

Pattern of Patient Referrals from Family Healthcare Centers to Tertiary Centers in Erbil City

Vian Fareq Obaid^{1*} and Lana Adil Bakir²

¹Community Medicine Department, College of Medicine, Hawler Medical University, Kurdistan Region of Iraq.

²Swedish National Board-Certified Family Physician, Community Medicine Department, College of Medicine, Hawler Medical University, Kurdistan Region of Iraq.

*Corresponding Authors Email: * vean79@hotmail.com, lanacalaby@hotmail.com

ABSTRACT

Background: Family medicine provides personal, comprehensive, and ongoing care for individuals within the context of their family and community. There is little information on referral status in Middle Eastern countries. **Purpose:** In this regard, we aimed to investigate the reasons for patient referrals from family healthcare centers (FHCs) to tertiary health facilities within Erbil City. **Methods:** A cross-sectional study was conducted in five FHCs in Erbil City from October 1st 2024 to September 1st 2025. This study included patients who attended these FHCs and subsequently received referrals to tertiary health centers. **Results:** Of the 400 patients, one-third (36.3%) were male, and more than two-thirds (63.7%) were female. The mean age was 33.21 (SD: 18.18 years). More than two-thirds (65.8%) of the referrals were indicated, and 34.3% were self-request referrals with no significant difference in genders ($p=0.941$). The main reasons for referral were insufficient investigation (44%), non-existence of a specialty in the hospital (34.3%), non-diagnosis (13%), and non-availability of medicine (8.8%). Internal medicine (13.5%), ENT (13.8%), skin (11.8%), and obstetrics and gynecology (10.3%) were the main areas to which patients were referred. Pediatric and orthopedic services had equal representation (8.8%). **Conclusions:** Research revealed that medical professionals sent a significant number of patients to Family Health Centers (FHCs). Patients frequently self-referred because they perceived family care centers to be inadequate. Such a trend of self-referral could add a strain on the already scarce resources of the specialized healthcare institutions.

Keywords: Management, Primary Health System, Referral System.

Article Information

Received: June 28, 2025; Revised: November 17, 2025; Online December, 2025

INTRODUCTION

As per the World Organization of Family Doctors, the goal of family medicine is to offer personal, comprehensive, and continuous care to each individual in the family and community context. The family doctors' participation is essential for the promotion and preservation of primary healthcare, which is the focus of the PHCs (Primary Health Centers) services. One of the fundamental aspects of PHC is the referral system, which lets patients visit health centers for services before being passed on to

secondary or tertiary hospitals (1). If the referral system is set up well in a healthcare system, it will not only help patients a lot but also make better use of the resources at both the local and national levels. The positive aspects of such a system would be staggering, and it could be seen as a ray of hope for the enhancement of healthcare in the Kurdistan region of Iraq (2).

Referral takes place when a primary healthcare provider is unable to handle a patient's condition because of the lack of

resources and thus requests help from a superior clinical establishment (3). To refer patients appropriately, three levels have been considered: the first level is the PHC facility. The secondary hospital provides a secondary level of care, and the tertiary level of care is provided in specialized hospitals (4). The health system's performance is reflected through its referral, and it shows the strength of relations between all levels of care. Studies revealed that many patients referred to secondary hospitals can be managed at the PHC level at a lower cost (5). The health services in this region are provided through PHC and hospitals. The health systems in this region of the world faces many obstacles. Among them are overutilization, poor organization, and a lack of trained staff. Currently, there are many efforts to reform the health system in the Kurdistan region of Iraq. The decision-makers in this region need to be informed about the elements of reform, like quality assurance, the health referral system, pharmaceutical management, health financing, and health policy. The needs of the population in this area can be summarized as a health system that is of high quality, unbiased, strong, and efficient. Previous studies have indicated that the current system is overcoming various obstacles, which calls for enhancements (6, 7).

It is important to emphasize the fact that the referral system from health centers in this region is in urgent need of more thorough research. The urgency and significance of more extensive research in this field are also the main reasons for this study. The involvement of the audience in this research is crucial for the successful enhancement of the healthcare system.

The current study aimed to investigate the referral of patients from FHCs inside Erbil City to tertiary health facilities. The specific objectives were to identify the reasons for referral, the type of referral, the department chosen for referral, and the symptoms

presented. Additionally, the study aimed to investigate the associations between the sociodemographic characteristics of the referred patients and the type of referral.

PATIENTS AND METHODS

Study design

A cross-sectional study was conducted in five FHCs in Erbil City from October 1st 2024 to September 1st 2025. Five FHCs were Azadi, Shahid, Nazdar Bamarni, Mala-Afandee, and Brayaty. In this regard, the patients who attended the above-mentioned FHCs and were referred to the tertiary hospital for any reason were interviewed consecutively in this study. The patients who attended these FHCs had different socio-demographic characteristics in terms of age, gender, religion, residency, and other general and medical aspects.

Settings

The FHCs included in this study serve areas with diverse socio-demographic characteristics. Although established primarily for urban and suburban populations, they also provide services to rural residents. These centers offer diagnostic, therapeutic, and consultation services to patients of all ages, from newborns to the elderly. Services provided include family planning, laboratory tests, X-ray and ultrasound imaging, and vaccinations. Patients are often referred to tertiary centers by family physicians or upon patient request. Most centers are operated by family physicians and include specialists such as obstetricians, ENT specialists, internists, pediatricians, and nurses. Whenever there is a shortage of medications or a limitation in diagnostics, the patients who cannot be treated in the FHCs are referred to the tertiary hospitals. The presence of some specialists within FHCs does not change the fact that most centers still do not have the required facilities to properly diagnose or treat complex cases.

Sample size calculation

A specific formula was used to calculate the sample size: $n = [z^2 p (1 - p)] / e^2$, where



n refers to how many participants are going to be involved in the study, z is the 95% confidence level, p is the 30% expected prevalence, and e is the 0.05 margin of error. The researcher, to make up for possible non-responses, planned to have 400 participants in total. Every patient who was referred from the chosen centers to the different secondary care facilities, regardless of whether he/she was referred or self-requested, was included in the study. The study was based on purposive sampling to get the participants.

The inclusion and exclusion criteria

In this study, the main criterion for selection was the participant's readiness to take part in the research. People who came to the FHCs for pregnancy antenatal care services, hypertension follow-up, diabetes mellitus, and neonatal vaccination were not included. The questionnaire was tested in a pilot study for its clarity and interpretability. Data were gathered through face-to-face interviews.

Data collection

After reviewing the literature, the investigator constructed a questionnaire. This questionnaire consisted of four parts: the first one collected general personal information like age, sex, occupation, education, marital status, and residence. The second part inquired about the kinds and reasons for referrals. The third part concentrated on the department of referral, whereas the fourth part provided information on health problems. The study's data were obtained via a researcher-administered self-report method. The first researcher was the sole

interviewer and recorder of the data in this study.

Statistical analysis

The data were recorded in an Excel 2016 spreadsheet. Data analysis was performed using SPSS version 27. The Kolmogorov-Smirnov test checked if the data followed a normal distribution. The reasons for the referral were determined using descriptive statistics. Categorical variables were analyzed using either the chi-square test or Fisher's exact test. Results with a p-value less than 0.05 were considered statistically significant, and those with a p-value less than 0.001 were considered highly significant.

RESULTS

We included 400 patients from five FHCs in this study. The mean value of the patient's age was 32.21 (SD: 18.18 years). The patients were males (36.3%) and females (63.7%). The patients were from urban (88.3%) and rural (11.8%) areas and were employed (36.8%) and unemployed (63.2%). The patients had different marital statuses and mostly were married (60.5%), followed by single (38.25%). Most of the patients had a primary education level (30.0%), followed by uneducated (24.8%; Table 1). The age distribution was as follows: less than 18 years of age (25%), 18-29 years (17%), 30-39 years (18.3%), 40-49 years (18.3%), 50-59 years (11.5%), and 60-69 years (7%). The group aged 70 years and above accounted for 2.8% (Fig. 1).

Table (1): Sociodemographic characteristics of the patients included from the primary health centers

Characteristics	No (%)
Age Mean (SD)	33.21 (18.18)
Gender	
Male	145 (36.3)
Female	255 (63.7)

Characteristics	No (%)
Residency	
urban	353 (88.3)
rural	47 (11.8)
Occupation	
Employed	147 (36.8)
Unemployed	253 (63.2)
Marital status	
single	153 (38.25)
Married	242 (60.5)
widow	3(0.8)
divorced	2(0.5)
Educational level	
Not educated	99 (24.8)
Primary	120 (30.0)
Intermediate	69 (17.3)
Secondary	51 (12.8)
College degree	61 (15.3)

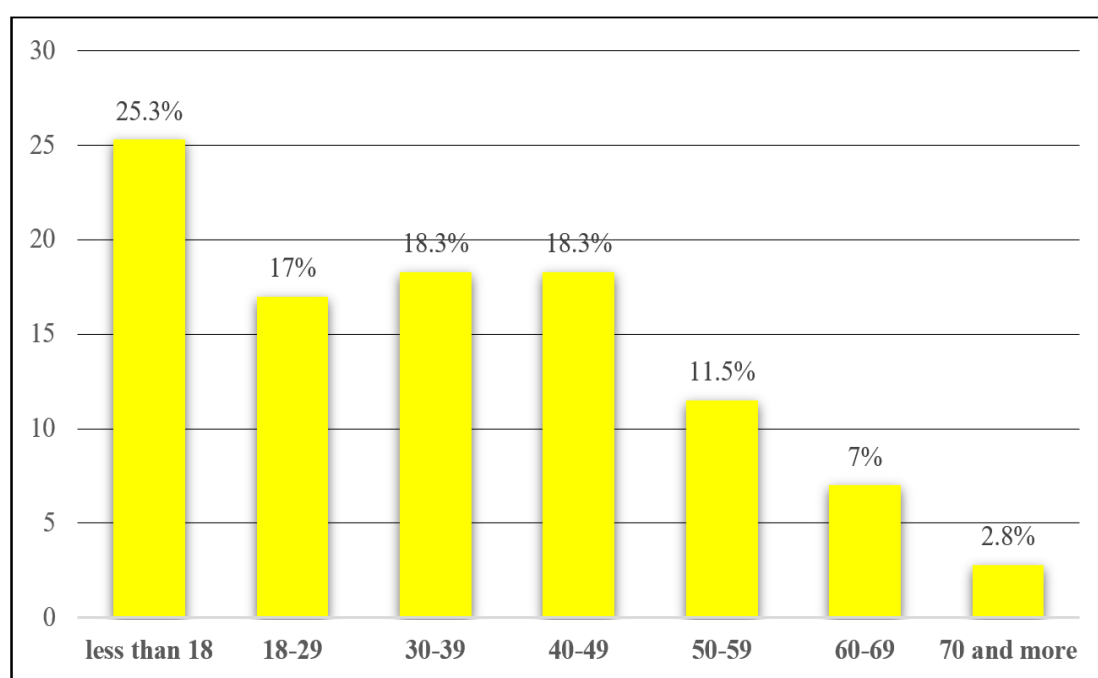


Fig 1: The distribution of the included patients by age groups

Most of the patients were indicated for referral (65.8%), and the remaining were self-referred (34.2%). The gender variation by type of referral did not show a statistically significant relationship. The p-value of the Chi-square test was 0.941 (Fig. 2). The reasons for referral were a lack of investigation (44%), absence of a specialty in the health center (34.3%), inability to diagnose (13%), and lack of medication (8.8%; Fig. 3).

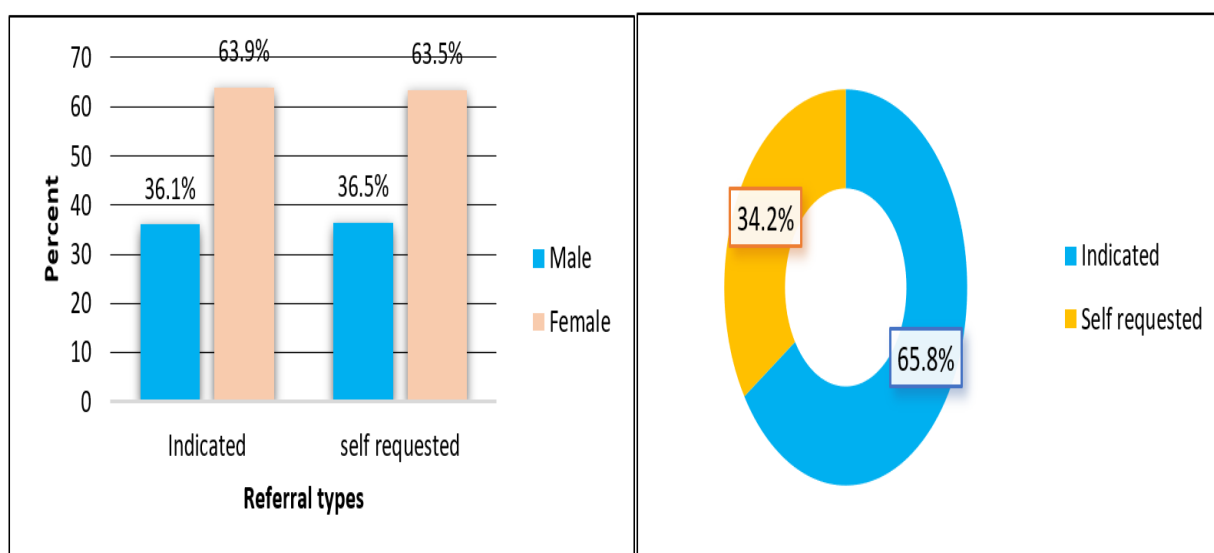


Fig 2: Referral types and gender

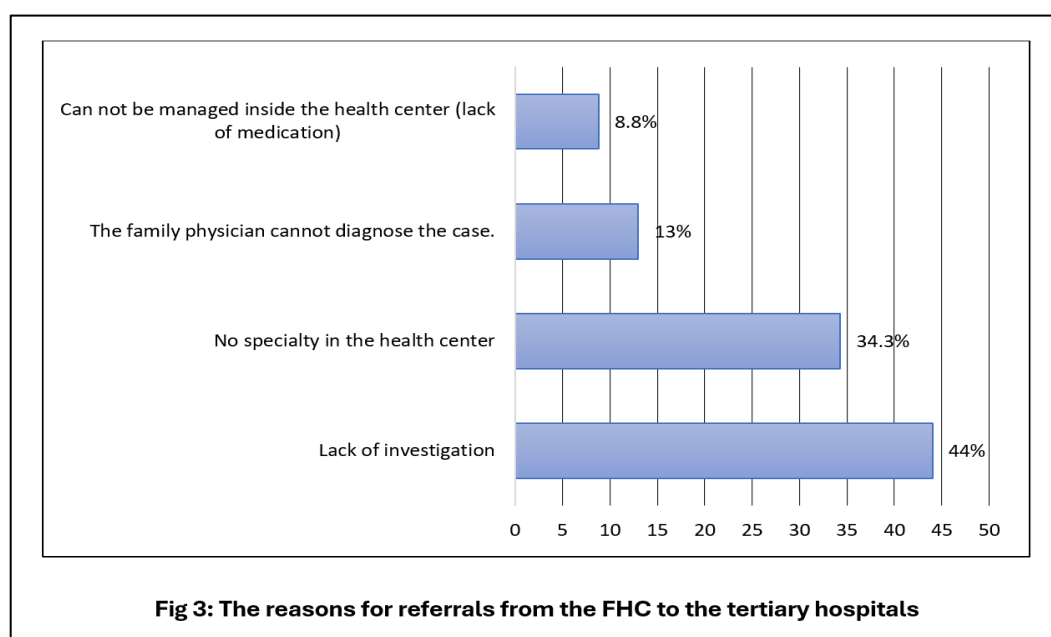


Fig 3: The reasons for referrals from the FHC to the tertiary hospitals

In Table 2, out of 400 patients, 53 (13.3%) were referred due to ENT problems, 11% were indicated, and 17.5% were self-requested. Musculoskeletal complaints were common among 12.3%, with self-requested cases being higher (13%) than indicated cases (11%). Those referred due to skin problems were 11.8%, with the indicated versus not indicated cases being 13% vs 8%. The total cases of abdominal pain that were referred were 9.8%, and 12.4% were self-requested. In

terms of the medical departments, the patients were referred to internal medicine (13.5%), ENT (13.8%), dermatology (11.8%), and obstetrics and gynecology (10.3%). The pediatric and orthopedic services showed the same proportions (8.8%). The lowest proportion was in the dentistry department (4%; Table 2), and Table 3 shows association of referral types with chief complainants and medical departments

Table (2): Referrals by chief complainants and departments.

Referral types no (%)				
Characteristics (n=400)	Indicated (n=263)	Self-request (n=137)	Total (n=400)	p
Chief complaints				
Vomiting and diarrhea	10 (3.8)	3 (2.2)	13 (3.3)	0.031
Headache	14 (5.3)	7 (5.1)	21 (5.3)	
Musculoskeletal complaint	30 (11.4)	19 (13.9)	49 (12.3)	
Fracture due to trauma	6 (2.3)	2 (1.5)	8 (2)	
Urinary symptoms	18 (6.8)	11 (8)	29 (7.2)	
ENT problems	29 (11)	24 (17.5)	53 (13.3)	
Eye problems	15 (5.7)	5 (3.6)	20 (5)	
Jaundice	3 (1.1)	1 (0.7)	4 (1)	
Abdominal pain	22 (8.4)	17 (12.4)	39 (9.8)	
Mass	16 (6.1)	5 (3.6)	21 (5.3)	
Chest pain	8 (3)	6 (4.4)	14 (3.5)	
Teeth problems	11 (4.2)	5 (3.6)	16 (4)	
Gynecological problems	29 (11)	11 (8)	40 (10)	
Skin	36 (13.7)	11 (8)	47 (11.8)	
Fever	7 (2.7)	6 (4.4)	13 (3.3)	
Cough	9 (3.4)	4 (2.9)	13 (3.3)	
Departments				
Pediatric		8 (5.8)	35 (8.8)	0.021
Internal medicine	27 (10.3)	25 (18.2)	54 (13.5)	
Surgery	29 (11)	11 (8)	37 (9.3)	
ENT	26 (9.9)	24 (17.5)	55 (13.8)	
Dermatology	31 (11.8)	11 (8)	47 (11.8)	
Ophthalmology	36 (13.7)	5 (3.6)	20 (5)	
Obstetrics and gynecology	15 (5.7)	12 (8.8)	41 (10.3)	
Orthopedics	29 (11)	9 (6.6)	35 (8.8)	
Dentistry	26 (9.9)	5 (3.6)	16 (4)	
Rheumatology	11 (4.2)	12 (8.8)	21 (5.3)	
Urology	9 (3.4)	11 (8)	25 (6.3)	
Neurology	14 (5.3)	4 (2.9)	14 (3.5)	
	10 (3.8)			

Table (3): Association of referral types with chief complainants and medical departments

Characteristics (n=400)	Referral types no (%)			p
	Indicated (n=263)	Self-request (n=137)	Total (n=400)	
Chief complaints				
Vomiting and diarrhea	10 (3.8)	3 (2.2)	13 (3.3)	0.031
Headache	14 (5.3)	7 (5.1)	21 (5.3)	
Musculoskeletal complaint	30 (11.4)	19 (13.9)	49 (12.3)	
Fracture due to trauma	6 (2.3)	2 (1.5)	8 (2)	
Urinary symptoms	18 (6.8)	11 (8)	29 (7.2)	
ENT problems	29 (11)	24 (17.5)	53 (13.3)	
Eye problems	15 (5.7)	5 (3.6)	20 (5)	
Jaundice	3 (1.1)	1 (0.7)	4 (1)	
Abdominal pain	22 (8.4)	17 (12.4)	39 (9.8)	
Mass	16 (6.1)	5 (3.6)	21 (5.3)	
Chest pain	8 (3)	6 (4.4)	14 (3.5)	
Teeth problems	11 (4.2)	5 (3.6)	16 (4)	
Gynecological problems	29 (11)	11 (8)	40 (10)	
Skin	36 (13.7)	11 (8)	47 (11.8)	
Fever	7 (2.7)	6 (4.4)	13 (3.3)	
Cough	9 (3.4)	4 (2.9)	13 (3.3)	
Departments				
Pediatric	27 (10.3)	8 (5.8)	35 (8.8)	0.021
Internal medicine	29 (11)	25 (18.2)	54 (13.5)	
Surgery	26 (9.9)	11 (8)	37 (9.3)	
ENT	31 (11.8)	24 (17.5)	55 (13.8)	
Dermatology	36 (13.7)	11 (8)	47 (11.8)	
Ophthalmology	15 (5.7)	5 (3.6)	20 (5)	
Obstetrics and gynecology	29 (11)	12 (8.8)	41 (10.3)	
Orthopedics	26 (9.9)	9 (6.6)	35 (8.8)	
Dentistry	11 (4.2)	5 (3.6)	16 (4)	
Rheumatology	9 (3.4)	12 (8.8)	21 (5.3)	
Urology	14 (5.3)	11 (8)	25 (6.3)	
Neurology	10 (3.8)	4 (2.9)	14 (3.5)	

The reasons for referrals in the indicated group were a lack of investigations in 42.6% and in the self-requested group (46.7%). The absence of the required specialty was about 34% in both groups. The lack of medication was one of the indicated causes in the first group (10%), and it was self-requested in only 5% (Fig. 4).

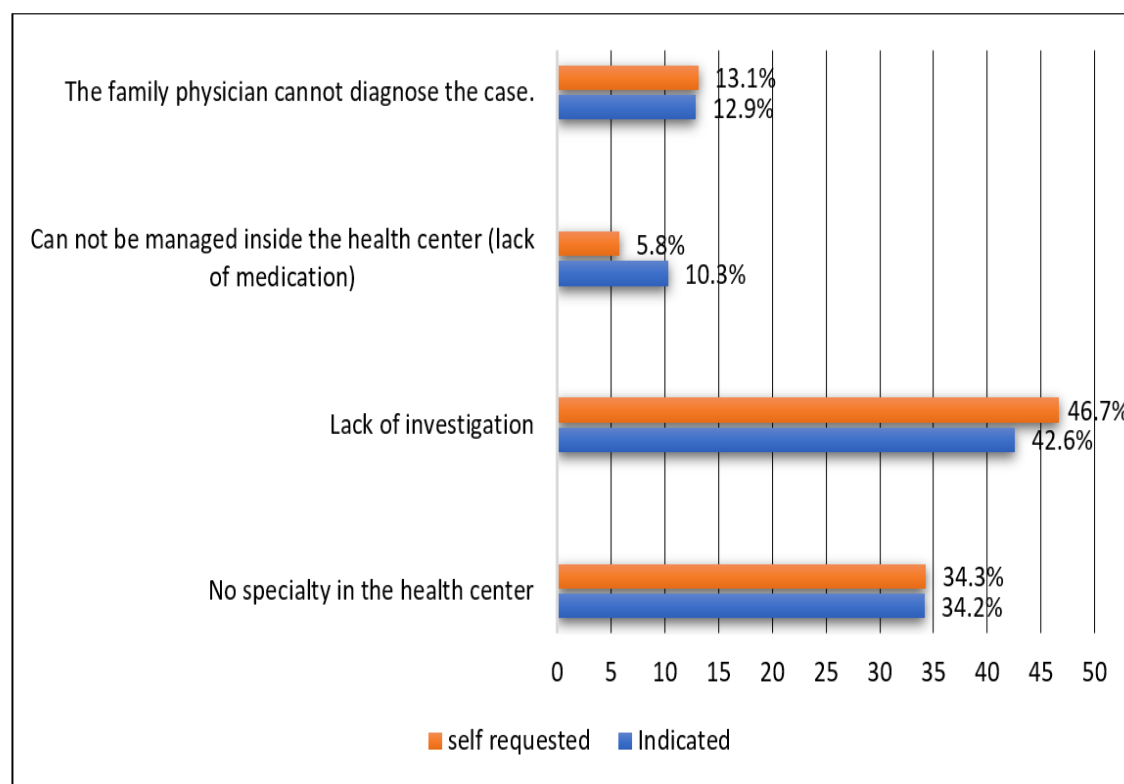


Figure 4: Reasons of referral by types of referrals

DISCUSSION

This study showed that most of the patients were indicated for referral (65.8%), and the remaining were self-requesting for referral (34.2%). The reasons for referral were a lack of investigation (44%), absence of a specialty in the health center (34.3%), inability to diagnose (13%), and lack of medication (8.8%).

The Iraqi healthcare system uses a family doctor and referral system in PHCs. This system was created to ensure people get services under the supervision of a family doctor and follow specific pathways. However, there are problems, such as patients referring themselves directly to specialists, which have not been well studied. (8) In a recent study, 34.2% of patients went to family clinics not for

a consultation but to get a referral for specialist services, which is considered self-requested. About 65.8% of patients followed the proper referral process. A similar study in Iraqi Kurdistan found that 38.4% of patients also requested referrals on their own.(8) A study in Iran reported a higher rate of self-referral (41.1%) and a lower rate of adherence to family physicians' referrals (58.9%), which differs from the findings of the present study. The healthcare system, to function effectively, requires good adherence to the referral system.(9)

The sociodemographic factors that predict referral were studied in the current study. The results showed no gender variation in requesting a referral, although a higher proportion of females (63.5%) requested self-referral compared to males (36.5%). This

finding was inconsistent with a previous study in Iran (9), but it was in line with a recent study in Pakistan, where females formed 61% and males formed 39%.(10)

In the current study, two-thirds of the participants were female, and one-third were male. This could be explained by the fact that women use FHCs more frequently than men. Men's work-related issues may also contribute to the limited use of health facilities by males, as caring is often considered a female task, and there is a lack of services targeting men in FHCs. Generally speaking, men tend to take less care of themselves and expose themselves to higher risks.(11)

In terms of age, a study in India revealed that 60% of the referred patients were in the 30-60-year age group.(12) About half of the clients in the current study were in the same age group. In this region of the world, anyone can access healthcare facilities, regardless of existing planning in the healthcare system. Typically, patients are seen in outpatient clinics inside hospitals for minor issues that family physicians can treat.

The reasons for referrals in this study were a lack of investigation in 44%, absence of a specialty in the health center in 34.3%, inability to diagnose in 13%, and lack of medication in 8.8%. This finding was in line with a study conducted in Bangladesh (13), where the reasons for referrals were a lack of expert physicians in 31.27%, inadequate treatment in 47.2%, and inadequate facilities in 53.09%. The health system in developing countries faces similar challenges. This disposition towards self-referral might strain the limited resources available at the health facilities inside Erbil City.

In the current study, the referral rates were 13.5% to internal medicine, 13.8% to ENT, 11.8% to dermatology, and 10.3% to obstetrics and gynecology. Pediatric and orthopedic services showed the same rate at 8.8%. A higher referral rate to internal medicine (46.83%) was reported in a

Bangladesh study. The most frequently referred specialty in a recent Saudi study was internal medicine (20.4%), followed by obstetrics and gynecology (16.8%), orthopedics (13%), general surgery (11.1%), and dermatology clinic (10.1%). (14) An analysis of referrals from healthcare centers in Ankara (Turkey) revealed that 3.9% were for abdominal pain, 3.9% for vomiting, and 1.7% for fever.(15) The abdominal pain was the chief complaint in 9.8% of referrals in the present study, the vomiting rate was 3.3%, and the fever rate was 3.3%. Self-requested referrals in the current study were not associated directly with respondents' socio-demographic characteristics. This finding was consistent with a previous study.(8)

In the Kurdistan region of Iraq, a survey was carried out with the aim of identifying the impact of socioeconomic, demographic, and cultural factors on the utilization of primary healthcare services. The results indicated that patients favor hospitals mainly due to better access to specialists, a wider range of medications, and laboratory tests. (16). Furthermore, physicians' prescriptions for referrals are often not easy to come by. Better healthcare services and greater public health awareness would be some of the measures that they might consider in their efforts to reduce patient referrals. (8) The improvement of existing referral systems would require the strengthening of primary care through the imposition of stringent rules as well as the incorporation of innovations.(17)

The examination of primary care to secondary care referrals in Rio de Janeiro showed that the pattern of referrals in primary health care clinics was different between family doctors as compared to general practitioners. Family doctors, when present in consultations, made referrals 50% less than the other doctors. (18) The current research found that the rate of referrals stayed constant with preceding studies in Erbil City. (7, 8) Despite the fact that the Ministry of Health has made a

number of improvements through the introduction of family medicine, the rate of self-referred patients remains high.

This research represents the initial evaluation of the family centers' referral system since its inception. Nevertheless, the reasons for referrals were not included in the study, like issues with human resources, limitations of the infrastructure, and lack of equipment.

CONCLUSIONS AND RECOMMENDATIONS

The investigation conducted in Erbil City found that a considerable number of people affected by illnesses directly visit the specialized hospitals, bypassing the family care centers. The healthcare system's referral policy needs to be enhanced to limit unnecessary hospital visits. The patients usually opt for self-referral, believing that the family care centers do not have the necessary tests conducted and specialists available. This practice not only leads to the hospitals being overloaded but also delays patients with serious conditions from getting the needed care in time. Consequently, the healthcare system must work on establishing an efficient referral system and upgrading FHCs by putting in place specialists in the most required areas like internal medicine, obstetrics, gynecology, and ENT. Moreover, family doctors should make the community and policy makers aware of the problems and points of concern, as this would help in the formulation of better healthcare policies through the medium of policy makers.

ACKNOWLEDGMENT

We would like to present our deep thanks to the administration of the family health centers. Undoubtedly, without their cooperation, it was not possible to perform this study.

Funding

No funding was received for this study.

Conflicts of interest

The authors do not declare any conflicts of interest.

Ethical approval

The protocol of this study was approved by the Medical Ethics Committee, College of Medicine, Hawler Medical University, in meeting number 3, paper code number 4 on 4 December 2024. The investigator invited patients to participate in the study, ensuring confidentiality. We obtained the verbal consents before including them in the study.

REFERENCES

1. Abraham O, Linnander E, Mohammed H, Fetene N, Bradley E. A patient-centered understanding of the referral system in Ethiopian primary health care units. *PloS one*. 2015 10(10):e0139024.
2. Legodi TL, Wolvaardt JE. A blank page: Feedback from first referral hospitals to primary health care clinics. *South African Family Practice*. 2015 57(4):282-85.
3. World Health Organization. High-value referrals: learning from challenges and opportunities of the COVID-19 pandemic: concept paper. High-value referrals: learning from challenges and opportunities of the COVID-19 pandemic: concept paper. 2023.
4. Omole VN, Mora AT, Yunusa IU, Audu O, Jatau AI, Gobir AA. Knowledge, attitude, and perception of the referral system among tertiary health-care workers in Kaduna metropolis, Nigeria. *Int J Med Sci Public Health*. 2017 6:1481-9.
5. Harahap NC, Handayani PW, Hidayanto AN. Barriers and technologies of maternal and neonatal referral system in developing countries: a narrative review. *Informatics in Medicine Unlocked*. 2019 15:100184.
6. Shabila NP, Al-Tawil NG, Tahir R, Shwani FH, Saleh AM, Al-Hadithi TS. Iraqi health system in Kurdistan region: medical professionals' perspectives on challenges and

priorities for improvement. *Conflict and Health*. 2010 4:1-6.

7. Shabila NP, Al-Tawil NG. Assessment of referral characteristics of a sample of patients attending the secondary care units at Erbil teaching hospital. *The N Iraqi J Med*. 2011 72(2):70-6.

8. Shabila NP, Al-Tawil NG, Al-Hadithi TS, Sondorp E, Vaughan K. Iraqi primary care system in Kurdistan region: providers' perspectives on problems and opportunities for improvement. *BMC international health and human rights*. 2012 12:1-9.

9. Sokhanvar M, KABIR MJ, Bevrani H, Nosratnejad S, Janati A, Hasanpoor E. Family physician and referral system adherence in Iranian primary healthcare system. *Family Medicine & Primary Care Review*. 2020 22(2).

10. Kakakhel SI, Mahmood H, Khan J, Makey G, Arif M, Jamil S, et al. Assessment of Referral Patterns and Utilization of Basic Health Facilities in the Outpatient Department of a Tertiary Care Hospital: A Cross Sectional Study: Referral Patterns and Utilization of Basic Health Facilities. *Pakistan Journal of Health Sciences*. 2023:42-46.

11. Ab Aziz MZ, Tengku Ismail TA, Ibrahim MI, Yaacob NM, Mohd Said Z. Experiences and expectations of the characteristics of friendly primary health services from the perspective of men: A phenomenological qualitative study. *International Journal of Environmental Research and Public Health*. 2022 19(19):12428.

12. Keertish N, Sathyanarayana M, Kumar BH, Singh N, Udagave K. Pattern of

psychiatric referrals in a tertiary care teaching hospital in southern India. *Journal of clinical and diagnostic research: JCDR*. 2013 7(8):1689.

13. Hasan MJ, Rafi MA, Nishat NH, Islam I, Afrin N, Ghosh B, et al. Patient self-referral patterns in a developing country: characteristics, prevalence, and predictors. *BMC Health Services Research*. 2024 24(1):651.

14. Algain S, Alsuwaidan M, Alsuwaidan S, Al-Deaji F. Evaluation of referrals from cluster 1 accredited primary healthcare centers to secondary hospitals in Saudi Arabia. *J Comm Med and Pub Health Rep*. 2022 3(04).

15. Bala ED, Kalafat AFB, Sari E, San I, Kalafat UM, Tapkan RB, et al. An Analysis of Referrals Done by Primary Care Centers to Tertiary Care Institutions. *Cureus*. 2024 16(6).

16. Mahmood KA, Saleh AM. Barriers and facilitators influencing access to and utilization of primary healthcare services in Kurdistan-region, Iraq: a cross-sectional study. *Annals of Medicine and Surgery*. 2023 85(7):3409-17.

17. Gupta AK, Talati S, Bhattacharya S, Singh A. Health system strengthening-focusing on referrals: an analysis from India. *JOJ Nurs Health Care*. 2017 2(4):1-3.

18. Jantsch AG, Burström B, Nilsson GH, de Leon AP. Residency training in family medicine and its impact on coordination and continuity of care: an analysis of referrals to secondary care in Rio de Janeiro. *BMJ open*. 2022 12(2):e051515.