

Employment Preferences of Cardiologists in Türkiye: A Discrete Choice Experiment

Türkiye'deki Kardiyoloji Uzmanlarının İstihdam Tercihleri: Ayrık Seçim Deneyi Modellemesi

ABSTRACT

Objective: The homogeneous distribution of physicians is important for ensuring patients' access to health services. To encourage physicians to work in underserved areas, policymakers create incentives. Understanding physicians' employment preferences is essential when developing these incentive packages. This study aims to quantitatively reveal the preferences of cardiologists in Türkiye using a discrete choice experiment (DCE).

Methods: A DCE questionnaire was distributed electronically to all cardiologists in Türkiye. It included 14 different pairs of hypothetical job offers based on seven parameters likely to influence their employment preferences. The data were analyzed using a conditional logit model. The coefficients (CEs) of conditional logistic regression and the willingness-to-accept (WTA) values were calculated.

Results: The analysis included 278 cardiologists. It revealed that the most influential parameter was location (CE: 2.86). To move to an undesirable location, the average participant would require an earnings increase of at least 123.3% relative to the average potential earnings of a cardiologist. Other parameters included availability of suitable facilities (CE: 1.07, WTA: 46.3%), harmony with co-workers (CE: 0.92, WTA: 39.61%), working conditions (CE: 0.68, WTA: 29.26%), and the number of night shifts (CE: 0.61, WTA: 26.34%).

Conclusion: "Location" emerged as the most important factor in the employment preferences of cardiologists in Türkiye. However, several other monetary and non-monetary factors were also influential, suggesting that policymakers should adopt a holistic approach when developing incentives for cardiologists.

Keywords: Cardiologist, employment, discrete choice experiment, health policy

ÖZET

Amaç: Hekim dağılımının ülke çapında homojen olması hastaların sağlık hizmetlerine erişimi açısından önemlidir. Sağlık politikasını düzenleyenler, doktorları yetersiz hizmet alan alanlarda çalışmaya yönlendirmek için teşvikler yaratırlar. Teşvik paketlerinin oluşturulması sürecinde hekimlerin istihdam tercihlerinin bilinmesi önemli bir ihtiyaçtır. Bu çalışmada, ayrık seçim deneyi (ASD) kullanarak Türkiye'deki kardiyoloji uzmanlarının tercihlerini nicel olarak ortaya koymayı amaçladık.

Yöntem: ASD anketi Türkiye'de çalışan kardiyoloji uzmanlarına elektronik form olarak dağıtıldı. Bu anket istihdam tercihlerinde etkili olabilecek yedi parametreye ilişkin 14 farklı varsayımsal iş teklifi çifti içermekteydi. Veriler, koşullu logit modeli kullanılarak analiz edildi. Koşullu lojistik regresyonun katsayıları (CE) ve kabul etmeye isteklilik (WTA) değerleri hesaplandı.

Bulgular: Analize toplam 278 kardiyoloji uzmanı dahil edildi. Katılımcıların istihdam tercihinde en etkili parametrenin konum olduğu izlendi (CE: 2,86). İstenmeyen bir yere taşınmayı kabul etmek için bir katılımcının, ortalama bir kardiyoloji uzmanının potansiyel kazancına göre en az %123,3 daha fazla kazanma ihtiyacı olacaktı. Diğer parametreler yeterli araçların bulunması (CE: 1,07, WTA: %46,3), iş arkadaşları ile uyum (CE: 0,92, WTA: %39,61), çalışma koşulları (CE: 0,68, WTA: %29,26) ve gece vardiyası sayısıdır (CE: 0,61, WTA: %26,34).

Sonuç: Sağlık politikasını düzenleyenlerin parasal kazanç yanında parasal olmayan teşvikleri de içeren bütüncül bir yaklaşımı dikkate almaları gerekmektedir.

Anahtar Kelimeler: Kardiyolog, istihdam, ayrık seçim deneyi, sağlık politikası

ORIGINAL ARTICLE

KLİNİK ÇALIŞMA

İdris Buğra Çerik¹ 

Emin Koyun² 

Yavuz Selim Kıyak³ 

İşıl İrem Budakoğlu³ 

Ferhat Dindaş⁴ 

Özlem Coşkun³ 

¹Department of Cardiology, Faculty of Medicine, Ordu University, Ordu, Türkiye

²Department of Cardiology, Faculty of Medicine, Cumhuriyet University, Sivas, Türkiye

³Department of Medical Education, Faculty of Medicine, Gazi University, Ankara, Türkiye

⁴Department of Cardiology, Uşak Training and Research Hospital, Uşak, Türkiye

Corresponding author:

İdris Buğra Çerik
✉ cerikbugra@gmail.com

Received: July 17, 2023

Accepted: December 09, 2023

Cite this article as: Çerik İB, Koyun E, Kıyak YS, Budakoğlu İİ, Dindaş D, Coşkun Ö. Employment preferences of cardiologists in Türkiye: a discrete choice experiment. *Türk Kardiyol Dern Ars.* 2024;52(3):199–207.

DOI:10.5543/tkda.2023.09255



Available online at archivestsc.com.
Content of this journal is licensed under a Creative Commons Attribution – NonCommercial–NoDerivatives 4.0 International License.

A feasible distribution of the physician workforce within a country is one of the critical factors in ensuring patients' access to healthcare. Providing conditions that satisfy physicians, particularly in regions with limited opportunities, is key to achieving a homogeneous distribution of the workforce. In Türkiye, the ratio of active cardiologists to the population is less than half of the European average.¹ This relative scarcity underscores the importance of ensuring a more evenly distributed cardiologist workforce and increasing the motivation of physicians in Türkiye. Fulfilling expectations related to professional practice can elevate physician motivation and, consequently, the quality of health services provided. To adequately meet these expectations, it is essential to first explore them in detail. Although traditional questionnaires can determine expectations, they are limited in quantifying the relative importance of factors affecting physicians' employment preferences. Similarly, these surveys cannot provide quantitative data on the required salary increase that would make physicians choose a negative condition over a positive one.

Discrete Choice Experiment (DCE) models have been utilized in health research and many fields related to economics to quantitatively reveal the parameters influencing individuals' preferences. This is achieved by allowing them to choose a hypothetical offer from a set of options.^{2,3}

DCE is a "stated preference" method used to determine participant preferences regarding the characteristics of a subject under research. It assumes that participants will choose the option offering them the highest utility among the alternatives. While traditional survey methods list influential factors in respondents' preferences, DCE enables the determination of the relative importance of these factors. It also assesses the willingness of respondents to trade between two options, one positive and one negative.⁴ For instance, questions such as "To what extent will a salary increase lead physicians to accept working in a place with significantly limited opportunities?" can be answered. Based on these answers, policymakers can create incentive packages that will satisfy physicians and lead to better service in underserved regions. Previous studies in some countries have guided policies to ensure that the healthcare workforce is directed to rural areas according to the needs of the country, and that doctors can continue their career and specialization plans in alignment with these needs.⁵⁻¹⁰

In this study, we aimed to identify which factors are most important to cardiologists when deciding where they want to work. We also sought to express the relative importance of these factors quantitatively using a DCE model.

Research Questions

1. What is the relative importance of the factors that cardiologists consider in their employment preferences?

2. How much of a salary increase is required for a cardiologist to accept a position in a setting with negative conditions (e.g., an undesirable city, high number of shifts, poor working conditions, lack of medical equipment, disagreement with colleagues)?

Materials and Methods

This quantitative study employs a Discrete Choice Experiment (DCE) to understand the job offer preferences of cardiology specialists. The DCE method allows us to comprehend the participant preferences by presenting them with two hypothetical alternative job offers in each choice set. The options in each set are described using several features and the levels of those features. To determine the extent to which these factors affect the participants' preferences, we analyzed their choices.¹¹ Researchers can make inferences about participants' willingness to trade off features since they choose one job over another.

Survey Form and Choice Sets

We developed the choice sets based on the DCE User Guide published by the World Health Organization (WHO).¹¹ Our prior experience in conducting a DCE, as outlined in our previous study, informed our methodology.¹² To identify the factors influencing cardiology specialists' job preferences, we reviewed existing literature on the career choices of cardiologists. We identified six features with different levels, detailed in Table 1.

The choice sets were generated using JMP Statistical Software 13 (SAS Institute Inc, Cary, NC, USA), which includes a choice design tool specifically for DCE. This tool was utilized to ensure effective set design. Each choice set contained two hypothetical job offers. The software generated 11 choice sets, to which we added three extra pairs of positions, resulting in a total of 14 pairs. These additional pairs were included to identify participants who may not have paid sufficient attention while completing the survey. These "tricky" pairs contrasted the best options in one offer with the worst in another.

The survey form consisted of two parts. The first part gathered demographic and personal information such as age, gender, marriage status, location, and job satisfaction. The second part presented 14 pairs of job offers. An explanation of all hypothetical alternatives and levels was provided before the first pair. Participants were instructed to choose the one position that best suited them from each pair of alternatives, with no opt-out option available. The explanation for participants and a choice set are presented in Table 2.

Participants and Data Collection

Participants were cardiology specialists working in Türkiye in 2021. We determined that a sample size of 246 was needed to achieve a 0.95 confidence level (CI) with a 6% margin of error. We disseminated the electronic survey form through cardiology specialists' groups on the internet. Data collected occurred between February 2021 and April 2021. In total, 326 cardiology specialists completed all the questions. However, 48 participants chose the worst option in the "tricky" pairs instead of the best option; therefore, we decided to exclude their responses. Consequently, the analysis included data from 278 participants.

ABBREVIATIONS

CE	Coefficient of Conditional Logistic Regression
CI	Confidence Interval
DCE	Discrete Choice Experiment
OB-GYN	Obstetrics and Gynecology
WTA	Willingness to Accept

Table 1. Descriptions and Levels of Features in Job Offers for Cardiology Specialists

Features	Description	Levels
Earnings	Describes your earnings compared to the average earnings of a cardiology specialist in the country.	<ul style="list-style-type: none"> • Average • 25% Above Average • 50% Above Average
Location	Describes the geographical location of the job, including the physical and cultural opportunities of the city, and proximity to friends or family.	<ul style="list-style-type: none"> • Location Not Desired • Desired Location
Number of Night Shifts per Month	Describes the frequency of night shifts required.	<ul style="list-style-type: none"> • 7 Shifts • 3 Shifts
Working Conditions	Describes conditions such as the number of daily patient-doctor appointments, the difficulty of the patients, etc.	<ul style="list-style-type: none"> • Poor • Good
Facilities	Describes the tools available for providing health services, e.g., ECG, X-Ray, Angiography Unit.	<ul style="list-style-type: none"> • Available tools include ECG, Chest X-Ray, Echocardiography, and Stress Test ECG, but no Angiography Unit. • All tools, including the Angiography Unit.
Co-workers	Describes all the people you work with in the hospital, such as doctors, nurses, hospital managers, secretaries, housekeepers, etc.	<ul style="list-style-type: none"> • Cannot get along • Can get along

Table 2. Explanation for Participants and a Choice Set

In this section, you will encounter 14 pairs of job offers for a position as a cardiology specialist. Each question presents two different hypothetical job offers that vary across six distinct features.

We ask you to imagine that you are about to start working as a cardiology specialist in a new location. You are offered two alternatives to choose from. These alternatives only differ in the features specified below. All other unspecified aspects of the job options are identical.

- "Earnings" describes how your earnings compare to the average earnings of a cardiology specialist in the country.
- "Location" describes the geographical location of the job, including the physical and cultural opportunities of the city, and its proximity to your friends or family.
- "Number of Night Shifts per Month" indicates the frequency of night shifts required.
- "Working Conditions" details conditions such as the number of daily patient-doctor appointments, the difficulty of the patients, etc.
- "Facilities" describes the medical equipment available for providing health services, such as ECG, X-Ray, Angiography Unit.
- "Co-workers" refers to all the people you would work with in the hospital, including doctors, nurses, hospital managers, secretaries, housekeepers, etc.

You may not find any of the positions in the options preferable, but we ask you to select the one that is better from your perspective.

Please remember that your answers are not 'right' or 'wrong.' We just want to understand your personal point of view.

A Choice Set		
Parameters	Option A	Option B
Earnings	25% Above Average	50% Above Average
Location	Desired Location	Location Not Desired
Number of Night Shifts per Month	3 Shifts	7 Shifts
Working Conditions	Poor	Good
Facilities	All tools, including the Angiography Unit.	Available tools include ECG, Chest X-Ray, echocardiography, and Stress Test ECG, but no Angiography Unit.
Co-workers	Can get along	Cannot get along
Which One Do You Prefer?	A <input type="checkbox"/>	B <input type="checkbox"/>

Preference Analysis

Our study assumed that cardiology specialists would choose the job offer providing the highest utility among alternatives in each pair. A conditional logit model was used to estimate participants' preferences.¹¹ All levels were qualitative, and we entered the

data into the sheets as dummy-coded variables. We used Stata 13 (StataCorp LP, College Station, TX, USA) for the analysis.

We assumed a linear and additive utility, following the function of the features:

Table 3. Participant Characteristics

Characteristics	n (%)
Gender	
Male	210 (75.5)
Female	68 (24.5)
Age (years)	
25–35	138 (49.6)
36–45	122 (43.9)
46–55	17 (6.1)
Over 55	1 (0.4)
Marriage Status	
Married	210 (75.5)
Single	68 (24.5)
Hospital Status	
Public	148 (53.2)
Private	78 (28.1)
Other	52 (18.7)
Satisfaction Regarding the Job	
Pleased	216 (77.7)
Not Pleased	62 (22.3)
Region	
The Mediterranean Region	44 (15.8)
Eastern Anatolia Region	26 (9.4)
The Aegean Sea Region	36 (12.9)
Southeastern Anatolia Region	18 (6.5)
Central Anatolia Region	56 (20.1)
The Black Sea Region	34 (12.2)
The Marmara Region	64 (23.0)

$$V = \beta_1 \text{income}_{25\text{above}} + \beta_2 \text{income}_{50\text{above}} + \beta_3 \text{location}_{\text{desirable}} + \beta_4 \text{shifts}_3 + \beta_5 \text{workingconditions}_{\text{good}} + \beta_6 \text{tools}_{\text{angiography}} + \beta_7 \text{coworkers}_{\text{getalong}} + \epsilon_i$$

"V" describes the utility derived from a given job offer. "ε_i" refers to the error term. We calculated the values of willingness to accept (WTA) and confidence intervals (CI) using the delta approach in Stata, as reported in the DCE User Guide.¹¹ The average salary for cardiologists in Turkey was recorded at 2,000 to 3,000 US dollars during the period when our study was conducted.

Ethical Considerations

The survey form did not request any information that could reveal the participants' identities. The questionnaire commenced with the approval of "I agree to participate in the study of my own will," linked to the informed consent form. Participants who did not give their consent were unable to access the survey. The study was approved by the Sivas Cumhuriyet University Non-invasive Clinical Research Ethics Committee (Approval Number: 2021-02/49, Date: 10.02.2021), adhering to all ethical criteria for human investigations as outlined in the Second Declaration of Helsinki.

Results

Of the approximately 2,400 cardiologists actively working in Türkiye,¹ 326 responded to the survey. However, only 278 of them were included in the final analysis. According to the consistency test, 48 participants who marked the worst choice instead of the best choice for tricky couples were excluded. Among the cardiology physicians in the sample, 75.5% were male, and most participants were between the ages of 25–45 (93.5%). The majority of the participants were married (75.5%), worked in a public hospital (53.2%), and were satisfied with their employment (77.7%). Participants from all regions of the country participated in the survey. The characteristics of the participants are detailed in Table 3.

The results in Table 4 show the main effects of employment position characteristics on respondents' preferences. The results indicated that all attributes influenced employment preferences, and that all coefficients (CE) were statistically significant at the 5% level. The predicted preferences aligned with our presuppositions regarding the effects of improvements in employment center characteristics. Coefficients were interpreted as preferences and refer to the effects of qualitative characteristics on the respondents' preferences. The WTA represents the required percentage change in potential earnings relative to their average earnings. In terms of the importance of the attributes that participants pay attention to, the results of the conditional logistic regression analyses showed the largest possible compensation for movement between conditions was "moving to an undesirable location" (CE: 2.86). To accept this undesirable move, the average participant would need an increase in earnings of at least 123.3% relative to an average cardiologist's potential earnings.

The results also indicated that cardiologists attributed the second-highest value to the presence of an angiography unit in the hospital (CE: 1.07). To prefer a hospital without an angiography unit, the average respondents would need to claim an increase in earnings of at least 46.3% relative to an average cardiologist's potential earnings.

In addition, the results showed that following geographical location and the angiography unit, the most important factor for the respondents was sincerity in the work environment (CE: 0.92). The participants expected at least a 39% increase in earnings to work in a hospital where colleagues could not get along with each other. The next important parameter was good working conditions (CE: 0.68), and interestingly, the parameter with the smallest effect was the number of night shifts (CE: 0.61). The coefficients and WTA values indicating the importance respondents attach to these attributes are detailed in Table 4.

Subgroup Analyses

According to the participants' subgroup characteristics, analyses showed that employment preferences overlapped with those of the general study population. The most important parameter in all evaluated subgroups was the location of the offered employment. The presence of an angiography unit was more important than getting along with co-workers for male cardiologists (CE: 1.07 vs. 0.86). Similarly, for married cardiologists, the presence of an angiography unit was more important than getting along with

Table 4. Results of the Conditional Logistic Regression Model Showing Main Effect Estimates and Corresponding Willingness to Accept Estimates as a Percent of Earnings

Features (Model Parameters)	Coefficient (CE)	WTA (CI)
Income (constant)	0.023* (0.002)	
<i>Location (relative to undesirable city)</i>		
Desirable city	2.86* (0.08)	-123.18 (-141.52; -104.85)
<i>Number of night shifts per month (relative to seven shifts per month)</i>		
Three shifts per month	0.61* (0.07)	-26.34 (-34.84; -17.84)
<i>Working conditions (relative to poor conditions)</i>		
Good working conditions	0.68* (0.08)	-29.26 (-35.57; -22.95)
<i>Tools (relative to the place with ECG, Chest X-Ray, Echocardiography, Stress Test ECG, but without an Angiography Unit)</i>		
All tools, including the Angiography Unit	1.07* (0.07)	-46.30 (-53.56; -39.05)
<i>Co-workers (relative to not getting along with them)</i>		
Getting along with co-workers	0.92* (0.07)	-39.61 (-48.34; 30.87)
<i>Statistics</i>		
Participants		278
Observations		6116
Parameters		11
Log-likelihood		-2734.32

*P < 0.001, WTA, Willingness to Accept.

Table 5. Results of Conditional Regression According to Characteristics of the Participants

Feature (Model Parameters)	Gender		Marriage Status		Age		Hospital Status		Satisfaction	
	Male	Female	Married	Single	25-35	36-45	Public	Private	Pleased	Not Pleased
Income	0.021* (0.002)	0.032* (0.004)	0.024* (0.002)	0.020* (0.004)	0.027* (0.004)	0.021* (0.003)	0.024* (0.002)	0.035* (0.004)	0.023* (0.002)	0.023* (0.004)
<i>Location (relative to undesirable city)</i>										
Desirable	2.63* (0.08)	3.79* (0.20)	2.86* (0.09)	2.89* (0.16)	3.03* (0.12)	3.03* (0.12)	2.82* (0.11)	4.02* (0.19)	3.05* (0.09)	2.34* (0.16)
<i>Number of Night Shifts per Month (relative to seven shifts per month)</i>										
Three Shifts per Month	0.59* (0.08)	0.70* (0.16)	0.56* (0.08)	0.76* (0.14)	0.78* (0.10)	0.38* (0.11)	0.78* (0.10)	0.31* (0.15)	0.39* (0.08)	1.26* (0.15)
<i>Working Conditions (relative to poor conditions)</i>										
Good	0.63* (0.09)	0.88* (0.18)	0.62* (0.09)	0.87* (0.16)	0.67* (0.11)	0.73* (0.12)	0.63* (0.11)	1.04* (0.17)	0.77* (0.09)	0.43* (0.16)
<i>Tools (relative to the place that has ECG, Chest X-Ray, Echocardiography, Stress Test ECG, but no Angiography Unit)</i>										
All tools, including the Angiography Unit	1.07* (0.08)	1.15* (0.16)	1.13* (0.08)	0.89* (0.14)	1.16* (0.10)	1.05* (0.11)	1.16* (0.10)	1.23* (0.15)	1.20* (0.08)	0.76* (0.14)
<i>Co-workers (relative to not getting along)</i>										
Getting along with them	0.86* (0.07)	1.17* (0.16)	0.89* (0.08)	1.00* (0.14)	0.95* (0.10)	1.00* (0.10)	0.82* (0.09)	1.15* (0.15)	0.91* (0.08)	0.95* (0.14)

*P < 0.001

colleagues (CE: 1.13 vs. 0.89), while for single cardiologists, getting along with colleagues was more important than the presence of an angiography unit (CE: 1.00 vs. 0.89). The order of importance given to job characteristics in terms of participant ages largely overlapped. The number of night shifts was more important than working conditions for cardiologists aged 25-35 (CE: 0.78 vs. 0.67), but working conditions were more important than the number of night shifts for cardiologists aged 36-45 (CE: 0.73 vs. 0.38). Similarly, in terms of working in a public or private hospital, the number of shifts was more important than the working conditions for cardiologists employed in public hospitals (CE: 0.78 vs. 0.63), but working conditions were more important than the number of night shifts for cardiologists employed in private hospitals (CE: 1.04 vs. 0.31).

In terms of the characteristics of the hospital where they will be employed, the most significant differences in the subgroups were observed between cardiologists who are pleased with the hospital they work in and those who are not, and between cardiologists with and without academic career plans. The order of importance for cardiologists who are pleased was location, angiography unit, getting along with coworkers, working conditions, and number of shifts (CE: 3.05, 1.20, 0.91, 0.77, 0.39, respectively). For cardiologists who are not pleased with their hospital, the order was location, number of shifts, getting along with coworkers, angiography unit, and working conditions (CE: 2.34, 1.25, 0.95, 0.76, 0.43, respectively). For those with an academic career plan, the order was location, angiography unit, getting along with coworkers, number of shifts, and working conditions (CE: 2.09, 1.12, 0.80, 0.74, 0.38, respectively). For the group 'without an academic career plan,' the order was location, working conditions, getting along with coworkers, angiography unit, and number of shifts (CE: 4.69, 1.50, 1.31, 1.16, 0.40, respectively). The conditional regression results according to the characteristics of the participants are detailed in Table 5.

Discussion

According to the results of our study, the most important factor for cardiology specialists when deciding on a hospital to work in was location. Following location, in order of importance, were the presence of an angiography unit, getting along with colleagues, the difficulty level of working conditions, and the number of night shifts, which was the least influential factor. We concluded that while location is the most important factor, it needs to be balanced with other sources of motivation to provide better healthcare services to the public. Physicians cannot be motivated solely by financial incentives. It is necessary to direct them in line with their various needs and the importance of these needs, as revealed in this study. We believe that the results of this study will guide health policymakers to contribute to patient outcomes and physician satisfaction by balancing parameters such as earnings, equipment, the difficulty of working conditions, and the number of shifts, which influence the motivation of cardiologists.

There are approximately 2,400 cardiologists working actively in Türkiye.¹ While the ratio of cardiology specialists is 7.8 per 100,000 physicians/patients in European countries, it is reported as 3.0 per 100,000 physicians/patients in our country.¹ These data highlight the importance of the homogeneous distribution

of cardiologists and increasing the motivation of physicians in our country. In a study on cardiology residency training in Türkiye, it was found that only 32.9% of residents had enough time for social activities during the residency period.¹³ This finding underscores the need to find ways to increase cardiologists' motivation after such challenging residency training.

Evaluating the parameters that physicians consider when choosing a cardiology career is important in terms of understanding the sources of motivation in practicing medicine. In a study evaluating the factors affecting physicians' career choices in cardiology in the USA, the most important factors were identified as feeling positive about learning cardiac pathophysiology, offering the possibility of a rewarding career and family life, and having an abundant number of opportunities to perform procedures.¹⁴ Similarly, the results of a study conducted in the UK to evaluate factors affecting career choice after medical education are quite interesting. While the factors that significantly affect choosing a cardiology career were found to be 'enthusiasm/commitment, experience of jobs so far, particular teacher/department,' it was seen that 'domestic circumstances' and 'hours/working conditions' have less influence on participants who chose a cardiology career. Another finding of the study was that as the years in medical education progress, the rate of choosing cardiology as the first choice decreases, with the cardiology career being preferred less each year.¹⁵ Researchers concluded that this situation may have influenced the decision of physicians who value domestic circumstances, working hours, and conditions more. In a study evaluating the career planning of first-year medical students in Türkiye, cardiology was the most chosen specialty. The influential parameters in the preferences of the participants were financial opportunities, prestige, personal development opportunities, more benefits for the patient, and willingness to work in an urban area, respectively.¹⁶ There was no further information on whether these preferences have changed over the years. As students' plans have evolved over the years,¹⁵ the preferences of physicians in the cardiology career, which began as cardiology residents with different dreams and plans, may also change over time due to real-life experiences. The expectations of cardiology specialists, the extent to which they can be achieved, and the order of importance of their expectations on an individual basis have not been investigated so far.

Based on the previous research we mentioned, we concluded that domestic circumstances and the opportunity to perform procedures, which may be important when cardiologists are shaping their career planning, should be among the primary parameters examined. In our study, we referred to these parameters as 'location' and 'tools'. We also considered different parameters such as the number of shifts, the difficulty of working conditions, and getting along with colleagues, which can affect the professional life of physicians. Moreover, we revealed the order of importance of all these parameters and which one would be preferred over the other. What is good and bad, or what is important and unimportant for a cardiologist can be stated using logical inferences, and these could even be determined using traditional surveys. However, these methods could not reveal which of the parameters would be preferred over the others. The DCE model, developed to reveal which alternatives individuals

choose and to quantitatively show the parameters that affect their preferences, provided unique information in our research.

DCE models were first used in economics for the price analysis of products by determining which alternative options individuals choose (commodities, services, or courses of action).¹⁷ DCE models were introduced into health economics in the 1990s and are considered a useful tool for evaluating the effectiveness of healthcare interventions.¹⁸ In subsequent years, DCEs have become a widely used technique in health economics, addressing a wide range of policy questions.^{3,19} Subsequently, studies conducted using the DCE method in various fields, such as medical education, health economy, and physician employment, have informed policymaking.^{5,6,11,20,21}

Studies using the DCE method in cardiovascular practice have recently started to gain attention. Treatment guidelines recently published in the USA and Europe emphasize the importance of joint decision-making with the patient in choosing treatments.²²⁻²⁴ However, the current clinical condition of the patient can guide the selection of treatment options. In a study conducted using the DCE method, which evaluated parameters that may relate to patients' willingness to accept risks associated with the mitral valve procedure, it was found that patients' acceptance of the procedures varied according to the severity of heart failure symptoms.²⁵ Similarly, in a study examining patient and physician preferences for the characteristics of coronary revascularization using the DCE method, it was found that the preferences of patients and physicians differ from each other.²⁶ Understanding how patients value aspects associated with a healthcare intervention is vital for decision-makers. The researchers emphasized that incorporating patients' values could ultimately result in clinical and policy decisions that better reflect patient preferences. These studies clearly show that the clinical conditions and motivations of patients can influence the decisions they make regarding treatment options. However, when patient data is presented as a whole, there is no information about whether the working conditions or motivations of physicians affect the decisions made by physicians. It is highly likely that factors related to physicians and/or work environment as treatment guides are effective in terms of recommended treatment options.

Large-scale studies on the employment preferences of specialists are not yet available. The most detailed study conducted so far is the DCE study in Nepal on the employment preferences of obstetrics and gynecology (OB-GYN) specialists to work in district hospitals.⁶ In this study, which involved relatively fewer participants compared to ours, the parameters with the highest WTA were having a full team at the workplace (OB-GYN, pediatrician, and anesthesiologist), providing primary and secondary education to children, and having the opportunity for private practice. Researchers guided the authorities for monetary and non-monetary interventions by considering the real-life conditions in their countries. In our country, primary and secondary education is already provided to children in all locations where cardiology specialists are employed. However, private practice opportunities do not vary according to the locations where they are employed. It should be kept in mind that interventions need to be developed according to the specific needs of each country.

The studies on the employment of cardiologists are very limited. In a study evaluating the employment characteristics of young cardiologists in the Netherlands, it was found that only 7% of the participants started their careers with a permanent contract. At a median follow-up of 2.3 years, 33% of the cardiologists were still working in a temporary position, while 0.6% were not employed.²⁷ Since this leads to job insecurity, many young cardiologists in the study described the job market as problematic. This situation clearly reveals the necessity of organizing incentive packages after medical education and directing them towards residency education in line with the needs of the country. In this context, we believe that each country should make its own evaluation for each area of expertise, along with its own opportunities and possible incentive packages.

A total of 766 cardiologists work as scholars in the field of cardiology in Türkiye.²⁸ Employing clinicians or scholars according to the needs of countries is necessary for the long-term planning of health services and scientific developments. A reasonable number of cardiologists should be encouraged to become scholars for research and development, to plan medical education, and to provide high-quality health services. About 65% of the participants in our study declared that they have an academic career plan. According to our results, it may be more encouraging to plan the employment of cardiologist scholars in locations where the equipment is complete, even if the working conditions are not good.

Possible changes in policy, considering the importance of the parameters that affect motivation, can ensure a better distribution of physicians throughout the country. It could also lead to changes that encourage physicians to work more efficiently. This study has confirmed the importance of combining monetary and non-monetary incentives for better distributing physicians according to the needs of the country.

Limitations of the Study

In order to maintain the motivation of participants while answering the questionnaire and to reduce confusion, a few variables that could be influential in their preferences were not included in the parameters investigated. By doing so, we managed to conduct this study using fewer choice sets. There still may be parameters that were not evaluated in our study, and these parameters could be influential in the participants' preferences. Approximately 13% of cardiologists in the country responded to our survey. Even though the response rate may seem low, since the required sample size was reached, we do not expect different results if more participants had responded. Another limitation is that only 24.5% of the participants were women. However, it should be kept in mind that the number of women among physicians employed as cardiology specialists is also low.

Conclusion

The most important parameter among the employment preferences of cardiologists in Türkiye was 'location'. All other parameters that we investigated were also found to be statistically significant. The order of importance in the employment preferences was as follows: the availability of diagnostic and

therapeutic tools, getting along with coworkers, good working conditions, and the number of night shifts, respectively. Not only monetary but also non-monetary incentive packages can be developed for locations where the number of cardiologists is below the required level. By doing so, physicians can be incentivized to work in these areas. Additionally, by considering subgroups such as cardiologists with and without academic career plans, more effective strategies could be developed since the importance of the parameters may vary according to the targeted group. This study emphasizes the need for a holistic approach while creating and sustaining employment policies.

Ethics Committee Approval: The study was approved by the Sivas Cumhuriyet University Non-invasive Clinical Research Ethics Committee (Approval Number: 2021-02/49, Date: 10.02.2021).

Informed Consent: Informed consent was obtained from the participants.

Author Contribution: Concept - I.B.C., Y.S.K., I.I.B., O.C.; Design - I.B.C., Y.S.K.; Supervision - I.B.C., Y.S.K.; Resource - E.K., F.D.; Materials - E.K., F.D.; Data Collection and/or Processing - E.K., F.D.; Analysis and/or Interpretation - I.B.C., Y.S.K.; Literature Review - E.K., F.D.; Writing - I.B.C., Y.S.K.; Critical Review - I.I.B., O.C.

Peer-review: Externally peer-reviewed.

Use of AI for Writing Assistance: The authors declared no AI assistance during any stage for preparation of the manuscript.

Conflict of Interest: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study received no financial support.

References

1. T.C. Sağlık Bakanlığı. Türkiye Kalp ve Damar Hastalıkları Önleme ve Kontrol Programı Eylem Planı (2015-2020). Accessed Jan 30, 2024. Available from: <https://tkd.org.tr/TKDData/Uploads/files/Turkiye-kalp-ve-damar-hastalıkları-onleme-ve-kontrol-programi.pdf>
2. Bridges JF. Stated preference methods in health care evaluation: an emerging methodological paradigm in health economics. *Appl Health Econ Health Policy*. 2003;2(4):213-224.
3. de Bekker-Grob EW, Ryan M, Gerard K. Discrete choice experiments in health economics: a review of the literature. *Health Econ*. 2012;21(2):145-172. [CrossRef]
4. Cleland J, Porteous T, Skåtun D. What can discrete choice experiments do for you? *Med Educ*. 2018;52(11):1113-1124. [CrossRef]
5. Scott A, Witt J, Humphreys J, et al. Getting doctors into the bush: general practitioners' preferences for rural location. *Soc Sci Med*. 2013;96:33-44. [CrossRef]
6. Gautam B, Sapkota VP, Wagle RR. Employment preferences of obstetricians and gynecologists to work in the district hospitals: evidence from a discrete choice experiment in Nepal. *Hum Resour Health*. 2019;17(1):96. [CrossRef]
7. Lagarde M, Pagaiya N, Tangcharoensathian V, Blaauw D. One size does not fit all: investigating doctors' stated preference heterogeneity for job incentives to inform policy in Thailand. *Health Econ*. 2013;22(12):1452-1469. [CrossRef]
8. Cleland J, Johnston P, Watson V, Krucien N, Skåtun D. What do UK doctors in training value in a post? A discrete choice experiment. *Med Educ*. 2016;50(2):189-202. [CrossRef]
9. Ramos P, Alves H. Doctors' career choices in health systems constrained by national medical exams: A discrete choice experiment. *Int J Health Plann Manage*. 2018;33(4):e1211-e1224. [CrossRef]
10. Liu S, Li S, Yang R, Liu T, Chen G. Job preferences for medical students in China: A discrete choice experiment. *Medicine (Baltimore)*. 2018;97(38):e12358. [CrossRef]
11. Ryan M, Kolstad JR, Rockers PC, Dolea C. How to conduct a discrete choice experiment for health workforce recruitment and retention in remote and rural areas: a user guide with case studies. Accessed Jan 30, 2024. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/586321468156869931/how-to-conduct-a-discrete-choice-experiment-for-health-workforce-recruitment-and-retention-in-remote-and-rural-areas-a-user-guide-with-case-studies>
12. Kiyak YS, Budakoğlu İİ, García-Estañ J, Atta K, Coşkun Ö, Koyun E. What do Turkish, Spanish, and Pakistani medical students value in specialty training positions? A discrete choice experiment. *BMC Med Educ*. 2022;22(1):752. [CrossRef]
13. Yıldız BS, Alkan MB, Güngör H, et al. A survey for the evaluation of the training period of cardiology specialists in Turkey. *Anadolu Kardiyol Derg*. 2011;11(8):661-665. [CrossRef]
14. Douglas PS, Rzeszut AK, Bairey Merz CN, et al.; American College of Cardiology Task Force on Diversity and Inclusion and American College of Cardiology Women in Cardiology Council. Career Preferences and Perceptions of Cardiology Among US Internal Medicine Trainees: Factors Influencing Cardiology Career Choice. *JAMA Cardiol*. 2018;3(8):682-691. [CrossRef]
15. Smith F, Lambert TW, Pitcher A, Goldacre MJ. Career choices for cardiology: cohort studies of UK medical graduates. *BMC Med Educ*. 2013;13:10. [CrossRef]
16. Dikici MF, Yaris F, Topsever P, et al. Factors affecting choice of specialty among first-year medical students of four universities in different regions of Turkey. *Croat Med J*. 2008;49(3):415-420. [CrossRef]
17. Mas-Colell A, Whinston MD, Green JR. *Microeconomic Theory*. New York:Oxford University Press;1995.
18. Tinelli M, Ryan M, Bond C. What, who and when? Incorporating a discrete choice experiment into an economic evaluation. *Health Econ Rev*. 2016;6(1):31. [CrossRef]
19. Ryan M, Gerard K, Amaya-Amaya M. *Using Discrete Choice Experiments To Value Health And Health Care*. Netherlands Antilles: Springer Science & Business Media; 2007. [CrossRef]
20. Walsh K, Levin H, Jaye P, Gazzard J. Cost analyses approaches in medical education: there are no simple solutions. *Med Educ*. 2013;47(10):962-968. [CrossRef]
21. Porteous T, Ryan M, Bond C, Watson M, Watson V. Managing Minor Ailments; The Public's Preferences for Attributes of Community Pharmacies. A Discrete Choice Experiment. *PLoS One*. 2016 Mar 31;11(3):e0152257. doi: 10.1371/journal.pone.0152257. PMID: 27031588; PMCID: PMC4816534. [CrossRef]
22. U.S. Food and Drug Administration. Patient preference information - voluntary submission, review in premarket approval applications, humanitarian device exemption applications, and de novo requests, and inclusion in decision summaries and device labeling. Accessed Jan 30, 2024. Available from: <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/patient-preference-information-voluntary-submission-review-premarket-approval-applications>.
23. Hindricks G, Potpara T, Dagres N, et al.; ESC Scientific Document Group. 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. *Eur Heart J*. 2021;42(5):373-498. Erratum in: *Eur Heart J*. 2021;42(5):507. Erratum in: *Eur Heart J*. 2021;42(5):546-547. Erratum in: *Eur Heart J*. 2021;42(40):4194.
24. Vahanian A, Beyersdorf F, Praz F, et al.; ESC/EACTS Scientific Document Group. 2021 ESC/EACTS Guidelines for the management of valvular heart disease. *Eur Heart J*. 2022;43(7):561-632. Erratum in: *Eur Heart J*. 2022. [CrossRef]
25. Reed SD, Fairchild AO, Johnson FR, et al. Patients' Willingness to Accept Mitral Valve Procedure-Associated Risks Varies Across Severity of Heart Failure Symptoms. *Circ Cardiovasc Interv*.

- 2019;12(12):e008051. Erratum in: *Circ Cardiovasc Interv.* 2020;13(7):e000076. [CrossRef]
26. Magliano CADS, Monteiro AL, Tura BR, Oliveira CSR, Rebelo ARO, Pereira CCA. Patient and physician preferences for attributes of coronary revascularization. *Patient Prefer Adherence.* 2018;12:757-764. [CrossRef]
27. Vorselaars VMM, van der Heijden AC, Joustra R, et al. Early career perspectives of young Dutch cardiologists. *Neth Heart J.* 2021;29(9):433-440. [CrossRef]
28. T.C. Yüksek Öğretim Kurumu. Anabilim Dalı İsmine Göre Öğretim Elemanı Sayıları Raporu 2022. Accessed Jan 3, 2022. Available from: <https://istatistik.yok.gov.tr/>