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Agreement for diagnosis of depression and anxiety between self-assessment with e-questionnaire and psychiatric telephone interview among post-COVID-19 patients

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Abstract:

BACKGROUND: Psychological disorders, such as depression and anxiety, are common among individuals who have experienced coronavirus disease 2019 (COVID-19); however, diagnosis may be challenging and subjected to invalidity. This study aimed to examine agreement between online self-assessment and psychiatric telephone interview among COVID-19 survivors.

MATERIALS AND METHODS: This cross-sectional descriptive study was carried out from March to June 2021 in Afzalipour Hospital, Kerman, Iran. The inpatients confirmed with COVID-19 were contacted within the first week after discharge and were asked to fill the Hospital Anxiety and Depression scale (HADS) and socio-demography questionnaire. They were later interviewed using Hamilton Depression Rating Scale (HAM-D) and Hamilton Anxiety Rating Scale (HAM-A). Agreement between the data extracted from self-report and telephone interview was analyzed using Cohen's kappa coefficient, sensitivity, and specificity.

RESULTS: Out of 200 post-COVID patients, 60 participants completed all assessments. Prevalence of depression was observed to be 88% via telephone interview and 45% via self-assessment. Moreover, 83% of the participants were diagnosed with anxiety according to the telephone interview, in comparison to 31% diagnosed with anxiety using self-report questionnaire. The agreement between online self-assessment and telephone interview for depression and anxiety was not significant ($\kappa = 0.08$ and $\kappa = 0.1$, respectively).

CONCLUSION: The discordance between online self-report and clinician's assessment via phone contact interview indicates that using self-report evaluations is not sufficient as the single assessment tool for mental health monitoring and reflects the need to employ multiple assessments for diagnosis of psychiatric problems in pandemics.

Keywords:

Agreement, anxiety, clinical assessment, COVID-19, depression, self-assessment

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Introduction

The new coronavirus disease 2019 (COVID-2019) started to spread in Wuhan, China in December 2019, and on January 30, 2020, the World Health Organization (WHO) announced the COVID-19 outbreak as a public health emergency of international concern due to its rapid spread and high rates of morbidity and mortality.[1] Although the virus mainly affects the respiratory system, multiple organs and systems may be involved through inflammatory responses and psychosomatic complications.[2,3] Widespread nature of the virus, rapid

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transmission, high rates of mortality,[4] absence of definitive treatments, physical distancing and lockdowns, shortage of clinical facilities, a sudden change in the routine lifestyle,[5] social distress, and financial insecurity[6] have left psychologic impacts on patients and general population, mainly appearing as depression, anxiety, and trauma distress.[7] About 27.3% of the general population are assumed to have significant levels of mental distress during COVID-19 outbreak[8] and the prevalence of mental health complications is estimated to be 22.12% for depression and 21.63% for anxiety in the general population.[9] Infectious and respiratory diseases are known to be correlated with long-term psychopathologic outcomes,[10] as about 56% of the survivors experience at least one emotional distress (28% post-traumatic stress disorder (PTSD), 31% depression, 42% anxiety, 20% obsessive–compulsive symptoms, and 40% insomnia).[3] Besides, major depression and anxiety are associated with years of life lived with disability[11] and may lead to life-threating behaviors such as suicide.[12] Therefore, screening patients and survivors for mental health symptoms and further interventions are crucial for controlling COVID-19 outbreak efficiently.[13]

Self-assessment questionnaires are useful tools to identify individuals with psychiatric disorders as they provide a broad spectrum of responses and are easy to obtain, quick to collect, and not demanding to close contact.[14] However, they are sometimes considered to be invalid and unreliable due to various issues including construct and content validity and self-reporting bias (recall bias due to forgetting past events and social desirability bias regarding stigma and stereotype of infectious diseases).[15-17]

Considering the importance of public mental health during infectious pandemics and on the other hand, controversy in terms of self-assessment tools' accuracy and also emerging need to develop safe and effective tools for screening population mental health status, the question arises whether the available assessments are of sufficient validity and reliability, and therefore, the present study was aimed to evaluate the prevalence of depression and anxiety using a self-assessment tool and phone contact interview and then compare the extent of agreement between the two methods.

Materials and Methods

Study Design and Setting

This cross-sectional descriptive study was carried out from March to June 2021 in Afzalipour Hospital, which is an educational hospital affiliated to Kerman University of Medical Sciences and serves as the central medical center for COVID-19 patients in Kerman province, Iran.

Study Participants and Sampling

A total of 350 participants entered the study through convenience sampling. During the period of the study and every 2 days, data of COVID-19 inpatients discharged within the past 7 da ys was extracted from the hospital records. The criterion for considering individuals as COVID-19 positive was a polymerase chain reaction (PCR) test confirmation. The individuals received a phone contact within the first week after discharge and a resident of psychiatry (H. G.) explained them the goals and method of the study. Finally, the patients with at least 8 years of education, who had access to smartphones, had no previous history of mental disorders, and agreed to participate entered the study through convenience sampling.

Data Collection Tools and Technique

For self-reported evaluations, a Persian version of Hospital Anxiety and Depression Scale (HADS) was employed.[18] This questionnaire consisted of 14 items, seven items for anxiety (Cronbach's $\alpha = 0.7$) and seven items for depression subscale (Cronbach's $\alpha = 0.85$). Answers to each item were scored from 0 to 3, and the maximum score for either anxiety or depression was considered to be 21. Scores more than 11 were considered as a severe condition, 8–10 as borderline, and 0–7 as normal.[19] The questionnaire consisted of two parts: I sociodemographic questions (age, sex, education, and marital status) and II HADS questionnaire. A Google Doc form including both parts was created (the link given below) and the generated link of the study was sent to the participants via WhatsApp.[20] The form could be registered if the participants gave an answer to each item.

Link for questionnaire:

https://forms.gle/o6n8x1gDsYCvWizB6

Finally, after 2 days, the psychiatric resident video called the eligible participants who had filled the first questionnaire. This interview was aimed to evaluate the presence and severity of depression and anxiety by using Hamilton Depression Rating Scale (HAM-D) and Hamilton Anxiety Rating Scale (HAM-A), respectively. The 24-item version of HAM-D measures the severity of depressive symptoms; the first 17 items indicate the depression overall score and the remaining seven items provide more details about the condition. Each item is scored from 0 to 4 (mild to severe) and the maximum score is 52. Scores from 0 to 7 are indicative of normal condition, from 17 to 23 as moderate, and from 24 to 52 as severe depression.[21] The severity of anxiety symptoms is usually measured by HAM-A. The scale includes 14 items, with each item scored from 0 to 4 (absence of symptom to severe symptom) and the maximum score being 56. An overall score less than

17 shows mild anxiety and 25–30 shows moderate to severe condition.[22]

Data Analysis

Scores to each question and the overall score for each participant were measured and entered into Statistical Package for the Social Sciences (SPSS) 25. Severity of depression and anxiety assessed by HADS and HAM-A/HAM-D were described using descriptive statistics. Degree of agreement between self-report and clinician assessment was evaluated by analyzing Cohen's kappa coefficient, sensitivity, and specificity.

Ethical Considerations

The study protocol was approved by the Ethics Committee of Kerman Medical University (IR.KMU.AH.REC.1399.108). The study was blinded, and patients' personal information was extracted and coded by the researcher under the supervision of contagious diseases office in Afzalipour Hospital. The patients were free to participate and had the choice to exit whenever they wished. Patients were assured of their personal data confidentiality and announced their consent verbally if they were willing to participate.

Results

In this study, 350 post-COVID patients were contacted and 200 patients agreed to participate in the self-reporting assessment. Of the 200 self-rated patients, 60 respondents filled the demographic questionnaire and HADS and were therefore interviewed by the clinician. Table 1 shows the demographic characteristics of the study participants answering both HADS and HAM-A/HAM-D questionnaires.

Table 1: Demographic characteristics of the participants answering both HADS and HAM-A/HAM-D questionnaires (*n*=60)

Variable	*n* (%)
Gender, male (%)	35 (58.3)
Age in years, mean (SD)	45.4 (13)
Education, (%)	
<8 years	14 (24)
8-12 years	16 (26)
>12 years	30 (50)
Married (%)	50 (83)

HADS=Hospital Anxious and Depression Scale, HAM-A=Hamilton Anxiety Rating Scale, HAM-D=Hamilton Depression Rating Scale, SD=standard deviation

Table 2: Descriptive data of depression diagnosis using HAM-D and HADS

	Telephone interview (HAM-D)	Self-report (HADS)
Mean score (SD)	17.9 (7.5)	6.3 (3.9)
Severity of depression		
Mild	21 (35%)	19 (31.7%)
Moderate	17 (28.3%)	8 (13.3%)
Severe	15 (25%)	0

HADS=Hospital Anxious and Depression Scale, HAM-D=Hamilton Depression Rating Scale, SD=standard deviation

Table 3: Descriptive data of depression diagnosis using HAM-A and HADS

	Telephone interview (HAM-A)	Self-report (HADS)
Mean score (SD)	15.8 (9.8)	5.6 (4.1)
Severity of anxiety		
Mild	21 (35%)	9 (15%)
Moderate	13 (21.7%)	8 (13%)
Sever	16 (26.7%)	2 (3.3%)

HADS=Hospital Anxious and Depression Scale, HAM-A=Hamilton Anxiety Rating Scale, SD=standard deviation

Depression Assessment

Out of the 60 participants included, 53 (88%) individuals were diagnosed with depression based on HAM-D telephone interview and 27 (45%) were depressed based on the online self-assessment [Table 2]. Considering the severity of depression based on the scoring scale explained earlier, 21 (35%) participants were categorized as mildly depressed and 32 (53%) as having moderate to severe depression. According to the online self-assessment, 19 (31%) had mild depression and 8 (13%) had moderate depression.

Anxiety Assessment

Telephone interview (HAM-A) revealed that 50 individuals (83%) in the study sample were anxious, while 19 participants (31%) had anxiety based on online self-report [Table 3]. Regarding the severity of the condition, 29 participants (48.4%) were categorized to have moderate to severe anxiety using HAM-A interview; however, 10 (16.3%) of them were known to be moderately to severely anxious based on self-assessment.

Agreement Analysis

The results showed that there was no agreement between the telephone interview and online self-assessment ($\kappa = 0.08$). Self-assessment (HADS) showed a sensitivity of 49% and specificity of 86% for screening depression compared to clinical assessment using HAM-D.

Also, the agreement to diagnose anxiety using HADS and HAM-A methods was not statistically meaningful ($\kappa = 0.1$). Sensitivity and specificity for self-assessment tool compared to HAM-A was reported to be 36% and 90%, respectively.

Discussion

Pandemics like Middle East respiratory syndrome (MERS), H1N1 flu, and severe acute respiratory syndrome (SARS)

[23] have shown to leave several mental problems in survivors even years after their outbreak; more frequently, they cause conditions such as posttraumatic stress disorder, panic disorder, obsessive–compulsive disorder, depression, and anxiety.[24-26] COVID-19 is also not an exception and such psychopathological consequences may happen following nervous system infection, immunological responses, or social distress (lockdown, stigmatization, and stereotype).[6,27-29] Efficient control of the COVID-19 pandemic is not just saving the lives, but also decreasing the burden of noncommunicable diseases such as depression and anxiety.[4] However, rapid transmission of COVID-19 causes several problems found by routine mental health assessments. Self-reporting assessments have shown to be acceptable means in previously described conditions,[7] although some argue the validity and reliability of such tools.[15]

The present study investigated the extent to which a self-rating tool can reflect the actual mental state of post-COVID patients by evaluating the degree of agreement between HADS as the self-reporting tool and HAM-A/HAM-D as the clinician assessment.

Self-report Questionnaire for Diagnosis of Depression and Anxiety

In non-COVID settings, the mean prevalence of depression in hospitalized patients has been reported to be 12%–32% and in SARS or MERS pandemic, it is 32.6%–40.9%.[23] Our findings are in agreement with the results of this systematic review, as of all our participants, 45% were depressed based on the online self-assessment (31% with mild and 13% with moderate depression). The frequency of anxiety in respiratory pandemics is estimated to be about 35.7%;[23] however, we observed that 16.3% of the participants were diagnosed with moderate to severe anxiety. In a study conducted on Turkish population to evaluate depression and anxiety during COVID-19 pandemic using HADS questionnaire, 23.6% of the population were depressed and 45.1% were anxious.[30] It is notable that the Turkish research has studied the general population and not COVID-19 patients or survivors. A similar study in Turkey considered confirmed COVID-19 cases and the findings using HADS inventory were as follows: 34.9% of the participants had anxiety and 42% of patients had depression symptoms.[31] Another study to investigate the mental health status in Chinese COVID-19 patients revealed that on using HADS questionnaire, 34.72% and 28.47% of hospitalized patients showed symptoms of depression and anxiety, respectively.[32] Mean age, gender, duration of hospitalization, residency in urban areas, cultural factors, and economic difficulties are demographic variables that may cause variations in the findings of different studies and must be concerned while comparing the reports.

Clinical Assessment for Diagnosis of Depression and Anxiety

Based on clinician assessment in this study, slightly more than half of the participants were moderately to severely depressed and a similar proportion had moderate to severe anxiety. These results are consistent with the results of a recent meta-analysis which assessed the prevalence of depression and anxiety in COVID-19 patients. It reported that the pooled prevalence of depression was 45% and the pooled prevalence of anxiety was 47%.[33] Our findings suggest that the prevalence of depression and anxiety increases in COVID-19 patients compared to the general population. A Chinese study has compared HAM-A and HAM-D scores in COVID-19 patients and healthy volunteers and has shown that HAM-D and HAM-A total scores are significantly higher in COVID-19 patients compared to general pneumonia patients and healthy control group (5.96 vs. 2.77 and 1.47 for depression and 7.85 vs. 4.29 and 1.60 for anxiety, respectively).[34] Considering health-care staff (HCS) and non–health-care staff (NHCS), a recent report using HAM-A and HAM-D scales has demonstrated that the prevalence of anxiety and depression is 25.5% and 12.1%, respectively, in HCS and 20% and 8.2%, respectively, in NHCS.[35]

Agreement Between Self-report and Clinician Assessment

The findings demonstrated that there is little agreement between HADS and HAM-A/HAM-D, suggesting that HADS cannot be employed as a single tool to diagnose depression and anxiety or estimate the severity of the condition in COVID-19 setting. Overreporting and underreporting in self-reported assessment have been previously discussed. Self-report Internet Gaming Disorder (IGD) assessment in Korean adolescents revealed that false-negative and false-positive rates for psychological characteristics, including anxiety, were 44% and 9.6%, respectively.[36] Another study investigating the agreement between self-report and chart data of depression showed it to be low ($\kappa = 0.4$). Sensitivity and specificity of the self-report scale were also low (0.74 and 0.72, respectively).[37] However, a recent study on Japanese population showed that HADS has adequate validity and reliability related to the fear of COVID-19.[38] This difference may be because general population was considered in this study. Also, the version of inventory used in this study was not the same as ours. Another study on Iranian population to develop and validate a psychometric scale indicated that HADS is positively correlated with anxiety, depression, and fear of COVID-19; however, this study did not examine the HADS outcomes according to other valid assessment tools.[39] One explanation to inconsistency of HADS in this study

might be the participants' mean age; the participants were averagely 45.4 years and this age group might have found using smartphone and being assessed in cyberspace non-engaging. On the other hand, Iranian population, particularly those in rural areas, are not used to telemedicine approaches and this might adversely affect the assessments outcomes.

Limitations and Recommendation

Although a validated translated version of the inventories was used, the threshold scores come from existing literature and may not exactly represent the domes tic condition of Iranian inpatients. The present survey was carried out in the central COVID-19 hospital in Kerman province with the highest number of patients, and due to confidentiality regulations, just one individual was allowed to access patients' information. Therefore, the working load of data collection limited the pace of data analysis and interpretation. On the other hand, a noticeable proportion of the participants were from rural areas and did not have access to Internet connection, which made it more time consuming to follow-up the patients.

Conclusion

The results demonstrated that there is not sufficient agreement between depression and anxiety online self-reporting and clinician assessment in COVID-19 survivors. These disagreements indicate the need to carry out multiple assessments of psychiatric problems in pandemics and the risk of outcomes inconsistency in case of relying solely on self-report assessments. The authors suggest that the pattern of severity and prevalence of depression and anxiety in COVID survivors may change over the time; therefore, patients' follow-up and routine assessments in regular intervals may generate valuable knowledge about pandemic emotional outcomes. Furthermore, other variables exist that could affect the overall findings, for example, variables such as patients' past history of mental health, duration of hospitalization, family condition, public perspective, and financial income. The authors recommend to consider these correlates in longitudinal future studies with larger samples.

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Ethics

When reporting studies on human beings, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/17-c_e.html). For prospective studies involving human participants, authors are expected to mention about approval of (regional/ national/ institutional or independent Ethics Committee or Review Board, obtaining informed consent from adult research participants and obtaining assent for children aged over 7 years participating in the trial.

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Conflicts of interests

There are no conflicts of interests.

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