HEALTH-SERVICE-FAILURE SCALE: DEVELOPING A SCALE TO DETERMINE HEALTH SERVICE FAILURES

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ABSTRACT

The main purpose of this study is to develop a scale for determining health service errors. Within the scope of this purpose, as a result of literature review and interviews with health institution managers, a question pool consisting of 57 statements was created. The pilot implementation was conducted as a result of interviews with the health service manager and academicians who are experts in their fields. Data were collected by convenience sampling method from 392 individuals with a total of 53 statements remaining in the item pool. reliability and validity tests were performed in the analysis of the questionnaires collected by hand-away method. Eight dimensions emerged as a result of the exploratory factor analysis. These dimensions include "pricing errors"; "errors related to violation of rights"; "service delivery errors" "behavioral errors" "errors related to physical infrastructure" "e-service error" "privacy related errors" and "accessibility errors". In addition, it was determined that the model fit values for the confirmatory factor analysis met the specified criteria.

Keywords: Healthcare failure, scale development, types of errors.

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SAĞLIK-HİZMET-HATASI ÖLÇEĞİ: SAĞLIK HİZMET HATALARININ BELİRLENMESİNE YÖNELİK BİR ÖLÇEK GELİŞTİRİLMESİ

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ÖZ

Bu çalışmanın temel amacı sağlık hizmet hatalarının belirlenmesine yönelik bir ölçeğin geliştirilmesidir. Bu amaç kapsamında literatür incelemesi ve sağlık kurumları yöneticileri ile yapılan görüşmeler sonucunda 57 ifadeden meydana gelen soru havuzu oluşturulmuştur. Pilot uygulama sağlık hizmet yöneticisi ve alanında uzman akademisyenler ile görüşmeler sonucunda yapılmıştır. Madde havuzunda kalan toplam 53 ifade ile 392 kişiden kolayda örnekleme yöntemi ile veriler toplanmıştır. Elden bırakıp-alma yöntemi ile toplanan anketlerin analizinde güvenilirlik ve geçerlilik testleri yapılmıştır. Açımlayıcı faktör analizi sonucunda sekiz boyut ortaya çıkmıştır. Bu boyutlar "fiyatlandırma ile ilgili hatalar"; "hak ihlali ile ilgili hatalar"; "hizmet sunum hataları" "davranışsal hatalar" "fiziksel altyapı ile ilgili hatalar" "e-hizmet hatası" "mahremiyet ile ilgili hatalar" ve "erişilebilirlik ile ilgili hatalardır". Ayrıca doğrulayıcı faktör analizine ilişkin model uyum değerlerinin belirtilen kriterleri sağladığı belirlenmiştir.

Anahtar Kelimeler: *Sağlık hizmet hatası, ölçek geliştirme, hata türleri.*

I. INTRODUCTION

In today's world where competition and consumer expectations are increasing, customer retention has become more important than acquiring new customers. Accordingly, businesses value the issues of why customers are lost in their customer satisfaction studies, which actions of the business or its employees cause customers to switch from one service provider to another. Due to various reasons, business practices, policies or situations arising by employees cause customers to choose different businesses, make complaints, claim their rights or leave the business. In this case, the concept of "service error" attracts the attention of businesses and researchers.

If the service applications offered by businesses are below consumer expectations, service error occurs (Hoffman and Bateson, 1997; Bell and Zemke, 1987). From this definition, service failure simply means problems with perceived service (Palmer, 2000). Errors may arise in case of disruption that will occur in any part of the service process. In the service quality gap model (GAP) studied by Parasuraman and others (1985), it is stated that the errors that can mostly arise from the business may consist of five gaps. These gaps are: the difference between the business management's perception of what customer expectations are and the actual customer expectations, the management's inability to understand the quality standards, the difference between the quality standards and the service, communication issues, the difference between expectations of the customers and the perception of the service offered.

Service errors can be perceived differently in various service sectors. The fact that health services are touched and oriented to the human body (health) also increases the sensitivity of consumers in service perception. In addition, the fact that health services are labor intensive and that they have a complex structure based on continuous service that includes different professions together make mistakes inevitable. According to a research report, at least 44 thousand people die every year in America due to health service errors. It has been stated that there are more people who die from healthcare failures than from traffic accidents, breast cancer and AIDS (Kohn et al., 2000). In Turkey, it is stated that an annual average of 35 thousand people die due to medical errors.

Errors in health services may cause a number of financial (monetary) and non-material (psychological, time, social) losses (Hess, 2008). In researches, it is stated that the average cost of medical errors in the world constitutes a large part of the country's income and is between 17 billion and 29 billion dollars (Kohn et al., 2000). Another study conducted in Turkey shows that as a result of 30 law cases which was later transferred to the Supreme Court, medical specialists held responsible for the failure of health services (mostly in surgery) (Can et al., 2011).

It is as important to compensate for errors as well as detecting service errors. Improving the determined service errors or eliminating them with the appropriate compensation method can positively affect the satisfaction of the customers (Hess et al., 2003). According to Davidow (2000), service failure compensation methods can be examined in six dimensions. These are: punctuality, apology, correction, facilitation, reliability and courtesy. According to a study, it has been revealed that reliability, courtesy and correction dimensions among service compensation strategies have a significant effect on satisfaction after service compensation and repurchase intention (Mete, 2021). It should be acknowledged that health service providers are not only institutions equipped with information, but also places that should be considered as humanitarian care centers (Wei et al., 2018).

While many academic studies have been conducted to measure the satisfaction perceptions of health consumers, there are few studies on "health service errors" or "dissatisfaction with health services". In this direction, there is a need to study the sources of errors that affect the quality of healthcare services (Um and Lau, 2018). There are not many studies in the literature to develop scales for determining health service errors. Studies on service failures are either referred to as medical errors, investigated as causes of complaints or dealt with professionally-clinically (doctor, nurse, intensive care, examination, etc.). With this study, the types of errors that may occur in health services are examined in a comprehensive way. In this direction, we hope to contribute to the literature, as well as help healthcare service providers

to improve themselves in terms of quality. In addition, we think that this study can be a guide to prevent material and intangible consequences that may occur as a result of errors.

II. LITERATURE

Healthcare providers are generally places where people go to resolve their health-related problems. Peoples' perception of going to hospitals is very different from going to a restaurant, hotel, grocery store or a movie theater. Therefore, when people go to healthcare providers, they have feelings of anxiety, stress, fear, anxiety, and uncertainty. In this case, people give stronger emotional, cognitive and behavioral responses to errors in health services (Tsarenko, 2009).

Healthcare errors are explained with different classifications in the literature. It would not be a good approach to consider healthcare errors as medical errors only. It is possible to classify health services in two groups; as main services and complementary services (Walton and Hume, 2012). In this respect, health care errors can be divided into two as medical errors and non-medical errors. Alternatively, it can be classified as non-delivery of expected service, incorrect delivery of expected service, and incorrect service delivery (Mackie and Sommerville, 2000). Healthcare errors can also be classified as consequence and process errors (Smith et al., 1999). While the service provider does not meet the basic service needs (the patient cannot be examined despite the appointment, lack of physical infrastructure, errors related to accessibility, not being able to receive health services) in result errors, the service provided is defective (rude treatment, wrong drug use, pricing errors, privacy related errors). In this case, it is important to know which types of mistakes health consumers care more about for healthcare providers to compensate.

Healthcare errors can also be classified as clinical errors, administrative errors, and relationship-based errors (Salazar et al., 2018). Bitner and collegues (1990) basically divided service errors into three parts in their study. These are behavioral errors (apathy, inability to empathize, rude behavior, lack of emphasis on privacy, gender discrimination, etc.), errors in meeting customer needs (inability to respond to special needs, failure to assist with customer mistakes) and service delivery errors (unavailable service, slow service offered and low value service).

In a study conducted by Keaveney (1995), among more than 500 service customers, he identified more than 800 behaviors that cause customers to change the company they receive service from. He divided these behaviors into eight categories. These are: pricing error, incompatible service to the customer, core service failure, behavioral errors, employee and company response to service failures, competition, ethical problems, and involuntary substitution.

In the study performed by Krishna and collegues (2011), health service errors were divided into three parts. These are errors related to hygiene and physical evidence (poor cleaning, physical appearance of the staff, ambient temperature, defective facilities, untidy waiting rooms in clinics, etc.), errors related to the procedures (uncertainty in waiting times, mispricing, loss of personal items, appointments. related mistakes etc.) and errors related to employees (careless-indifferent employees, inability to empathize, inexperienced employee, etc.).

Wei et al. (2018), it has been observed that among the 821 complaints, apathetic behaviors (careless attitudes) are among the most frequently received complaints. Later followed with, respectively, inadequate treatment quality or competence, communication problems, care process, fees and billing problems.

Hoşgör and Cengiz (2020) have conducted a literature review on Turkey as their research sample, they found out that subject of complaints were errors in management (47.78%), errors in relationships (32.76) and clinical errors (19.46) respectively. It has been revealed that the mistakes in the field of administration are service problems, environment, bureaucracy/paper work, finance and billing, personnel employment, access to health services and patient admission, delays, discharge and referrals. It has been determined that the mistakes in the field of relations are patient rights, way of

conduct/attention and communication. Clinical errors have emerged to be related to quality (treatment, care, examination, referral) and patient safety (diagnostic errors, medication errors, skills and professional compliance).

Reader and others (2014) found that the patient safety and quality (33.7%) was the most common among the classification of patient complaints in various academic databases. They have also captured that the types of error that are the subject of the other two important complaints are the management of health institutions (35.1%) and the healthcare worker-patient relationship (29.1%).

Ten themes emerged according to the qualitative study of Öcel (2020) on 1274 complaints from 2018 on the şikayetvar.com website. These are behavioral complaints, waiting times, not being able to receive health care service, lack and ignorance of personnel, lack of physical infrastructure, accessibility problem, ethical problems, weakness of security, price and payment problems and other complaints.

Kroening and collegues (2015) revealed that the most common complaint by healthcare consumers is the attitude of employees. Other complaints are problems with diagnosis and delays in treatment. In addition, physical environment and administrative problems and problems of coordination were among the complaints in the study.

In the study of Coşkun (2014), the causes of dehumanization in health services were investigated. According to the research, dehumanization was examined in three categories: sectoral, organizational and relational.

Considering the studies in the literature, it is observed that the error types are diversified in both classification and sizing. Subsequently, we intended to research these many dimensions that appears in literature in order to determine these varying errors in health services These dimensions are described below with examples from the literature.

Behavioral errors

One characteristic of the healthcare industry is simultaneous production. In this direction, healthcare professionals and patients can take part in the production together. There is physical and verbal interaction between healthcare consumers and employees. Relationships between healthcare professionals and healthcare consumers constitute the most fundamental relationship dimension in health interaction (Güven and Taşkıran, 2019). Health consumers may have some expectations in this relationship. Examples of these expectations are mutual understanding, trust, sincerity, affection, empathy, interest, etc. (Parasuraman et al., 1985; Güven and Taşkıran, 2019). Behavioral errors may arise as a result of this interaction that occurs below the expectations of healthcare consumers. These mistakes can occur in the form of indifference, rude behavior, disregarding complaints, and ridiculing (Daniel et al., 1999; Wei et al., 2018; Kroening, 2015; Öcel, 2020). In a study, it was stated that healthcare workers behave differently according to the occupational groups, gender, education status, and ethnic origin of the patients (Cirhinlioğlu, 2001). The most frequently reported complaints in the studies were the reckless attitudes of the healthcare personnel (consecutively doctors with highest number 56%, civil servants 15%, nurses 7%) (Wei et al., 2018) (Kroening, 2015). Another study conducted in Turkey demonstrates that the highest rates of observed complaint type is behavioral errors in health services (Öcel, 2020).

Service delivery errors

In health services, service delivery error (medical error) can be defined as healthcare professional's inappropriate and unethical behavior, and the patient's harm as a result of inadequate and negligent behavior in professional practices (Wei et al., 2018; Intepeler and Dursun, 2012). Among those errors are; wrong treatment, wrong examination / test, wrong drug use, lack of medical equipment, lack of healthcare workers. In addition, these types of errors can be classified as medication errors, surgical errors, errors in diagnosis, errors due to system failure, and other errors (hospital infections, wrong blood

transfusion, etc.) (Akalın, 2005). Errors arising from the lack of required material and information can be added to this group (Tucker, 2004). In a study, the biggest mistake of nurses during oral drug application was not being present until the patient takes the drug, leaving the drug next to the patient, and applying the drug prepared by another person (Ayık et al., 2010). Another study (Walton and Hume, 2012) shows that basic health service errors cause lower satisfaction, higher level of word-of-mouth communication, and higher negative reactions than complementary health service errors. Research results revealed that some of the preventable medical errors (95% of medication errors) were not reported to managers by employees for fear of punishment (Hume, 1999). In a study, it was stated that nurses only reported 25% of all medication errors (Mayo and Duncan, 2004). It is beneficial to look at the causes of medical errors as well as their consequences. In the studies conducted, the factors that cause medical errors can be examined in three parts as health worker factors, institutional factors and technical factors (McNutt et al., 2004). Factors related to healthcare professionals, fatigue, lack of education, logic error, lack of communication, etc. Institutional reasons may occur as a result of workplace layout, management policy, wrong distribution of personnel, etc. Technical factors, on the other hand, may appear as insufficient medical devices, lack of automation, etc.

Physical infrastructure-related errors

In this type of error, there are deficiencies, insufficiencies or malfunctions in the physical infrastructure of healthcare providers. These are the kind of errors that are related to Web site, e-health systems, medical devices or other equipment, food and beverage services, etc.. According to the results of a study conducted by examining the intensive care unit, it is stated that the main factor that causes medical errors is due to system inadequacy and deficiency rather than personal errors (Akalın, 2005).

Waiting related errors

Waiting occurs before, during and after the process (Dube-Rioux et al., 1988). The waits that occur before, during and after the examination are among those. In healthcare services, there are error types that result from the perception that work and processes take slower than it normally should and the perception of unnecessary waiting and waiting too long. According to a study conducted in India, it was observed that the highest type of error encountered in health services was the delivery of the service too slow (67%) (Krishna et al., 2011). Waiting is an important indicator in the positive-negative perception of service quality (Parasuraman et al., 1985). It has been revealed that patients complain about the quality and adequacy of the treatment if they do not feel that healthcare workers are doing a comprehensive job of examining or observing and perceive this as the cause of delays in treatment or medical errors (Wei et al., 2018).

Errors related to violation of rights (ethical concerns)

The concept of violation of rights is actually a concept that includes whether the decisions are correct or not (Tax et al., 1998). It is possible to examine the concept of violation of rights perceived by health consumers in three dimensions: distributive justice, procedural justice, and interaction justice (Austin, 1979). Distributive justice is the type of justice that is related to results. It is the case that is related to how physical, psychological and financial results received by a person supposed to be (Koç, 2015). In some cases, irreversible (unavoidable) mistakes can be made. Procedural justice arises as a result of the mistakes experienced in the process about how the results are reached and the methods of compensation (Lind and Tyler, 1988). In communicative justice, it refers to situations related to how the client should be treated (Bies and Moag, 1986). Concepts such as respect, kindness, and empathy fall under this dimension of justice (Bies and Shapiro, 1987). In a study, it was revealed that nurses have difficulty in deciding what is the ethically right action and they often have conflicts about how they should approach the patient (Filizöz et al., 2015). In addition, the cancellation of the appointment by the health service company, non-compliance with the appointment time, discrimination among patients, creating unfair examination queues, healthcare workers' prioritizing their own financial interests in service delivery, etc. these can be considered among the types of errors.

Accessibility errors

This type of error occurs as a result of the person's physical and virtual inability to access health services and employees. Examples such as not being able to reach to the results, not being able to reach via phone, not being able to reach the authorized person physically can be given. In a study conducted in Australia, it was revealed that 621 of 1308 complaints were caused by communication problems (Anderson, 2001).

Information errors

It is the type of error that occurs when the health consumer cannot obtain the information that is legally requested or required to be given about health services. Not providing information about the appointment, not providing information about the surgery, not giving information about the medication to be used, not giving information about the fee are common errors under this category (Wei et al. 2018). In another study, it was revealed that information errors cause serious problems in health services. For example, it was reported that patients were faced with infection because they were given wrong instructions regarding the medical supplies they use (Salazar, 2018). This situation can also be considered as problems in communication. The reason for the closure of the communication channel between doctor and patient in general can be attributed to the fact that doctors use the scientific terminology when they communicate with their patients (Yağbasan and Çakar, 2000). In a study, it was stated that 63.9% of the problems that patients had was due to the miscommunication with doctors which was based on frequent use of medical terminology. In this study, they argued that half of the women receiving breast cancer treatment did not understand the information given to them about their disease (Yağbasan and Çakar, 2000).

Pricing errors

Pricing is an important tool in the outright perception of services. It can be an indicator that can affect the perception of service quality. In this type of error, charging outside the legal limits, invoicing the same transaction multiple times, charging a fee for a transaction that is not performed, applying a high price, etc. errors are common examples.

Errors related to privacy

Privacy is a concept that defines the state of immunity related to the areas that are forbidden to look at, touch and talk about on human body, and in short, it indicates an "inaccessible" area (Özata and Özer, 2017). This type of error may differ according to beliefs, culture and legal situations. Examples of mistakes made in cases such as health worker preference in terms of gender, suitability of the physical environment according to gender, confidentiality of personal information can be cited as examples to this group. Privacy can be listed under four factors (Health Quality Standards). These are cognitive, physical, psychological and social intimacy. Cognitive privacy is the state of sharing personal information with others. Physical privacy involves the individual's physical contact and control over that contact. Psychological privacy constitutes the situation regarding the values, beliefs, thoughts and feelings of the individual. Social privacy is related to the individual's management of social relations. A possible privacy-related error can lead to psychological traumas that will not be erased from the memory of the patient for a lifetime (Özata and Özer, 2017). In a study, it was found that receiving health service from the same gender is 50% more effective in communicating with the healthcare worker (Yağbasan and Çakar, 2000).

III. METHOD

Surveys are one of the most widely used methods for research in the field of data collection (Stone, 1978). Performing the measurement in a valid and reliable manner ensures that the research results are interpreted correctly. The first requirement for a valid and reliable measurement is to have a valid scale. Perhaps the biggest challenge in building surveys is the questionnaire's ability to accurately measure the subject of research (Barrett, 1972). The measurement accuracy of a scale can be achieved by finding the correspondence of the concepts of validity (construct validity, content validity, face validity, criterion validity, predictive validity, etc.) and reliability (test-re-test reliability, alternative forms, internal consistency-cronbach's alpha) (Altunışık et al., 2010; Büyüköztürk, 2015). Perhaps the most important concept that should be emphasized among these concepts is content validity (Hinkin, 1995). Content validity is to make sure that the statements in the questionnaire contain sufficient number of statements that can represent the phenomenon to be measured (Altunışık et al., 2010). In this study, the steps to be followed in the research were determined in order to establish the accuracy of the content validity. The steps of the research are included in Figure-1.

Figure 1. Steps for Developing the Health-Service-Failure Scale.

Step 1: Literature review on the concept of health service failures and its domain.

Step 2: Developing the item pool (57 statements and showing health service errors in 9

Step 3: Interviews with healthcare managers and academicians who are experts in their fields (43 people in total). Evaluation of expressions according to Davis's (1992) method. Removal of inappropriate expressions.

Step 4: Application of the questionnaire to 392 people, conducting reliability and validity analyzes, applying exploratory and confirmatory factor analyzes

Step 5: Creating the health-service-failure scale with 42 expressions and 8 dimensions

In this study, the deductive method was used to determine the dimensions and expressions about which health service errors might be in the scale. Dimensions created by deductive method can be used to examine the previously defined population (Hinkin, 1995). In this context, the literature was examined and the dimensions were determined by investigating what kind of error types exist in the health service sector. Specifically in the creation of the dimensions of service errors, the dimensions of errors and complaints in Bitner and collegues (1990), Keaveney's (1995), Krishna and collegues (2011) and Öcel's (2020) study were taken into account (Table 1). Later, the managers of health institutions and academicians who have encountered errors in health services, have been experienced in this field and have served for years were interviewed. Each interview has taken 30 to 50 minutes. During the interview, we asked whether the participants find the expressions and the dimensions suitable. We created an item pool by preparing 57 statements as a result of the interviews based on the specified dimensions and expressions. No expressions that need to be reverse scored were used among the created items. It is stated that the inclusion of an expression that needs to be reverse coded in the scale decreases

the validity of the scale, decreases the factor load, and may cause systematic error (Schriesheim and Hill, 1981; Jackson et al., 1993; Hinkin, 1995).

Table 1. Distribution of Items in the Scale in the Pilot Implementation by Sub-Dimensions

Sub-dimension	Number of items
Behavioral errors	6
Service delivery errors	10
Physical infrastructure related errors	8
Waiting related errors	4
Errors related to infringement of rights	7
Accessibility errors	6
Information errors	4
Pricing errors	7
Privacy errors	5
Total	57

In order for a scale to be valid and reliable, it is necessary to work and comment in accordance with many criteria and standards during the development and use of the scale (Karakoç and Dönmez, 2014). In this study, in accordance with the technique developed by Davis (1992) to test the content validity, explanatory and confirmatory factor analyzes were used to test the construct validity. In the technique developed by Davis (1992), the experts submit the statements to the researcher by choosing one of the options "Item Suitable", "Item Should Be Slightly Revised", "Item Should Be Seriously Reviewed" and "Item Not Suitable". For any of the items, if the ratio that is calculated by dividing the number of experts marking the "Item Suitable" and "Item Should Be Slightly Revised" to the total number of experts is greater than 0,80, in that case the content validity of the items is deemed to have been provided. This means that the statement will continue to remain in the pool of questions (Davis, 1992). In order to determine whether the content of the created items is suitable for health service error, a total of 43 people, who are expert health service managers and academicians, were interviewed. As a result of the interview, face validity of the items is shown on the Table 2 below.

Table 2. Results on the Face Validity of the Items

Dimensions	Statements	Item Suitable", "Item Should Be Slightly Revised		Item Should Be Seriously Reviewed		Item Not Suitable	
		n	%	n	%	n	%
Behavioral Errors	Indifference of health employee	40	93,0	2	4,7	1	2,3
	Rude behavior of health employee	39	90,7	3	7,0	1	2,3
	Employee's disregard for working hours	37	86,0	4	9,3	2	4,7
	Not taking the complaints serious by the hospital management	36	83,7	4	9,3	3	7,0
	Not taking the complaints serious by the higher authorities	35	81,4	3	7,0	5	11,6
	Ridiculing language of health employee	33	76,7	2	4,7	8	18,6
Service Delivery Errors	Rude behavior during treatment	37	86,0	3	7,0	3	7,0
	Wrong treatment	40	93,0	1	2,3	2	4,7
	Wrongful diagnosis	41	95,3	1	2,3	1	2,3
	Wrong examination / test	41	95,3	2	4,7	-	-
	Wrong drug use	41	95,3	1	2,3	1	2,3
	Lack of medical equipment in the hospital when needed	41	95,3	1	2,3	1	2,3
	Suffering from lack of hospital employee	41	95,3	2	4,7	-	-
	Not concluding the treatment	38	88,4	3	7,0	2	4,7
	The treatment services that should be done are not provided completely	35	81,4	4	9,3	4	9,3
	Not paying enough attention to cleanliness (sink, room, corridor, polyclinic, etc.)	42	97,7	1	2,3	-	-

Table 2. Results on the Face Validity of the Items (continuation of the table)

Dimensions	Statements	Item Suitable", "Item Should Be Slightly Revised		Item Should Be Seriously Reviewed		Item Not Suitable	
		n	%	n	%	n	%
Physical infrastructure related errors	The central physician appointment system (MHRS) and hospital records do not match	38	88,4	3	7,0	2	4,7
	The e-government system and hospital records do not match	39	90,7	3	7,0	1	2,3
	The e-pulse system and hospital records do not match	38	88,4	5	11,6	-	-
	Some medical devices not working effectively	39	90,7	3	7,0	1	2,3
	Automation system not working effectively	40	93,0	3	7,0	-	-
	Other Equipment Other Than Medical Devices not working effectively (Elevator, Ventilation, Bed, Door etc.)	41	95,3	2	4,7	-	-
	Not having enough patient beds in the hospital	39	90,7	4	9,3	-	-
	Food and beverage services are not provided appropriately for patients	37	86,0	4	9,3	2	4,7
Waiting related errors	Time loss of the patient due to referral to unnecessary unit	39	90,7	2	4,7	2	4,7
	Waiting unnecessarily during examination	36	83,7	2	4,7	5	11,6
	Disruption of the treatment process for emergency patients who come to the emergency department for examination due to waiting too long	40	93,0	3	7,0	-	-
	Disruption of the patient's treatment process due to delay in the examination appointment	40	93,0	3	7,0	-	-
Errors related to infringement of rights	Failure to comply with the appointment time	42	97,7	-	-	1	2,3
	Canceling the appointment	39	90,7	3	7,0	1	2,3
	Failure to pay attention to the patient examination order	41	95,3	-	-	2	4,7
	Creating unfair examination orders	38	88,4	1	2,3	4	9,3
	Physician's inhumane attitude (just having financial concerns)	40	93,0	2	4,7	1	2,3
	Healthcare professionals making statements that do not reflect the facts	32	74,4	7	16,3	4	9,3
	Discrimination among patients	38	88,4	2	4,7	3	7,0
Accessibility errors	Failure to reach test/examination results when needed	41	95,3	1	2,3	1	2,3
	Inability to reach employees on the phone when needed	35	81,4	4	9,3	4	9,3
	Difficulty in road accessibility	34	79,1	4	9,3	5	11,6
	Failure to see results in E-Pulse system when needed	41	95,3	2	4,7	-	-
	Inability to reach results on the hospital's website when needed	40	93,0	3	7,0	-	-
	Inability to physically reach authorized persons when needed	40	93,0	3	7,0	-	-
Information errors	Not reporting canceled appointments	42	97,7	1	2,3	-	-
	Inability to get detailed information on the phone	30	69,8	4	9,3	9	20,9
	Not sharing enough information about health services to be provided (surgery, medication, examination, etc.)	43	100	-	-	-	-
	Failure to provide the patient with the necessary information about the fee / additional fee to be paid	40	93,0	1	2,3	2	4,7
Pricing errors	Charging for emergency services	37	86,0	4	9,3	2	4,7
	Public hospital charging patients for services that should not be charged	35	81,4	3	7,0	5	11,6
	Different price applications for the same process (analysis, examination, treatment, etc.)	39	90,7	1	2,3	3	7,0
	Charging multiple times for the one procedure (analysis, examination, treatment, etc.)	40	93,0	1	2,3	2	4,7
	Different price implementations for the same drugs	38	88,4	-	-	5	11,6
	Charge a fee for a service not received	39	90,7	-	-	4	9,3
	Requesting fees outside the legislation	40	93,0	1	2,3	2	4,7
Privacy errors	Unauthorized use of personal data	41	95,3	1	2,3	1	2,3
	not given the right to choose the health worker in terms of gender (doctor, health officer, nurse, nurse, etc.)	36	83,7	2	4,7	5	11,6
	Not caring patient's privacy during service (examination, treatment, etc.)	43	100	-	-	-	-
	Sharing patient information with third parties	41	95,3	1	2,3	1	2,3
	Unsuitable physical environment for privacy (washbasin, rooms, polyclinic, etc.)	42	97,7	-	-	1	2,3

When Table 2 is examined, it is seen that the items in the question pool are generally appropriate. The expressions such as "Ridiculing language of health employee", "Healthcare workers making statements that do not reflect the facts", " Difficulty in road accessibility " and " Inability to get detailed information on the phone " were excluded from the item pool because they were below 80% in the scope validity test.

After the items that did not pass the scope validity were removed, 53 statements remained in the item pool. One of the ways to ensure reliability is related to the number of items. While scales created with very few statements may lack content, having too many questions on a scale can prevent respondents from focusing on statements. In a study conducted on scale development, it was stated that the number of statements generally varied between 2 and 46 (Hinkin, 1995). However, the complex structure of health services may require a higher number of questions.

The 5-point likert technique was used in the questionnaire form (1-strongly disagree, 2-disagree, 3-moderately agree, 4-agree, 5-strongly agree). Data were collected from 413 people who have encountered various errors in health services,with simple sampling method between 1 December and 30 January in 2019-2020. Of the collected data, 21 questionnaires were not processed due to incomplete and incorrect filling. The remaining 392 data were processed. As a general rule, the sample size to be taken should be at least 5 times or even 10 times the number of variables (Karagöz and Kösterelioğlu 2008). In this study, it is seen that the sample is more than 5 times the number of statements (392 people in total). In addition, it is stated that at least 150 samples are acceptable in scale development studies (Hinkin, 1995). An ethics committee report was received from Düzce University Scientific Research and Publication Ethics Committee that the study was ethically sound (Decision date: 21.02.2019, Decision number: 2019/12, Meeting number: 3). SPSS and AMOS package programs were used for analysis. Expressions with a factor load of less than 0.45 were excluded from the analysis (Büyüköztürk, 2015). Eigen values are acknowledged above 1 (Altunışık et al., 2010). The eigenvalues of all factors were found to be above 1 in all the analysis we have made. The Cronbach's Alpha value is measured to be above 0.70 (Altunışık et al. 2010).

IV. FINDINGS

This section includes demographic findings and results of explanatory and confirmatory factor analysis. Factor analysis can be used to determine the construct validity of the studies (Büyüköztürk, 2015). Findings about the demographic characteristics of the participants in the research are seen in Table 3. The table shows that women and men participate almost equally in the study. Most of the participants are between the ages of 18-29 or between 30 and 39. Married and single people participate almost equally. Most of the participants are university graduates. Looking at the table, we can say that public employees, private sector employees and students participate more in the study. There is almost an even distribution among the participants in terms of income.

Table 3. Demographic Findings

		n	%
Gender	Male	189	48,2
	Female	203	51,8
Age	18-29	200	51
	30-39	119	30,4
	40-49	49	12,5
	≥ 50	24	6,1
Marital status	Married	200	51
	Single	192	49
Education	Primary	14	3,6
	Secondary	11	2,8
	High	79	20,2
	University	222	56,6
	Graduate	66	16,8
Job	Worker	20	5,1
	Government Officer	129	32,9
	Private-sector	60	15,3
	Housewife	33	8,4
	Self-employment	14	3,6
	Student	101	25,8
	Not working	28	7,1
	Retired	7	1,8
Income	Below 2020 TL	34	8,7
	2021 – 3500 TL	103	26,3
	3501–5000 TL	82	20,9
	5001–6500 TL	64	16,3
	6501 and above	109	27,8

Table 4 contains findings about the health service providers preferred by the participants in general. The table demonstrates that public hospitals are preferred more than others (state and university hospitals and family doctors). Among the public hospitals, it is seen that state hospitals are the most preferred.

Table 4. Hospital Preferences

Hospital type	n	%
Public hospitals	271	66,9
University hospitals	146	36,0
Private hospitals	130	32,1
Family doctors	84	20,7
Specialized hospitals	3	0,7

Table 5 includes the most common error types encountered by the participants. Studies in the literature have been effective in determining these error types. Looking at the table, it is understood that the most encountered errors are of behavioral followed by errors related to waiting. Delivery errors (medical errors, etc.) come in the third place.

Table 5. Most Common Types of Errors

Failure Type	n	%
Behavioral errors	296	74,7
Waiting related errors	249	62,9
Service delivery errors	140	35,4
Informational errors	112	28,3
Related to physical infrastructure	89	22,5
Accessibility errors	65	16,4
Errors related to infringement of rights	51	12,9
Privacy related errors	35	8,8
Pricing errors	17	4,3

Explanatory Factor Analysis (EFA) applied to the collected data is shown in Table 6. When Table 6 is examined, it is seen that the factor analysis Kaiser-Meyer-Olkin (KMO) sampling adequacy test and Bartlett test result for health service errors are sufficient (KMO value is 0.931. Bartlett test result p <0.000). Table 6 shows that, principal component analysis and varimax rotation were used for healthcare errors factor analysis. Statements 12, 13, 24, 26, 34, 36, 39, 40 and 49 were excluded from the scale since the factor load was low and there were close overlapping loads in different factors. As a result of the factor analysis, 42 statements were remained out of 53 statements in the item pool. On Table 6 we can see that the expressions in the scale are grouped under 8 factors. When the expressions in the factors are considered together, the first factor appears to be "Pricing errors"; the second factor is "Errors regarding violation of rights"; third factor; "Service delivery errors" fourth factor is "behavioral errors". Fifth factor; "related to physical infrastructure", sixth factor "E-service failure", the seventh factor; "Privacy related errors", and the eighth factor was named "Accessibility errors". When the table is examined, it is seen that the total variance explained is 66,097%. With this result, it can be said that the expressions in the scale have an acceptable share of 8 factors in explaining health service errors.

Table 6. Factor Analysis Findings

Dimensions and Items		EFA Results	CFA Results			
		Loads	Variance	Eigen V.	Cronbachs Alpha	Loads
Pricing errors	44 Different prices are applied for the same process (test, examination, treatment, etc.).	0,850	36,188	15,923	0,916	0,897
	43 Public hospital charging patients for services that should not be charged	0,832				0,809
	45 Charging multiple times for the one procedure (analysis, examination, treatment, etc.)	0,818				0,872
	42 Charging for emergency services	0,753				0,679
	48 Requesting fees outside the legislation	0,713				0,731
	46 Different price implementations for the same drugs	0,674				0,778
	47 Charging a fee for a service not received	0,628				0,664
	41 Not informing the patient about the charged extra fee prior to the service	0,491				0,612
Errors related to infringement of rights	30 Failure to pay attention to the patient examination order	0,758	7,474	3,289	0,892	0,786
	31 Creating unfair examination orders	0,719				0,789
	33 Discrimination among patients	0,704				0,756
	27 Disruption of the patient's treatment process due to delay in the examination appointment	0,677				0,710
	28 Failure to comply with the appointment time	0,643				0,724
	25 Waiting unnecessarily in the queue for the examination	0,602				0,694
	29 Canceling the appointment	0,503				0,557
	32 Physician's inhumane attitude (just having financial concerns)	0,501				0,681
Service delivery errors	8 Wrongful diagnosis	0,843	5,713	2,514	0,904	0,899
	7 Wrongful treatment	0,834				0,880
	10 wrong drug use	0,831				0,804
	9 wrong examination / test	0,790				0,811
	13 Not concluding the treatment	0,478				0,645
	14 The treatment services that should be done are not provided completely	0,469				0,630
Behavioral errors	2 Rude behavior of health employee	0,730	4,925	2,167	0,862	0,703
	4 Not taking the complaints serious by the hospital management	0,715				0,772
	5 Not taking the complaints serious by the higher authorities	0,714				0,686
	1 Indifference of health employee	0,664				0,650
	6 Rude behavior of health employee	0,577				0,706
	3 Employee's disregard for working hours	0,544				0,612
Errors related to physical infrastructure	19 Some medical devices not working effectively	0,724	3,279	1,443	0,835	0,734
	21 Other Equipment Other Than Medical Devices not working effectively (Elevator, Ventilation, Bed, Door etc.)	0,667				0,755
	20 Automation system not working effectively	0,604				0,719
	22 Not having enough patient beds in the hospital	0,564				0,650
	15 Not paying enough attention to cleanliness (sink, room, corridor, polyclinic, etc.)	0,530				0,591
	11 lack of medical equipment in the hospital when needed	0,492				0,634
e-service errors	18 The e-pulse system and hospital records do not match	0,814	2,962	1,303	0,843	0,872
	17 The e-government system and hospital records do not match	0,797				0,863
	16 The central physician appointment system (MHRS) and hospital records do not match	0,706				0,693
Errors related to privacy	51 Not caring patient's privacy during service (examination, treatment, etc.)	0,736	2,830	1,245	0,840	0,857
	50 not given the right to choose the health worker in terms of gender (doctor, health officer, nurse, nurse, etc.)	0,650				0,743
	53 Unsuitable physical environment for privacy (washbasin, rooms, polyclinic, etc.)	0,633				0,775
	52 Sharing patient information with third parties	0,581				0,689
Accessibility errors	37 Inability to reach results on the hospital's website when needed	0,641	2,726	1,199	0,807	0,696
	38 Inability to physically reach authorized persons when needed	0,615				0,865
	35 Inability to get detailed information on the phone	0,579				0,776

Table 6. Factor Analysis Findings (continuation of the table)

Evaluation criteria		Model Fit
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0,931 Approx. Chi-Square: 10097,334 Bartlett's Test of Sphericity, p.: 0,000 Total variance Explained: %66,097 Extraction method: Principal Component Analysis Rotation method: Varimax	$x^2 = $ **2,260** <3 CFI = 0,95<**0,95**<1 IFI: 0,90<**0,905** NFI = 0<**0,842**<1 TLI = 0<**0,896**<1 RMSEA =0<**0,057**<1 p=0,000
Not: CFA = confirmatory factor analysis; EFA = exploratory factor analysis		

When the findings of the confirmatory factor analysis (CFA) are examined, it is seen that the values are within the acceptable value margins. When CFA fit indices are examined, Chi-square goodness of fit (x2) value is less than 3, comperative fit index (CFI) value is greater than 0.95, incremental fit index (IFI) value is greater than 0.90, Normed fit index (NFI) value should be greater than 0.90, Tucker-Lewis index (TLI) value should be greater than 0.90, rook men square error of approximation (RMSA) value should be between 0 and 1 (Meydan and Şeşen, 2015). When Table 6 is examined, it is seen that the fit index values are within the specified ranges.

V. CONCLUSION, LIMITATIONS AND FUTURE DIRECTIONS

In this study, a scale for determining health service errors was developed. We think that this study will be useful due to the limited number of comprehensive studies on healthcare errors in the literature. In this direction, content and construct validity tests were applied to the statements in the item pool created about health service errors. As a result of the tests applied, the dimensions and expressions of health service errors suggested in the item pool created before the analysis and the dimensions and expressions of health service errors emerging after factor analysis were found to be compatible. In general, health service failures are classified as; monetary and non-monetary failures (Hess, 2008), medical and non-medical failures (Walton and Hume, 2012), result and process failures (Smith et al., 1999), clinical, managerial and relationship-based failures in the literature (Salazar et al., 2018). As a result of this study, dimensions and expressions were created to cover these failures. In addition, the classifications in the literature and the dimensions and expressions in this study were found to be consistent. As a result of the exploratory factor analysis, 8 dimensions emerged. These dimensions are similar to the studies of Krishna and others (2011) Keaveney (1995), Wei and others (2018), Kroening and others (2015) and Öcel (2019). The alpha coefficient, KMO value and the variance results revealed in the exploratory factor analysis show that the scale has a reliable structure. In the confirmatory factor analysis, the results were within the limits of goodness of fit values. In addition, the exploratory factor analysis findings and the confirmatory factor analysis results were also compatible. Considering all the results, this paper suggests that;

- The statements made about health service errors represent the area

- The dimensions are consistent with the literature

- The dimensions and expressions are consistent with the item pool created before the analysis and the dimensions and expressions revealed after the factor analysis.

It was revealed that the most common types of errors encountered by the participants were behavioral errors. This result shows similarities with the studies conducted by Wei and others (2018), Öcel (2020), and Kroening and others (2015). In this case, it was stated by the participants that health service providers display rude, harsh and indifferent behaviors. In-depth research on this subject can be done and suggestions for the solution of the problem can be presented. Next, it was understood that the errors related to waiting were stated. This conclusion is similar to Krishna and collegues (2011). It can be said that situations such as not paying attention to appointments, unnecessary waiting, and delays due to unnecessary transfers cause these errors. Next, the service delivery errors were stated. This result is

similar to Van Den Berg and collegues 2019, Salazar and collegues (2018), Bouwman and collegues (2016), Kline and collegues (2008), Daniel and collegues (1999). When the expressions included in the service delivery errors are considered together, errors such as misdiagnosis, treatment, drug use are among the common complaints.

The limitations of this study can be explained by the following statements;

- This study is limited to 2019 and Bolu-Düzce provinces. The research can be widened by implementing similar methods in different provinces, regions or at national level.

- This study determined the framework of errors in the provision of health services in the provinces of Bolu and Düzce. Serving errors made in different countries may also be researched.

- In the study, the experience and thoughts of the people working in Bolu and Düzce provinces were effective in determining the error expressions included in the scale.

The large number of statements in the scale may avert the participants' ability to focus on the questions. In this direction, scales with less number of expressions can be developed in future studies. For preventable error types it can be investigated why employees do not report errors to their superiors or what kind of encouragement methods they should so that the health workers will report them. Studies can be carried out on the method of remediation for mistakes encountered by healthcare service consumers. Different forms of relationships between health care failures and compensation methods can be established.

Ethical Approval: An ethics committee report was received from Düzce University Scientific Research and Publication Ethics Committee that the study was ethically sound (Decision date: 21.02.2019, Decision number: 2019/12, Meeting number: 3).

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