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A Research on the Factors Affecting the Preference of Medical Specialization Branches

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ABSTRACT

Aim. The aim of this study is to determine the factors affecting the preferences of specialization in the field of medicine.

Material and Methods. Mixed research and exploratory sequential research design were used. In the exploratory phase, data were collected from specialist physicians (n=14) and findings were analyzed by descriptive and content analysis. In the light of qualitative findings, a measurement tool was developed and applied to medical school students and the physicians who prepared specialty exams (n = 502).

Results. Qualitative findings were structured under 3 themes: individual, occupational and systemic factors. The measurement tool, which was named "Physicians' Preference Tendencies of Specialty Branch" was structured as 42 items and 7 dimensions: risk, comfort, health problems, status, emotional interest, gender, and marital status.

Conclusions. Although there are many factors that affect medical specialty choice preferences, it is concluded that personality traits and idealism of individuals and mortality rates associated with branch or field of medicine are the most significant professional factors, while the risks and the exposure to threatening behavior that poses a risk and the application of the additional payment based on the performance of candidates are the systemic factors that affect selections and preferences. Also, it was concluded that qualitative data obtained in the research were supported with quantitative data.

Key Points

- The medical specialty choice was an important issue within the medical specialties, meriting a separate assessment domain.
- The study observed that specialist physicians and physician candidates consider professional factors in the selection of specialization.
- The study acknowledged threatening behavior that poses a risk and performance-based payment system impacted specialty choices.

Introduction

The density of knowledge emerging in medical sciences has increased continuously with the effect of developing technology, requiring it to be divided into sections, and the most important feature of societies for a while has been the rise of experts and professionals. The reflection of this situation in the field of medicine was in the form of "specialization" [1] Specialization in medicine is defined as an effort to understand more specific issues specific to a disease, an organ, an operation [2, 3]. This concept, which is in widespread demand among physicians, is seen as almost a necessity today [4, 5[, and the choice of specialization turned to a crossroad for physicians who have graduated from medical school. The choice of specialty in medicine is an important decision of critical importance as it determines the professional future of a physician in her/his professional life [6]. This decision also affects the person's lifestyle, financial situation, work environment and circle of friends, and even the choice of spouse. For this reason, people in career professions such as the profession of medicine need to choose the field that suits their expectations, personality traits, abilities, and ideals [7]. However, most of the time, physicians have difficulties in finding an answer to the question of which specialty they will focus on, despite having an opinion about the "best" specialty while graduating from medical school. Sometimes they can get information about their specialty from family members, sometimes from other physicians, and sometimes from an outsider. It often seems more difficult to decide how or in which branch to become a physician than to decide to become a physician. This is because physicians almost take on a new identity with their chosen field of specialization [3].

However, although the choice of specialty in medicine seems to be a decision that only concerns the physician, it has both individual and social consequences. Although this choice is an individual decision for the physician, the characteristics of the chosen branch and the patient population of the branch cause social consequences. For example, it is reported that while the elderly population in the United States of America is estimated to increase almost twice between 2005 and 2030 the preference for internal medicine concerning this population has decreased by approximately 35% between 1985 and 2008, and this is likely to result in a doctor shortage in the future 8. Therefore, the selection of specialization is a complex, dynamic, and not fully understood process that includes many factors. Increasing socio-political and socio-economic factors predominantly shape the preferences of physicians in many countries today, and it is not yet known how this situation will affect the health sector and therefore society in the future [9–11].

It is reported in the literature that many factors affect physicians' choice of specialization. Studies have revealed that factors such as personality structure, workload, lifestyle, financial gain of the chosen branch, prestige, personal role model, familial reasons, experiences gained during medical education, talent, and gender are effective in the selection of specialization [12–15]. Among the studies designed with both qualitative and quantitative methods, no research was found using a mixed-method. The fact that the specialization selection decision is an individual decision increases the number of factors affecting the process and makes it difficult to understand the reasons behind the preferences. Understanding this complex process and the factors affecting it requires an in-depth perspective. From this point of view, it is aimed to determine the factors affecting the preferences of specialization in medicine in this study.

Material and Methods

Method. this study was designed as a mixed-method and "exploratory sequential design" from mixed-method research was used.

Research Group. In the qualitative phase of the research, the opinions of 14 physicians who are currently active in the health system were consulted. In the quantitative stage, it was carried out with 3rd, 4th, 5th, 6th-grade medical faculty students who are thought to have high awareness about the choice of specialty in medicine, and a total of 502 participants who were preparing for the specialty exam. Ethics Committee approval was obtained from Süleyman Demirel University for the research (29.05.2018/147130).

Sample. Although the number of samples is not mentioned in qualitative studies, sample selection methods are used when determining the sample group created for the research purpose. The maximum diversity sampling method was used to reflect the diversity of individuals at the maximum level by the research purpose of the qualitative data of the research [16].

While determining the sample at the quantitative stage, the number of scale items was taken as a basis. Although there is no consensus among researchers about the number of sample sizes made according to the number of items in the scale, it is often accepted that the criterion sample size should be at least 10 or at least 5 times the number of items in the scale [17]. In this study, the scale was applied to a total of 502 people and a sufficient sample size was achieved.

Working Group. The participants of the qualitative phase of the study consist of 14 specialist physicians who are currently working actively in the health system. Participants were coded as "H1, H2, H3" and their characteristics are given in **Table 1**.

The participants of the quantitative phase of the study consisted of 3rd, 4th, 5th, 6th-grade medical faculty students and physician candidates preparing for the specialty exam. The characteristics of the quantitative participants are shown in **Table 2**.

Data Collection. In the qualitative part of the study, the "Semi-Structured Interview" technique, one of the data collection methods, was used. To examine the subject in-depth, probing questions such as 'why can you give an example, can you explain a little more' were asked to the participants. The interviews were conducted in places where the physicians could be comfortable, at the places they preferred, on the day and time they determined, by voice recording. As a result of the interviews, a total of 604 minutes were interviewed. Qualitative research was carried out between January and May 2018.

The data of the quantitative phase of the research were collected with a measurement tool called "Physicians' Branch Preference Tendency Scale", which was developed to cover 11 themes obtained in the qualitative phase. This tool was created with the answers given by the qualitative participants of the research, to reveal the tendencies of the physicians on the choice of specialization and to determine whether the qualitative data are supported by the quantitative data. First of all, an item pool consisting of 100 statements was

Table 1. Characteristics of Qualitative Participants of the Study

Participant	Gender	Age	Branch	Years of experience in specialty
H1	Male	60	Radiology	35
H2	Female	48	Biochemistry (Public Health)	25
H3	Male	59	Pediatric Surgery	32
H4	Female	45	Biochemistry (Hospital)	22
H5	Male	46	Internal medicine	16
H6	Male	52	Clinical Microbiology and Infectious Diseases	10
H7	Male	46	Cardiovascular Surgery	18
H8	Female	39	Neurology	11
H9	Male	48	Psychiatry	23
H10	Male	43	Emergency Service	7
H11	Male	38	Orthopedics and Traumatology	11
H12	Male	49	Urology	24
H13	Female	42	Family Physician	9
H14	Female	41	Medical Pharmacology	10

Table 2. Characteristics of Quantitative Participants of the Study

Gender			Age				Grade					
Male	Female	N	20-23	24-27	28+	N	3	4	5	6	Graduate	N
219	283	502	213	215	75	502	53	61	82	175	131	502

written for the measurement tool, and the items were read by 3 faculty members and evaluated in terms of language, scope, and the number of items. As a result of the expert evaluation, it was reported that the items were appropriate for the way they were expressed and the purpose of the study, and a suggestion was made to reduce the number of items. It has been seen that the measurement tool is suitable for content validity. As a result of the expression reduction proposal, the measurement tool consisting of 55 statements, with at least 3 statements under each of the 11 themes in the measurement tool, was made ready for application. The measurement tool, which consists of 55 statements, includes 44 positive and 11 negative statements, and is structured as a 7-degrees Likert scale. After the measurement tool was applied to the research group, the answers were scored by considering positive and negative statements. Quantitative research was conducted between July and October 2018.

Analysis of Data: The raw data collected during the qualitative phase of the research were transcribed, transferred to Microsoft Word, converted into text, and the generated texts were read line by line. Then, the themes were determined, and studies were carried out on what the themes meant. Descriptive analysis and content analysis techniques were used to decompose the qualitative data of the research.

Quantitative data, on the other hand, were subjected to Exploratory Factor analysis using the SPSS 23.0 package program.

Validity-Reliability: To ensure the validity of the qualitative phase of the research, the data were sent to 2 faculty members who had worked on qualitative research, and the data were asked to be coded. As a result of coding, different coded themes were discussed between the researcher and the coders, and a consensus was reached between the themes. To confirm the research, the data obtained with the voice recorder during the research process, the themes, categories, and codings created are kept by the researcher for re-examination when necessary.

The reliability of the scale was determined by the Cronbach Alpha coefficient. This coefficient was found to be 0.924 out of 55 items. This result is evidence of reliable and consistent measurement.

Results

Qualitative Research

The opinions of the participants were conveyed within the ethical rules, by the principle of confidentiality, without revealing their identity information. Physicians are coded as "H1, H2, H3". The characteristics of the participants are shown in **Table 1**.

The qualitative findings obtained in the research were structured under three main themes "Individual Factors", "Occupational Factors" and "Systemic Factors". Sub-themes and codes were created under the main themes.

Main Theme 1: Individual Factors

Individual factors affecting the choice of medical specialization branches were divided into main themes and sub-themes in line with the answers of the participants. The main theme and sub-themes of individual factors and examples from the statements of the participants are given in **Table 3**.

Main Theme 2: Occupational Factors

Occupational factors that affect the choice of medical specialization branches were divided into main themes and sub-themes in line with the answers of the participants. The main theme and sub-themes of occupational factors and examples from the statements of the participants are given in **Table 4**.

Main Theme 3: Systemic Factors

The systemic factors that affect the choice of medical specialization branches were divided into main themes and sub-themes in line with the answers of the participants. The main theme and sub-themes of systemic factors and examples from the statements of the participants are given in **Table 5**.

Quantitative Research

The findings of the quantitative phase of the research include the descriptive statistics of the measurement tool and the results of the factor analysis applied to the data set.

Descriptive Statistics Related to Measurement Tool

Descriptive statistics of the measurement tool consisting of 55 expressions are shown in the table. When the mean scores of the participants

Table 3. Findings Related to Individual Factors Effective in Preferring Medical Specialization Branches

Themes and Sub-Themes / Statements of Participants
Main Theme 1: Individual Factors
Sub-Theme 1: Demographics
– *"The women already focused on dermatology and physical therapy so that I could think ahead and have a child anyway" (H10, male, 43 years old).*
– *"It is especially important for women …. Because there are housework, there are children, there are many things waiting for women" (H4, female, 45 years old).*
– *…of course, gender affects women, for example, they choose a branch by considering their future life. Because, due to the mission of women in society, women inevitably tend towards the comfortable branch (H8, female, 39 years old).*
Sub-Theme 2: Personal Features
– *"First of all, they prefer what they want to do according to their character. But the important thing is that he wants it personally. Depends on which part you want. They will also be happy if they can choose their ideal profession. For example, if you are an idealist, you prefer and do it even if you do two compulsory services. That is to say, in that case, I was not an idealist" (H14, female, 41 years old).*
– *"…..there are people who are such idealists. In other words, people who have determined their own branch a long time ago, who are different from others in order to reach their goal, who are more hardworking, who are different from the average group, who get high scores but who endure other conditions, think this directly when they make a choice" (H11, male, 38 years old).*
Sub-Theme 3: Reasons for Health
– *"Of course, this is also important here, if the person does not have any health problems, he should choose accordingly. For example, why can't someone with a hand injury choose orthopedics because they do power-based work? There may be health problems, for example, the person has a hand injury, is disabled, or has a crippled foot. For example, he cannot stand very long. Such people cannot opt for a surgery" (H5, male, 46 years).*
– *"….Or if there is a biological reaction reaction that he does not know about when he sees blood, this time he can quickly leave the surgical branches" (H1, male, 60 years old).*
– *"Physicians consider physical fatigue. In other words, they tend to where I get less physically tired (H11, male, 38 years old).*
– *"… There may be many reasons for this. For example, surgery, you know, is the job of surgery, the person who says I can't stand the sight of blood says that they will not choose a surgical branch, we can't do without seeing blood" (H12, male, 49 years old).*
Sub-Theme 4: Reasons for Ability and Experience
– *"For example, I practiced for 3 years. I went through such bad things when I was a practitioner that I hated the clinic and then turned to biochemistry" (H2, male, 48 years old).*
– *"…then talent is very important. It is very important for a physician to feel that he will be successful in that field. Because, you know, surgical branches are very dependent on manual skills. A physician cannot choose surgical branches if he does not have manual dexterity" (H13, female, 42 years old).*
– *"… medical school is more attractive to people now. You feel as if the end is very beautiful and bright, but of course, the practice period, compulsory service, emergency, the cases seen there, the environment, etc. guide your choice of branch" (H8, female, 39 years old).*
– *"…a doctor who chooses a specialty until he becomes a specialist can choose a branch either as much as he saw at the university or there are people he knows at the university somewhere around him, being influenced by them" (H12, male, 49 years old).*

in **Table 6** are examined, it is seen that they answered "strongly disagree", "somewhat disagree" and close to "disagree" to 9 statements in the scale, and "neither agree nor disagree" to 11 statements. When the average scores of the remaining 35 statements of the participants are examined, it is seen that the participants gave positive answers as "agree", "agree a little" and "strongly agree" to these statements. This shows that the qualitative data of the research is largely supported by the quantitative data.

Factor Analysis

In the study, (KMO) and Barlett's tests were used to determine whether the measurement tool was suitable for factor analysis (**Table 3**). The test result was 0.938, and it was seen that this value was quite sufficient for factor analysis. In addition, the significant result of Barlett's Sphericity test (Sig. Value = 0.000; $p < 0.05$) shows that the matrix formed by the relations between the variables is suitable for factor analysis.

When the total explained variance value was examined, it was seen that there were 6 factors with Eigenvalues greater than 1 in the measurement tool. The first factor (eigenvalue 13,622) explains 24.76% of the variance and the second factor (eigenvalue (3,878) explains 7.05% of the variance (**Table 7**) When the eigenvalues are examined, it is seen that the measurement tool consists of 6 dimensions. Appropriate expressions and factor load scores in the measurement tool will be revealed by subjecting them to exploratory factor analysis.

Table 4. Findings Related to the Professional Factors Effective in the Preference of Medical Specialization Branches

Themes and Sub-Themes / Statements of Participants
Main Theme 1: Professional Factors
Sub Theme 1: Working Conditions
– *" ….if he goes with this thought, young physicians will definitely prefer comfortable branches" (H4, female, 45 years old).*
– *"…in my opinion, it's also about the watch, and how many emergency services there are in the branch. Physicians determine their preferences accordingly. Of course, it can vary according to individuals" (H7, male, 46 years old).*
– *"… they choose not to communicate with the patient, so the radiology score is very good" (H8, female, 39 years old).*
Sub-Theme 2: Threatening behaviour that poses a risk
– *"…the attitudes of patients have also changed recently. As a result of the media being so active, people have realized something. Physician errors come up a lot" (H2, female, 48 years old).*
– *"…that is, patients complain and are investigated afterward. In addition, patients are constantly complaining, you cannot please them, who wants a branch that is constantly complained about" (H3, male, 59 years old).*
– *"I think in the history of the Republic, there has never been such a high intensity in preclinical branches. Lastly, I am following the intensity of this last semester with amazement. But I am not giving any rights to my fellow physicians. complications, malpractice, violence, such cases have now alienated physicians from this job" (H5 male, 46 years old).*
– *In other words, physicians are doing their best not to see patients today. Why, because there is violence, this is a separate issue in the first place, then he considers various alternatives and chooses to secure himself in a way, along with financial concerns (H11, male, 38 years old).*
Sub-Theme 3: Risk
– *"…they choose groups where seizures are low, where there is no malpractice, where there is no possibility of harming the patient, there are no complications, and they do not take such risks" (H5, male, 46 years old).*
– *"….and branches with less risk, more comfortable working conditions, a regular life, good salary, and high returns are generally preferred" (H14, female, 41 years old).*
– *"That's why they don't go to branches with high mortality rates and high complication rates. I think the risk and mortality rate of that branch is a factor that affects, even directly affects, the choice of branch today" (H11, male, 38 years old).*
Sub-Theme 4: Punishment
– *"I'm looking at what will make me happy. Everyone is looking at this now, so that when I make a choice, my peace should not be disturbed, I should not face a complaint or a court. In other words, the possibility of encountering punishment affects the choice" (H11, male, 38 years old).*
– *"….when you make a mistake, there is no one beside you, you are directly in court" (H9, male, 48 years old).*
– *"Of course they're running, wouldn't you? If the patient is well, he leaves without even thanking him, but if there is a mishap, his complaint, penalty, court is dragged out. Why doctor bother with this?" (H12, male, age 49).*
Sub-Theme 5: Specialization and Status
– *"Since the structure of the system, family type and capacity in Turkey is not built on capacity, it has to be an expert in a way. ….But the physician feels obliged to be an expert in terms of his apparent status, perspective and prestige of the society. Because otherwise he is classified as a second class doctor" (H7, male, 46 years).*
– *"Why specialist medicine is preferred? a little bit of status in my opinion. So this was the case in Roman times as well. So physicians were doing magical work. In other words, there were lawyers, clergy, and sociologists in the Senate at that time, but physicians were a profession preferred by the poor in order to advance faster in terms of status. In those days, medicine was a matter of status, today nothing has changed about expertise or status" (H11, male, 38 years old).*
– *"I tried to be an expert because I didn't want to stay a general practitioner. At that time, general medicine was not even considered as a physician. So is it now. Its status is very low, expertise is required. They feel compelled to be experts and they tend towards it like all of us…" (H9, male, 48 years old).*

Exploratory Factor Analysis

The dimensions and factor scores of the exploratory factor analysis applied to the measurement tool are shown in **Table 8**. According to **Table 8**, the factor loads of the items in the expressions that make up the scale are between 0.344 and 0.798. It is seen that 23 expressions in the scale are collected in the 1st dimension, 10 expressions in the 2nd dimension, 8 expressions in the 3rd dimension, 5 in the 4th dimension, 5 in the 5th dimension, and 4 in the 6th dimension.

Factorization

There are many techniques used for factorization while performing factor analysis. These techniques combine in two main points as principal component analysis and factor extraction techniques. A good factorization process should include variable reduction, ensuring unrelatedness between new variables, and making the obtained factors meaningful [18]. While factoring in the study, the statements in the dimensions were examined one by one with a faculty member, and the relationships and unrelatedness between the statements were evaluated. When the expressions in the dimensions were examined, it was seen that all of the expressions S24th, S25th, S11th, S18th, S50th, S3rd, S22th, S48th, S53th, and S9th in the 2nd dimension belonged to the opposite expressions and there was no corre-

Table 5. Findings Related to Systemic Factors Effective in the Preference of Medical Specialization Branches

Themes and Sub-Themes / Statements of Participants
Main Theme 1: Systemic Factors
Sub-Theme 1: Performance-Based Additional Payment Application
– *"...In recent years, preclinical branches, especially biochemistry, radiology, microbiology, laboratory departments are preferred" (H5, male, 45 years old).*
– *"Performance directly affects the system, namely income is the most important thing in a person's life. When you say income, you know that doctors are getting paid like a bird, if we can call it salary now, that is a separate issue. That's why people turn to performance. Why are laboratory branches preferred so much today? Because of the performance system, physicians think that I should not bother and get my doner" (H12, male, age 49).*
– *"Yes, I am talking about performance income. Today, physicians want to go to branches with high performance scores, just because of their income" (H13, female, 42 years old).*
Sub-Theme 2: Specialization Training
– *"...by the way, where you will do your specialization training is important. We said we should not leave Antalya, but the university here is good. When I think about it, for example, both the province and the clinic affected my choice of branch" (H13, female, 42 years old).*
– *"I want to specialize. First you think about what to do. For example, you choose a province, I choose one, I don't want to go to that province, let it be a place close to my hometown, Isparta Antalya, Denizli..."(H9, male, 48 years old).*
– *"But there is another point. It is the inadequacy and inequality of medical education. Today, he called me from the Emergency Department at 11:30 and said this is a general practitioner, the man has an heir, brother..." (H7, male, 46 years old).*
Sub-Theme 3: Health Policies
– *"Actually, we can say that here. Unfortunately, the system, today's system, forces physicians to do so. In other words, if a person who has always wanted to choose the same branch and continues in this direction changes his choice because of the system, there is a serious problem there" (H11, male, 38 years old).*
– *"If the health system in Turkey changes, the preferences will also change in that direction. Of course, health policies are effective... "(H12, male, 48 years old).*
– *"Health policies are also effective. The system is constantly changing. Healthcare has changed the most in the last 10 years. Doctors' preferences are also affected by these changes" (H6, male, 52).*

Table 6. Descriptive Statistics (n = 502)

Order	Minimum	Maximum	Average	Standard deviation	Order	Minimum	Maximum	Average	Standard deviation	Order	Minimum	Maximum	Average	Standard deviation
S1	1,0	7,0	4,76	1,79	**S19**	1,0	7,0	3,88	1,81	**S37**	1,0	7,0	4,40	1,81
S2	1,0	7,0	5,46	1,34	**S20**	1,0	7,0	4,93	1,80	**S38**	1,0	7,0	4,29	1,93
S3	1,0	7,0	3,20	1,75	**S21**	1,0	7,0	4,80	1,85	**S39**	1,0	7,0	5,96	1,29
S4	1,0	7,0	1,97	1,61	**S22**	1,0	7,0	1,91	1,51	**S40**	1,0	7,0	4,64	1,98
S5	1,0	7,0	4,37	1,99	**S23**	1,0	7,0	4,32	1,84	**S41**	1,0	7,0	5,00	2,01
S6	1,0	7,0	4,34	1,68	**S24**	1,0	7,0	2,38	1,66	**S42**	1,0	7,0	3,98	1,99
S7	1,0	7,0	4,51	1,71	**S25**	1,0	7,0	2,94	1,58	**S43**	1,0	7,0	3,19	2,05
S8	1,0	7,0	4,32	1,82	**S26**	1,0	7,0	5,02	1,80	**S44**	1,0	7,0	4,76	1,95
S9	1,0	7,0	5,18	1,58	**S27**	1,0	7,0	3,30	1,97	**S45**	1,0	7,0	4,71	1,76
S10	1,0	7,0	6,24	1,16	**S28**	1,0	7,0	4,06	1,97	**S46**	1,0	7,0	4,86	1,84
S11	1,0	7,0	2,72	1,47	**S29**	1,0	7,0	5,45	1,81	**S47**	1,0	7,0	4,45	1,79
S12	1,0	7,0	3,75	1,88	**S30**	1,0	7,0	5,13	1,67	**S48**	1,0	7,0	3,97	1,64
S13	1,0	7,0	5,25	2,01	**S31**	1,0	7,0	3,64	1,52	**S49**	1,0	7,0	3,18	2,02
S14	1,0	7,0	4,43	2,04	**S32**	1,0	7,0	5,14	1,81	**S50**	1,0	7,0	2,76	1,73
S15	1,0	4,0	2,34	1,13	**S33**	1,0	7,0	3,46	2,04	**S51**	1,0	7,0	4,92	1,65
S16	1,0	7,0	4,61	1,93	**S34**	1,0	7,0	5,00	1,87	**S52**	1,0	7,0	4,96	1,86
S17	1,0	7,0	5,07	1,86	**S35**	1,0	7,0	4,37	1,99	**S53**	1,0	7,0	2,96	1,72
S18	1,0	7,0	2,97	1,64	**S36**	1,0	7,0	4,41	1,94	**S54**	1,0	7,0	4,64	1,94
										S55	1,0	7,0	3,39	1,97

Table 7. View of Total Explained Variance

Dimensions	Total explained variance								
	Eigenvalues			Sums of Factor Loads			Rotated Sums of Factor Loads		
	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %	Total	Variance %	Cumulative %
1	13,622	24,767	24,767	13,622	24,767	24,767	11,596	21,083	21,083
2	3,878	7,051	31,818	3,878	7,051	31,818	3,375	6,137	27,220
3	2,625	4,772	36,590	2,625	4,772	36,590	2,937	5,339	32,559
4	2,298	4,178	40,768	2,298	4,178	40,768	2,830	5,145	37,704
5	1,883	3,423	44,191	1,883	3,423	44,191	2,634	4,788	42,492
6	1,654	3,007	47,198	1,654	3,007	47,198	2,588	4,706	47,198

Table 8. Items and Factor Load Scores

Dimensions	Items and Factor Load Points
1 (23 expressions)	S34 (0,796), S32 (0,773), S46 (0,761), S44 (0,756), S52 (0,746), S54 (0,741), S40 (0,724), S21(0,715), S16 (0,713), S26 (0,706), S17(0,687), S38(0,682), S42(0,663), S29 (0,642), S5 (0,631), S28 (0,624), S13 (0,597), S14 (0,576), S36 (0,573), S15 (0,550), S8 (0,498), S31 (0,406), S55 (0,394)
2 (10 expressions)	S24 (0,640), S25 (0,543), S11 (0,541), S18 (0,502), S50 (0,488), S3(0,477), S22 (0,458), S48 (0,414), S53 (0,386), S9 (0,344)
3 (8 expressions)	S35 (0,705), S43 (0,688), S41 (0,614), S33 (0,575), S49 (0,514), S47 (0,798), S37 (0,736), S45 (0,725)
4 (5 expressions)	S39 (-0,693), S10 (-0,610), S30 (-0,541), S23 (-0,521), S27 (0,467)
5 (5 expressions)	S1 (0,736), S7 (0,695), S20 (0,625), S12 (0,546), S2 (0,432)
6 (4 expressions)	S6 (0,725), S51 (0,705), S19 (-0,619), S 4(0,555)

Table 9. Analysis of the Measurement Tool for the 1st Dimension of the Dimensional Instrument

Dimension	Items and Factor Load Points
1 (12 expressions)	S26 (0,752), S42 (0,740), S34 (0,728), S29 (0,723), S52(0,714), S44 (0,709), S28 (0,708), S46(0,666), S40(0,663), S17(0,609), S21 (0,578)
2 (7 expressions)	S13 (0,720), S8 (0,682), S55 (0,641), S16 (0,637), S5 (0,632), S27 (0,577), S31 (0,451)
3 (4 expressions)	S36 (0,782), S38 (0,630), S14 (0,602), S54(0,581)

lation in terms of the expressions in the dimension. Since 'S49', which is one of the expressions forming the 5th dimension, is meaningless in the dimension and S4, which is in the 6th dimension, is meaningless in the dimension, these expressions were excluded from the measurement tool. Then, the dimension structure of the whole measurement tool was re-examined, and although the expressions were grouped under dimensions, to create a more homogeneous scale, factor analysis was also conducted on 23 expressions that make up the first dimension, and it was determined that the expressions here were also divided into dimensions (**Table 9**).

After the dimensions and expressions in the measurement tool were determined, the dimensions were named. It was seen that the final version of the measurement tool consisted of 43 statements and 7 sub-dimensions. The names and expressions given to the dimensions are given in **Table 10**.

Discussion and conclusions

In the last century, there have been tremendous scientific and technological developments in the field of medicine. Medical knowledge that transcends borders has resulted in specialization in medicine. Since the beginning of the last century, the whole world has entered a very rapid transformation due to the beginning of specialization in medicine, discoveries emerging with technological advances in medicine, new diseases emerging with the increase in life expectancy, and political developments; The health sector has also been

Table 10. Names and Expressions Given to Dimensions

Dimension	
Risk	26 – I prefer branches with fewer seizures. 42 – I prefer branches with a low probability of encountering difficult patients. 34 – I prefer branches where the probability of encountering an administrative investigation due to the treatment or procedure applied to the patient is low. 32 – I prefer branches with low risk of malpractice in patients. 29 – I prefer branches where I will not be exposed to hostile attitudes from patients. 52 – I prefer branches where the possibility of paying compensation for the treatment or procedure applied to the patient is low. 44 – I prefer branches where the probability of being judged due to the treatment or procedure applied to the patient is low. 28 – I prefer branches that do not have emergency services. I prefer branches with low risk of complications in 46 – patients. 40 – I prefer branches with a low mortality rate in their patients. 17 – I prefer branches where I am less likely to be verbally insulted. 21 – I prefer branches where I am less likely to make mistakes.
Dimension	
Comfort	13 – If I get a high score in the TUS exam, I prefer comfortable branches. 8 – In order to increase the performance score, I prefer branches in which I will not exert much effort. 55 – Today, as a result of the TUS exam, I choose the branches most preferred by the physicians. 16 – I prefer branches with a light workload. 5 – I prefer branches with comfortable assistantship training. 27 – I prefer branches where I do not need to develop a dialogue with the patient. 31 – I prefer branches where the performance score is fixed every month.
Dimension	
Health problems	36 – I prefer branches that do not require much physical strength. 38 – I prefer branches that do not require me to run all the time. 14 – I prefer branches that do not require me to stand for a long time. 54 – I prefer branches where I will be less physically tired.
Dimension	
Status	43 – Since I think that specialist physicians look at general practitioners negatively, I will choose a branch. 35 – I will choose a branch because I think being a specialist is prestigious. 49 – I prefer a branch to go to the compulsory service later. 33 – I will choose a branch because of the social pressure on physicians. 41 – I will choose a branch because I do not want to stay as a general practitioner
Dimension	
Emotional Involvement	51 – I prefer branches that have the opportunity to do research. 19 – I prefer branches that require my lifelong reading and research. 39 – I prefer branches that suit my personal abilities. 30 – I always prefer branches that are in my ideal. 6 – I prefer branches that I think will work with high-level technology in the future. 23 – I prefer the branches of my professors that I was influenced by during my medical education. 10 - I prefer branches that suit my personality.
Dimension	
Earning	47 – I prefer branches with high performance gain. 37 – I prefer branches with high performance scores. 45 – I prefer branches where I will earn more.
Dimension	
Gender and Marital Status	1 – Gender is effective in choosing the branch of physicians. 7 – Male physicians tend to choose surgical branches. 20 – The number of shifts is important in the branch preference of female physicians. 12 – It is important that spouses are guided by the choice of branch of married physicians.

affected by these developments. Health reform movements have started in many countries, and health systems have been restructured by governments. As a result of this change and transformation, which affects many areas in health, the preference of physicians in their specialty has changed direction, branches that were popular in the past have lost their popularity, and the preferences of physicians have been reshaped. From this point of view, it is aimed to determine the factors affecting the preferences of specialization in medicine in this study. The choice of field of spe-

cialization and the factors affecting it have been the subject of many studies all over the world. In these studies, it was revealed that gender, marital status, desire for specialization, presence of a physician in the family, talent, personal interest, wage policies, workload, and working environment were effective in the preference of physicians [5, 19–24]. In this study, similar and consistent results were obtained with the studies carried out.

The qualitative findings of the research reveal detailed and rich data reflecting the views of physicians in the health system. The findings reveal that personality traits and idealism are important in choosing a specialty, although many factors affect the choice of specialty in medicine. Buddeberg Fischer and collaborators of her concluded that gender has a strong effect on the choice of branch, and that personality traits and ideals affect this choice [25].

Demographic characteristics related to individual factors were discussed by female participants in the context of gender and roles, and female physicians stated that they also care about the role of motherhood and the wishes of their spouses in their branch selections. Bedoya-vaca et.al. in their research on gender and specialty in medicine drew attention to the increasing employment of women in the field of medicine and stated that women, especially women who are surgeons, have difficulties in work life, and they consider the socio-cultural characteristics in the choice of specialization and observe the balance between family and professional life; Heiliger and Hingstman reported that especially female physicians consider the work and family balance in their study to reveal the branch choices of physicians, therefore they prefer the part-time working system. Similar results were obtained in our study. In addition, female physicians, who drew attention to the working conditions, reported that the branches with a low number of shifts were preferred [19, 26].

In this research, they stated that individual abilities are important and can affect their choices. Physicians drew attention to the importance of manual dexterity, tool use, and physical strength, especially in surgical branches. Han reported that the most important issue for physicians, especially those specializing in surgery, is talent and skill characteristics [27]. Similarly, Park et al. reported that teamwork is important for surgical branches, and talents and skills are very important for a successful professional life in a qualitative study conducted in Korea to reveal the perceptions of physicians regarding the specialty characteristics. In the study, one of the remarkable findings regarding the factors thought to affect the choice of the branch was the mortality rate of patients within the specialty [23].

The participants shared their experiences that they did not want to encounter difficult patients in their branch selection and that they empathized especially as a result of the death of the patient they treated, so they thought about branches that did not have a high mortality rate in their patients, and they chose this direction.

Threatening behavior that poses a risk emerged as another factor affecting the choice of a branch in the study, and almost all of the participants mentioned the recent increase in threatening behavior that poses a risk and stated that this situation caused a withdrawal in the physicians working in the system, and that important branches were not preferred for the physicians who were not yet in the system. In addition, physicians stated that they faced sanctions such as administrative investigations, courts, and penalties due to the risks of their profession, especially the risk of malpractice, which both affected their motivation and preferred comfortable branches to avoid such sanctions, and therefore some difficulties were experienced.

This study investigated the factors affecting the preferences of specialization in the field of medicine. The strengths of our study are the design of a mixed method study and the in-depth discussion of the views of specialist physicians.

The present study has some limitations. Personality traits are inherited and relatively constant throughout life, and important life events influence this personality development. Therefore, it is possible for a physician's personality would be affected because of medical education and/or career choice. Longer-term follow-ups will be necessary to gain a broader and more reliable table of how a physician's personality contributes to career choices and to shed light on questions of causation. We were not able to retain all specialties in the qualitative phase of the study, we retained representatives of the most preferred specialties and the least preferred fields. In terms

of data diversity, we could have consulted with more specialist physicians.

In the study, it was concluded that an important factor affecting the branch preferences is the performance-based additional payment application applied in Turkey, it was revealed that the application directly affects the physician preference and is the dominant factor due to economic reasons. In addition, the results of the research indicate that the risk of the branch, exposure to threatening behavior that poses a risk and performance-based additional payment application affect and guide this choice. This result was not surprising in our study, especially since threatening behavior that poses a risk is an important problem faced by healthcare professionals all over the world. Considering that factors other than personality and idealism that stand out in our qualitative findings are also deterrents, it is suggested that policymakers and researchers interested in the subject should work on these deterrent reasons in the future.

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Authors' contributions
NÖ and MG designed the study; NÖ performed database searches for literature; two authors screened titles and extracted data; NÖ and MG performed initial analyses of data; two authors discussed results, finalized analyses, and potential implications of the results; NÖ and MG drafted the manuscript with tables and appendices; two authors read and approved the final manuscript.

Availability of data and materials
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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