

Psychometric properties of the Illness Attitude Toward COVID-19 Scale (IATCS)

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Introduction

On the 11th of March 2020, the World Health Organization (WHO) declared the novel coronavirus (COVID-19) a global pandemic due to the rapid transmission of the virus between individuals, the absence of an approved vaccine to cure the virus or any particular antiviral treatment, and its life-threatening impacts on the physical and mental health of patients (Chu *et al.* 2020; He *et al.* 2020; Huang *et al.* 2020). Several cross-cultural research studies have been performed to examine the mental health of people with suspected and confirmed cases of COVID-19 and describe their attitudes and experiences with regard to the pandemic (Chen 2020; Holshue 2020; Xiang *et al.* 2020). Other studies aim to measure the impact of isolation, quarantine, and lockdown on individuals' psychological health and well-being (Dong and Bouey 2020; Gao *et al.* 2020; Ho *et al.* 2020; Jung and Jun 2020; Keesara *et al.* 2020; Tanhan *et al.* 2020; Torales *et al.* 2020).

Questionnaires that measure hypochondriasis and related psychopathological behaviours have been designed as part of many studies (Barsky *et al.* 1986b; Kellner *et al.* 1992; Pelletier *et al.* 2002; Pilowsky 1967; Speckens *et al.* 1996). Pilowsky (1967) constructed a binary self-report questionnaire called the Whitley Index (WI). This was the first instrument designed to assess hypochondriasis.

The factor analysis of the instrument uses three subscales (disease phobia, bodily preoccupation, and conviction of the presence of disease with non-response to reassurance). In addition, the findings showed that WI scores were higher among patients

who were receiving treatment for malignant disease than among other individuals from the general population who were not receiving any treatment. A study by Barsky *et al.* (1986a) conducted among general medical outpatients showed that there was a significant

correlation between the three subscales of the WI. Out of the 14 items on the WI, the mean scores of nine of those items were similar for general practice patients and medical outpatients. Furthermore, the study by Barsky *et al.* (1986b) showed that hypochondriasis, somatic symptoms, and a number of other medical diagnoses could predict medical utilisation. Ferguson and Daniel (1995), who conducted a study among 101 undergraduate students, argued that the Illness Attitude Scale (IAS) had a four-factor structure: thanatophobia, symptoms experience and frequency of treatments, general hypochondria, and fear of coronary heart disease and associated preventative health habits.

In 1986, Kellner designed the IAS, which consists of nine subscales that measure abnormal illness behaviour, fears, and attitudes and concerns associated with hypochondriacal beliefs. Then, Kellner *et al.* (1992) conducted a study among a sample of 100 general practice patients

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(nonpsychotic and psychiatric) and matched outpatients using two subscales of the WI (fear of disease and disease conviction) and two subscales of the IAS (disease phobia and hypochondriacal beliefs). The study findings demonstrated that there was a significant intercorrelation between all of the hypochondriasis scales.

Many researchers (Ferguson and Daniel 1995; Hadjistavropoulos and Asmundson 1998; Speckens *et al.* 1996; Stewart and Watt 2000) used the IAS scale to test their hypotheses and answer their enquires. Speckens *et al.* (1996) administered a Dutch translation of the IAS and conducted a study among 447 participants to measure the reliability and validity of the following instruments: the IAS, the Somatosensory Amplification Scale (SAS), and the WI. The outcomes of the study demonstrated consistency within the factorial structure of the IAS as well as between two of its subscales, namely illness behaviour and health anxiety, in all of the samples. Furthermore, there was a significant intercorrelation between the three questionnaires, and internal consistency and stability among them was also satisfactory. Speckens *et al.* concluded that there might be a relationship between medical care utilisation and hypochondriasis because the scores for the WI and health anxiety subscale of the IAS were significantly higher for general population subjects than for general practice patients or general medical outpatients. Dammen *et al.* (1999) administered a Norwegian translation of the IAS and conducted a study among 199 cardiological outpatients using principal component analysis (PCA) and varimax rotation to determine the numbers within the factor solution. The study found three factors: health habits, health anxiety, and illness behaviour. However, Hiller *et al.* (2002) distributed a German translation of the IAS to a mixed group of patients with psychophysiological and mental disorders to determine the number of factors applicable. The study found seven factors after using a two-factor solution.

Stewart and Watt (2000) conducted a study among 197 undergraduate university students which looked at the hierarchical factor structure of the IAS and tested the relationship between a set of anxiety-related measures related to each illness attitude. Based on oblique (Oblimin) rotation analysis, the findings of the study revealed that the IAS score is best conceptualised at the lower order level for the following factors: illness-related

fears, behaviour, beliefs, and effects. At the higher-order level, the IAS score was unifactorial for the general hypochondriacal concerns factor. Furthermore, anxiety sensitivity was strongly associated with both the lower-order factors, such as beliefs, fears, and effects, and the higher-order factor, such as the general hypochondriacal concerns.

Pelletier *et al.* (2002) argued that most instruments designed to detect symptoms of hypochondriasis aimed to measure specific behaviours not beliefs and were unable to measure erroneous health beliefs. These existing instruments were also unable to measure the general health beliefs of excessive health worriers because they only had the potential to assess beliefs around having an illness. In addition, Pelletier *et al.* (2002) argued that currently researchers had false beliefs about worry in people with general anxiety disorder (GAD) who, similar to individuals with hypochondriasis symptoms, held erroneous beliefs that could lead to worries about illness. Therefore, Pelletier *et al.* highlighted the essential need to construct instruments about symptoms of hypochondriasis that measure erroneous beliefs relating to worry about health. The Why do people worry? (WW) questionnaire is insufficient to accurately assess beliefs related to health worry, even though it assesses beliefs associated with general worries in people with sufficient psychometric symptoms. Pelletier *et al.* (2002) conducted a study among 429 non-clinical participants (French-speaking university students) to explore the following aspects of the Why do people worry about health? (WW-H) questionnaire and the General Health Beliefs Questionnaire (GHBQ): temporal stability; the convergent, factorial structure; and criteria and divergent validities. Participants of the study received five questionnaires: Beck Anxiety Inventory (BAI), Illness Worry Scale (IWS), Beck Depression Inventory-short form (BDI-short form), WW-H, and the GHBQ. To test the stability of the WW-H and the GHBQ over time, the questionnaire was distributed again to the same students three weeks after the first administration took place. Findings of the study demonstrated excellent internal consistency for the WW-H ($\alpha = .90$) and the GHBQ ($\alpha = .80$). A correlation between the WW-H and the GHBQ was found ($r = 0.49$). There was also a correlation between the WW-H and the IWS, which measures tendency to worry ($r = .49$), a correlation between the GHBQ and the IWS ($r = .50$), which revealed an adequate validity for the

WW-H and the GHBQ questionnaires, and a satisfying temporal stability after the second administration of the WW-H ($r = .71$) and the GHBQ ($r = .70$). Additionally, Pelletier *et al.* (2002) detected a significant difference between the means of the moderate worriers ($M = 23.8$, $ET = 8.56$) and the means of the high worriers ($M = 27.3$, $ET = 8.59$) in the WW-H [$F(1,181) = 23,129$, $p < 0,001$]. These outcomes showed that the association between false beliefs, general health beliefs, and worry about health is more often found in high worriers than in moderate worriers.

Crössmann and Pauli (2006) distributed the IAS among a German sample that consisted of a mixed group of students (296) and a mixed group of patients (130), using exploratory factor analysis to analyse the IAS factor structure. In the student sample, the PCA detected a four-factor solution: hypochondriacal beliefs, fear of illness and death, effect of symptoms, and treatment experience. However, a two-factor solution (effect of symptoms and treatment experience and health-related anxiety) was best in explaining the data of the patient sample. Furthermore, the study showed that there was acceptable to good reliability coefficients for all scales. The scales from the study sample (students and patients) were able to distinguish between pain patients and a matched group of normal controls.

Luo *et al.* (2014) carried out a study among 282 Chinese university students to examine the validity of the IAS by distributing a survey that contained three questionnaires: the Plutchik-van Praag Depression Inventory (PVP), the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ), and the IAS. The study found a four-factor structure for the IAS in Chinese culture: symptom effect, hypochondriacal belief, patho-thanatophobia, and treatment seeking. In addition, the findings showed that women reported higher scores than men for the following: PVP, neuroticism-anxiety (ZKPQ), treatment seeking and patho-thanatophobia (IAS). There was a significant correlation between patho-thanatophobia, symptom effect and neuroticism-anxiety, and a positive correlation between symptom effect and PVP among female participants. In male participants, there was a significant correlation between patho-thanatophobia and neuroticism-anxiety. Symptom effect was significantly correlated with impulsive sensation seeking and activity.

Ahorsu *et al.* (2020) developed the Fear of COVID-19 Scale (FCV-19S), which contains seven items based on the following methodological procedures: interviewing 717 Iranian participants; revision and evaluation of an expert physician, psychiatrist, and psychologist; and examining scales on fears. In order to obtain a satisfactory assessment on the seven items of the FCV-19S scale, participants' responses were set on a four-point Likert scale, and the Rasch model and classical test theory were used. To evaluate participants' levels of depression and anxiety, the Persian version of the Hospital Anxiety and Depression Scale (HADS) was used, and the Perceived Vulnerability to Disease Scale (PVDS) was used to evaluate participants' sensitivity to infectious disease. The findings of a study by Ahorsu *et al.* (2020) show that there was a significant correlation between the seven items of the (FCV-19S) scale (0.66) and the internal consistency of the reliability values ($\alpha = .82$). Wang *et al.* (2020) conducted a longitudinal study of 1,738 respondents from 190 Chinese cities during the initial outbreak and peak of the COVID-19 pandemic. The Depression, Anxiety, and Stress Scale (DASS-21) and the Impact of Event Scale-Revised (IES-R), which measures PTSD symptoms, were used to measure changes in mental health status and levels of psychological impacts, such as depression, stress, and anxiety, among the general population in China. Wang's study outcomes reveal that during the initial evaluation of respondents' mental health status, there were no significant longitudinal changes in the levels of psychological impact among the participants. Moreover, Wang's study outcomes detect that respondents' PTSD symptoms for the first and second surveys were above the cut-off scores, and the mean scores of the IES-R reduced at the pandemic's peak (after four weeks). Many participants also reported in the second survey that they underwent a home quarantine compared to the participants in the first survey, whereas few participants reported physical symptoms, such as cough, sore throat, headache, chills, or getting physician consultations, in the second survey. Moreover, Wang's study findings detected that there was a significant association between the mean scores of DASS-21 and reported gastrointestinal and physical symptoms, such as difficulty breathing and coughing, among participants in the second survey that was absent in the first survey. A quantitative and qualitative

study by Hao *et al.* (2020) was performed with 30 Chinese participants (patients with acute COVID-19 infection, psychiatric patients, and healthy controls) during the COVID-19 pandemic to examine the impact of the pandemic on participants' neuropsychiatric and mental health well-being. The following scales were used to detect the psychological impact of the COVID-19 outbreak: Depression, Anxiety and Stress Scale (DASS-21), Impact of Event Scale-Revised (IES-R), and Insomnia Severity Index (ISI). The findings of the study demonstrate that the pandemic has a significant impact on COVID-19 patients' physical symptoms (60 per cent) compared to psychiatric patients (30 per cent) and healthy control participants (0 per cent). Moreover, there was a significantly higher association between reported psychological symptoms, such as worry, among COVID-19 patients (40 per cent) and psychiatric patients (20 per cent) than among healthy control participants. A mild level of impulsivity was reported by 50 per cent of COVID-19 patients compared to 20 per cent of psychiatric patients who reported moderate to very serious levels of impulsivity. Moreover, the findings by Hao *et al.* (2020) illustrate that the COVID-19 pandemic has a significant impact on participants' sleep quality, with half (50 per cent) of COVID-19 patients experiencing insomnia and sleep disturbances compared to 30 per cent of the psychiatric patients, and 0 per cent of the healthy control participants. The DASS-21 subscores for anxiety, depression, and stress were higher among COVID-19 and psychiatric patients compared to healthy control participants, and psychiatric patients reported higher scores of anxiety and depression than COVID-19 patients.

Significance of the study

Since the emergence of COVID-19, several cross-cultural studies have been conducted to assess the negative impact of the pandemic on individuals' psychosocial and mental health conditions (Brooks *et al.* 2020; Chu *et al.* 2020; He *et al.* 2020; Huang *et al.* 2020; Shigemura *et al.* 2020; Yi *et al.* 2020). These studies illustrated that patients with a confirmed or suspected case of COVID-19 reported high scores on anxiety, irritation, depression, obsessive compulsion, and psychoticism.

Under exceptional circumstances, such as the COVID-19 pandemic, it is important to under-

stand the psychological processes that individuals experience in order to maintain and protect their mental health conditions and psychological well-being through effective psychological interventions (Holmes *et al.* 2020). The psychological flexibility model aims to predict the significant effect of exceptional conditions, such as the COVID-19 pandemic, on individuals' psychological well-being through understanding individuals' responses, coping behaviors, and strategies through these circumstances in order to select effective implications to help individuals mentally to overcome any serious long-term mental health difficulties (Dawson and Golijani-Moghaddam 2020; Lee *et al.* 2015; Karekla and Panayiotou 2011).

The current study will develop the Illness Attitude Toward COVID-19 Scale (IATCS) scale, which is considered the only one to the authors' knowledge that was distributed among Kuwaiti individuals during the COVID-19 pandemic to evaluate illness attitudes toward the pandemic. It is different to other scales that measure many aspects, such as: hypochondriasis (Kellner *et al.* 1985); illness attitude (Kellner *et al.* 1985); symptoms of hypochondriasis (Pelletier *et al.* 2002); depression, anxiety, and stress (Norton 2007); PTSD symptoms (Hosey *et al.* 2019); and fear of COVID-19 (Ahorsu *et al.* 2020).

The findings of the current study will be essential for future studies across the Gulf Cooperation Council (GCC) and Arab countries' populations with similar cultures that are aiming to assess populations' illness attitudes toward the COVID-19 pandemic. Furthermore, the present study will develop a scale that will help social workers, psychologists, and psychiatrists to evaluate the attitudes, fears, and beliefs surrounding the COVID-19 pandemic from a mental health perspective. This scale will measure the psychopathology of hypochondriasis and the abnormal illness behaviours that individuals could develop during the COVID-19 pandemic.

Purpose of the study

The purpose of the present study is to develop a scale that evaluates the mental health attitudes, fears, and beliefs of individuals surrounding the COVID-19 pandemic. The scale will be called the IATCS. The study will also assess the internal consistency reliability, criterion validity, and factorial validity of the scale.

Methods

The instrument

The participants completed an online questionnaire that included questions on demographics, COVID-19, and hypochondriasis. The first section of the questionnaire included demographic questions, such as marital status, age, and gender. In the second section, participants were asked about precautionary measures they were taking to protect themselves against COVID-19 after its emergence in Kuwait. It included questions such as “Have you been washing your hands continuously since the coronavirus infection emerged in Kuwait?” and “Did you start exercising after coronavirus emerged in Kuwait?”. Responses were set as “Yes” or “No”. The third section of the online questionnaire included a scale developed by the authors of the study which is called the IATCS. The IATCS is based on the IAS developed by Kellner *et al.* (1985). There are two reasons behind choosing the IAS as the base when developing the IATCS: first, because its items measure the illness attitude, which matches the purpose of developing the IATCS, and second, because it showed good reliability and validity (Sirri, Grandi and Fava 2008).

The original IAS is a 28-item instrument that measures hypochondriasis in individuals. For the purpose of the current study, the term “hypochondriasis” will be used instead of using the two terms Illness Anxiety Disorder (IAD) and Somatic Symptom Disorder. The IAS includes nine subscales which measure many aspects of hypochondriasis, such as attitudes, fears, beliefs, treatment, abnormal illness behaviour, effects of symptoms, and thanatophobia. In addition, the IAS has good stability and known-groups validity (Kellner *et al.* 1985). The IATCS contains 18-items and six subscales. For the purpose of the present study, the authors have excluded three subscales from the IAS (disease phobia, bodily preoccupation, and effects of symptoms) because these three subscales cannot be tested at the current time. Furthermore, some questions in the IAS ask about illness in general. This was adapted specifically to COVID-19 in line with the purpose of the study. For example, the IAS contains a question which reads: “Are you worried that you may get a serious illness in the future?”. This was changed to: “Are you worried that you may get COVID-19 in the future?”. The six subscales that

were used in this study were: worry about illness, concern about pain, health habits, hypochondriacal beliefs, thanatophobia, and treatment experience. In addition, each of the subscales contains three items with scores ranging from 3 to 15. The higher the score for the subscales, the higher the pathology (Fischer and Corcoran 2013). Responses were set on a five-point Likert scale, where 1 = No, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Most of the time. Responses for the subscale on treatment experience were set on another 5-point Likert scale, where 1 = Almost never, None, or Not at all, 2 = Only very rarely, 1, or once 3 = About 4 times a year, 2 or 3, or 2 or 3 times, 4 = About once a month, 4 or 5, or 4 or 5 times and 5 = About once a week, 6 or more, or 6 or more times. Furthermore, the worry about illness subscale contains the following items: “Do you worry about your health?”, “Are you worried that you may get COVID-19 in the future?”, and “Does the thought of catching COVID-19 scare you?”. The concern about pain subscale includes the following items: “If you have symptoms, such as fever or cough, do you worry that they may be caused by COVID-19?”, “If these symptoms last for days, do you see a physician?”, and “If these symptoms last for a week, do you believe that you have COVID-19?”. The hypochondriacal beliefs subscale contains the following items: “Do you believe that if you have COVID-19, your doctor may diagnose it incorrectly?”, “When your doctor informs you that you do not have COVID-19 to account for your symptoms, do you refuse to believe him or her?”, and “When you have been told by a doctor that he or she has found something, do you believe that you might have developed a new sickness?”. The thanatophobia subscale includes the following items: “Are you afraid of news that reminds you of death?”, “Does the thought of death frighten you?”, and “Are you afraid that you might die soon?”. The treatment experience subscale contains the following items: “How many times have you visited your doctor in the last year?”, “How many doctors have you seen during the last year?”, and “How often have you been treated during the past year?”.

The language of the IAS is English. Therefore, the items borrowed from the IAS and modified in the IATCS were translated into Arabic. The translation of the scale was a back-to-back translation by a professional who is well-informed about the Arabic and English languages. However, the items

TABLE 1. Results from a Factor Analysis of the Illness Attitude Toward COVID-19 Scale (IATCS)

IATCS item	Factor loading					
	1	2	3	4	5	6
Factor 1: Thanatophobia						
Item #12	.818	.276	.074	.166	.117	.003
Item #13	.907	.177	.080	.059	.097	.018
Item #14	.860	.211	.089	.118	.071	.008
Factor 2: Worry about illness						
Item #1	.142	.724	.150	.089	.028	.078
Item #2	.228	.804	.039	.112	.148	.023
Item #3	.301	.731	.034	.091	.197	.078
Factor 3: Treatment experience						
Item #15	.031	.109	.779	.053	.016	.155
Item #16	.110	.081	.861	.086	.015	.002
Item #17	.065	.018	.831	-.00	.070	-.01
Factor 4: Hypochondriacal beliefs						
Item #9	.054	.180	.025	.750	-.03	-.02
Item #10	.081	.022	.070	.803	.039	.053
Item #11	.211	.087	.043	.556	.315	.107
Factor 5: Concern about pain						
Item #4	.212	.484	.056	.209	.469	.070
Item #5	.039	.028	.100	-.01	.787	.018
Item #6	.125	.211	-.03	.114	.770	-.02
Item #2						
Factor 6: Health habits						
Item #7	.046	-.21	.029	.004	.074	.791
Item #8	-.02	.212	.094	.121	.071	.643
Item #18	.005	.299	.013	-.02	-.17	.445

developed by the authors were written in Arabic. The language of the IATCS is Arabic.

Sample and data collection

The online questionnaires were distributed to participants of the study via the Whatsapp application, which is one of the most commonly used applications in Kuwait. The present study used a convenience-sampling method, which is considered a non-probability sample, to recruit the participants for the study. The sample consisted of individuals who were living in Kuwait during the COVID-19 pandemic.

A total of 1,413 individuals who we were living in Kuwait participated voluntarily in this study. Their ages ranged from 18 to 99 years old (mean = 39 years old, SD = 13.81). The majority of the sample was female (69.2 per cent) while 30.4 per cent were male. With regard to the marital status of the participants, 58.8 per cent of the sample were married, 31 per cent were single, 7.5 per cent were divorced, and 1.7 per cent were widowed. The majority of the sample was employed (63.2 per cent), followed by students (15.6 per cent), retirees

(13 per cent), and businessmen (6.4 per cent). With regard to education level, 7.4 per cent of the sample had a high school diploma or less, 69.4 per cent of the sample had a bachelor's degree, and 22.7 per cent had a master's degree or higher (see Table 1).

Data analysis

The current study used the Statistical Package for Social Sciences (IBM SPSS 25.0) to run descriptive statistics for means, standard deviation, percentages, and frequencies. The internal consistency reliability of the IATCS and its subscales were used to assess Cronbach's alpha (α). Exploratory factor analysis and confirmatory factor analysis were used to assess the validity of the scale and any correlations.

Results

Internal consistency

The internal consistency was calculated using Cronbach's alpha. The internal consistency for the IATCS alpha was .81. The reliability alpha scores of

these subscales were found to be as follows: worry about illness ($\alpha = .79$), concern about pain ($\alpha = .63$), hypochondriacal beliefs ($\alpha = .60$), thanatophobia ($\alpha = .89$), and treatment experience ($\alpha = .80$), all of which were considered satisfactory. However, the reliability alpha score for the subscale on health habits was ($\alpha = .32$), which was considered low.

Exploratory factor analysis for IATCS

The varimax rotation was used to explore the patterns between the 18 items of the IATCS. The Kaiser-Meyer-Olkin test (KMO) was used to verify the sampling adequacy. The results showed that $KMO = .83$. Bartlett's test of sphericity was calculated as follows: $\chi^2(153) = 7441.919$, $p < .000$. Furthermore, the varimax rotation method yielded a six-factor solution, which is considered the best fit for the data, accounting for 64.76 per cent of the variance. In addition, the purpose of using Kaiser criterion of eigenvalues greater than one (Braeken and Van Assen, 2017) was to recognise the factors. The first factor was called "thanatophobia". The eigenvalue of this factor was 4.711 and accounted for 26.17 per cent of the variance. The second factor was called "worry about illness". The eigenvalue of this factor was 1.93 and accounted for 10.76 per cent of the variance. The third factor was called "treatment experience". The eigenvalue of this factor was 1.42 and accounted for 7.92 per cent of the variance. The fourth factor was called "hypochondriacal beliefs." The eigenvalue of this factor was 1.25 and accounted for 6.96 per cent of the variance. The fifth factor was called "concern about pain". The eigenvalue of this factor was 1.25 and accounted for 6.96 per cent of the variance. The last factor was called "health habits". The eigenvalue of this factor was 1.07 and accounted for 5.96 per cent of the variance. All of the loadings for the above factors were greater than $\pm .40$, which is considered significant. Therefore, the scale is considered valid (see Table 1).

Criterion validity

The bivariate correlations coefficients were run for the IATCS scale and five of its subscales (worry about illness, concern about pain, hypochondriacal beliefs, thanatophobia, treatment experience) to test the validity of the scale. The subscale on health

habits was left out, however, the three items of the health habits subscale will not be removed in the IATCS (further discussion about this issue will be discussed in the discussion section). The use of the bivariate correlations between the IATCS and its five subscales is to examine the strength of the relationships among these subscales, which are intended to predict the illness attitude. However, the criterion validity will be examined between the IATCS and other measures in a future study.

The results showed a positive correlation between the IATCS and the five subscales (worry about illness, concern about pain, hypochondriacal beliefs, thanatophobia, treatment experience). The results of the correlations were as follows: worry about illness ($r = 0.74$, $p < 0.01$), concern about pain, ($r = 0.66$, $p < 0.01$), hypochondriacal beliefs ($r = 0.59$, $p < 0.01$), thanatophobia ($r = 0.75$, $p < 0.01$), treatment experience ($r = 0.45$, $p < 0.01$). There was a positive correlation between worry about illness and the following subscales: concern about pain ($r = 0.44$, $p < 0.01$), hypochondriacal beliefs ($r = 0.30$, $p < 0.01$), thanatophobia ($r = 0.50$, $p < 0.01$), and treatment experience ($r = 0.19$, $p < 0.01$). There was a positive correlation between concern about pain and the following subscales: hypochondriacal beliefs ($r = 0.31$, $p < 0.01$), thanatophobia ($r = 0.36$, $p < 0.01$), and treatment experience ($r = 0.14$, $p < 0.01$). There was a positive correlation between hypochondriacal beliefs and the following subscales: thanatophobia ($r = 0.31$, $p < 0.01$) and treatment experience ($r = 0.13$, $p < 0.01$). There was a positive correlation between the subscale on thanatophobia and the subscale on treatment experience ($r = 0.19$, $p < 0.01$). There was a significant correlation between the IATCS scale and each of its five subscales (see Table 2). The overall pattern of correlation within the measure and its subscales supports the construct validity of the IATCS.

The five-factor model, which emerged in the exploratory factor analysis, was examined using confirmatory factor analysis (CFA) (see Figure 1). The CFA was conducted on 15 items using AMOS to test the hypothesised model ($n = 1413$). The model tested whether the IATCS scale could be explained by five factors that measure worry about illness, concern about pain, hypochondriacal beliefs, thanatophobia, and treatment experience. The five-factor CFA model was examined. The 15-item model yielded the following result: $\chi^2(80, N$

TABLE 2. Descriptive Statistics and Correlations for Study Scale and Subscales

Scales	n	M	SD	1	2	3	4	5	6
IATCS	1341	50.93	10.99	—					
Worry about illness	1404	9.29	3.01	.74**	—				
Concern about pain	1402	9.78	2.84	.66**	.44**	—			
Hypochondriacal beliefs	1400	6.81	2.66	.59**	.30**	.31**	—		
Thanatophobia	1401	7.64	3.89	.75**	.50**	.36**	.31**	—	
Treatment experience	1394	8.62	2.36	.45**	.19**	.14**	.13**	.19**	—

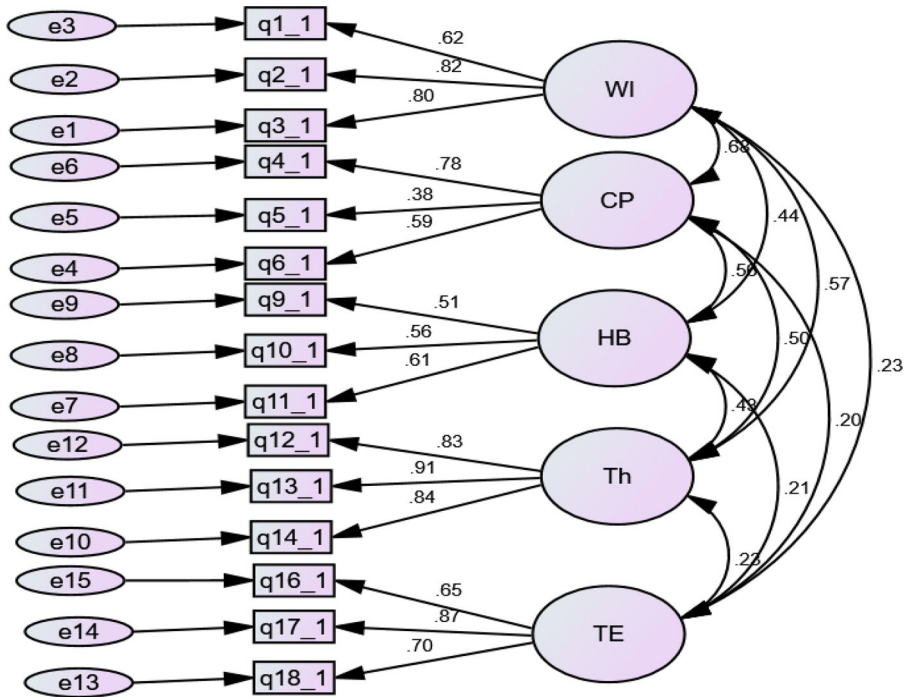


FIGURE 1. WI = worry about illness; CP = concern about pain; HB = hypochondriacal beliefs; Th = thanatophobia; TE = treatment experience; q1-3 = WI items; q4-6 = CP items; q9-11 = HB items; q12-14 = Th items; q16-18 = TE items. [Colour figure can be viewed at wileyonlinelibrary.com]

= 1413) = 419.953 $p < .000$. The 15-item model was a satisfactory fit (CFI = .95, RMR = .05, RMSEA = .05). Thus, the 15-item model was the best model for the data in this study (see Figure 1).

Discussion

The main purpose of this study was to develop a scale that would help in measuring the abnormal illness behaviours of individuals during the COVID-19 pandemic. The scale could help social workers, psychologists, and psychiatrists to provide better assistance to their clients. The IATCS scale

is based on the IAS developed by Kellner *et al.* (1985). However, major modifications have been made to the items borrowed from IAS to make them fit with the themes of the scale. Many statistical tools were used to test the validity and reliability of the IATCS scale, such as exploratory factor analysis, correlation, and confirmatory factor analysis.

The findings in the present study support the reliability, criterion validity, and factorial validity of the IATCS scale. The internal consistency of the overall scale and five of its subscales was satisfactory, while “health habits” had a low alpha score.

The low alpha score could be due to the conceptual breadth of the subscale when recapturing a long scale. Furthermore, this could be related to a lack of unidimensionality among items in the subscale where one item could be loaded into multiple factors. Exploratory factor analysis can examine the likelihood of multidimensionality. In this study, exploratory factor analysis was used to evaluate the loading of the factors related to the IATCS, which contained 18 items. The analysis yielded a six-factor solution consisting of the following factors: worry about illness, concern about pain, hypochondriacal beliefs, thanatophobia, treatment experience, and health habits. All factor loadings were greater than $\pm .40$. The factor loadings of the IATCS scale were all significant. This means that the scale is considered valid. Although “health habits” had a good factor loading, its low alpha score means it will not be used as a subscale. However, three items that represent it will be kept in the scale.

The bivariate correlation coefficients were calculated to assess the scale criterion validity. The findings of the study revealed that there were good associations between the overall scale and the five remaining subscales which supported the criterion validity of the IATCS scale. In addition, the criterion validity was supported by 15 significant correlations.

The CFA goodness of fit indices implied that the five-factor model of the scale had an adequate to good fit overall. Furthermore, all of the indicators loaded well on each of the hypothesised subscales, and estimated correlations between the factors were high or acceptable. The IATCS measures the illness attitude toward COVID-19 in different dimensions, such as beliefs and behaviours, which is different from the other scales that are designed to measure the illness attitude in general. In addition, the results of the current study showed that the IATCS scale is valid and reliable. Therefore, researchers who seek to evaluate the illness attitude toward COVID-19 can use this instrument for their future studies. The IATCS scale was distributed to 1,413 individuals who were living in Kuwait. Therefore, researchers can use it across this population and across populations with similar cultures, such as the countries of the Gulf Cooperation Council (GCC) and Arab countries, to evaluate illness attitudes toward COVID-19 among individuals.

Further research is needed to apply this scale to populations who have a different culture. It will then be possible to evaluate whether the components of the model are comparable across different groups.

This study used a non-random sample, which limited the study's generalisability. The purpose of the study was to assess the validity of the scale and not the generalisability. Furthermore, this study used a self-report instrument because it is an effective method of collecting data. However, this method is subject to social desirability and bias. In addition, there is a need to test this scale on high-risk groups, such as clinical samples, to evaluate its validity in relation to these groups. The current study's aim is to develop a scale that measures individuals' mental health attitudes toward the COVID-19 pandemic; therefore, only two physical symptoms (cough and fever) were included in the questionnaire. Future studies are recommended to measure the impact of the COVID-19 pandemic on individuals' mental and physical health status, such as gastrointestinal symptoms, difficulty breathing, sore throat, fever, and cough.

Implications

There are some implications based on the findings of the current study for educators, future research, and social work and mental health.

Educators: Educators and trainers could use this scale for education and training purposes. In addition, educators could expand their students' knowledge about the five dimensions of the illness attitude toward COVID-19 and train them on how to apply the IATCS scale with their future clients.

Future research: Researchers might use the IATCS scale to study illness attitudes toward COVID-19 and their association with other variables, such as gender, age, educational level, and marital status. Furthermore, the IATCS scale can be used by researchers who wish to evaluate the illness attitude toward COVID-19 among individuals during and after the pandemic.

Social work and mental health: Social work and psychology professionals could use the scale to evaluate illness attitudes toward COVID-19 among their clients. Therefore, the scale could help them to make assessments for their clients and develop plans. In addition, the IATCS subscales help professionals in social work and mental health to identify

the dimension that scores higher than the others so the professionals can assist clients in a better way.

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Conflict of interests

There is no conflict of interests.

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