

The Effect of Family Medicine Implementation on Primary Health Care Services: Northeast Anatolia Region Evaluation

 Hasan Bağcı¹,  Memet Taşkın Egici²,  Dilek Öztaş³,  Mehmet Ziya Gençer⁴,
 Gözde Nizamoğlu Mercan⁵

¹Department of Healthcare Management, Yüksek İhtisas University, Faculty of Health Science, Ankara, Turkey

²Department of Family Medicine, University of Health Sciences Turkey, Hamidiye Faculty of Medicine, Haydarpaşa Numune Health Application and Research Center, İstanbul, Turkey

³Department of Public Health, Ankara Yıldırım Beyazıt University, Faculty of Medicine, Ankara, Turkey

⁴Department of Family Medicine, International Hoca Ahmet Yesevi Turkish-Kazakh University, Kazakistan

⁵Kagithane Centrum Family Medicine Center, İstanbul, Turkey

Abstract

Introduction: Eastern region of Turkey faces challenges in the provision of health-care services due to insufficient human resources and geographical difficulties. In our study, periodic changes and effects of family medicine (FM) practice on the parameters of first step health-care of Northeast Anatolia Region (NAR) are examined.

Methods: In the descriptive and cross-sectional retrospective study, basic health data of NAR obtained from open sources between 2008 and 2018 were compared within the scope of Nomenclature of Territorial Units for Statistics. Microsoft Excel 2016 was used for calculations.

Results: In the region, access to Primary Health-Care (PHC) got easier, the number of doctors and nurses-midwives rose by 24.6% and the number of applications for PHC increased by 42% in 2018 compared to 2008. In Turkey, while the average per capita population of 3405 family physicians, the NAR's population has been in the family physician per 3252 people as top average. The monitoring numbers recorded even higher increases with a 45% increase in pregnancy monitoring, 166% rises in post-puerperal monitoring, 57% growth in average monitoring per baby, and an average increase of 29% in monitoring per child were recorded. Whereas maternal death rate was 22.9 in the region for every one hundred thousand births versus a countrywide average of 19.4 in 2008, these rates were recorded as 24.9 and 13.6, respectively, in 2018. It could be argued that maternal rates fell by one third compared to 2006 and the approximately same rate was maintained between 2008 and 2018 but it was higher than the average of Turkey. Compared to 2008, the infant mortality rate in the region was 17.8 per thousand live births, but decreased by 40% and fell to 10.6. While the rate of Quinary Composit Vaccination (DaBT+IPA+Hib) was 74% in 2002, it was observed as 96% in 2008 and exceeded the Turkey average with 100% in 2010 when FM practice became widespread, this rate fell back down to 93% in 2018. The pace of Measles, Rubella, and Parotitis vaccination pace slowed by 6% as well. Fall in vaccination rates contrary to the general improvement in parameters could be attributed to vaccination reluctances, administrative changes, geographical difficulties, the high turnover rate among the health professionals, and difficulty to detect the target population before FM Practice.

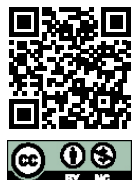
Correspondence (İletişim): Memet Taşkın Egici, M.D. Aile Hekimliği Kliniği, Sağlık Bilimleri Üniversitesi Hamidiye Tıp Fakültesi, Haydarpaşa Numune Sağlık Uygulama ve Araştırma Merkezi, İstanbul, Turkey

Phone (Telefon): +90 505 468 55 76 **E-mail (E-posta):** megici@gmail.com

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Discussion and Conclusion: With improvements in health-care followed by FM practice, generally positive results were recorded in terms of service integration, access to protective health-care thanks to the balanced distribution of health personnel, and raising the basic health level indicators. More attention should be paid to maternal mortality and immunization in the region. To the sustainability of quality of care in PHC, population per FM should be reduced, specialization should be prioritized, and FM should be supported with integrated health-care models that unite various disciplines at the first step enabling early diagnosis and management of chronic diseases and disease management. If the FM system which is implemented for almost 15 years in our country is continuously updated according to needs, promising signs for the health of our nation could be expected for the future.

Keywords: Family practice; health region; health services accessibility; integrated health-care systems; primary health-care.

According to the definition made by the World Health Organization (WHO), the health system includes "... all activities aimed at improving and providing health services by improving the health status of the community served, responding to people's expectations, and providing financial protection against the costs of diseases and ailments."^[1] One of the most effective and valuable stages of promoting health in all countries is the adoption of "Primary Health-Care" as a new approach beyond the traditional health system as the main strategy in the WHO 1978 Alma-Ata Conference. As a result of the decision to determine "Primary Health-Care" as a roadmap within the scope of "Health for All," health system searches have been started in all countries. To achieve these goals in our country, the Health Transformation Program (HTP) was established in 2003 to organize, finance, and provide family-based PHC services in an integrated, efficient, and equitable manner, with the help of health-care teams equipped with the necessary training and skills^[2,3]. The "Strengthened Primary Health-care Services" sub-component is included in the "Widespread, Easily Accessible, Friendly Health Service System" component of this program^[4]. The most radical change of HTP is the regulations on the reorganization of PHC services and family physicians now take on the main task in the new model of PHC services. In addition to Family Medicine (FM) units, community health centers in the districts provide community and public health services with units such as environmental health, infectious diseases, immunization and epidemic control, women's, children's and adolescents' and reproductive health (ÇEKÜS-WCARH), cancer early diagnosis, screening and training center (KETEM-CEDSTC), occupational health and safety, diabetes, and obesity^[5].

Before the implementation of FM, the basic reasons for the insufficient health outcomes especially in the rural areas were based on the insufficiency of buildings, equipment, and personnel, which constitute the infrastructure of service provision, the distribution of service providers and health personnel to be not in favor of rural areas, and preventive health service programs to be not sufficiently de-

veloped^[6,7]. As a result of the adoption of a new service delivery approach in PHC, a FM model has been designed in which preventive health-care services are at the forefront, which will ensure the improvement, dissemination and facilitation of access. In 2005, Turkey launched the FM practice as a pilot project in Düzce Province, and at the end of 2010, has extended to the whole of Turkey.

The provision of FM services in Turkey is provided in Family Health Centers (FHC) (ASM), where more than one family physician work under one roof, or in Family Health Units (FHU), where a single family physician works^[2,8]. Family physicians and family health-care staff, with a contract made with the governorship, work for the sum of the cost consisting of the population served, the socio-economic development index of the province, mobile health services, examination and consumable costs and the operating costs of FM centers. Family physician and family health-care staff work within the scope of contracts based on performance targets^[9]. By monitoring babies and pregnant women registered to the FM information system, it is expected to provide preventive health services in terms of growth, development and immunization, and to achieve the targets set separately for pregnancy, and infant and child monitoring and vaccination. If there is no risk, the pregnant woman should be followed up at least 4 times during pregnancy, the child to be followed up at least 9 times in the 1st year of life, and 7 times up to the age of 6, according to protocols determined by the Ministry of Health, to be considered fully monitored^[10]. In cases, where preventive medicine services including vaccination, pregnancy, and baby-child follow-up are not achieved, the targets are interrupted and applied as negative performance^[11].

The stability in Turkey's policies to correct inequalities in health services provided between different regions of Turkey and FM practice to produce measurable results in terms of health services will undoubtedly need time. In this study, the basic health indicators before the FM practice, in which access to health services were inadequate, and the basic health indicators afterward were compared, and the effect of FM practice on PHC has been evaluated in the

Northeastern Anatolia Region (NAR), which is geographically difficult to access and a mountainous region, which consists of provinces that are at the lowest rank in terms of education level and development level.

Materials and Methods

In this cross-sectional descriptive retrospective study, NAR, which consists of the combination of Erzurum Sub-Region consisting of Erzurum, Erzincan and Bayburt and Ağrı Sub-region consisting of Ağrı, Kars, Iğdır and Ardahan Provinces, within the scope of nomenclature of territorial units for statistics (NUTS), the health indicators for the period between 2008, when FM practice started, and 2018, are compared. In this study, which evaluated the FM practice in NAR, pregnancy follow-up, baby follow-up, child follow-up, and vaccination services, which are the basis of performance, were evaluated.

In the study, open-access sources were used, mainly such as the Ministry of Health and Turkish Statistical Institute, and statistical analysis of the obtained findings were made in Microsoft Excel 2016 program. Descriptive statistical methods (arithmetic mean, standard deviation, ratio, and frequency analysis) were used in the analysis of the data in the study.

Results

Population Analysis

With the Statutory Decree enacted on September 22, 2002, "Level 1" Statistical Regional Units constituted 12 provinces, which were defined as a result of the grouping of Level 2 Statistical Regional Units, and "Level 2" Statistical Regional

Units constituted 26 provinces, as a result of grouping 81 provinces^[12]. Northeastern Anatolia Region, which has a lower socioeconomic level and geographical disadvantages compared to Turkey's western region, was evaluated for socio-economic development ranking, and Erzurum sub-region ranks 22nd, consisting of the three provinces Erzincan (47th), Erzurum (61st), Bayburt (65th). Ağrı sub-region is at the 24th rank, consisting of Ardahan (67th), Kars (69th), Iğdır (70th), and Ağrı (80th)^[13].

Republic of Turkey, located in a vast geography, has a population of 82.003.882 as of 2018, and is one of the most important countries of the region. While the population of the country was 71.517.100 in 2008, it increased by 14.6% in 2018. While the population of the country was 71.517.100 in 2008, it increased by 14.6% in 2018. NAR, which consists of Erzurum, Erzincan, Bayburt, Ağrı, Kars, Iğdır, and Ardahan Provinces, according to NUTS-1, constitutes 2.70% of the population of Turkey. While the total population of the provinces of the region was 2,201,862 according to address based population registration system in 2008, it was determined as 2.211.054 in 2018. Although the population increased by 14.7% in Turkey between the years 2008 and 2018, the population in the region has increased only by 0.4%. This situation may resulted from immigration out of the region (Table 1)^[14].

While the rural population rate in the region was 47.2% in 2008, this rate has decreased over the years to 28.6% in 2018. Representing the number of live births per thousand populations, the average crude birth rate in Turkey was 18.1 per thousand in 2008, while it was 15.4 per thousand in 2018. The crude birth rate in NAR was 23.8 per thousand

Table 1. Some demographic data of the provinces of the Northeastern Anatolia Region, according to NUTS-1, by years^[14]

	2008	2010	2012	2014	2016	2018
ABPRS Population						
Turkey	71.517.100	72.561.312	75.627.384	7.695.904	79.814.871	82.003.882
Northern Anatolia Region	2.201.862	2.202.106	2.226.155	2.206.326	2.201.368	2.211.054
Crude Birth Rate (in a thousand)						
Turkey	18.1	17.2	17.2	17.5	16.6	15.4
Northern Anatolia Region	23.8	23.4	22.8	22.7	21.2	19.0
Total Fertility Rate (Average Number of Children)						
Turkey	2.1	2.1	2.1	2.2	2.1	2.0
Northern Anatolia Region	2.9	3.0	2.9	2.9	2.7	2.4
Ratio of Rural Population to Total Population (%)						
Turkey	25.0	23.7	22.7	8.2	7.7	7.7
Northern Anatolia Region	47.2	23.1	44.2	31.5	30.3	28.6

ABPRS: Address based population registration system.

in 2008 and 19 per thousand in 2018. With these rates, it ranks third after Southeastern Anatolia and Middle East Anatolia in the regional ranking^[14].

Analysis of Data Related to Health-care Services

FM practice in NAR provinces started in Bayburt in January 2008, in Erzurum in November 2008, in Erzincan in January 2010, in Iğdır in April 2010, in Ardahan in August 2010, and in Kars and Ağrı Provinces in October 2010^[15].

With this cross-sectional study, basic health data before FM practice (2002 and 2008) and after FM practice (2010, 2012, 2014, 2016, and 2018) were compared in NAR Provinces of Turkey, which have lower socioeconomic levels compared to Turkey's western regions.

While the number of PHC applications per person increased by 80% in the 2002–2008 period, the increase in the number of physicians was 44% and the increase in the number of assistant health personnel (midwives-nurses) remained at the level of 10%^[16]. In 2018, compared to 2008, the number of assistant health personnel (midwives-nurses) increased by 24.6%, and the number of general practitioners increased by 26.3% (Table 2). While the number of applications to PHC per person in the region was 1.62 in 2008, this rate was determined as 2.3 in 2018 and the number of PHC applications per person increased by 42%. The number of applications to health institutions per capita in the region increased from 5.22 in 2008 to 8.2 in 2018 with an increase of 57% (Table 2)^[16-18].

The population per health center was used in 2008 and before. Since FM practice has just started in this period, the

population per active family physician could not be evaluated, and the data of 2010 were used at the earliest. When the whole country switched to FM practice in 2010, there were 3523 people per family health unit in NAR. In 2018, this number decreased by 7.7% to 3252. This value is under 3405, the average of Turkey for number of patients per active family physicians (Table 2)^[17,18].

In 2008, the rate of population receiving mobile health services was determined as 83%, by 2010 this rate reached 100%, and in 2018 this rate was maintained. While the rate of referrals from family health centers to hospitals was 2.7% in 2008, it decreased by 61%–1.05% in 2018. While the number of PHC examination rooms in the region was observed as 468 in 2008, it reached 749 with an increase of 60% in 2018 (Table 2).

In 2018, compared to 2008, when FM practice started, huge increases were achieved by 45% in pregnancy follow-up, by 166% in puerperal follow-up, by 57% in average follow-up per baby, and by 29% in average follow-up per child. Relatedly, the rate of fully followed pregnant women in NAR was 91.6%, the rate of fully followed-up babies was 87.6% and the rate of fully followed-up children was 88.3% (Table 3). The average rates of Turkey over the same period were 95.2%, 88.6%, and 92.8%, respectively^[17,18].

Five-in-one Vaccine (DaBT + IPA + Hib) rate was 74% in 2002, while in 2008, it was detected as 96% and in 2010, with the application of FM practice, this rate reached to the 100% level, which exceeded the average rate of Turkey. However, this rate declined to 93% in 2018, and the vaccination rate for measles, rubella, and mumps (MMR) increased by 3% in

Table 2. 2002–2018 comparison of indicators related to access to some basic health services in the Northeastern Anatolia Region^[17–22,30,31]

	2002	2008	2002–2008 rate of change (%)	2010	2012	2014	2016	2018	2008–2018 rate of change (%)
Number of General Practitioners	772	1110	44	1098	1386	1327	1375	1402	26.3
Population per Family Physician				3523	3420	3374	3011	3252	–7.7
Number of AHP (midwife-nurse)	4073	4462	10	4668	5018	5559	5544	5561	24.6
Number of Applications for Primary Care (per person)	0.9	1.62	80	1.7	1.8	1.9	1.9	2.3	42
Number of Applications to the Health Institution (per person)	1.9	5.22	174	6.4	6.7	7.0	7.4	8.2	57
Referral Rate (%)	20.2	2.7	–87	1.1	1.0	0.9	1.05	1.05	61
Rate of Population Provided Mobile Health-care Services (%)	18	83	361	100	100	100	100	100	20
Number of Primary Care Examination Rooms	302	468	55	682	698	723	731	749	60

Table 3. Basic health indicators in the Northeastern Anatolia Region by years 2002–2018^[16-22,30,31]

	2002	2008	2002–2008 rate of change (%)	2010	2012	2014	2016	2018	2008–2018 rate of change (%)
5-in-1 vaccine (DaBT+IPA+Hib) Third Dose Vaccination Rate (%)									
NAR	74	96	30	100	97	97	93	93	-3
Turkey	78	96	23	97	0	96	98	98	2
HBV-3 Vaccination Rate (%)									
NAR	61	87	43	96	96	97	93	93	7
Turkey	72	92	28	97	0	95	98	98	7
MMM Vaccination Rate (%)									
NAR	78	95	22	98	96	96	92	89	-6
Turkey	82	97	18	97	0	94	98	96	-1
Average number of follow-ups per pregnant woman									
NAR	1.1	2.9	164	4.3	3.7	3.8	4.1	4.2	45
Turkey	1.7	3.3	94	4.2	0	4.8	4.7	4.8	45
Average number of follow-ups per baby									
NAR	2.3	5.1	122	6.6	7.8	7.6	8.1	8	57
Turkey	3.4	6.4	88	7.1	0	8.2	8.4	8.6	34
Average number of follow-ups per child									
NAR	0.9	1.7	89	1.6	1.7	2.1	2.2	2	18
Turkey	1	1.6	60	2	0	2.2	2.1	2.1	31
Average number of follow-ups per puerperal									
NAR	0.4	0.9	125	1.1	1.8	2.4	2.4	2.4	167
Turkey	0.7	1.2	71	1.5	0	3	3	3.1	158
Maternal mortality rate* (Per 100 thousand live births)									
NAR	68.5	22.9	-67	22.6	32.2	12.2	23.8	24.0	4.8
Turkey	28.5	19.4	-32	16.4	15.4	15.2	14.7	13.6	-30
Infant death rate** (Per 1000 live births)									
NAR	41.0	17.8	-57	12.8	10.5	10.2	12.7	10.6	-40
Turkey	29.0	17.0	-41	10.1	7.4	7.6	9.7	9.2	-46

*Maternal mortality data of 2002, Turkey was taken from "National Maternal Mortality Study 2005;" for closest data for Northeastern Anatolia Region closest, year 2006's data was used. **The infant mortality rate 2002 data were taken from "Turkey Demographic and Health Survey 2003." Year 2009 data were used instead of 2008 Northeastern Anatolia Region data.

2010 to 98%, and decreased to 89% in 2018. HBV-3 vaccination rate increased from 87% in 2008 to 93% in 2018 (Table 3)^[16,18-22].

Discussion

There are various evaluations for providing health services in rural areas, based on many factors such as population size, size of villages, and distance to the city center. Mobile health services include outpatient diagnosis and preventive health services that the family physician and/or family health-care personnel will provide at specified intervals and on-site in settlements where there is no health institution (in rural areas such as districts, towns, villages, and hamlets)^[7]. While mobile health services were provided

in the region in a very limited way before 2002, in 2008, when the transition to FM started, the rate of population who received mobile health services reached 83% in the region, and 100% since 2010, when the region completely switched to FM application. In 2018, the provision of prescriptions issued by family physicians within the scope of "mobile health service" to patients has increased the effectiveness of mobile health services (Table 2).

It is seen that in 2008, the number of applications to health institutions per person in NAR was 5.22 and the number of applications to PHC was 1.62, and 31% of the applications were made to PHC. In 2010, the number of applications to the health institution reached the level of 6.4, the level of 7.0 in 2014, 7.4 in 2016, and 8.2 in 2018. The number of ap-

plications to PHC is also on an upward trend. The number of applications to the PHC in NAR increased to 2.3 in 2018, and it is seen that 28% of the applications were made to the primary level and 72% to the secondary level (Table 2). In Turkey, the number of applications to health institutions in 2008 was 6.28 per capita; and within these applications, 39% was at primary level with a rate of 2.45, and in 2018, the number of applications to health institutions was 9.5 per capita, with 33% to PHC with a rate of 3.2^[17,18]. Both in Turkey and in NAR, the reasons for low levels of PHC applications may be due to high population per family physician, inadequate specialization in PHC, the application directly to inpatient treatment institutions with better medical and technical facilities, considering that health needs will be met better, besides the absence of a mandatory referral system^[23].

While the number of examination rooms in primary care was 468 in 2008, this number reached 749 with an increase of 60% in 2018 (Table 2). With the practice of FM, the gradual dissemination of simple laboratory examinations, primarily in the public health laboratories, requested by family physicians, and the free provision of these services have increased the effectiveness of the services provided in primary care. This situation can be considered as the right steps taken to provide PHC more effectively within the scope of the HTP and FM practice.

While the rate of referral from primary care to secondary care in the region was 2.7% in 2008, even the number of applications to primary care increased in 2018, the rate of referrals to secondary health-care facilities decreased to 1.05%, and this decrease is difficult to interpret correctly since there is no mandatory referral chain (Table 2). In a study, family physicians stated that a mandatory referral system should be introduced after reducing the registered population and improving the conditions of FM centers^[24]. In another study, it was observed that the communication status of family physicians with the consultant specialists also affected the referral rate^[25,26]. The absence of other health assistant professionals (such as psychologists, dieticians, and physiotherapists) in the team is seen as a deficiency^[18]. Healthy Life Centers (HLC) have recently been established to reinforce and strengthen the FM model. HLCs have a complementary role in PHC and these centers support the strengthened and integrated FM model^[11].

5-in-1 vaccine (DaBT+IPA+Hib) rate increased from 96% before 2008 to 98% in 2010, but by 2018, this rate was 93%. MMR vaccination rate increased by 3% in 2010 to 98%, while it decreased to 89% in 2018 (Table 3). While a level

above even the average of Turkey was reached in vaccination rates in 2010, negative factors such as administrative changes due to the restructuring efforts of the Ministry of Health, geographical difficulties as well as unwillingness of families to vaccinate, problems in determining the target populations before FM and the increase in health worker turnover rate may have been effective in the decrease of this rate in 2018. The course of this situation, which may be influenced by this and similar different factors, should be followed carefully.

Antenatal care coverage (ratio of mothers who were visited at least for once), which was 49% in NAR in 2002, with being the lowest rate in Turkey, raised to 99.7% in 2018. In terms of maternal health, the rate of births in hospitals among live births has also increased, from 63% in 2002 to 93% in 2018^[18]. Considering the difficulties of the region, significant increases have been achieved by 45% in pregnancy follow-up, 166% in puerperal follow-up, 57% in average follow-up per baby, and 29% in average follow-up per child in 2018 compared to 2008, when FM practice began (Table 3). In addition to the numerical increase in primary care services, the quality of pregnant, infant and child follow-ups should be increased by focusing on quality enhancing activities.

Maternal mortality rate in Turkey was determined as 26.5 in hundred thousand live births in 2006, as 19.4 in 2008, as 16.4 in 2010, and as 13.6 in 2018, while it was 68.5 per hundred thousand live births in 2006, 22.9 in 2008, 22.6 in 2010, and 24 in 2018 in NAR (Table 3). It can be said that maternal mortality rates decreased by almost one third in the region compared to 2006, and the rate increased slightly between 2008 and 2018. Despite the importance of the "Maternal Death Detection and Prevention Commission"^[27] studies and the regulations such as "Guest Mother Application,"^[28] which enables high-risk pregnant women to be identified in advance and followed up in hospitals in winter conditions, it is observed that maternal and infant mortality rates in NAR are still higher than the country average and care should be taken in this region in terms of preventable maternal mortality. About 91.3% of births in Turkey and 75.5% in NAR was being held with the assistance of health personnel in 2008, and in 2018, the average level of Turkey of births at the hospital has increased to 93%, and in NAR, to 98%^[17,18].

The infant mortality rate in 1000 live births in all weeks in 2008 was 17.0 in Turkey, and this was found to be 17.8 in NAR. This rate was 13.5 in Southeastern Anatolia and 11.1 per 1,000 live births in the Middle East Anatolia region of

Turkey in 2018, while it was 10.6 in NAR, with being over average level of Turkey, which was 9.2 (Table 3). During this 10-year period, with FM practice, the infant mortality rate in one thousand live births in Turkey decreased by 46%, and by 40% in NAR, and the maternal mortality rate in 100 thousand live births decreased by 30% in Turkey, while increased by 5% in NAR. While the decrease in infant mortality rate in NAR in basic health indicators after FM practice was evaluated positively, the increase in maternal mortality rates were evaluated negatively.

In 2018, the total fertility rate was found to be 2.44 in the NAR, 2.52 in Middle East Anatolia and 3.22 in Southeastern Anatolia (Table 1)^[14]. In these regions, where the total fertility rate and the maternal and infant mortality rates are above the Turkey average and where staffing is difficult, it is thought that planning of population per family physicians to be below the average Turkey levels is important in terms of health service provision. There is a difference between countries regarding the population per family physician. While determining the number of people who will not affect preventive health services, it is necessary to take into account the conditions of the country, the characteristics of the population, as well as the services that other public health units undertake, which will be affected directly. Although there are different studies on the registered population per family physician, there are studies showing that populations <2500 provide better health outcomes and increase patient and physician satisfaction^[29]. In many countries, the employment and continuity of the employment of health-care professionals, especially physicians, in distant, under populated and deprived regions is an important problem. To ensure adequate access to medical care, a sufficient and balanced distribution of health-care professionals, especially physicians, in all regions of the country is required. However, it is known that it will not be easy to completely eliminate the problem of high personnel turnover ratio.

As a result of this study, the data were evaluated in NAR, Turkey, of the period before and after family physician system was launched. From 2002, when the HTP was initiated, to 2008, important developments were achieved in basic health indicators, and after 2008, when FM was implemented, many indicators improved, although there are issues still to improve. Access to primary care services has been facilitated, and significant progress has been achieved in infant and pregnancy follow-up, vaccination and mobile health services. However access to PHC remained lower as compared to inpatient facilities and in Turkey, it cannot yet be said of family physicians play a role as a gate keeper.

To increase the quality of PHC services, the population per family physician should be reduced, specialization should be emphasized, and FM should be supported with integrated health models that bring different disciplines together in primary care. The responsibilities of family physicians should be increased in processes such as screening and diagnosis of diseases, especially non-communicable diseases. The FM performance system should be redesigned to include non-communicable diseases in a way that is incentive rather than punitive. Although the FM information system, which has been used by all family physicians from the very beginning, has been integrated into the "e-nabız" application, it should be ensured that the disease management platform and telemedicine applications are widely applied in PHC.

If the FM practices, which has been applied in our country for about 15 years, is updated according to the needs and developing conditions with continuous improvements, it is promising for the future in terms of health-care services in our country.

Ethics Committee Approval: The study was conducted retrospectively and publicly available data were used.

Peer-review: Externally peer-reviewed.

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