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Research Article

Tendency to Stigmatize Epidemic Diseases Scale: Scale Development and Validity Study

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SUMMARY

Purposes: The purpose of this study was to develop a scale to measure stigma during epidemics among adults in nursing care and validate its psychometric properties.
Methods: The preliminary items of the Tendency to Stigmatize Epidemic Diseases Scale scale were developed through a literature review, the Delphi technique, and content validity analysis. A total of 723 adults living in Turkey responded to the questionnaire from June to December 2021. The collected data were analyzed by exploratory factor analysis and confirmative factor analysis using SPSS and AMOS programs.
Results: The experts agreed on 51 scale items, and 24 items were removed following exploratory factor analysis. On the 27-item scale, a five-factor structure was found with an eigenvalue >1, explaining 59.2% of the total variance. The overall Cronbach's α value was 0.88.
Conclusions: This scale is a reliable and valid measurement tool for adults to determine their level of stigma during epidemics in nursing care. This scale helps develop interventions to improve the psychological health of adults in nursing care.
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Introduction

Epidemics caused by infectious diseases (malaria, cholera, Spanish flu, COVID-19, *severe acute respiratory syndrome*, etc.) have been a problem for the humanity throughout the history because they affect not only infected individuals but societies as well [1,2]. Epidemics, from the 19th century's smallpox to the 21st century's COVID-19, have always been associated with stigma and serious social consequences [3]. It is also emphasized that in epidemics caused by respiratory viruses, different social reactions occur because there is less control over the contamination and spread, and when this situation is combined with the fear of global epidemic, economic collapse, and famine scenarios, stigma may be exacerbated [3,4]. In the literature, it has been seen that different characteristics of stigma emerge when epidemics related to infectious diseases such as plague, tuberculosis, syphilis, human immunodeficiency virus (HIV), hepatitis, Middle East respiratory syndrome, and COVID-19 occur [3]. It has been observed that stigmatization might occur in a certain group of people. For instance, homosexual men are stigmatized in having sexually transmitted diseases such as HIV, individuals with low socioeconomic status are stigmatized in having tuberculosis, and risk group of the elders or individuals with chronic health problems are stigmatized in having COVID-19 [3,5–7]. However, it appears that insufficient information about the prognosis and consequences of diseases, the uncertainty of the process of finding a treatment, and the fear caused by the lack of an effective preventive treatment option or vaccine are underlying causes of stigmatization in epidemics [3,5]. It is observable that fear and anxiety associated with epidemic diseases lead to stigmatization by creating negative attitudes and beliefs toward people, places, or society [5,6,8]. Related studies have reported that people are labeling patients with epidemic diseases as ignorant or negligent and that they are held responsible for transmitting diseases to society, resulting in social devaluation and discrediting as well as social stigma [3,6]. Consequently, negative attitudes and beliefs such as isolation, fear of death, discrimination, embarrassment, and exclusion also increased rapidly [7]. Social stigma can intensify structural and internalized stigma. Stigmatization may worsen physical and mental health such as depression, anxiety, emotional and mental distress, decreased quality of life, reduced compliance with

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treatment, and reduced access to medical facilities [3,7]. Therefore, improvements regarding this situation are needed. Improvements can be done by analyzing the tendency to stigmatize epidemic diseases.

Stigma refers to discrimination against an identifiable group of people, a place, or a nation [9,10] whereas stigma related to epidemic diseases are characterized by labeling, stereotyping, and discriminating against individuals with infectious disease symptoms. This can result in loss of status, and it consists social, interpersonal, and individual levels. [11,12]. According to Yuan et al. [13], the overall pooled prevalence of stigma is 34%, including a perceived stigma of 31.0% and an enacted stigma of 36.0%. When the causes of stigmatization are examined, it can be seen that social structures and policies create preparatory or facilitating factors, while insufficient information or contradictory messages constitute the triggering factors. Stigma toward epidemic diseases has already been discussed in many studies [4,8,14–17]. In these studies, it can be seen that the stigma scales related to diseases such as HIV, hepatitis C virus, Middle East respiratory syndrome, and tuberculosis focus on internalized and perceived stigma. However, the COVID-19 stigma scale is more relevant to structural and internalized basis, and the studies emphasize the disease specifics on individual levels. According to Goffman's social stigma theory, it is known that stigmatization occurs due to the socially discrediting quality or behavior and that it only occurs through social relationships. Social stigma is shaped by certain cultural configurations that emerge over time and place, and this also affects labeling, discrimination, and stigma on structural and individual levels [12,18]. For this reason, organizational, social, internalized, perceived, and structural stigmas are examined in the study we discussed. Those five aspects of stigmatization are constantly interacting with each other (Fig. 1).

Reliably and accurately measuring the tendency to stigmatize epidemic diseases in adults is of great importance in effective planning and implementation of nursing care. These measurements can increase individuals' treatment compliance, support psychosocial health, create an effective strategy in health communication, and increase cooperation with the society. It can also increase nurses' ability to provide individualized nursing care and help them deliver nursing services more effectively. Therefore, measuring stigmatization tendency accurately and reliably is of critical importance for controlling epidemics and protecting public health [19–21]. In this regard, the purpose of this study is contributing to the literature by providing a new measurement tool that is not disease-specific and that can be used in different epidemic diseases. It may also encourage research on stigma that analyzes the level of stigma specific to the epidemic disease.

Methods

Study design

The present study adopted an instrument development and validation design. This study was prepared in line with the scale development principles of DeVellis to determine individuals' epidemic disease stigmatization levels [22]. Scale development was conducted in three stages (Fig. 2).

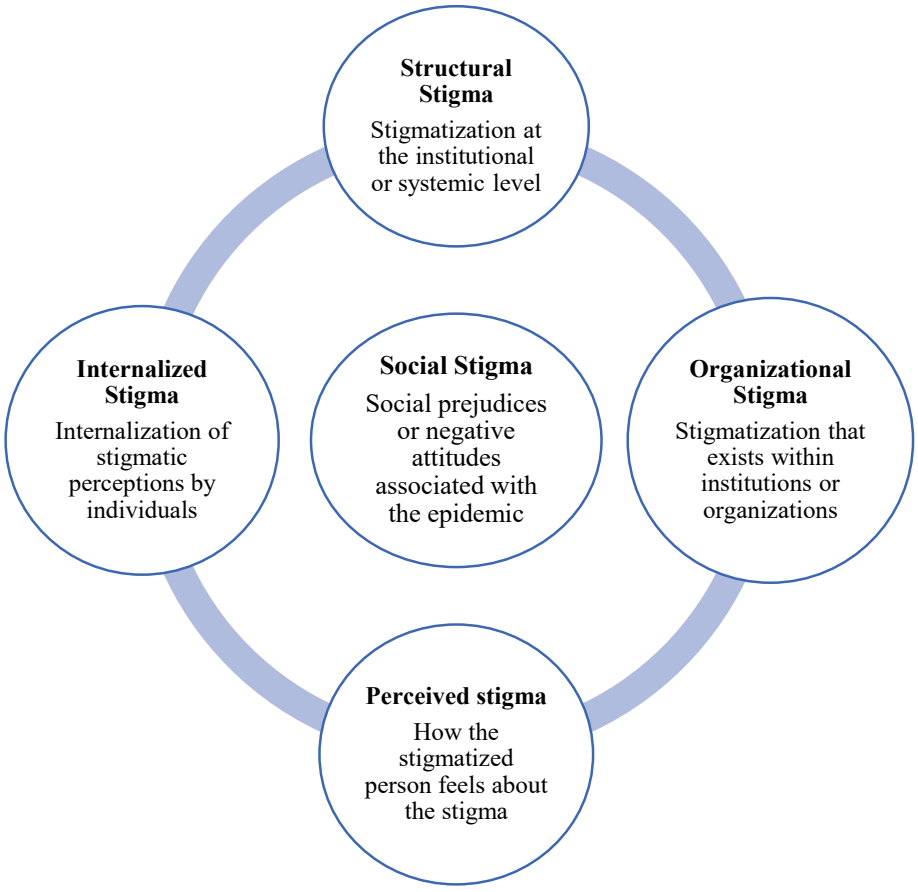

Figure 1. Conceptual Structure of the Scale Development Process.

Phase 1: scale development

Clarification of concept

To develop the Tendency to Stigmatize Epidemic Diseases Scale (TSEDS), a comprehensive literature review was conducted to examine stigma dimensions and stigma scales [9,14–17,23–26]. Previous studies have used these scales as self-report tools that specifically measure stigma related to chronic diseases. For this reason, scales for epidemic diseases and COVID-19 stigma scales provided important guidance in creating the structure [27,28]. The subdimensions were then defined, based on the structures associated with stigma [10,12,18]. While creating the conceptual framework of the scale structure, the following structures, which are in constant interaction with each other, were taken as basis: individual stigma, social stigma, and structural stigma [10,29,30]. In addition, the stages of stigmatization were taken into consideration in creating the scale items, such as labeling, stereotypes, prejudices, emotional reactions, loss of social reputation, and discrimination [30,31]. As a result, it is aimed to measure stigma during epidemic diseases by creating five subdimensions: internalized stigma, perceived stigma, social stigma, and organizational and structural stigma.

Establishing the item pool

The Delphi technique was used to develop a scale-item pool and evaluate its content validity [32]. In this process, the problem was first defined, and the panel members were selected in the second step. Twenty-five experts were selected and contacted, 20 of whom agreed to participate in the study. In this context, 14 experts in the fields of mental health, public health, infectious diseases, internal diseases, and scale development (three psychiatry nurse academicians, two public health nurse academicians, one infectious disease specialist, one internal disease specialist, two nurse academicians with scale development experience, three infection control nurses, and two specialist nurses), and six patients with the epidemic disease (six nurses diagnosed with COVID-19) were invited to participate. In the first round, they were asked to answer the following question: "Which emotions, attitudes, and behaviors define individual stigma, social stigma, and structural stigma in epidemics?" At the end of this round, their responses were analyzed by the research team, and the first draft was created by combining similar items. The experts reviewed the first draft of the scale in the second round and were asked to rate each item on a 4-point scale (1 = *not appropriate*, 2 = *seriously reviewed*, 3 = *slightly revised*, 4 = *appropriate*). All experts agreed on 51 scale items after the third round of Delphi. After obtaining the experts' opinions, the researchers made necessary arrangements in terms of language and expression.

Phase 2: evaluation of the scale

Setting and samples

Participants constitute the internal and external stakeholders of a university located in Istanbul, Turkey. This university was chosen because it has approximately 21,000 students, over 50,000 graduates, and over 1,400 academics. In addition, this university has two full-fledged hospitals, with a bed capacity of approximately 200, a dental hospital, ambulatory care centers, an eye hospital, and nearly twenty primary, secondary, and high school schools. These institutions continued to provide services during the pandemic period. The majority of individuals receiving services from institutions are employees, graduates, and students. The study population included individuals aged above 18 years who could be reached online through the university, did not receive psychiatric treatment, and did not receive outpatient or inpatient treatment and care during the COVID-19 pandemic. Considering the number of items in the draft scale to calculate the required sample size in scale-development studies, it was necessary to work with a sample at least five times the number of items [33–35]. A total of 431 people who volunteered to participate in the study constituted the study sample. After this stage, a final TSEDS with 27 items was developed, including five dimensions (structural stigma, perceived stigma, organizational stigma, internalized stigma, and social stigma). Another cross-sectional online survey was conducted to evaluate the psychometric properties of the final scale. The sample size of this stage was calculated according to confirmatory factor analysis (CFA). The sample size for CFA is recommended to be at least 100–200 [36]. At this stage, a total of 300 people were invited to the study, and questionnaires that were not filled out appropriately were excluded from the study. Inclusion criteria were the same as those included in the first stage. At this stage, a total of 292 people filled out the 27-item TSEDS. All 292 people who participated in this survey completed the survey again four weeks later [16,24,35].

Ethical consideration

This study was approved by the Yeditepe University Non-Interventional Clinical Research Ethics Committee (Yeditepe University Approval no. 202109093). The participants were also informed that completing the questionnaire was voluntary. The data were kept anonymous and were used only for study purposes, and their permission was received with an "informed-consent form."

Instruments

Data were collected online between June 1 and December 31, 2021, with a socio-demographic information form consisting 17 questions, a draft scale consisting 51 items, and an epidemic disease anxiety scale (EDAS) consisting 18 items and four subfactors (epidemic, economic, quarantine, and social life) developed by Sayar et al. [37]. Cronbach's α for the EDAS scale was 0.90. The scores ranged from 18 to 90, with a high score indicating an increase in epidemic disease anxiety [37]. The EDAS was used for parallel form reliability.

Data analysis

SPSS 25 and AMOS 21 packages were used to analyze the data. Descriptive statistical methods, including frequency, percentage, mean, and standard deviation, were used to summarize the data.

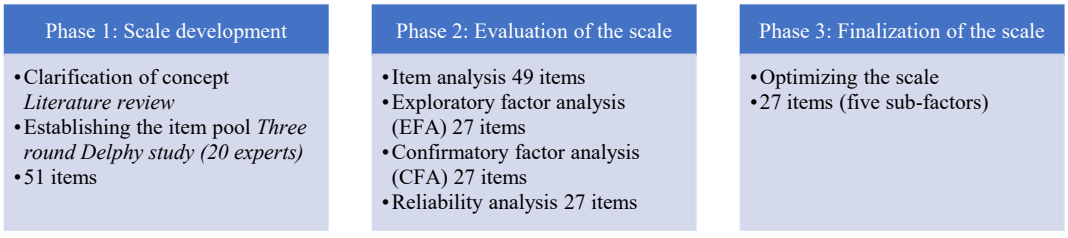

Figure 2. Scale Development Process.

Skewness and kurtosis values of ±1.5 were used as a condition of conformity to a normal distribution [38]. Construct validity was assessed by item analysis, exploratory factor analysis (EFA), and CFA. During item analysis, two items were deleted due to item total correlation values that are lower than 0.20 and also items that reduced Cronbach's α (35). In order to eliminate the common factors, EFA was done using principal component analysis and varimax rotation. For EFA, Kaiser–Meyer–Olkin (KMO) and Bartlett tests were conducted to evaluate sampling adequacy. The KMO value that has been used to assess whether factor analysis were suitable or not should be below 60 [39]. Moreover, Bartlett's Test of Sphericity's results should be statistically compatible [40]. It has been observed that the data were appropriate for factor analysis. According to the EFA results, five factors with eigenvalues greater than 1 were obtained. CFA was used to verify the factor structure that has been found from EFA. The ratio of chi-square to the degree of freedom, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), Tucker–Lewis index (TLI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR) were evaluated. The ratio of chi-square to the degree of freedom value below 3, CFI, TLI ve IFI values above 0.90, and RMSEA and SRMR values below 0.08 indicate the goodness-of-fit [39–41]. After CFA, convergent validity was assessed based on mean variance extracted and composite reliability (CR). Cronbach's alpha was calculated for item analyses and scale and subdimensions to examine internal consistency reliability. The item-total correlation coefficient was calculated within the scope of item analysis. Pearson's correlation analysis and a paired samples *t*-test were used to analyze the test–retest results. For parallel form reliability, the correlation values between the EDAS and the scale used in the study were analyzed using Pearson's correlation analysis. The results were evaluated at 95.0% and 99.0% confidence intervals and significance levels of $p < .005$ and $p < .001$, respectively.

Results

Twenty experts participated in the first phase of this study. All experts had at least 10 years of work experience.

In total, 723 adults participated in the second phase of the study. The sociodemographic characteristics of the participants are presented in Table 1.

Phase I: scale development

The item pool was created using the Delphi technique, which was repeated three times. In the first round, the experts provided 107 answers to the questions sent via e-mail. Subsequently, a pool of 75 items was formed by bringing similar items together and transforming them into scale items. Twenty items were removed from the pool at the end of the second round. At the end of the third round, the experts reached a consensus on 51 items; consequently, a draft scale consisting of 51 items was developed. The results of the content validity using the Delphi technique are presented in Supplemental Table S1.

Phase 2: evaluation of the scale

Item analysis

Two items with an item-total correlation coefficient of less than .20 for the items of the scale were deleted [39–41]. The reliability of the remaining 49 questions increased to .90. These results show good homogeneity and discrimination among the 49 items; therefore, factor analysis was performed for all items.

Table 1 *Distribution of General- and Epidemic-Disease-Related Characteristics of the Participants (n = 723).*

Variable		Frequency (percentage, %)			
		First sample ($n^a = 431$)		Second sample ($n^a = 292$)	
Gender	Women	324	(75.2)	224	(76.7)
	Men	107	(24.8)	68	(23.3)
Age, years	20–29	120	(27.8)	77	(26.4)
	30–39	159	(36.9)	113	(38.7)
	40–49	32	(7.4)	24	(8.2)
	50–59	120	(27.8)	78	(26.7)
Marital status	Married	92	(21.3)	86	(29.5)
	Single	339	(78.7)	206	(70.5)
Status of having a child	Yes	85	(19.7)	71	(24.3)
	No	346	(80.3)	221	(75.7)
Educational background	Primary education	22	(5.1)	12	(4.1)
	Associate degree	15	(3.5)	10	(3.4)
	Undergraduate	328	(76.1)	214	(73.3)
	Graduate	66	(15.3)	56	(19.2)
Working status	Yes	111	(25.8)	98	(33.6)
	No	320	(74.2)	194	(66.4)
Income level	Low	46	(10.7)	31	(10.6)
	Middle	360	(83.5)	244	(83.6)
	High	25	(5.8)	17	(5.8)
Place of residence	Metropolis	346	(80.3)	231	(79.1)
	City center	28	(6.5)	21	(7.2)
	City	57	(13.2)	40	(13.7)
COVID-19 reatment status	Outpatient treatment	372	(86.3)	256	(87.7)
	Inpatient treatment	59	(13.7)	36	(12.3)

[a] Frequency.

Results of exploratory factor analysis

EFA was applied using the principal components method and the varimax axis rotation method to examine the scale's construct validity. The KMO value was .95, and Bartlett's test of sphericity was statistically significant ($X^2 = 13381.534$; $p < .001$).

As a result of the first-factor analysis, 11 factors with eigenvalues higher than one were obtained [39–41]. The following items were excluded from the scale: 4, 5, 12, 13, 19, 21, 33, 39, and 50 (boarding items); 35 (low factor load); 1, 17, 20, 23, 25, 26, 40, 41, 42, 43, 44, and 51 (not suitable for the theoretical structure). As a result, 22 items were removed, and the final scale comprised 27 items. Thus, five factors with eigenvalues greater than one were obtained. The total variance explained by the five factors in the scale was 59.2% (Table 2).

Confirmatory factor analysis

Table 3 shows the standardized factor loadings of the factors according to the primary-level CFA results applied to the scale. To test the convergent validity of the measurement model, mean explained variance (AVE) and CR values were calculated. The CR values, which are the combined reliability values calculated for the model, are between .74 and .92 and above .70, indicating that the combined reliability condition is fulfilled. The smallest AVE value is between .48 and .65 and is close to .50. It can also be seen that all CR values are greater than the AVE values (Tables 4 and 5, Fig. 3).

The scale met the primary CFA goodness-of-fit values ($\chi^2/SD = 1.96$, GFI = .86, AGFI = .83, CFI = .93, IFI = .93, TLI = .93, RMSEA = .06, and SRMR = .06). Similarly, it met the goodness-of-fit values for the secondary-level CFA ($\chi^2/SD = 2.02$, GFI = .85, AGFI = .82, CFI = .93, IFI = .93, TLI = .93, RMSEA = .06, and SRMR = .07) [39–41].

According to the secondary-level CFA results of the scale, factor loads on each subfactor are between .30 and .96. It can be seen that the calculated AVE value is .50, and the overall CR value is greater

Table 2 *Results of Explanatory Factor Analysis and Descriptive Statistics (n = 431).*

Items	Mean ± SD[a]	F1	F2	F3	F4	F5
Item 31	3.75 ± 1.28	.831				
Item 32	3.51 ± 1.33	.800				
Item 29	3.57 ± 1.33	.764				
Item 34	3.87 ± 1.15	.742				
Item 36	3.44 ± 1.31	.687				
Item 30	3.3 ± 1.42	.679				
Item 38	3.93 ± 1.15	.653				
Item 8	2.16 ± 1.26		.841			
Item 7	2.35 ± 1.26		.779			
Item 9	2.21 ± 1.27		.749			
Item 3	2.24 ± 1.23		.696			
Item 6	2.35 ± 1.27		.674			
Item 2	1.7 ± 1.03		.673			
Item 47	0.13 ± .2			.781		
Item 46	1.76 ± 1.07			.779		
Item 49	2.01 ± 1.22			.773		
Item 48	2.08 ± 1.21			.743		
Item 45	2.26 ± 1.29			.691		
Item 15	2.2 ± 1.19				.747	
Item 16	2.0 ± 1.1				.629	
Item 24	2.75 ± 1.29				.618	
Item 18	2.48 ± 1.24				.614	
Item 22	2.12 ± 1.27				.607	
Item 11	1.92 ± 1.21				.606	
Item 27	3.37 ± 1.13					.749
Item 28	2.61 ± 1.18					.688
Item 37	2.65 ± 1.24					.607
Eigenvalues		4.07	3.74	3.25	3.12	1.82
Explained variance (%)		15.06	13.86	12.02	11.56	6.76
Cumulative variance (%)		15.06	28.92	40.94	52.51	59.26
Cronbach's α of each subscale		.87	.87	.84	.80	.64

Note. F1: structural Stigma, F2: perceived stigma, F3: organizational stigma, F4: internalized stigma, F5: social stigma.
Total Cronbach's α: 0.88.
[a] SD = standard deviation.

than the AVE value. Additionally, the R^2 values for all factors were .09, .50, .93, .49, and .70.

Reliability analysis

Cronbach's α values of the scale's subfactors are between .64 and .87, and the total Cronbach's α value of the scale is .88. To test the reliability of the parallel scale, a positive and moderately significant relationship was found between the scale and the EDAS applied simultaneously ($r = .51$, $p < .001$). A positive relationship exists between the scale and epidemic subdimensions ($r = .49$, $p < .001$), economic subdimension ($r = .38$, $p < .001$), quarantine subdimension ($r = .35$, $p < .001$), and social-life subdimension ($r = .38$, $p < .001$).

The scale was reapplied to the sample group 4 weeks after the first application. The correlation coefficient between the first and second application of the items should be at least .20 [42]. The correlation between .47 and .64 for the test–retest reliability of the scale was significant ($p < .001$), whereas repeated measurements did not show a statistically significant difference ($p > .999$). These results demonstrate that the scale is reliable and invariant over time.

Phase 3: finalization of the scale

The researchers finalized the scale, which comprised 27 items with scores between 27 and 135. Additionally, a structure with five subfactors was obtained in the scale. These factors include F1 (structural stigma) with 7 items (15, 16, 17, 18, 19, 20, 22), F2 (perceived stigma) with 6 items (1, 2, 3, 4, 5, 6), F3 (organizational stigma) with 5 items (23, 24, 25, 26, 27), F4 (internalized stigma) with 6 items (7, 8, 9, 10, 11, 12), and F5 (social stigma) with 3 items (13, 14, 21).

Table 3 *Validity and Reliability Analysis Factor Loads (n = 292).*

Factor name and items	Factor loads	*t*-value	AVE	CR
Factor 1: Structural stigma			.48	.86
29. People who catch epidemic diseases should have exclusive public transportation	.73			
30. People who catch epidemic diseases should not have treatments at hospital with other people	.59	9.56		
31. People who catches epidemic diseases should not be using the common areas with their neighbors	.78	12.64		
32. People should be distant from the people who catch epidemic diseases	.80	12.81		
34. People should be afraid of contacting with each other during pandemics	.62	9.94		
36. People who catch epidemic diseases are prevented to enter public building or social venues	.71	11.45		
38. People who catch epidemic diseases are taken an area away from other patients in the hospital	.59	9.49		
Factor 2: Perceived stigma			.65	.92
2. I would be embarrassed if I catch an epidemic disease	.80			
3. I would feel guilty if I catch an epidemic disease	.71	13.05		
6. I would feel alone if I catch an epidemic disease	.76	14.39		
7. I would feel resentful due to the reactions of the other people if I catch an epidemic disease	.79	15.04		
8. I would be afraid that people might judge me if I catch an epidemic disease	.90	18.13		
9. I would be afraid that people might not contact me if I catch an epidemic disease	.87	17.12		
Factor 3: Organizational stigma			.61	.88
45. People who catch epidemic diseases should be isolated from society	.63			
46. I would not want to take an elevator with healthcare workers	.89	11.96		
47. I would not want to live in the same apartment building with healthcare workers	.85	11.64		
48. Hospitals that allow patients with epidemic diseases should not be never visited	.76	10.69		
49. Healthcare workers who take care of people with epidemic diseases should not enter public areas	.75	10.62		
Factor 4: Internalized Stigma			.55	.88
11. If someone close to me (friends, family member etc.) catches an epidemic disease, I would be contacting them less	.67			
15. If I catch an epidemic disease, my friends would be more distant.	.84	12.50		
16. If I catch an epidemic disease, I would stop contacting with the people due to their reactions	.77	11.59		
18. If I catch an epidemic disease, I would not enjoy anything	.57	8.94		
22. If I catch an epidemic disease, relationships with my family would be affected	.79	11.91		
24. If I catch an epidemic disease, relationships with my social	.77	11.56		
Factor 5: Social stigma			.49	.74
27. People who catch epidemic diseases would be reluctant to tell to other people	.57			
28. People who catch epidemic diseases would be outcast from society	.79	8.72		
37. People who catch epidemic diseases would be discriminated from society	.73	8.48		

Note. AVE = average variance extracted; CR = composite reliability.
*$p < .001$.

Table 4 *Model Suitability (n = **292**).*

Model	CMIN/df	RMSEA	SRMR	GFI	AGFI	CFI	IFI	TLI
First	1.96	.06	.06	.86	0.83	.93	.93	.93
Second	2.02	.06	.07	.85	0.82	.93	.93	.92
Acceptable values	<3.0	<.08	<.08	>.90	>0.90	>.90	>.90	>.90

Note. AGFI = adjusted goodness-of-fit index; CFI = comparative fit index; CMIN/df = the ratio of chi-square to the degree of freedom; GFI = goodness-of-fit index; IFI = incremental fit index; RMSEA = root mean square error of approximation; SRMR, standardized root mean squared residual; TLI = Tucker–Lewis index.

Table 5 *Factor Loadings, Convergent Validity, and Composite Reliability for Second-Order Model of the TSEDS (n = 292).*

Main construct/subconstruct	Factor loads	*t*-value	R^2	AVE	CR
TSEDS				.50	.83
Structural stigma	.30		.09		
Perceived stigma	.71	4.15	.50		
Organizational stigma	.96	4.32	.93		
Internalized stigma	.70	3.99	.49		
Social stigma	.83	4.39	.70		

Note. AVE = average variance extracted; CR = composite reliability; TSEDS = Tendency to Stigmatize Epidemic Diseases Scale.
*$p < 0.001$.

Discussion

This study aimed to test the scale's psychometric properties to determine the level of stigma associated with epidemics. To test its construct validity, a five-factor model was determined to obtain a simple optimal structure that is easy to interpret using the principal components method and varimax axis rotation method. The scale reflects conceptual theory within the framework of elements in the stigma structure [10]. The scale developed in this context includes concepts of individual, social, and structural stigma [10]. Overall, the CFA results show that stigma fits well with its theoretical structure. The scale was finalized with 27 items at the end of the analysis. Additionally, a correlation was observed between the internal consistency of the scale and the overall scale. The load score of the total and subdimensions was calculated on the scale, showing that the items had structural precision, and the scale's total score represented the entire structure of the feature to be measured.

The scale's factor structure was determined to have five components representing structural, perceived, organizational, internalized, and social stigma load. When compared with other scales related to stigma, differences and similarities were observed [9,43]. Internalized stigmatization concepts, which are perceived in field-based scales, are more common. However, the concepts of social, organizational, and structural stigmatization do not coexist. The level of internalized stigma draws attention to low self-esteem and self-evaluation, and individuals are exposed to social, organizational, and structural stigma. Thus, it is important to include questions that investigate stigmatization tendencies during epidemics more comprehensively. In this way, it is possible to help individuals in the early detection and intervention of psychological, emotional, and social problems. This scale is crucial because it allows individuals to measure the stigmatization tendency during epidemics with all dimensions. In this study, the conceptual structure and main framework of the stigma phenomenon during epidemics were developed using classical and current sources [9,43,44]. Additionally, the Delphi technique was used to create an item pool and evaluate content validity.

CFA was used to evaluate whether the items in a scale were adequately represented in the specified subscales and whether the subscales sufficiently explained the structure of the scale. The fit indices and factor loadings evaluated the model's fit. Structural stigma, the first of the defined factors, is the creation of injustice and inequality of opportunity in the system itself, such as restricting opportunities against groups in society by sociopolitical forces and not allocating sufficient shares from government budgets [10]. It seems that structural stigma is addressed more in cases such as mental diseases, sexual orientation, and HIV/AIDS [7,10,15]. However, with the experience of the COVID-19 pandemic, the importance of structural stigma has also been seen. That's why we worked extensively on these dimensions and items with our expert team. Individuals' structural stigmatization tendency can be evaluated with the TSEDS scale developed in this study. Additionally, it is seen that 15.1% of the total variance of the scale belongs to this dimension.

The second factor is perceived stigma, how the stigmatized individual feels about the stigma [10]. Guilt, discrimination, fear, etc. are included as negative emotions in many stigma scales [9,14,17,27]. Our second factor, which constitutes 13.9% of the total variance of the scale, can evaluate the perceived stigmatization tendency, including these emotions, with six items. We think that this dimension should especially be taken into consideration in individualized nursing care. An increase in this tendency in individuals receiving health services may cause treatment and care to be ineffective.

The third factor is organizational stigma, the stigma experienced during daily transactions in the public sphere [10]. This dimension refers to the problems that may be experienced in areas such as hospitals, workplaces, public institutions, etc. [10]. It is seen that Kuramochi's Epilepsy Self-Stigmatization Scale is addressed in two items as the dimension of social incomprehension [14]. However, it is insufficient in measuring this dimension. The organizational stigma dimension, which constitutes 12.0% of the total variance in the scale we developed, consists of a total of five items. Measuring this dimension can play a fundamental role in creating nurses' health communication strategies.

The fourth factor is internalized stigma, where the stigmatized individual accepts the attributions, internalizes them, assimilates the beliefs of the society and embraces the existence of this situation [10]. It is seen that this dimension is mostly addressed in studies on the stigma scale [9,14,17,27]. The internalized stigma dimension, which constitutes 11.6% of the total variance in the TSEDS, consists of a total of six items. In CFA, the correlation between the perceived stigma subfactor and the internalized stigma subfactor was found to be .81. Looking at the correlation coefficients between the factors, these values should not be .85 or above [36,40]. On the scale we developed, this value seems close to the upper limit. However, a strong theoretical relationship between subdimensions may cause the correlation to increase, but perceived stigma is a situation in which the individual or others feel at risk of experiencing negative stigma or discrimination. Internalized stigma, on the other hand, is the situation in which the individual develops beliefs against society's negative perceptions of stigma and discrimination and identifies these negative beliefs with the identity [10,12,17,18]. When examined within the scope of the conceptual framework of stigma, CFA results support the structure of the scale and show that it is a valuable tool that can be used.

The fifth factor, social stigma, is the social and psychological reactions, intolerant behaviors and attitudes that society shows toward a stigmatized person or group [10]. Social stigma is addressed with eight items in the social isolation dimension in the cancer stigma scale [9]. There are a total of three items in this dimension, which constitute 6.8% of the total variance in the TSEDS.

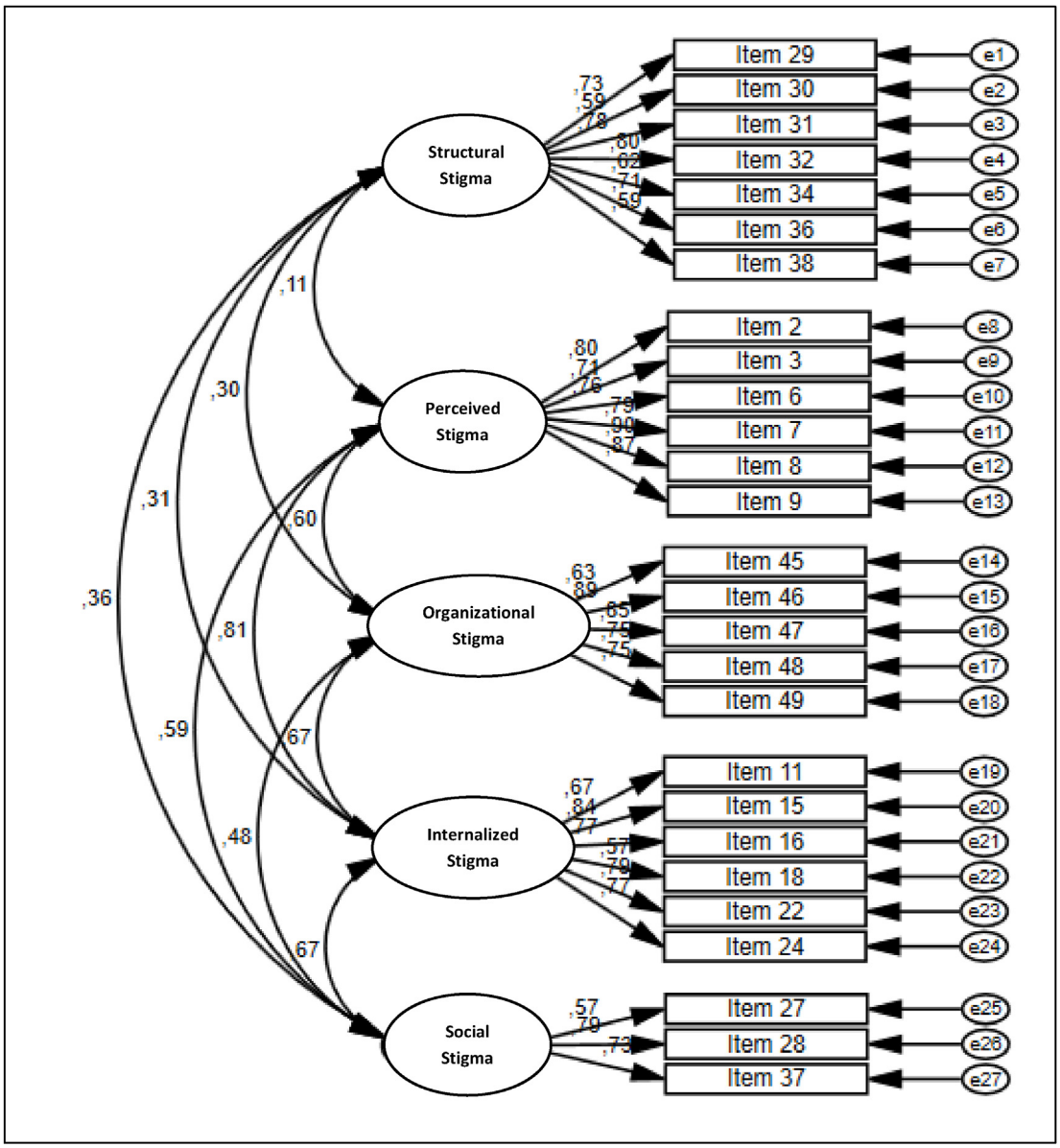

Figure 3. Confirmatory Factor Analysis of the Tendency to Stigmatize Epidemic Diseases Scale ($n = 292$).

This scale, we developed, can measure the tendency to be stigmatized in a broad perspective, in line with the conceptual framework of stigma. Reliable measurement of stigmatization tendency from a broad perspective can help understand how supportive the society is in the process of combating epidemics. Nurses should encourage the cooperation of the society with these measurements and serve as a bridge between the health authorities and the society.

As a result, the tendency to stigmatization may negatively affect individuals' compliance with treatment and protective measures, may cause individuals to remain silent about disease symptoms or contact or avoid sharing information. Additionally, stigma may cause psychosocial effects such as stress, anxiety, and depression in individuals. These situations can cause treatment ineffectiveness, make the epidemic difficult to control, and contribute to the spread of the disease. Therefore, it is important to determine the stigmatization tendency of individuals in epidemic diseases and to reduce this tendency because stigma can cause patients to avoid seeking their treatment or coming into contact with other people. Nurses play a key role in tackling stigma and helping educate society against such false beliefs and prejudices. Therefore, it is important for nurses to have measurement tools for epidemic diseases in order to provide rapid intervention.

Conclusion

This study showed that the scale developed to determine the tendency to stigmatize epidemic disease is valuable and reliable. It is the first scale developed on this subject, and it may encourage the development of strategies to reduce stigma during epidemics. This scale can ensure that nurses are aware of the society's emotions and behaviors related to epidemic diseases. In this way, positive patient outcomes can be achieved for the society, such as receiving quality nursing care, treatment compliance, and increased access. Additionally, the nurse–patient relationship process can be positively affected. It can also be used in different cultures after being translated into other languages. Further research is recommended to

evaluate the risk factors for stigma in adults during epidemics. It is recommended that validity and reliability studies be conducted among individuals from different countries and cultural backgrounds to verify the applicability of the scale in future studies on TSEDS.

Conflict of interest

The authors have no relationships of financial support or other relationships that might pose a conflict of interest.

CRediT authorship contribution statement

Sevim Şen: Formal analysis, Investigation, Resources, Data curation, Writing—Original draft, Writing—Review & editing, Supervision. **Hediye Arslan Özkan**: Writing—Review and editing—Supervision. **Ceren Zeren**: Investigation, Data curation, Writing—Review and editing—Resources. **Begüm Kırık**: Investigation, Data curation, Writing—Review and editing—Resources.

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Appendix A. Supplementary data

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