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Research Article

A RURAL-URBAN COMPARISON OF PERFORMANCE-BASED PRIMARY HEALTH CARE SERVICES IN ERZURUM

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Abstract: *Family physicians in Turkey apply to the provincial health directorate every month with performance exception forms reporting the performance-linked preventive health services they could not provide to avoid penalty deductions from their monthly pay. This form is a good tool for evaluating the reasons that preventive health care cannot be provided. The aim of this study was to examine rural-urban differences in performance-based service data and evaluate the reasons physicians are unable to provide service. We retrospectively evaluated 4187 performance exception forms sent to the provincial health directorate by family physicians between 2019 and 2021. The preventive health service not provided, the reason specified by the family physician, the year, and whether the setting was rural or urban were noted. Categorical data were summarized as frequency and percentage, numerical data as mean and standard deviation or median and range. The chi-square test and Mann-Whitney U test were used to compare the data. Between 2019 and 2021, there were 2553 applications from urban areas and 1634 applications from rural areas. There were significantly fewer applications from rural areas. During this period, disruptions in immunization services were most frequent (61.1%), with a significantly greater frequency in urban (65.5%) than rural (54.3%) settings. Nearly one-third of service disruptions were attributed to migration out of the family physician's service area. The most common reason reported for immunization service disruption was vaccine refusal (47.6%). Vaccine refusal and migration were identified as the main barriers to the provision of preventive health services. Although the global struggle against vaccine rejection continues, national legislative changes should be implemented to prevent a simple factor such as migration from interrupting health services in our country.*

Keywords*: family practice, immunization, incentive reimbursement, preventive health services, primary health care*

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1. Introduction

Effective provision of primary health care (PHC) is among the priorities of a country [1, 2]. The family practice model is one of the most frequently employed service delivery models for this purpose. However, there are international differences in the implementation and remuneration methods used in this model.

In Turkey, public health services such as environmental health services and infectious disease tracking have been carried out by community health centers since 2010. Personalized services are provided by general practitioners and family medicine specialists, called family physicians (FP), using a list-based approach. Infant-child, pregnant, and puerperant follow-ups, immunization and other preventive health services, primary care diagnosis, and treatment services are provided by FPs within the PHC. A composite method was adopted in the remuneration of family physicians. Compensation is determined according to several components, including the number of people, performance-based (PBS) services, the level of socioeconomic development in the area, expenses of the family health center, and mobile health service. Vaccines in the extended immunization program, antenatal follow-up, and infant/child follow-up were included in performance-based pay. In addition, mobile services were defined for areas without nearby health centers. These practices facilitated access to health services and aimed to ensure these services were not neglected [3, 4].

Despite these efforts, however, service disruptions sometimes occur. If the service is based to performance, the disruption will result in a penalty deduction from the family physician's pay. In such a case, the family physician submits a performance exception form each month explaining the reasons for the disruption to the health directorate. These applications are evaluated by a commission. If accepted, no deduction is made from the physician's pay.

This method of preventing deductions from performance-based compensation is one of the unique features of the family medicine model applied in our country. These exception forms also enable the identification of barriers to the provision of preventive health care services. However, there is no previous study examining these forms in the literature.

The aim of the present study was to investigate rural-urban differences in performance-based PHC service data in the Erzurum province in the Northeast Anatolia Region of Turkey and to evaluate the reasons for the inability to provide these services.

2. Materials and Methods

This retrospective cross-sectional study included 4 187 performance exception forms submitted by FPs to the Erzurum Provincial Health Directorate as a basis for performance-based compensation in the years 2019 through 2021.

The study was approved by the Clinical Research Ethics Committee of the Erzurum Regional Training and Research Hospital on 18.04.2022 (Erzurum BEAH KAEK 2022/05-44). The study was conducted in accordance with the principles of the Declaration of Helsinki.

2.1. Study setting

The Erzurum province is in the northeast of Turkey. According to the socio-economic development index, it ranks 61st among 81 provinces [5]. It has a surface area of 25,006 km², making it the fourth-largest province in Turkey in terms of area [6]. According to data from the General Directorate of Meteorology, it is also one of the coldest provinces in Turkey, with an average annual temperature of 5.7°C [7]. Rural areas are difficult to access because of snow in the winter months, rely on coal for domestic heating, and are less preferred by FPs. Therefore, starker rural-urban differences are expected in the province. Of the 20 districts within the province, the 3 central districts (Yakutiye, Palandoken, Aziziye) are in the first or third development tier, while the 17 peripherally located districts (the most remote district is 180 km from the center) either have smaller populations or a lower development level [8]. According to 2021 data, the literacy rates were 97.57% among the population living in the 3 urban districts and 92.47% among those in the 17 rural districts [9]. Selected characteristics of Turkey and the Erzurum are presented in Table 1.

Table 1. Comparison of selected characteristics of Turkey and Erzurum, 2019–2021 [9, 22-24].

Variable	Turkey			Erzurum		
	2019	2020	2021	2019	2020	2021
Population (n)	83 154 997	83 614 362	84 680 273	762 062	758 279	756 893
Female population (%)	49.8	49.9	49.9	50.1	50.1	50.1
Proportion of females aged 15–49 years (%)	25.9	25.8	25.8	26.5	26.3	26.4
Proportion of population aged 0–14 (%)	23.1	22.8	22.4	25.6	25.3	24.8
Older population (%)	9.1	9.5	9.7	8.7	9.1	9.4
Population growth rate (‰)	13.9	5.5	12.7	-7.6	-4.9	-1.8
Crude birth rate (‰)	14.4	13.3	12.8	19.9	15.8	15.2
Total fertility rate (n of children)	1.9	1.8	1.7	2.1	2.0	1.95
Number of live births (n)	1 183 652	1 112 859	1 079 842	12 929	12 029	11 510
Infant mortality rate (‰)	9.0	8.5	9.1	9.7	10.1	11.2
Mortality rate in children under 5 years of age (‰)	11.1	10.6	11.1	11.9	12.1	13.6
BCG vaccination coverage among infants (%)	96	96	95	99	99	99
MMR vaccination coverage among infants (%)	97	95	96	98	98	99
HBV-3 vaccination coverage among infants (%)	99	98	96	99	99	99
Maternal mortality rate (per 100,000)	13.1	13.1	13.1	15.4	8.3	8.3
Illiteracy rate among population over 15 years old (%)	3.1	2.9	2.8	5.9	5.6	5.3
Number of family physicians (n)	26 476	26 594	25 611	274	271	272
Average population per family physician (n)	3 141	3 144	3 306	2 781	2 798	2 783

BCG: Bacillus Calmette-Guerin, MMR: Measles, mumps, rubella, HBV: Hepatitis B virus

2.2. Family medicine practice

The family practice model in Turkey has been explained in detail in numerous publications [1, 3, 4, 10, 11]. All health services are overseen by the Ministry of Health (MoH), resulting in uniform practices nationwide. Provincial health directorates are responsible for ensuring that services are provided as instructed by the MoH [3, 4, 11].

The compensation received by FPs is dependent on several variables [12]:

i) Main payment based on the number of persons registered to the physician and the characteristics of these people.

ii) Penalty deduction in case of failure to provide appropriate preventive health services (follow-up and immunization) for priority groups with different coefficients (PBSs);

iii) Additional pay according to the socioeconomic development index of the district where they work;

iv) Reimbursement of costs associated with the operation of the family health center (FHC); and

v) Reimbursement of mobile health care expenses, if applicable.

The FP's compensation is determined from the sum of these variables. Among those registered to a physician, pregnant people, prisoners and convicts, children aged 0-59 months, and adults over 65 years of age are multiplied by a higher coefficient when included in this total. Follow-up and immunization with vaccines included in the extended immunization program offered to this priority

group are included in performance-based compensation. The objective is complete or near-complete provision of these services, or reductions are made from the FP's pay. FPs can see whether there is a failure to provide services in the family medicine information system and MoH system. Each month, they explain the reasons for this failure to the performance exception commission in the provincial health directorate and object to the pay deduction. A form structured by the Ministry is used to file for exceptions. The commission evaluates whether the documents specified by the Ministry are complete and then evaluates the physician's statement. If deemed to be justified, an exception is granted and no deduction is made. If not, the corresponding amount is deducted from the physician's salary [4, 12]. Therefore, performance exception applications are a good source of data on both the areas of deficient preventive health services and the reasons for these deficiencies.

2.3. Data collection

Performance exception forms sent by FPs to the provincial health directorate every month are evaluated by the commission and these documents are retained. In this study, we retrospectively reviewed 4187 forms from 2019, 2020, and 2021 held by the provincial health directorate. There were 277 duplicate applications in 2019, 248 in 2020, 231 in 2021, and 751 in total. From the records, we collected and analyzed data pertaining to:

- the district,
- the family medicine unit,
- the PBS that could not be provided,
- If this service was immunization, the vaccine was not administered,
- the reason for not providing the service, and
- additional statements, if any.

The form used to file for performance exception by the Ministry contains four main headings: i) Antenatal follow-up, ii) Infant follow-up, iii) Child follow-up, and iv) Immunization.

After all applications were evaluated under these four main headings, any information provided by the physicians in additional statements was also noted. We also classified these explanations under general headings as follows: no-shows, vaccine refusal, late detection of pregnancy, migration, refusal of follow-up, service provided outside the performance dates, system error, and medical indication.

2.4. Definitions

No-shows: This category included all cases in which the family/person did not present to the FHC despite the FP informing them about the follow-up or vaccination.

Vaccine refusal: Cases where the family of an infant/child did not consent to the administration of vaccines in the extended immunization program. In such cases, the parent signs a form stating that they refuse the vaccine.

Late detection of pregnancy: At least 4 antenatal follow-up visits are mandatory in primary care. If pregnancy is not detected within the first 12 weeks, the first antenatal follow-up cannot be performed. This was among the reasons cited for the inability to perform the first antenatal follow-up.

Migration: The service could not be provided because the registered person moved out of the service area of the FP or was not present in the service area (e.g., was on vacation) when the follow-up/vaccination was required.

Refusal of follow-up: There may be situations where the person does not consent to antenatal or infant/child follow-up. In this case, the pregnant person or parents of the infant/child sign a form stating that they refuse follow-up.

Service provided outside the performance dates: All follow-up and vaccine administration times are determined by software (as a date range) according to the person's birthdate or the date of the last

menstrual period if pregnant. If a service was provided before or after this date range, it was included under this heading. Possible reasons for this include the measles vaccine being administered after contact with a measles patient, the tetanus vaccine being administered after a contaminated injury, or vaccination having to be delayed due to medical problems.

System error: Although health records software is used by both FPs (the Family Practice Information System) and the MoH (National Health System), differences may arise in the software of these two parties. For this reason, despite the FP having performed follow-up or immunization, it may appear in the Ministry system as if it has not been performed. Although very rare, sometimes even if the physician sends a record of the procedure to the Ministry's information systems through the data management system they use, a disruption in data transmission between the systems may occur. Such disputes were grouped under this heading.

Medical indication: This category includes cases where the general health of the infant/child precluded vaccination. This may also include acute diseases or hospitalizations. As pregnant women receiving inpatient treatment due to the threat of preterm birth cannot undergo antenatal follow-up by the FP, these instances are included under this heading.

Urban: The three districts in the center of the province (Yakutiye, Palandoken, and Aziziye) were regarded as "urban" because they are in the first or third development tier [8].

Rural: The 17 peripheral districts were considered "rural" because they have a smaller population (328,591) and lower development level (5 or 6), and are also regarded as rural in public service provision [8].

Mobile health services: Health services are provided by the FP in the community by going to locations such as towns, villages, hamlets, and remote settlements. In the Erzurum, FPs provided mobile health services to 157 795 people in 2021, 163 911 people in 2020, and 171 314 people in 2019 living in locations that are difficult to reach and are not located in the province/district center. A total of 27 FPs serving urban areas and 119 FPs in rural areas are obligated to provide mobile services.

2.5. Statistical analysis

All analyses were performed using SPSS Statistics version 20.0 (IBM Corp, http://www.spss.com). Categorical variables were summarized as frequency and percentage; numerical variables as mean and standard deviation or median and range. Categorical data were compared using the Chi-square Goodness of Fit Test, Chi-square test, followed by post-hoc Bonferroni correction. Mann-Whitney U test was used to compare the number of applications filed in rural and urban areas. A p-value <0.05 was considered statistically significant.

Ethical statement

The study was approved by the Clinical Research Ethics Committee of the Erzurum Regional Training and Research Hospital on 18.04.2022 (Erzurum BEAH KAEK 2022/05-44). Owing to the retrospective nature of the study, the need for informed consent was waived. The study was conducted in accordance with the principles of the Declaration of Helsinki.

3. Results

A total of 4 187 performance exception forms submitted in the years 2019–2021 were evaluated. During this period, there were 2 553 applications from 147 units serving the urban center. The mean number of applications per unit was 17.4±1.6 (median, 12; range, 0-162). In the same period, there were a total of 1634 applications from rural areas. As there are 127 units serving rural areas, the mean number of applications per unit in these three years was 12.9±1.1 (median, 9; range, 0-74). There were significantly fewer applications from rural areas ($p=0.015$). However there was no statistically significant difference between the number of applications by years ($p>0.05$).

Table 2 shows the distribution of performance exception requests by year. In all three years, immunization-related service disruptions in urban areas significantly outnumbered those in rural areas ($p<0.001$). In addition, there were significantly more disruptions in infant follow-up in rural areas during 2021 ($p<0.001$).

Table 2. Distribution of health services reported in performance exception applications by year in Erzurum, 2019–2021.

		Antenatal Follow-up	Infant Follow-up	Child Follow-up	Immunization	Total	p*
2019	Rural n (%†)	117 (22.7)	62 (12.0)	111 (21.6)	225 (43.7)	515 (100)	<0.001
	Urban n (%†)	128 (15.8)	56 (6.9)	169 (20.9)	457 (56.4)**	810 (100)	
	Total n (%†)	245 (18.5)	118 (8.9)	280 (21.1)	682 (51.5)	1325(100)	
2020	Rural n (%†)	93 (15.9)	65 (11.1)	90 (15.4)	336 (57.5)	584 (100)	<0.001
	Urban n (%†)	101 (11.6)	61 (7.0)	131 (15.1)	575 (66.2)**	868 (100)	
	Total n (%†)	194 (13.4)	126 (8.7)	221 (15.2)	911 (62.7)	1452(100)	
2021	Rural n (%†)	71 (13.3)	74 (13.8)**	64 (12.0)	326 (60.9)	535 (100)	<0.001
	Urban n (%†)	92 (10.5)	33 (3.8)	111 (12.7)	639 (73.0)**	875 (100)	
	Total n (%†)	163 (11.6)	107 (7.6)	175 (12.4)	965 (68.4)	1410(100)	
General	Rural n (%†)	281 (17.2)	201 (12.3)	265 (16.2)	887 (54.3)	1634 (100)	<0.001
	Urban n (%†)	321 (12.6)	150 (5.9)	411 (16.1)	1671 (65.5)	2553 (100)	
	Total n (%†)	602 (14.4)	351 (8.4)	676 (16.1)	2558 (61.1)	4187 (100)	

*Chi-square **Statistically significant variable † Raw percentage

Table 3 shows the grounds for performance exception claims related to antenatal follow-up by year. There were problems with at least one follow-up visit of 209 pregnant women in 2019, 165 pregnant women in 2020, and 141 pregnant women in 2021 when considered singular because there was duplicate data in the table. The most common reason cited for the inability to perform antenatal follow-up was migration, which was more frequent in applications from rural areas. Of these, 223 follow-up visits were not performed because the person migrated out of the service area. For 52 missed follow-ups, address information was not available for the pregnant person. Detailed explanations regarding the late detection of pregnancy in particular were as follows: 31 urban and 40 rural follow-ups could not be performed because the FP was not notified of the pregnancy; 17 urban and 16 rural follow-ups were missed because the pregnant person did not present to the FHC; 10 urban and 4 rural follow-ups were not performed because the person did not realize they were pregnant; 2 urban and 1 rural follow-up were for pregnant adolescents; and in 6 urban and 1 rural follow-up, the pregnancy was not detected because either the FP or the pregnant person was new to that unit.

Table 3. Distribution of reasons for performance exception applications related to antenatal follow-up by year in Erzurum, 2019–2021.

Antenatal follow-up	2019		2020		2021		Total
	Urban n (%*)	Rural n (%*)	Urban n (%*)	Rural n (%*)	Urban n (%*)	Rural n (%*)	n (%*)
Preferred a (private/public) hospital	3 (2.3)	1 (0.9)	2 (2.0)	5 (5.4)	1 (1.1)	0	12 (2.0)
No-show	4 (3.1)	2 (1.7)	6 (5.9)	1 (1.1)	5 (5.4)	0	18 (3.0)
Late detection of pregnancy	35 (27.3)	26 (22.2)	20 (19.8)	20 (21.5)	27 (29.3)	20 (28.2)	148 (24.6)
Migration	62 (48.4)	69 (59.0)	42 (41.6)	47 (50.5)	40 (43.5)	37 (52.1)	297 (49.3)
Refusal of follow-up	7 (5.5)	4 (3.4)	3 (3.0)	0	9 (9.8)	4 (5.6)	27 (4.5)
System error	16 (12.5)	15 (12.8)	28 (27.7)	20 (21.5)	9 (9.8)	10 (14.1)	98 (16.3)
Medical indication	1 (0.8)	0	0	0	1 (1.1)	0	2 (0.3)
Total	128(100)	117(100)	101(100)	93 (100)	92 (100)	71 (100)	602 (100)

*Column percentage

Table 4 shows FPs' reasons for claiming performance exceptions for the inability to perform infant follow-up by year. At least one follow-up was missed for 84 infants in 2019, 102 in 2020, and 84 in 2021 when considered singular because there was duplicate data in the table.". Of these, 147 follow-ups were not performed because the infant migrated out of the service area. For 19 missed follow-ups, the physician had no information about the infant's location. Another 43 follow-ups could not be performed because the infant was receiving inpatient treatment and 3 were not performed for different medical reasons.

Table 4. Distribution of reasons for performance exception applications related to infant follow-up by year in Erzurum, 2019–2021.

Infant follow-up	2019		2020		2021		Total
	Urban n (%*)	Rural n (%*)	Urban n (%*)	Rural n (%*)	Urban n (%*)	Rural n (%*)	n (%*)
No-show	1 (1.8)	0	4 (6.6)	5 (7.7)	4 (12.1)	3 (4.1)	17 (4.8)
Migration	24 (42.9)	37 (59.7)	25 (41.0)	31 (47.7)	18 (54.5)	31 (41.9)	166 (47.3)
Refusal of follow-up	13 (23.2)	5 (8.1)	13 (21.3)	2 (3.1)	9 (27.3)	4 (5.4)	46 (13.1)
System error	14 (25.0)	9 (14.5)	14 (23.0)	20 (30.8)	1 (3.0)	18 (24.3)	76 (21.7)
Medical indication	4 (7.1)	11 (17.7)	5 (8.2)	7 (10.8)	1 (3.0)	18 (24.3)	46 (13.1)
Total	56 (100)	62 (100)	61 (100)	65 (100)	33 (100)	74 (100)	351 (100)

*Column percentage

Table 5 shows FPs' reasons for claiming performance exceptions for the inability to perform child follow-up. At least one follow-up was missed for 253 children in 2019, 204 children in 2020, and 160 children in 2021. Of these, 192 follow-ups were not performed because the infant migrated out of the service area. In 137 follow-ups, there was no address information for the child. Nine follow-ups were not performed because the child was receiving inpatient treatment.

Table 5. Distribution of reasons for performance exception applications related to child follow-up by year in Erzurum, 2019–2021.

Child follow-up	2019		2020		2021		Total
	Urban	Rural	Urban	Rural	Urban	Rural	
	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)
No-show	0	0	6 (4.6)	0	1 (0.9)	6 (9.4)	13 (1.9)
Migration	123 (72.8)	85 (76.6)	84 (64.1)	61 (67.8)	77 (69.4)	44 (68.8)	474 (70.1)
Refusal of follow-up	20 (11.8)	6 (5.4)	22 (16.8)	6 (6.7)	16 (14.4)	4 (6.3)	74 (10.9)
System error	26 (15.4)	19 (17.1)	19 (14.5)	19 (21.1)	17 (15.3)	6 (9.4)	106 (15.7)
Medical indication	0	1 (0.9)	0	4 (4.4)	0	4 (6.3)	9 (1.3)
Total	169 (100)	111 (100)	131 (100)	90 (100)	111 (100)	64 (100)	676 (100)

*Column percentage

In the three-year study period, there were problems related to the administration of 519 hepatitis B, 199 BCG, 672 conjugated pneumococcal, 904 diphtheria-tetanus-acellular pertussis-inactive polio-*Haemophilus influenza* (DTaP-IPV/Hib), 507 oral polio, 259 chickenpox, 622 measles-mumps-rubella, 621 hepatitis A, 290 DTaP-IPV, and 313 Td vaccines to 1801 infants and children.

The distribution of reasons for performance exception requests related to immunization by year is shown in Table 6. Vaccine refusal was the most common reason for the inability to immunize and was more frequently reported in applications from urban areas. Of 1,218 vaccine refusals, 979 were reported from urban areas and 239 from rural areas. Reasons given by families refusing vaccination were mistrust of vaccines (n=169) and history of adverse effects after other vaccinations (n=17). No additional explanation was given for the other 959 vaccine refusals. In 67 instances of vaccine refusal, the family presented a medical reason.

Table 6. Distribution of reasons for performance exception applications related to immunization by year in Erzurum, 2019–2021.

Immunization	2019		2020		2021		Total
	Urban	Rural	Urban	Rural	Urban	Rural	
	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)	n (%*)
No-show	1 (0.2)	1 (0.4)	17 (3.0)	4 (1.2)	9 (1.4)	6 (1.8)	38 (1.5)
Vaccine refusal	286 (62.6)	71 (31.6)	309 (53.7)	93 (27.7)	384 (60.1)	75 (23.0)	1218 (47.6)
Migration	83 (18.2)	70 (31.1)	105 (18.3)	97 (28.9)	138 (21.6)	111 (34.0)	604 (23.6)
Administered outside of designated date range	1 (0.2)	5 (2.2)	32 (5.6)	32 (9.5)	24 (3.8)	16 (4.9)	110 (4.3)
System error	56 (12.3)	50 (22.2)	76 (13.2)	83 (24.7)	64 (10.0)	72 (22.1)	401 (15.7)
Medical indication	30 (6.6)	28 (12.4)	36 (6.3)	27 (8.0)	20 (3.1)	46 (14.1)	187 (7.3)
Total	457 (100)	225 (100)	575 (100)	336 (100)	639 (100)	326 (100)	2558 (100)

*Column percentage

In addition, 464 vaccines could not be administered because the infant/child migrated out of the service area. Another 140 infants/children requiring vaccination had no address information. Also, 173 vaccines were not administered in terms of medical indications specified by the physician.

4. Discussion

This study examined the causes of the failure to provide PBS in family medicine practice in Erzurum. We also classified the districts of the province as rural and urban according to population and socioeconomic development index to evaluate whether there was a difference in service delivery. Our results demonstrate urban-rural discrepancies in the provision of preventive services. A greater number of applications for performance exceptions related to immunization were submitted from urban areas in all three years in the study period. In addition, there were significantly more disruptions in the follow-up of infants from rural areas in 2021.

A systematic review published in 2021 evaluated the effects of performance-based compensation in low- and middle-income countries. A few of the studies included in this review suggested that performance-based incentives could encourage healthcare providers to exert more effort to increase demand. The authors of the study conducted in Argentina reported that the timing of receiving antenatal care has been 1.5 weeks earlier with home visits [13]. In our study, we found that 602 antenatal follow-ups could not be performed for a total of 515 different pregnant women, but problems related to pregnancy detection were relatively infrequent. Another factor contributing to this relatively good result is that whenever the ICD diagnostic code of pregnancy is recorded in any health institution, the FP is also notified of this through the national information system. As a result of the mobile health services provided in rural areas, no-shows (defined in this study as people who did not present at all or despite being contacted) remained a less common problem. One of the reasons for the higher number of missed antenatal follow-ups in urban areas is likely the presence of a university hospital staffed by gynecology and obstetrics specialists, as well as a regional training and research hospital in the area. Pregnant women may have preferred to present to these institutions because PHC services do not have a gatekeeper role in our country, and people are free to go to the health institution they want [3]. In fact, it is understood from the additional statements made by the FPs that women prefer public or private hospitals over FHCs. In fact, it is understood from the additional statements made by the family physicians that women prefer public or private hospitals over family health centers. In a 2015 study evaluating the institutions where women received antenatal care, 87% of 242 pregnant women reported that they preferred a tertiary health institution in addition to the family health center, and 39% preferred private hospitals. Only 10% preferred primary family physicians [14]. Similarly, another study conducted in a tertiary hospital in the capital of Turkey showed that women most frequently presented to secondary or tertiary health institutions during pregnancy [15].

It was notable in our study that a large number of people knew they were pregnant but did not present to their FP or share this information with them. A sad finding was that some women do not realize they are pregnant. Unfortunately, adolescent pregnancies are another problem. As it is not legal for people under the age of 18 to marry in our country, such pregnancies are concealed, resulting in the inability to provide antenatal care. Taken together, this information suggests that physician-patient communication is not well established, reproductive health counseling is not effective or well provided, women of childbearing age (15-49 years) who are not included in performance-based compensation are not examined at least twice a year as mandated by the MoH, and women do not have sufficient health literacy to understand that they are pregnant. Considering the number of live births reported for the area (Table 1), the rate of pregnant women with incomplete antenatal care seems low, but it should be kept in mind that this study is only a quantitative evaluation. Given the high maternal and infant mortality rates in the province, it is clear that the quality rather than quantity of PBSs should be evaluated. This finding was also emphasized in a study evaluating the opinions of family physicians in western Turkey. A family physician stated that there were problems in the follow-up and detection of pregnant women, infants, and women aged 15-49 years with the family practice model implemented in our country [16].

List-based service provision leads FPs to ignore the provision of health care to people who are not on their own list. This is one of the main reasons behind the service disruptions in the migration category. In our study, more than one-third of all applications were related to migration. Although half of these applications were a result of migration out of the province, even moving within the province created a barrier to service provision. A study conducted in our country reported that FPs experienced problems in the provision of services to people who were not registered with them and that they did not want to do so [17]. The fact that a simple situation such as migration hinders access to health care shows that this is a pressing issue that must be addressed first.

A systematic review published in 2021 examined the impact of remuneration methods for healthcare professionals providing outpatient health services and determined that performance-based compensation was likely to increase the number of immunization services [18]. While most applications in our study were related to missed immunization services, the fact that the number of vaccine refusals reported in urban areas was three times higher than in rural areas in the three years studied may be a result of providing services near the rural dwellers registered with mobile services. This view is supported by the relatively low numbers of no-shows and families signing vaccine refusal forms in rural areas. Similar observations were also made regarding pregnancy detection and antenatal follow-up. In a Turkish qualitative study based on in-depth interviews, it was stated that the services of midwives working in family medicine can only be provided to those who present to the FHC [19]. The small urban population qualifying for mobile services may have caused these problems. It should also be remembered that in the country, these mobile services are also included in the compensation given to the family physician.

In a study conducted in Turkey in 2020, healthcare professionals reported that the most common reasons for vaccine refusal in the community were mistrust of vaccine contents (84%) and belief the vaccine would cause harm (71%) [20]. Our data support this finding when evaluated within the known cause and shows that our community also expresses vaccine mistrust. A study conducted in Istanbul during the COVID-19 pandemic showed that the number of infant and child examinations decreased despite population growth [21]. In contrast, our results indicate a decline in missed infant/child follow-up. We believe a contributing factor to this finding is that during the COVID-19 pandemic, some hospitals started serving only COVID-19 patients and people were hesitant to go to other hospitals, resulting in a shift to PHC. However, the disruption in immunization services continued to increase over the years. We surmise that increasing vaccine hesitancy had a role in this, as seen in the rest of the world [20].

Study limitations

The main limitation of this study is the lack of a qualitative component. As compensation based on quantitative indicators is preferred in our country at present, we conducted our study within this scope. Although the study did not include data from all provinces of Turkey, similar results can be expected because the family medicine system is implemented uniformly nationwide. However, the reasons cited by the family physicians may vary based on the characteristics of the population they serve. Another limitation is that the two-year period of the study coincided with the COVID-19 pandemic. The pandemic may have affected people's applications.

5. Conclusion

There is a clear difference in the provision of PBSs between rural and urban areas of the Erzurum. The fact that mobile health services are more common in rural than urban areas is likely one of the factors contributing to the numerical success achieved and increasing the accessibility of PHC. However, problems persist on issues such as immunization, which requires more intense effort from both physicians and the global community.

It is discouraging that service disruptions caused by migration constituted a substantial proportion of all applications, considering that this problem is easier to address and can be prevented. In the current system, it is not obligatory for people to register where they migrate, and FPs are not obligated to provide service to unregistered people. This leads to disruptions in the provision of PHC services and poses a threat to public health.

Considering the high infant and maternal mortality in the province and the deficiencies in follow-ups, policies should be developed to increase the quality and quantity of follow-ups. Also, public health literacy should be improved to increase public participation.

Ethical statement

The study was approved by the Clinical Research Ethics Committee of the Erzurum Regional Training and Research Hospital on 18.04.2022 (Erzurum BEAH KAEK 2022/05-44). Owing to the retrospective nature of the study, the need for informed consent was waived. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Acknowledgment

There is nothing to declare in this section.

Conflict of Interest

The authors declare that there are no conflicts of interest.

Authors' Contributions:

EFK, OT, BI conceptualized the study (33%).
EFK, OT collected the data (50%).
EFK, OK analyzed the data (50%).
EFK, OT, BI drafted the initial manuscript (33%).
EFK, OT, BI, OK, GB reviewed the manuscript, approved the final manuscript, and agreed to be accountable for all aspects of the work (20%).

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