

# Empowering medical residency training: a comparative analysis for understanding outpatient clinic demand and training needs



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# Abstract

**Background** This research aims to identify the most common diagnoses recorded in the outpatient clinic database of a Training Hospital where residents provide patient care under trainer supervision, evaluate the adequacy of current training programs in addressing these diagnoses, and provide data for trainers to enhance early-stage resident education to provide insight for curriculum development and increasing the effectiveness of residency training programmes.

**Methods** The study involved ranking ICD-10 diagnosis codes by frequency for each department and surveying clinical medicine residents in their second year and above to gather their perspectives on speciality training.

**Results** Twenty-four clinical medicine departments (13 internal, 11 surgical medicine) were included. The top 5 diagnoses for each speciality and their rates in all patient encounters were determined. While the first 5 diagnoses in some of the specialities covered almost 90% (or above) of the outpatient diagnoses (Ophthalmology, Child & Adolescent Psychiatry, Gynaecology & Obstetrics), the place of the first five diagnoses in all diagnoses was determined as a very small proportion in departments such as Family Medicine, Emergency Medicine, Orthopaedics and Traumatology. The survey, which included 193 residents, uncovered that about half of the residents in both fields found the educational content partially sufficient (51.8%) and indicated a need for improvement in terms of expertise (70% in internal, vs. 51.8% in surgical medicine).

**Conclusions** The research emphasises the importance of early training focused on the most prevalent diagnoses in each speciality to enhance patient management and advocates for a more active role for trainers in developing a tailored education program considering the prevalence of top diagnoses in different specialities.

Keywords ICD-10, Diagnosis, Medical records, Resident, Specialisation training in medicine

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## Introduction

Medical residency training is an organised training program under guidance and supervision to ensure residents' professional and personal development, as well as safe and appropriate health care. The residency training aims to provide clinical, theoretical, and practical training to acquire the competencies to deliver effective health services, proper attitudes and behaviours, basic research notions and administrative/managerial skills [1, 2].

All medical residency training programs should have a core education curriculum aimed at achieving their goals, including knowledge-skill attitude components. Competence is the sum of these components, and having the necessary competencies of an expert is defined as competent [3]. Medical specialisation training varies between 3 and 5 years in Turkey. Physicians who have completed medical education and earned the title of medical doctor begin their residency training by taking the Medical Specialisation Exam and following central placement. Seniority is significant in showing the priority of acquiring the competencies included in the curriculum content in the education process. It indicates at which stage (seniority) of the educational process the competence should be acquired [4]. The Accreditation Council for Graduate Medical Education (ACGME) structure is mirrored in Turkey, where clinical residency training follows a standardised curriculum covering fundamental competencies in patient care, medical knowledge, and professionalism. Program lengths, clinical rotation schedules, and evaluation procedures are carefully planned to guarantee thorough skill development. Frequent assessments are essential to maintaining the high standards of medical education [5]. Although Turkish residency programs are not directly harmonised with ACGME accreditation, they share the common objective of preparing proficient physicians capable of independent practice. Certain centres actively pursue international accreditation, such as the Joint Commission International, a testament to the global recognition and comprehensive framework for evaluating and improving healthcare quality [6].

Clinical records play a pivotal role in evaluating the quality of residency training. These records, which should include medical history, physical examination, treatment plan, diagnostic and therapeutic procedures performed, and epicrisis, are a crucial part of the training process. Every institution should have a functioning and appropriate infrastructure that ensures these records are regularly reviewed for supervision and educational purposes [7].

Disease classification systems are the cornerstone of health records. These systems categorise diseases according to established criteria, and their purpose is to develop definitions and similar terminology for similar situations among healthcare providers [8]. One of these classifications is the International Classification of Disease (ICD). By providing ease of use in the management of health services and epidemiological studies, ICD also facilitates statistical studies on diseases and health-related comparisons between countries, as well as administrative use such as patient follow-up, keeping and accessing patient records and archives, and resource management [9]. ICD-10, used in many countries, is being developed with clinical modifications. In 1998, ICD-10-AM (Australian Modification) was started to be used in Australia [10], and this modification is also used in Turkey.

To standardise and improve the quality and efficiency of speciality training in medicine, it is imperative to first reveal the current situation with scientific data based on classification and coding-based records in the health database. This study aimed to identify the most common diagnoses recorded in the outpatient clinic database of the Ankara University Faculty of Medicine Hospitals, where residents provide patient care under the supervision of trainers, and the ratio of these diagnoses to all diagnoses made in their departments. It also aims to determine the perceptions of residents about the extent to which current training programs cover these diagnoses, and to determine the ratio of the diagnoses that residents will encounter most frequently in the early periods among all diagnoses. The ultimate goal, accordingly, is to create data that the trainers can use to meet the education needs of the residents when they start the outpatient clinic service in the early stages of their education, and provide insight for curriculum development and increasing the effectiveness of residency training programmes.

#### Materials and methods

#### **Ethical considerations**

This study was approved by the Ankara University Faculty of Medicine Human Research Ethics Committee, with decision number I4-264-21, dated 22.04.2021.

Data were used with permission from the Ankara University Hospitals.

#### Participants and setting

Under the guidance of trainers, residents primarily provide patient care in outpatient clinics at Ankara University Hospitals, a tertiary-level training facility. Trainers assist and supervise resident physicians during patient encounters rather than seeing patients outside the residency training process. Accordingly, residents are inevitably involved in all outpatient services. This arrangement guarantees that resident physicians actively participate in diagnosing and managing cases across all specialities. Therefore, all outpatient clinical diagnoses are related and can be generalised to resident physicians' patient encounters.

The data output of the ICD-10 diagnostic codes of the patient encounters registered to the AviCenna database

program used in the Hospitals' outpatient clinics between January 1 and December 31, 2019, were listed in order of diagnosis frequency specific to each speciality. ICD-10 diagnosis frequency data was used to give context to the scope and frequency of clinical encounters, not as a direct meter for education quality. The aim was to receive data before the COVID-19 pandemic started since the pandemic caused a shift in healthcare services.

In addition, a questionnaire form was applied to clinical medicine residents about their views on speciality training. It was planned to identify residents who started working before January 1, 2020 and are in their second year or more in specialisation training. The questionnaire form, which was developed for this study (see supplementary file), consisted of 17 questions including demographic characteristics, basic knowledge levels about the speciality, access to this information, and satisfaction with education, was delivered to the participants using the 'Surveey Online Questionnaire System'. The questionnaire was distributed between May 3 and October 26, 2021. The questions were asked to be answered according to the period before the COVID-19 pandemic. These forms were evaluated together with the hospital outpatient clinic data in 2019.

The sample size was not calculated for this study. It was aimed to reach all clinical medicine residents who started residency training before 2020 and are in their second year or more of specialisation training, which comprises 318 resident doctors.

#### Statistical analysis

Descriptive statistics were presented as mean±standard deviation or median (minimum-maximum) according to normal distribution for quantitative variables and frequency (percent) for qualitative variables. Due to the variability of participant characteristics and their distribution across twenty-four different departments, statistical comparisons were not performed. Analysis was conducted using SPSS (version 15.0, Chicago, IL.).

## Results

This study includes the outpatient clinic patient encounter records in Ankara University Faculty of Medicine Hospitals and the survey results of residents who were in their second year or above in specialisation training. The response rate was 60.9% in all clinical sciences (56.7% in internal medicine, 66.93% in surgery). The study included 24 different clinical medicine departments (13 internal medicine and 11 surgical medicine).

The sociodemographic characteristics of the residents participating in the study are shown in Table 1.

The total number of patient encounters in outpatient clinics, the total number of different diagnoses and the most common diagnoses in the outpatient clinics in 2019 Page 3 of 13

were determined, and the approximate proportions of the top 5 diagnoses in all patient encounters were calculated for each department. Table 2 presents the results, which, rather than demonstrating departmental performance, provide descriptive statistics to highlight the diversity and concentration of cases encountered in different departments and show the disparities in patient representation and diagnostic breadth between departments.

While the first five diagnoses in some of the specialities covered almost 90% (and above) of the outpatient diagnoses in that branch (Ophthalmology, Child and Adolescent Psychiatry, Gynaecology and Obstetrics, etc.), it was found that the first five diagnoses had a very small proportion in some of the branches (Family Medicine, Emergency Medicine, Orthopaedics and Traumatology, etc.). For each speciality outpatient clinic, the most frequent diagnoses that met half of the total admissions are shown in Fig. 1. It was observed that the most common first diagnosis in each of the outpatient clinics of Child and Adolescent Psychiatry, Ophthalmology, Gynaecology and Obstetrics, and Sports Medicine met half of the total admissions within a year.

The training received in the internal and surgical departments was requested to be evaluated by the residents. Senior residents in surgical departments, and classical books and electronic media in internal medicine were the prominent sources of information and the competency for expertise (Table 3).

Residents who received specialisation training in internal and surgical departments were asked questions about educational activities and current information sources (Table 4).

Internal and surgical residents were asked to evaluate their skills for frequently diagnosed diseases in their departments, and the results are shown in Table 5.

## Discussion

The current situation was revealed to standardise and improve the quality of residency training with in our Hospital. Determining the most common diagnoses in each speciality reveals the most common disease profile, if not in all steps in the relevant speciality, at least in the hospital outpatient setting where residency training is received. The diversity of patient presentations and clinical focus areas is reflected in the heterogeneity in patient encounters and the concentration of diagnoses between departments. The information provided does not suggest direct performance comparisons but offers useful context for comprehending the variety and volume of cases handled by each department. Our study suggests that residency training should emphasise exposure to both common and specialised conditions, tailored to the specific patient populations seen in each institution. Training may focus more on challenging cases in hospitals

 Table 1
 Sociodemographic characteristics of the residents

Table T Sociouemographic characteri	stics of the residents		
Gender	n	%	
Female	94	48,7 <b>%</b>	
Male	99	51,3 <b>%</b>	
Age			
25–30	165	85,5 <b>%</b>	
31–35	25	13 <b>%</b>	
36–40	1	0,5 <b>%</b>	
>41	2	1%	
Years of practice as an M.D.			
2–4 years	129	66.8 <b>%</b>	
5–7 years	59	30.6%	
8–10 years	3	16%	
> 10 years	2	1%	
Year of specialisation (Seniority)	2	1,0	
2nd year	65	33 7 <b>%</b>	
3rd year and above	128	55,770 663 <b>0</b> 4	
Department of specialisation	Number of residents	Number of targeted residents	The ratio of surveyed
Department of specialisation	surveyed	(Total number of residents in	residents to the
	· · · · · <b>· · ·</b> · ·	their 2nd year and above)	targeted number of
		•	residents
Internal Medicine	n	n	%
Emergency Medicine	20	20	100%
Family Medicine	15	15	100%
Child and Adolescent Psychiatry	4	7	57,14%
Paediatrics	15	65	23,08%
Dermatology	6	6	100%
Infectious Diseases	5	7	71.43%
Physical Medicine and Rehabilitation	4	9	44,4%
Chest Diseases	5	11	45,45%
Internal Medicine (Internal Diseases)	15	25	60%
Cardiology	5	8	62.5%
Neurology	4	9	44.4%
Psychiatry	9	9	100%
Sports Medicine	3	3	100%
Total	110	194	56.7%
Surgery	n	n	%
Neurosurgery	17	17	100%
Paodiatric Surgery	4	0	10078
Coporal Surgery	5	16	31 2506
	4	8	50%
	7	0	77 704
Curpage lagy and Obstatrics	/	9	77,7%0
	11	14	76,37%0
	5	4	1000/
	 E	17	
	5	/	29,41%
Plastic Surgery	4	/	J/,14%
	12	12	100%
lotal	83	1/4	00.93%

that serve as referral centres, such as the Ophthalmology department in the present study, which may result in less exposure to some common diseases. This highlights the need for residency programs to ensure a well-balanced curriculum that adequately prepares trainees for a broad range of clinical scenarios. Early emphasis on critical thinking and decision-making skills will better prepare residents for the ambiguity and diversity in these diagnoses. This focus aims to create more effective and efficient residency training.

According to our study, to cover 50-55% of the outpatient burden in specialities of Emergency Medicine, **Table 2** The total number of patient encounters, the total number of different diagnoses and the most common diagnoses in theoutpatient clinics, and the approximate proportions of the top 5 diagnoses in all patient encounters for each department

Internal Medicine The most common 5 diagnoses				
Emergency Medicine	1) Acute upper respiratory infections of multiple and unspecified sites (J06)			
Total number of patient encounters: 83,754	2) Malaise and fatigue (R53) 2) Abdominal and polytic pain (P10)			
Total number of different diagnoses: 1335	3) Abdominal and pelvic pain (R10)			
Percentage of top 5 diagnoses: ~%30	<ol> <li>4) Other and unspecified soft tissue disorders, not elsewhere classified (M79)</li> <li>5) Pain, unspecified (R52)</li> </ol>			
Family Medicine	1) Encounter for general examination without complaint suspected or reported diagnosis (700)			
Total number of patient encounters: 40 778	2) Acute upper respiratory infections of multiple and upspecified sites (106)			
Total number of different diagnoses: 1453	3) Essential (primary) hypertension (110)			
Percentage of top 5 diagnoses: ~%30	4) Unspecified diabetes mellitus (E14)			
	5) Vitamin D deficiency (E55)			
Child and Adolescent Psychiatry	1) Hyperkinetic disorders (F90)			
Total number of patient encounters: 21,715	2) Other anxiety disorders (F41)			
Total number of different diagnoses: 246	3) Reaction to severe stress, and adjustment disorders (F43)			
Percentage of top 5 diagnoses: ~%85	4) Pervasive developmental disorders (F84)			
	5) General psychiatric examination, not elsewhere classified (Z00.4)			
Paediatrics	1) Routine child health examination (Z00.1)			
Total number of patient encounters: 39,677	2) Acute upper respiratory infections of multiple and unspecified sites (J06)			
Iotal number of different diagnoses: 1113	3) Cough (R05)			
Percentage of top 5 alagnoses: $\sim$ %70	4) Vitamin D αεποίεπου (ESS) 5) Abdominal and polyic pain (P10)			
Dermatology	1) Other and unspecified dormatitis (L30)			
Total number of patient encounters: 29 751	2) Acne ( $170$ )			
Total number of different diagnoses: 955	3) Dermatophytosis (B35)			
Percentage of top 5 diagnoses: ~%45	4) Other epidermal thickening (L85)			
5 1 5	5) Psoriasis (L40)			
Infectious Diseases	1) Encounter for general examination without complaint, suspected or reported diagnosis (Z00)			
Total number of patient encounters: 9159	2) Chronic viral hepatitis (B18)			
Total number of different diagnoses: 727	3) Fever of other and unknown origin (R50)			
Percentage of top 5 diagnoses: ~%50	4) Urinary tract infection, site not specified (N39.0) 5) Osteomyelitis (M86)			
Physical Medicine and Rehabilitation	1) Other intervertebral disc disorders (M51)			
Total number of patient encounters: 23,535	2) Shoulder lesions (M75)			
Total number of different diagnoses: 1385	3) Other joint disorders, not elsewhere classified (M25)			
Percentage of top 5 diagnoses: ~%35	4) Osteoarthritis of knee (M17)			
	5) Cervical disc disorders (M50)			
Chest Diseases	1) Other chronic obstructive pulmonary disease (J44)			
Iotal number of patient encounters: 76,927	2) Preumonia, organism unspecified (J18)			
Parsontage of ten E diagnoses: 1686	3) Adhormalities of breatning (RU6) 4) Couch (RDE)			
Percentage of top 5 alagnoses. ~%55	4) Cougin (R05) 5) Asthma (145)			
Internal Medicine (Internal Diseases)	1) Other specified diabetes mellitus (E13)			
Total number of patient encounters: 34,677	2) Iron deficiency anemia (D50)			
Total number of different diagnoses: 1125	3) Essential (primary) hypertension (110)			
Percentage of top 5 diagnoses: ~%45	4) Vitamin D deficiency (E55)			
	5) Vitamin B12 deficiency anemia (D51)			
Cardiology	1) Essential (primary) hypertension (I10)			
Total number of patient encounters: 70,467	2) Chronic ischemic heart disease (125)			
Total number of different diagnoses: 924	3) Atrial fibrillation and flutter (I28)			
Percentage of top 5 alagnoses: $\sim$ %70	<ol> <li>Uisoraers of lipoprotein metabolism and other lipidemias (E/8)</li> <li>Abnormalities of beart heat (P00)</li> </ol>			
Neurology	1) Hoadacha (PS1)			
Total number of patient encounters: 24,078	2) Other polyneuropathies (G62)			
Total number of different diagnoses: 978	3) Parkinson's disease (G20)			
Percentage of top 5 diaanoses: ~%40	4) Epilepsy (G40)			
	5) Depressive episode (F32)			

# Table 2 (continued)

Internal Medicine	The most common 5 diagnoses			
<b>Psychiatry</b> Total number of patient encounters: 49,483	1) Depressive episode (F32) 2) Other anxiety disorders (F41)			
Total number of different diagnoses: 744 Percentage of top 5 diagnoses: ~%70	<ul> <li>3) Bipolar affective disorder (F31)</li> <li>4) Schizophrenia (F20)</li> <li>5) Unperformation disorders (F00)</li> </ul>			
Sports Medicine	5) Hyperkinetic disorders (F90) 1) Paint in joint (M25) 2) Forwards for any site for a set is in sect (702.5)			
Total number of patient encounters: 4211	2) Encounter for examination for participation in sport (202.5) 3) Internal decapedment of knee (M23)			
Percentage of top 5 diagnoses: ~%70	4) Muscle Strain (M62.6)			
Surgery	5) Dislocation and sprain of joints and ligaments at ankle, foot and toe level (593)			
Neurosurgery	1) Nerve root and plexus compressions in diseases classified elsewhere (G55)			
Total number of patient encounters: 13,367	2) Headache (R51)			
Total number of different diagnoses: 596	3) Cervical disc disorders (M50)			
Percentage of top 5 diagnoses: ~%70	4) Malignant neoplasm of brain (C71) 5) Benign neoplasm of meninges (D32)			
Paediatric Surgery	1) Undescended and ectopic testicle (Q53)			
Total number of patient encounters: 5998	2) Redundant prepuce, phimosis and paraphimosis (N47)			
Total number of different diagnoses: 538	3) Hypospadias (Q54)			
Percentage of top 5 diagnoses: ~%40	4) Inguinal hernia (K40) 5) Pilonidal cyst (L05)			
General Surgery	1) Unspecified lump in breast (N63)			
Total number of patient encounters: 40,764	2) Abdominal and pelvic pain (R10)			
Total number of different diagnoses: 1145	3) Other nontoxic goitre (E04)			
Percentage of top 5 diagnoses: ~%50	4) Other diseases of intestine (K63) 5) Other specified diabetes mellitus (E13)			
Thoracic Surgery	1) Abnormalities of breathing (R06)			
Total number of patient encounters: 6726	2) Malignant neoplasm of bronchia and lung (C34)			
Total number of different diagnoses: 533	3) Other chest pain (R07.3)			
Percentage of top 5 diagnoses: ~%55	4) Abnormal findings on diagnostic imaging of lung (R91)			
	5) Gastritis and duodenitis (K29)			
Ophthalmology	1) Disorders of refraction and accommodation (H52)			
Iotal number of patient encounters: 57,/19	2) Other retinal disorders (H35)			
Parcontago of ton 5 diagnosos: -9695	3) GlduCOMId (H4U) 4) Disorders of Lacrimal system (H04)			
rencentage of top 5 alagnoses. ~%95	5) Iridocyclitis (H20)			
Gypaecology and Obstetrics	1) Pregnant state (733)			
Total number of natient encounters: 55 847	2) Pain and other conditions associated with female genital organs and menstrual cycle (N94)			
Total number of different diagnoses: 522	3) Excessive, frequent and irregular menstruation (N92)			
Percentage of top 5 diagnoses: ~%85	4) Menopausal and other perimenopausal disorders (N95) 5) Vitamin D deficiency (E55)			
Cardiovascular Surgery	1) Chronic ischemic heart disease (125)			
Total number of patient encounters: 26,358	2) Other disorders of veins (187)			
Total number of different diagnoses: 524	3) Presence of cardiac and vascular implants and grafts (Z95)			
Percentage of top 5 diagnoses: ~%75	4) Essential (primary) hypertension (I10) 5) Other peripheral vascular diseases (I73)			
Ear, Nose, and Throat Diseases	1) Other and unspecified hearing loss (H91)			
Total number of patient encounters: 29,912	2) Vasomotor and allergic rhinitis (J30)			
Total number of different diagnoses: 824	3) Other and unspecified disorders of nose and nasal sinuses (J34)			
Percentage of top 5 diagnoses: ~%45	4) Chronic diseases of tonsils and adenoids (J35) 5) Otitis media, unspecified (H66.9)			
Orthopaedics and Traumatology	1) Pain in joint (M25.5)			
Total number of patient encounters: 27,566	2) Dislocation, sprain and strain of joints and ligaments of knee (S83)			
Total number of different diagnoses: 1653	3) Osteoarthritis of knee (M17)			
Percentage of top 5 diagnoses: ~%35	4) Scoliosis (M41) 5) Fracture of forearm (S52)			

#### Table 2 (continued)

Internal Medicine	The most common 5 diagnoses		
Plastic Surgery	1) Granulomatous disorders of skin and subcutaneous tissue (L92)		
Total number of patient encounters: 7577	2) Localized swelling, mass and lump of skin and subcutaneous tissue (R22)		
Total number of different diagnoses: 501	3) Other and unspecified disorders of nose and nasal sinuses (J34)		
Percentage of top 5 diagnoses: ~%65	4) Other disorders of breast (N64)		
	5) Other and unspecified malignant neoplasm of skin (C44)		
Urology	1) Other disorders of urinary system (N39)		
Total number of patient encounters: 16,247	2) Benign prostatic hyperplasia (N40)		
Total number of different diagnoses: 384	3) Neuromuscular dysfunction of bladder, not elsewhere classified (N31)		
Percentage of top 5 diagnoses: ~%85	4) Calculus of kidney and ureter (N20)		
5.5	5) Cyst of kidney acquired (N28.1)		





Fig. 1 The most frequent diagnosis numbers meeting half of the total patient encounters in a year (2019) in different clinical branches

Family Medicine, Dermatology, Infectious Diseases, Physical Medicine and Rehabilitation, Chest Diseases, Neurology, Internal Medicine (Internal Diseases), Paediatric Surgery, Orthopaedics and Traumatology, Ear, Nose, and Throat Diseases, the first 6-12 diseases should be well known by the residents in the first year, where they start working in the outpatient clinics. In Child and Adolescent Psychiatry, Cardiology, Psychiatry, Sports Medicine, Ophthalmology, Gynaecology and Obstetrics, Neurosurgery, Cardiovascular Surgery and Urology, mastering top five diagnosis can address 70-90% of outpatient cases. However, this opportunity cannot be mentioned in specialities such as Emergency Medicine and Family Medicine, where the top five diagnoses cover less of the spectrum, and more complex and comprehensive training is required.

In this study, the most common diagnoses in Ankara University Family Medicine outpatient clinics were encounter for general examination without complaint, suspected or reported diagnosis, acute upper respiratory infections, essential hypertension, unspecified diabetes mellitus and vitamin D deficiency, covering 30% of all patient encounters. The top 11 diagnoses account for half of all cases. Similarly, a study conducted in the field of family medicine in Ohio [11], found that the top 25 diagnoses, including hypertension, acute upper respiratory tract infection, general medical examination, sinusitis, and acute lower respiratory tract infection, made up 60% of all cases, with the first five covering a small percentage. A study conducted in 2016, based on a stratified sample of Family Health Centres in the three most populous districts of the capital city, Ankara, reported the most

# Table 3 Training evaluation and information resources for residents

		Internal Medicine		Surgery	
		n	%	n	%
Do you think the number of patients and pa-	Yes	68	61,8%	70	84,3%
tient diversity in your department is sufficient	Partly	35	31,8%	11	13,3%
for your education?	No	7	6,4%	2	2,4%
Do you find your speciality training sufficient	Yes	39	35,5%	43	51,8%
in terms of content?	Partly	57	51,8%	31	37,3%
	No	14	12,7%	9	10,8%
How would you describe the training you	Very good	2	1,8%	8	9,6%
received in rotations in general?	Good	35	31,8%	26	31,3%
	Fair	47	42,7%	29	34,9%
	Bad	24	21,8%	11	13,3%
	Very bad	2	1,8%	9	10,8%
From whom/where do you learn the most	Trainers in the department	20	18,2%	14	16,9%
information you have gained in your field?	Senior resident	29	26,4%	52	62,6%
	Classical books and electronic media	61	55,5%	17	20,5%
Do you attend vocational training events/con- gress and courses (outside of the institution)?	Usually	41	37,3%	32	38,6%
	Sometimes	56	50,9%	37	44,6%
	No	13	11,8%	14	16,9%
Is there any enlightenment on the importance	Yes	73	66,4%	55	66,3%
of continuing medical education (CME)/con- tinuous professional development during the education?	No	37	33,6%	28	33,7%
Do you think you will have difficulty diagnos-	Yes	16	14,5%	7	8,4%
ing and treating the diseases frequently diagnosed in your department?	No	94	85,5%	76	91,6%
How would you evaluate your competence in	I think I am competent.	29	26,4%	31	37,3%
terms of your expertise?	l think l am missing some things (l need improvement).	77	70%	43	51,8%
	I think I am professionally inadequate.	4	3,6%	9	10,8%

# Table 4 The status of conducting training meetings in the departments and current information sources

Which sources do you follow about the diagnoses frequently made in your department? (More than one option can be marked.)		Internal Medicine		Surgery	
	n	%	n	%	
I follow the updates in the current guidelines.	96	40,7%	59	33,9%	
I try to attend national and international congresses.	49	20,8%	38	21,8%	
I follow the developments through the internet.	71	30,1%	51	29,3%	
I only follow the relevant scientific meetings in the province where I work.	12	5,1%	11	6,3%	
I do not need extra information about these diagnoses.	8	3,4%	15	8,6%	
Are there any training activities for residents in your institution? How do residents primarily participate?					
Case report	80	28,6%	58	32,0%	
Seminar	102	36,4%	63	34,8%	
Article hour (Literature review)	92	32,9%	51	28,2%	
No training meeting	6	2,1%	9	5,0%	
Which ones do you benefit from in accessing up-to-date information? (More than one option can be marked.)					
Training meetings held in the institution	75	27,0%	50	27,3%	
Medical libraries	26	9,4%	30	16,4%	
Using information technology, including databases	92	33,1%	62	33,9%	
Using drug information databases	33	11,9%	14	7,7%	
Active participation in training courses, conferences and other educational events organised at local or national level	52	18,7%	27	14,8%	

Skills for diseases commonly	Department	rtment 1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strong				y Agree	
diagnosed in your department		1	2	3	4	5	
		n (%)	n (%)	n (%)	n (%)	n (%)	
l can take an adequate medical	Internal Medicine	1	4	10 (9,1%)	30 (27,3%)	65	
history and request necessary		(0,9%)	(3,6%)			(59,1%)	
tests.	Surgery	11 (13,3%)	1	6	12	53	
			(1,2%)	(7,2%)	(14,5%)	(63,9%)	
I can make an accurate diagnosis	Internal Medicine	1	3	17	53	36	
and differential diagnosis in ac-		(0,9%)	(2,7%)	(15,5%)	(48,2%)	(32,7%)	
cordance with DSM/ICD systems.	Surgery	7	4	10	22	40	
		(8,4%)	(4,8%)	(12%)	(26,5%)	(48,2%)	
I can plan the proper treatment.	Internal Medicine	2	1	17	44	46	
		(1,8%)	(0,9%)	(15,5%)	(40%)	(41,8%)	
	Surgery	7	3	12	20	41	
		(8,4%)	(3,6%)	(14,5%)	(%24,1)	(49,4%)	
l can make a qualified medical	Internal Medicine	0	14	21	43	32	
record.			(12,7%)	(19,1%)	(39,1%)	(29,1%)	
	Surgery	7	4	10	22	40	
		(8,4%)	(4,8%)	(12%)	(26,5%)	(48,2%)	
I can identify the emergency	Internal Medicine	2	3	9	39	57	
and refer it to a specialist when		(1,8%)	(2,7%)	(8,2%)	(35,5%)	(51,8%)	
necessary.	Surgery	8	2	6	13	54	
		(9,6%)	(2,4%)	(7,2%)	(%15,7)	(65,1%)	
I can follow up and control the	Internal Medicine	1	4	17	41	47	
patient.		(0,9%)	(3,6%)	(15,5%)	(37,3%)	(42,7%)	
	Surgery	7	2	8	20	46	
		(8,4%)	(2,4%)	(9,6%)	(24,1%)	(55,4%)	
I can request consultations from	Internal Medicine	2	2	10 (9,1%)	51 (46,4%)	45	
other branches of medicine and		(1,8%)	(1,8%)			(40,9%)	
interpret and evaluate them.	Surgery	8	3	9	24	39	
		(9,6%)	(3,6%)	(10,8%)	(28,9%)	(47%)	
l can get up-to-date informa-	Internal Medicine	3	6	22	39	40	
tion from literature and various		(2,7%)	(5,5%)	(20%)	(35,5%)	(36,4%)	
sources and evaluate them.	Surgery	8	4	18	18	35	
		(9,6%)	(4,8%)	(21,7%)	(21,7%)	(42,2%)	

Table 5 Skills of residents receiving specialisation training in internal and surgical sciences for commonly diagnosed diseases

common diagnosis groups as acute upper respiratory tract infections and hypertension [12]. Similarly, another study from the Family Medicine outpatient clinics in a University Hospital in a city in Northern Turkey from 2013 [13], and a retrospective review of health centre records from a Family Medicine Department in a city in Southern Turkey in 2003 also found acute upper respiratory tract infections and hypertension as the most common diagnosis [14] showing a consistent pattern with our study.

The five most common diagnoses in the family medicine cover only 30% of all diagnoses; however, this rate is 70% in cardiology and psychiatry. A secondary analysis of National Ambulatory Medical Care Survey data found that complexity in family medicine is one-third higher than cardiology and five times higher than psychiatry, considering encounter length [15]. US primary care physicians report that complexity, influenced by health status, environmental factors and treatment needs, leads to greater workload, communication challenges and time pressure [16]. Achieving high-quality healthcare throughout family medicine as the first point of contact, person-centred continuity of care, coordination of care, and preventive services are fundamental for healthcare; however, primary care often faces challenges and underinvestment within the healthcare system [17]. Complexity and uncertainty with different ages, genders, sociocultural dynamics, undifferentiated symptoms, multimorbidity, the coexistence of different environments, and patients/diseases are the main features of primary healthcare, and different approaches need to be adapted to cope with this greater complexity [18].

The study suggests that the variety of diagnoses in Emergency Medicine and Family Medicine outpatient clinics differs due to diverse patient profiles. Family Medicine often handles patients with undifferentiated complaints, which may not fit neatly into the ICD coding system. Since family medicine residents work in primary care after graduation, they frequently deal with complaints related to chronic disease management, prescriptions, reports, periodic health examinations, and vague complaints. Therefore, using the ICPC-2 classification system, which is commonly used in primary care in Europe, may be more appropriate [19, 20].

In this study, surgical residents found their training content more sufficient than internal medicine residents, though both viewed the content as adequate. In a 2008 study on family medicine residency in Turkey [21], only 30% found the training content sufficient, with the lack of a structured program being a key issue. Similarly, a 2013 study [22] showed that 87.8% of residents who found their training insufficient, pointed to inadequate content, and calling for standardisation. In a 2023 Istanbul Medical Chamber survey, 93% of residents reported regular training presentations/seminars are held in their departments. However, 64% of departments allocate a defined time during working hours for training seminars, showing that 30% of training activities are carried out during non-working hours [23]. On the other hand, the ACGME mandates setting aside time for educational purposes during the residency program, guaranteeing that every resident has regular access to training sessions [24].

Internal medicine residents primarily learn from classical books and electronic media, while surgical residents gain most of their knowledge from senior residents, who often play a significant mentorship role, particularly in surgical specialities [25]. They teach residents actual knowledge and skills in a peer-learning setting, which may cause residents to view them as their primary source of information. Additionally, because internal medicine residents regularly use electronic media and classical texts for evidence-based learning and remain up-to-date on research, these materials are essential sources of information. This outcome could also be influenced by the trainers' perceived availability or accessibility, their methods of instruction, and the time restrictions brought on by their clinical duties. These elements may cause residents to depend more on outside resources, such as senior residents, electronic media and textbooks, to augment their knowledge and competency development. As senior residents gain experience, responsibility and autonomy, they mentor junior residents and medical students, providing guidance in medical knowledge and skill transfer, patient care, clinical problem solving, ethics, teamwork and emotional support, while fostering a positive learning environment [26]. A qualitative study with internal and surgical residents and their attending physicians shows that interactions with colleagues and patient follow-up enhance cognitive and practical knowledge, highlighting the value of teamwork and peer learning. The 'hidden curriculum,' which encompasses unwritten norms and standards, plays a key role in clinical education, with hospital culture significantly influencing learning outcomes. Informal education often outweighs formal curricula, as clinical settings and physician-resident interactions impact the development of professionalism. The study also underscores the importance of attending physicians fostering positive relationships and offering constructive feedback to support learning [27]. In the Izmir-scale study [28], senior residents were ranked first, classical books second, and trainers third as learning resources, with only 2.5% of residents prioritising education in their institutions. Unlike the present research, a qualitative study with specialist residents and assistant general practitioners in China reported that residents mainly learned from their teachers [29]. An Australian study showed students used written notes and textbooks most frequently, though online resources were also preferred, especially for revision [30]. Residents generally follow up-to-date information from various sources. However, it was observed that the rate of benefiting from the training meetings held in the institution for both internal and surgical sciences residents in accessing up-to-date information is low. In the present study, using information technology, including literature databases, was determined to access up-to-date information by one-third of the participants. The findings suggest that trainers should play a more active role, improving the quality of theoretical education, focusing on common diagnoses early in training.

The present study highlights residents' perception that trainers' should take a more active teaching role. Trainers not only provide knowledge to trainees but also inspire as role models. A systematic review found that trainers with strong patient care, teaching and personal qualities positively influence trainees. Positive role models are knowledgeable, skilled, empathetic, person-centred and good communicators. They prioritise the needs of their students and create a supportive, safe learning environment [31].

Comprehensive medical education standards across all disciplines are crucial for quality assurance. This perspective underscores a growing consensus among experts regarding the adoption of such standards to promote institutional reform and uphold educational quality, especially those aligned with global benchmarks. Understanding and comparing medical residency training programs is of utmost importance. International institutions such as the ACGME and the Educational Commission for Foreign Medical Graduates (ECFMG) provide frameworks that support this process, thereby enhancing the quality of instruction. Their emphasis on accreditation as a transformative force in medical education is particularly relevant [32]. This understanding is crucial for assessing and contrasting medical residency training programs, including those in Turkey. The discussion over certification standards clarifies that there are significant global ramifications for the calibre of medical education and training. Analysing these requirements within the framework of Turkey's medical residency program will shed additional light on the obstacles and possibilities the nation's medical education system faces in meeting global standards.

Over 10% of surgical and internal medicine residents reported never attending vocational training outside their institution. During COVID-19, face-to-face CME activities declined, leading The rise of online training due to its flexibility and accessibility [33]. To achieve optimal learning results, blended learning is recommended and provides both the flexibility, cost-effectiveness, and accessibility features of online education, as well as the strengths of direct interaction, application and personalised guidance of on-site education [34]. Despite the ease of online access, it is noteworthy that some residents did not participate in the vocational events, possibly due to a lack of emphasis on CME, with 34% of residents stated no guidance on its importance. However, in the medical environment where knowledge is constantly evolving, CME is significant to provide highquality and up-to-date health care and for the physician to remain competent [35]. Study findings underscore the urgent need for more systematic encouragement and institutional support to foster a culture of lifelong learning. With the shift to competence-based education, complete acquisition of the targeted skills should be ensured. The competency-based approach in surgical residency training aims to ensure that surgeons are competent enough to provide the necessary services and skills to their patients, and competence is the ability to successfully apply professional knowledge, skills and attitudes to new situations and familiar tasks. While checklists define criteria, competencies increasingly viewed as a holistic concept that includes personal qualities [36]. Trainers should not only transfer knowledge but also serve as role models, as residents value practical training in competency-based programs [37]. Specialisations should tailor learning methods, utilise guides, create standardised training programs, and balance education with healthcare delivery, while residents must commit to both education and service.

## **Practical implications**

The study highlights that our institution should launch focused faculty development programs to encourage trainers to take a more active role. Tailored orientation programs focusing on prevalent diseases should also be implemented.

Our data offer important insights into resident doctors' learning preferences, habits, and areas needing more resources or help. The finding that residents in internal medicine mostly use electronic media and traditional literature raises the possibility that the curriculum may be improved by including more digital resources and evidence-based teaching methods. Likewise, the focus of surgical residents is on gaining knowledge from more experienced peers. This underscores the potential value of official peer-mentorship initiatives in enhancing the learning process.

Residency training should include structured opportunities and incentives for CME/CPD participation, with an emphasis on lifelong learning.

#### Limitations

This study was carried out during the COVID-19 pandemic, and due to the decrease in outpatient applications and the shift towards infection during the pandemic, 2019 data was used to determine patient encounters. These data were shared with the residents, who were asked to answer the questionnaire accordingly. Therefore, recall bias is one of the limitations. Also, although in some departments, almost all the residents in the population answered the questionnaire, in others, the response rate remained lower, and the survey results could be affected by volunteer bias which caused the limitation of generalisability.

Additionally, using ICD-10 codes has potential limitations, including umbrella terms of ICD-10 are broad and groups many conditions under it, which may not fully reflect the specific scope of each speciality, as well as the variability in how diseases are categorised and the potential for these codes to impact the data interpretation, which may have cause some artificial variation in diagnosis proportions due to the broad categorisation of certain conditions. Another limitation of this study is that the distribution of diagnoses in certain departments, such as ophthalmology, is affected by the hospital's role as a referral centre. Since our ophthalmology department is a referral centre for retina, uvea, and glaucoma diseases, residents may have fewer clinical encounters with more common ophthalmologic conditions, such as cataracts.

In addition, this study was conducted in a university hospital, and variations of learning experiences between different specialisations have not been examined in depth. Therefore, generalisation to other settings, hospitals, and the country is limited. Further research could explore these nuances across different specialisations and geographical areas to aim for significant advancement in the field.

## Conclusions

In accordance with the frequency and distribution of the most common diagnosis in outpatient clinics in the content of specialisation training, the subjects should be emphasised right at the beginning of the training of the first-year residents. Giving priority to the training for the most common diagnoses will significantly contribute to more effective and quality patient management by the residents who work intensively in the outpatient clinics in the early stages of the speciality training.

Trainers should take a more active role in education and take a higher place among information sources; theoretical education activities should be organised to include the most frequently diagnosed diagnoses in the early stages, effective use of guides should be ensured, and a standard education program should be developed and improved for specialisation training programs.

It can be thought that if the residents in the specialities with the highest rate of the first five diagnoses in the diagnosis distribution are well educated about them right at the beginning of the residency training, they can safely meet the majority of the outpatient clinic burden. This opportunity cannot be mentioned in the branches where the first five diagnoses have a small portion in the fields of specialisation, and education needs to be more complex.

### **Supplementary Information**

The online version contains supplementary material available at https://doi.or g/10.1186/s12909-025-06994-2.

Supplementary Material 1

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#### Author contributions

The authors are responsible for the content and the writing of the paper. Conception or design of the work: GCP, GND, MU. Data collection: GND, MU. Data analysis and interpretation: GND, HSÇ, GCP, MU. Preparation of tables and figures: GND, HSÇ. Drafting the article: GCP, HSÇ. Critical revision of the article: GCP, GND, HSÇ, MU. Final approval: GCP, GND, HSÇ, MU.

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#### Data availability

The datasets generated and/or analysed during the current study are not publicly available for privacy reasons, but are available from the corresponding author on reasonable request.

#### Declarations

#### Ethics approval and consent to participate

Ankara University Faculty of Medicine Human Research Ethics Committee, with decision number 14-264-21, dated 22.04.2021, was received for this study. Before the survey started, the respondents were informed about the study's aim and that it was an anonymous survey following the existing data protection standards. All participants gave consent to participate.

#### Consent for publication

Not applicable.

#### **Competing interests**

The authors declare no competing interests.

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