respondents became uncomfortable when they thought about COVID-19; whether respondents feared dying from COVID-19; whether respondents developed tension and/or anxiety

with news of COVID-19; whether respondents had insomnia due to worry about COVID-19; and whether respondents had palpitations when they thought about COVID-19.

Changes during the COVID-19 pandemic

The following were examined as changes that occurred with the onset of the COVID-19 pandemic: whether anxiety/depression increased; whether respondents felt isolation; whether respondents went out less because they were worried about what other people think; whether respondents had anxiety about becoming infected with COVID-19 and being criticized by others; whether respondents had been discriminated against in relation to COVID-19; whether respondents felt that they were being under constant surveillance by others with respect to infection prevention; and whether respondents felt anxiety with regard to the behavior of others in relation to infection prevention.

Physical condition during the COVID-19 pandemic

Data on the respondents' physical condition before and after the COVID-19 pandemic were collected.

Statistical analysis

Adjustments for the respondents' demographics and prefecture fixed effects (effectively comparing individuals living in the same prefecture) were made. The demographic characteristics included age and sex. The samples were classified into chronic pain and non-chronic pain groups. Univariate analyses were then conducted between the groups in order to compare demographic factors, socioeconomic factors, pain during the COVID-19 pandemic, lifestyle factors, psychological factors, and the changes during the COVID-19 pandemic. Normally distributed variables were compared using Student's *t*-tests. Chi-squared analysis was performed for categorical variables. Effect sizes (ESs) obtained using Cohen's *d* and Cramer's *V* measures were calculated for the groups. Cohen's *d* values were calculated to evaluate ESs, and ES values of < 0.5 , 0.5 to < 0.8 , and ≥ 0.8 have been suggested to represent small, medium, and large treatment effects, respectively [12]. Cramer's *V* values range from 0 (no association) to 1 (perfect association), and ES values of < 0.1 , 0.1 to < 0.3 , and ≥ 0.3 have been suggested to represent small, medium, and large treatment effects, respectively [13]. Factors associated with the physical condition were identified by univariate analyses comparing participants whose physical condition worsened and those whose physical condition had not worsened. Factors predicting physical condition were identified by multivariate analysis (multiple regression). Potential predictive variables were included in the multivariate model if values of $P < 0.05$ were obtained on univariate analysis. A multiple regression model and 95% confidence intervals (CIs) were used to identify the risk factors affecting physical condition. Differences of $P < 0.05$ were considered significant. Statistical analyses were conducted using SPSS software version 25.0 for Windows (IBM Corporation, Armonk, NY, USA).

Results

Patient background characteristics

Of the 25,482 participants in the JACSIS, this retrospective study included 4,972 participants (2,311 males, 2,661 females). The mean age of the participants at the time of examination was 53.8 years (range, 15–79 years). The characteristics of the participants who were included in the final analysis are shown in Table 1. Participants were divided into two groups based on the presence or absence of chronic pain (Table 2). The chronic pain group consisted of 2,486 participants (1,144 males, 1,342 females), and the control group consisted of 2,486 participants without chronic pain (1,167 males, 1,319 females).

Univariate analyses comparing participants with and without chronic pain

Whether factors related to COVID-19 differed with and without chronic pain were examined by univariate analysis. There were no significant differences in age and sex between the participants with and without chronic pain (Table 2). Although significant differences were observed between participants with and without chronic pain, there were low effect sizes for all pain that occurred during the COVID-19 pandemic, lifestyle during the COVID-19 pandemic, human relationships, psychological factors related to COVID-19, and changes during the COVID-19 pandemic. Similarly, ES was low with deterioration of the physical condition, but among all the factors, it was the only one for which ES was ≥ 0.2 .

Correlations between deterioration of the physical condition and risk factors

The data in Table 2 suggest that physical condition was associated with some of the risk factors. Therefore, factors associated with the physical condition were identified by univariate analyses. Univariate analyses of the deterioration of the physical condition showed low effects in the presence of chronic pain and pain that developed after the COVID-19 pandemic between the two groups (Table 3). The results of lifestyle during the COVID-19 pandemic analyses indicated that physical condition worsened in people with more insomnia than usual. Worsening relationships with family members among human relationships during the COVID-19 pandemic and decreased performance in work, study, and housework were related to deterioration of physical condition. Of the psychological factors associated with COVID-19, physical condition deteriorated in people with increased anxiety/depression compared to before the COVID-19 pandemic or who felt a sense of isolation.

A multiple logistic regression model yielding ORs and 95% CIs was used to identify predictors of deterioration of the physical condition. The model included variables showing a univariate association ($P < 0.05$, $ES \geq 0.3$) with deterioration of the physical condition. In a multiple logistic regression model for deterioration of the physical condition, insomnia, poor work/study/housework performance, and anxiety/depression were identified as factors related to deterioration of the physical condition during the COVID-19 pandemic (ORs, 3.20, 2.40, 2.94, and 1.96, respectively; $P < 0.0001$, Table 4).

Discussion

In this study, the effects of changes in lifestyle with COVID-19 and the COVID-19 pandemic were investigated in people with chronic pain, using the data from a large cross-sectional Internet survey. Chronic pain had little effect on physical condition during the COVID-19 pandemic. The factors affecting

deterioration of the physical condition were insomnia, poor work/study/housework performance, and anxiety/depression during the COVID-19 pandemic.

The spread of COVID-19 has caused the psychological damage, as well as the physical damage. After the COVID-19 pandemic hit, people felt a daily vague sense of anxiety about “when, where, and from whom” they could become infected with this unknown virus. The variety of information obtained from television and the Internet has greatly affected people due to social isolation. In this study, nearly 30% of respondents said that they felt tension and anxiety from news about the coronavirus.

People have spent more time at home in order to socially isolate, and this has increased their housework and childcare burden. With the exception of those continuing to work at their usual place of work, all of the women surveyed were spending more time on housework and childcare than before the COVID-19 pandemic [14]. Social isolation has led to various restrictions, and the stress from having to perform housework and childcare 24 hours a day is immeasurable. Del Boca et al. reported that most of the additional housework and childcare associated with COVID-19 fell on women, whereas childcare activities were more equally shared within the couple than housework activities [14]. In this study, poor housework performance was related to deterioration of physical condition during the COVID-19 pandemic. We consider that the COVID-19 pandemic has provided an opportunity to reconfirm the necessity and importance of expanding family members’ participation in childcare.

Remote working has become the “new normal” after the COVID-19 pandemic. It is not known what people who are working remotely are feeling and what kinds of effects are being produced. Communication with people in the workplace is insufficient, and email, chats, and web meetings have become more frequently used. As a result, progress on the work they should be doing may be slow, greatly increasing working hours. Using survey data from employees working at home during the pandemic, Wang et al. found that virtual work characteristics are linked to worker’s performance and wellbeing [15]. Specifically, social support was positively correlated with lower levels of all remote working challenges; job autonomy was negatively related to loneliness; and workload and monitoring were both linked to higher work-home interference. Receiving social support during the period of working away from the office, for instance, can help remote workers overcome social isolation [16]. Lopez-Leon et al. recommended that remote workers create routines, be organized, have an adequate home office, enhance productivity, be responsible, avoid extreme multitasking, facilitate communication and networking, be balanced, and use available computer programs [17].

Lack of exercise due to remote work has become a major problem. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease [18]. Changes in body weight are inversely correlated with changes in steps per day and moderate or vigorous-intensity exercise during the quarantine [19]. Exercise not only improves physical fitness, but is also associated with higher levels of serotonin [20]. Serotonin has been implicated in the motivational control of behavior. On the other hand, low levels of serotonin due to lack of exercise have been associated with anxiety, depression, and insomnia [21, 22]. Social isolation due to the COVID-19 pandemic may have effects on

sleep rhythms, which play an important role in mental health [23]. In the present study, insomnia was one of the factors affecting the deterioration of the physical condition during the COVID-19 pandemic. Therefore, insomnia should be controlled to improve the physical condition. Daniele et al. reported that sleep deprivation increased depressive behavior, and exercise improved it [20]. This effect is explained by exercise reducing serotonin turnover associated with sleep deprivation [20].

Isolation and social distancing are important risk factors related to mental health [24–26]. The prevalence of stress, anxiety, and depression were reported to be 29.6%, 31.9%, and 33.7%, respectively, in the general population during the COVID-19 pandemic [27]. A considerable proportion of workers experience mood and sleep disturbances during this outbreak, stressing the need to establish ways to mitigate mental health risks and adjust interventions under pandemic conditions [28]. Social distancing and isolation “exit strategies” must account for the fact that, although some individuals will voluntarily or habitually continue to socially distance, others will seek high levels of social engagement as soon as possible [29].

Previous reports have explored the mental health status of patients with chronic pain and compared various psychological metrics in patients with acute versus chronic pain [30]. Pincus et al. examined the transition to chronic pain status and reported finding strong evidence for the role of negative mood (distress or depression) [6]. It has also been reported that depression and sleep disorders, which cause functional impairment [31], can lead to reduced pain thresholds [32]. Avoidance of pain leads individuals to minimize or avoid physical and social activities completely [33]. In the current study, chronic pain patients had little deterioration of the physical condition during the COVID-19 pandemic in Japan. These results were considered to be related to the fact that the participants who had chronic pain were originally in a state close to social isolation by the COVID-19 pandemic and their physical condition had already deteriorated. Therefore, physical condition of the participants who had chronic pain was less affected by the social isolation and remote work due to the COVID-19 pandemic.

The present study has some limitations. First, the survey sample was gathered through a Web-based survey and was thus limited to people with access to the Internet. Therefore, there is a possibility that the survey results cannot be generalized. Even so, differences in age, sex, and demographics were minimized by propensity score matching. The results of this survey are therefore thought to be close to national estimates. Second, this study analyzed participants with chronic pain. However, chronic pain in this study included many pain locations, which included the neck, shoulder, lumbar area, hip, knee, and headache. Therefore, the effects on activity of daily living are thought to have differed depending on the site of pain. Third, chronic pain in this study was defined as pain that had continued for at least three months, and it is not clear whether participants were receiving medication for their chronic pain. In cases when participants were receiving medication, there may have been effects from the lack of pain control. Finally, physical condition, which was taken as an outcome in this study, was assessed subjectively by the participants, and an objective assessment tool was not used. Thus, assessments in this study might be influenced by the participants’ mental state.

Conclusions

Chronic pain patients had little deterioration of the physical condition during the COVID-19 pandemic in Japan. The factors affecting the deterioration of the physical condition were insomnia, poor work/study/housework performance, and anxiety/depression during the COVID-19 pandemic in Japan.

Abbreviations

COVID-19

Coronavirus disease 2019; LBP:lower back pain; JACSIS:Japan COVID-19 and Society Internet Survey; BMI:body mass index; ES:effect size; CI:confidence interval.

Declarations

Ethics approval and consent to participate

This research was approved by the ethics committee of the Okayama University.

Consent for publication

Candidates agreed to provide web-based informed consent.

Availability of data and materials

All data used and analyzed during this study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This study was funded by the Japan Society for the Promotion of Science (JSPS) KAKENHI Grants [grant number 17H03589; 19K10671; 19K10446; 18H03107; 18H03062], the JSPS Grant-in-Aid for Young Scientists [grant number 19K19439], Research Support Program to Apply the Wisdom of the University to tackle COVID-19 Related Emergency Problems, University of Tsukuba, and Health Labour Sciences Research Grant [grant number 19FA1005; 19FG2001].

Authors' contributions

TT1 contributed to the study design, the writing of the paper, and drafting of the manuscript. TT2 participated in the design of the study. HM, HT and TT3 collected and analysed the data. TO reviewed and edited the manuscript. All authors read and approved the final manuscript.

Acknowledgments

We would like to thank Forte for English language editing.

References

1. Holmberg SA, Thelin AG. Primary care consultation, hospital admission, sick leave and disability pension owing to neck and low back pain: a 12-year prospective cohort study in a rural population. *BMC Musculoskelet Disord*. 2006;7:66. doi: 1471-2474-7-66 [pii] 10.1186/1471-2474-7-66 [doi].
2. Murphy MT, Latif U. Pain During COVID-19: A Comprehensive Review and Guide for the Interventionalist. *Pain Pract*. 2020;10.1111/papr.12976. doi: 10.1111/papr.12976.
3. Johns Hopkins University. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. 2020 [updated 30 December 2020. Available from: <https://coronavirus.jhu.edu/map.html>.
4. Chan HN, Fam J, Ng BY. Use of antidepressants in the treatment of chronic pain. *Ann Acad Med Singapore*. 2009;38:974-9.
5. Linton SJ. A review of psychological risk factors in back and neck pain. *Spine (Phila Pa 1976)*. 2000;25:1148-56.
6. Pincus T, Burton AK, Vogel S, et al. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine (Phila Pa 1976)*. 2002;27:E109-20.
7. Ubara A, Sumi Y, Ito K, et al. Self-Isolation Due to COVID-19 Is Linked to Small One-Year Changes in Depression, Sleepiness, and Insomnia: Results from a Clinic for Sleep Disorders in Shiga Prefecture, Japan. *Int J Environ Res Public Health*. 2020;17. doi: 10.3390/ijerph17238971.
8. Tabuchi T, Kiyohara K, Hoshino T, et al. Awareness and use of electronic cigarettes and heat-not-burn tobacco products in Japan. *Addiction*. 2016;111:706-13. doi: 10.1111/add.13231.
9. Tabuchi T, Shinozaki T, Kunugita N, et al. Erratum to 'Study Profile: The Japan "Society and New Tobacco" Internet Survey (JASTIS): A Longitudinal Internet Cohort Study of Heat-Not-Burn Tobacco Products, Electronic Cigarettes, and Conventional Tobacco Products in Japan' [*J Epidemiol* 29 (11) (2019) 444-450]. *J Epidemiol*. 2020;30:55. doi: 10.2188/jea.JE20190317.
10. The Ministry of Health Labour and Welfare. Vital Statistics. 2019 [cited 2020 Nov 12]. Available from: <https://www.e-stat.go.jp/en/stat-search/files?page=1&toukei=00450011&tstat=000001028897>. .
11. The American Association for Public Opinion Research. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 8th edition. 2015.
12. Cohen J. A power primer. *Psychol Bull*. 1992;112:155-9.
13. Cramér H. Mathematical methods of statistics. Princeton, NJ, US: Princeton University Press; 1946. 591- p.

14. Del Boca D, Oggero N, Profeta P, et al. Women's and men's work, housework and childcare, before and during COVID-19. *Rev Econ Househ.* 2020;10.1007/s11150-020-09502-1:1-17. doi: 10.1007/s11150-020-09502-1.
15. Wang B, Liu Y, Qian J, et al. Achieving Effective Remote Working During the COVID-19 Pandemic: A Work Design Perspective. *Appl Psychol.* 2020;10.1111/apps.12290. doi: 10.1111/apps.12290.
16. Bentley TA, Teo ST, McLeod L, et al. The role of organisational support in teleworker wellbeing: a socio-technical systems approach. *Appl Ergon.* 2016;52:207-15. doi: 10.1016/j.apergo.2015.07.019.
17. Lopez-Leon S, Forero DA, Ruiz-Díaz P. Recommendations for working from home during the COVID-19 pandemic (and beyond). *Work.* 2020;66:371-5. doi: 10.3233/wor-203187.
18. Peçanha T, Goessler KF, Roschel H, et al. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. *Am J Physiol Heart Circ Physiol.* 2020;318:H1441-h6. doi: 10.1152/ajpheart.00268.2020.
19. He M, Xian Y, Lv X, et al. Changes in Body Weight, Physical Activity, and Lifestyle During the Semi-lockdown Period After the Outbreak of COVID-19 in China: An Online Survey. *Disaster Med Public Health Prep.* 2020;10.1017/dmp.2020.237:1-6. doi: 10.1017/dmp.2020.237.
20. Daniele T, de Bruin PFC, Rios ERV, et al. Effects of exercise on depressive behavior and striatal levels of norepinephrine, serotonin and their metabolites in sleep-deprived mice. *Behav Brain Res.* 2017;332:16-22. doi: 10.1016/j.bbr.2017.05.062.
21. Deakin JF. The role of serotonin in panic, anxiety and depression. *Int Clin Psychopharmacol.* 1998;13 Suppl 4:S1-5. doi: 10.1097/00004850-199804004-00001.
22. Monti JM. Serotonin control of sleep-wake behavior. *Sleep Med Rev.* 2011;15:269-81. doi: 10.1016/j.smr.2010.11.003.
23. Altena E, Baglioni C, Espie CA, et al. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *J Sleep Res.* 2020;29:e13052. doi: 10.1111/jsr.13052.
24. Assari S, Habibzadeh P. The COVID-19 Emergency Response Should Include a Mental Health Component. *Arch Iran Med.* 2020;23:281-2. doi: 10.34172/aim.2020.12.
25. Horesh D, Brown AD. Traumatic stress in the age of COVID-19: A call to close critical gaps and adapt to new realities. *Psychol Trauma.* 2020;12:331-5. doi: 10.1037/tra0000592.
26. Galea S, Merchant RM, Lurie N. The Mental Health Consequences of COVID-19 and Physical Distancing: The Need for Prevention and Early Intervention. *JAMA Intern Med.* 2020;180:817-8. doi: 10.1001/jamainternmed.2020.1562.
27. Salari N, Hosseini-Far A, Jalali R, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health.* 2020;16:57. doi: 10.1186/s12992-020-00589-w.
28. Pappa S, Ntella V, Giannakas T, et al. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun.* 2020;88:901-7. doi: 10.1016/j.bbi.2020.05.026.

29. Williams SN, Armitage CJ, Tampe T, et al. Public perceptions and experiences of social distancing and social isolation during the COVID-19 pandemic: a UK-based focus group study. *BMJ Open*. 2020;10:e039334. doi: 10.1136/bmjopen-2020-039334.
30. Heitz CA, Hilfiker R, Bachmann LM, et al. Comparison of risk factors predicting return to work between patients with subacute and chronic non-specific low back pain: systematic review. *Eur Spine J*. 2009;18:1829-35. doi: 10.1007/s00586-009-1083-9 [doi].
31. Tarride JE, Gordon A, Vera-Llonch M, et al. Cost-effectiveness of pregabalin for the management of neuropathic pain associated with diabetic peripheral neuropathy and postherpetic neuralgia: a Canadian perspective. *Clin Ther*. 2006;28:1922-34. doi: 10.1016/j.clinthera.2006.11.017.
32. Von Korff M, Dworkin SF, Le Resche L, et al. An epidemiologic comparison of pain complaints. *Pain*. 1988;32:173-83.
33. Lethem J, Slade PD, Troup JD, et al. Outline of a Fear-Avoidance Model of exaggerated pain perception—I. *Behav Res Ther*. 1983;21:401-8. doi: 0005-7967(83)90009-8 [pii].

Tables

Table 1. Characteristics of the sample	
Sociodemographic characteristics	Number of respondents (<i>n</i>=4,972)
Age (years)	53.8±15.5 (15–79)
Sex, female/male	2,661 / 2,311
BMI (kg/m ²)	22.7±3.8 (10.7–55.5)
Family	
Single	957
Marital partner	3,118
Children	1,825
Grandchildren	902
Parents	102
Grandparents	72
Brother and sister	299
Others	73
Education	
Junior high school	79
High school	1,497
Junior college, professional school	1,217
University	1,962
Graduate school	210
Others	7
Employment	
Independent business	387
Company employee	1,617
Contract employee, dispatched employee, and part-timer	943
Students	137
Unemployed	1,888
Chronic disease	

Hypertension	1,508
Diabetes	475
Asthma	728
Cardiovascular disease	360
Stroke	147
Chronic obstructive pulmonary disease	96
Cancer	358
Depression	641
BMI, body mass index	

Table 2. Univariate analyses comparing factors in patients with or without chronic pain				
Variables	Chronic pain		Pvalue	ES
	(+) (n=2,486)	(-) (n=2,486)		
Age (years)	53.7±15.5 (15–79)	53.8±15.6 (15–79)	0.8911 ^a	0.0039 ^c
Sex, female/male	1,342 / 1,144	1,319 / 1,167	0.5131 ^b	
BMI (kg/m ²)	23.0±4.1 (10.7– 55.5)	23.2±3.9 (12.1– 37.8)	<0.0001 ^a	0.1883 ^c
Pain that developed during the COVID-19 pandemic				
Neck/shoulder pain	82 (3.3%)	36 (1.4%)	<0.0001 ^a	0.0607 ^d
Upper limb pain	79 (3.2%)	40 (1.6%)	<0.0001 ^a	0.0512 ^d
Back pain	75 (3.0%)	32 (1.3%)	<0.0001 ^a	0.0595 ^d
Low back pain	94 (3.8%)	47 (1.9%)	<0.0001 ^a	0.0568 ^d
Hip/knee pain	79 (3.2%)	30 (1.2%)	<0.0001 ^a	0.0672 ^d
Lifestyle				
Body weight gain	880 (35.3%)	664 (26.7%)	<0.0001 ^a	0.0934 ^d
Sleep more than usual	236 (9.5%)	195 (7.8%)	0.04 ^a	0.0291 ^d
Insomnia	717 (28.8%)	411 (16.5%)	<0.0001 ^a	0.1465 ^d
Excluding breakfast	137 (5.5%)	83 (3.3%)	<0.0001 ^a	0.0527 ^d
Nutritionally balanced meal	1,947 (78.2%)	2,068 (83.2%)	<0.0001 ^a	0.0628 ^d
Disciplined life	1,934 (77.7%)	2,089 (84.0%)	<0.0001 ^a	0.0804 ^d
Sports viewing	80 (3.2%)	96 (3.9%)	0.2164 ^a	0.0175 ^d
Going to a gym	151 (6.1%)	173 (7.0%)	0.2022 ^a	0.0181 ^d
Outdoor sports	1,212 (48.7%)	1,122 (45.1%)	0.0119 ^a	0.0357 ^d

Human relationships				
Devoted more time to one's family members	603 (24.2%)	504 (20.3%)	<0.0001 ^a	0.0475 ^d
Worsening relationship with partner	150 (6.0%)	108 (4.3%)	0.0075 ^a	0.0379 ^d
Worsening relationship with children	99 (4.0%)	68 (2.7%)	0.0150 ^a	0.0345 ^d
Worsening relationship with family other than partner and children	158 (6.3%)	100 (4.0%)	<0.0001 ^a	0.0524 ^d
Worsening relationship with friends	178 (7.1%)	100 (4.0%)	<0.0001 ^a	0.0681 ^d
Work and/or study performance	2,042 (82%)	2,208 (88.8%)	<0.0001 ^a	0.0959 ^d
Housework performance	2,110 (84.7%)	2,290 (92.1%)	<0.0001 ^a	0.1146 ^d
Find one's life worth living	1,091 (43.8%)	937 (37.7%)	<0.0001 ^a	0.0625 ^d
Psychological factors related to COVID-19				
Fear of COVID-19	1,767 (71.0%)	1,621 (65.2%)	<0.0001 ^a	0.0620 ^d
Uncomfortable thinking about COVID-19	1,489 (59.8%)	1,367 (55.0%)	<0.0001 ^a	0.0489 ^d
Fear of dying from COVID-19	150 (6.0%)	220 (8.8%)	<0.0001 ^a	0.0538 ^d
Tension and/or anxiety with news of COVID-19	725 (29.1%)	656 (26.4%)	0.0309 ^a	0.0306 ^d
Insomnia due to worry about COVID-19	132 (5.3%)	164 (2.6%)	0.0538 ^a	0.0273 ^d
Palpitation when they thought about COVID-19	139 (5.6%)	179 (7.2%)	0.0198 ^a	0.0330 ^d
Changes during the COVID-19 pandemic				
Increased anxiety/depression	584 (23.5%)	336 (13.5%)	<0.0001 ^a	0.1281 ^d
Feeling isolated	500 (20.1%)	311 (12.5%)	<0.0001 ^a	0.1026 ^d
Refrained voluntarily from going out due to the scrutiny of others	532 (21.4%)	340 (13.7%)	<0.0001 ^a	0.1012 ^d
Anxiety about becoming infected with COVID-19 and being criticized by others	563 (22.6%)	369 (14.8%)	<0.0001 ^a	0.0996 ^d
Discriminated against in relation to COVID-19	106 (4.3%)	69 (2.8%)	0.0045 ^a	0.0402 ^d

Feeling to be under constant surveillance by others with respect to infection prevention	547 (22.0%)	337 (13.6%)	<0.0001 ^a	0.1101 ^d
Anxiety with regard to the behavior of others in relation to infection prevention	1,231 (49.4%)	779 (31.3%)	<0.0001 ^a	0.1846 ^d
Deterioration of physical condition	749 (30.1%)	332 (13.3%)	<0.0001 ^a	0.2029 ^d
ES, effect size; BMI, body mass index. Data are expressed as mean ± standard deviation, and range, or number of patients and percentage. ^a Student's <i>t</i> -test; ^b Chi-squared test; ^c Cohen's <i>d</i> ; ^d Cramer's <i>V</i> .				

Table 3. Univariate analyses comparing factors in patients with good or bad physical condition				
Variables	Physical condition		Pvalue	ES
	Good (n=3,891)	Bad (n=1,081)		
Age (years)	54.4±15.4 (15–79)	51.4±15.7 (15–79)	<0.0001 ^a	0.1993 ^c
Sex, female/male	2,018 / 1,873	643 / 438	<0.0001 ^b	
BMI (kg/m ²)	22.6±3.6 (12.1– 55.5)	22.9±4.4 (10.7–51.1)	0.0223 ^a	0.0783 ^c
Chronic pain	1,737 (44.6%)	749 (69.3%)	<0.0001 ^a	0.2033 ^d
Pain that developed during the COVID-19 pandemic				
Neck pain	61 (1.6%)	56 (5.2%)	<0.0001 ^a	0.0983 ^d
Upper pain	64 (1.6%)	55 (5.1%)	<0.0001 ^a	0.0929 ^d
Back pain	53 (1.4%)	54 (5.0%)	<0.0001 ^a	0.1033 ^d
Low back pain	67 (1.7%)	74 (6.8%)	<0.0001 ^a	0.1273 ^d
Hip/knee pain	49 (1.3%)	60 (5.6%)	<0.0001 ^a	0.1209 ^d
Lifestyle				
Body weight gain	1,047 (26.9%)	496 (45.9%)	<0.0001 ^a	0.1692 ^d
Sleep more than usual	303 (7.8%)	127 (11.7%)	<0.0001 ^a	0.0581 ^d
Insomnia	587 (15.1%)	541 (50.0%)	<0.0001 ^a	0.3443 ^d
Excluding breakfast	124 (3.2%)	96 (8.9%)	<0.0001 ^a	0.1142 ^d
Nutritionally balanced meal	3,177 (81.6%)	836 (77.3%)	0.0015 ^a	0.0451 ^d
Disciplined life	3,212 (82.5%)	809 (74.8%)	<0.0001 ^a	0.0809 ^d
Sports viewing	132 (3.4%)	44 (4.1%)	0.2860 ^a	0.0151 ^d
Going to a gym	245 (6.3%)	79 (7.3%)	0.2333 ^a	0.0169 ^d

Outdoor sports	1,837 (47.2%)	496 (45.9%)	0.4389 ^a	0.0110 ^d
Human relationships				
Devoted more time to one's family members	795 (20.4%)	311 (28.8%)	<0.0001 ^a	0.0827 ^d
Worsening relationship with partner	117 (3.0%)	141 (13.0%)	<0.0001 ^a	0.1866 ^d
Worsening relationship with children	70 (1.8%)	97 (9.0%)	<0.0001 ^a	0.1643 ^d
Worsening relationship with family other than partner and children	93 (2.4%)	165 (15.3%)	<0.0001 ^a	0.2394 ^d
Worsening relationship with friends	125 (3.2%)	153 (14.2%)	<0.0001 ^a	0.1964 ^d
Deterioration of work and/or study performance	3,546 (91.1%)	703 (65.0%)	<0.0001 ^a	0.3054 ^d
Deterioration of housework performance	3,655 (93.9%)	743 (68.7%)	<0.0001 ^a	0.3253 ^d
Find one's life worth living	1,434 (36.9%)	593 (54.9%)	<0.0001 ^a	0.1511 ^d
Psychological factors related to COVID-19				
Fear of COVID-19	2,562 (65.8%)	824 (76.2%)	<0.0001 ^a	0.0919 ^d
Uncomfortable thinking about COVID-19	2,095 (53.8%)	759 (70.2%)	<0.0001 ^a	0.1366 ^d
Fear of dying from COVID-19	1,362 (35.0%)	505 (46.7%)	<0.0001 ^a	0.0998 ^d
Tension and/or anxiety with news of COVID-19	970 (24.9%)	411 (38.0%)	<0.0001 ^a	0.1206 ^d
Insomnia due to worry about COVID-19	190 (4.9%)	106 (9.8%)	<0.0001 ^a	0.0858 ^d
Palpitation when they thought about COVID-19	197 (5.1%)	121 (11.2%)	<0.0001 ^a	0.1033 ^d
Changes during the COVID-19 pandemic				
Increased anxiety/depression	483 (12.4%)	437 (40.4%)	<0.0001 ^a	0.2976 ^d
Feeling isolated	441 (11.3%)	370 (34.2%)	<0.0001 ^a	0.2556 ^d
Refrained voluntarily from going out due to the scrutiny of others	542 (13.9%)	330 (30.5%)	<0.0001 ^a	0.1800 ^d

Anxiety about becoming infected with COVID-19 and being criticized by others	601 (15.4%)	331 (30.6%)	<0.0001 ^a	0.1604 ^d
Discriminated against in relation to COVID-19	103 (2.6%)	72 (6.7%)	<0.0001 ^a	0.0898 ^d
Feeling to be under constant surveillance by others with respect to infection prevention	569 (14.6%)	314 (29.0%)	<0.0001 ^a	0.1557 ^d
Anxiety with regard to the behavior of others in relation to infection prevention	1,396 (35.9%)	613 (56.7%)	<0.0001 ^a	0.1751 ^d
BMI, body mass index. Data are expressed as mean $\pm$ standard deviation, and range, or number of patients and percentage. ^a Student's <i>t</i> -test; ^b Chi-squared test; ^c Cohen's <i>d</i> ; ^d Cramer's <i>V</i> .				

Table 4. Multiple logistic regression analysis for physical condition.						
Variables	Partial regression coefficient	Standard error	OR	95% CI		<i>P</i> value
				Lower	Upper	
Insomnia	1.16	0.09	3.20	2.67	3.83	< 0.001
Deterioration of work and/or study performance	0.88	0.11	2.40	1.94	2.97	< 0.001
Deterioration of housework performance	1.08	0.12	2.94	2.33	3.70	< 0.001
Increased anxiety/depression	0.67	0.098	1.96	1.61	2.37	< 0.001
Constant term	-2.13	0.052	0.12	0.11	0.13	< 0.001
OR, odds ratio; CI, confidence interval.						