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PRIMARY HEALTH CARE SYSTEM'S EFFICIENCY IN RELATION TO WOMEN'S HEALTH IN ALBANIA

Silvana Mustafaj
Department of Mathematics and Informatics,
Faculty of Economics and Agribusiness, AUT, Albania
smustafaj@ubt.edu.al

Elfrida Dishmema
Department of Mathematics and Informatics,
Faculty of Economics and Agribusiness, AUT, Albania
edishmema@ubt.edu.al

Amalia Tola
Department of Agribusiness Management,
Faculty of Economics and Agribusiness, AUT, Albania
atola@ubt.edu.al

Abstract

The objective of this paper is to evaluate the efficiency of the primary health care (PHC) system in terms of the service provided in relation to women's health by the women's consultant centers, in Albania from 1999-2021. Data Envelopment Analysis (DEA) method was used to perform this analysis. The number of women's consultant centers, the number of doctors and the number of midwives in women's consultant centers were used as inputs, whereas the number of gynecological visits and the number of obstetrical visits performed in women's consultant centers were used as outputs. According to this analysis, it was found that the primary health care system, in terms of service to women's health in Albania, was efficient in 1999 only, whereas in all the other years of the period under study, along with the period of Covid-19, this system has been inefficient.

Keywords: primary health care system, women's health, women's consultant centers, efficiency, Data Envelopment Analysis, DEA

INTRODUCTION

A woman's good health and well-being is a very sensitive and important topic. Health care for women in Albania is provided by the primary health care service and by the hospital service (Law no. 10107, 2009; Mersini, 2013; Public Health Indicators, INSTAT, 2021). Primary health care is provided through a network of professionals and health institutions based on the principles of family health care (Law no. 10107, 2009; Mersini, 2013). In primary health care, the service for women's health is offered through women's consultant centers, which are located near health centers and ambulances (Basic Package of Services in Primary Health Care, Ministry of Health, 2018; Public Health Indicators, INSTAT, 2021). In urban areas, health care for women is provided in women's consultant centers by obstetricians and midwives. In rural areas, health care for women is provided by the family doctor and the nurse/midwife (Mersini, 2013).

Health care for women in health centers includes various aspects related to prevention, promotion, cure and rehabilitation. These services include: care before, during and after birth for the mother and the child, family planning, prevention and early diagnosis of breast cancer, etc., with the aim of reducing maternal morbidity and mortality (Arqimandriti et al., 2014; Basic Package of Services in Primary Health Care, Ministry of Health, 2018).

Hospital care for women is provided through obstetrics - gynecology beds services and through the service for hospital outpatients, organized in district, county and tertiary hospitals. (Law no. 9106, 2003; Mersini, 2013). Hospital care is provided for diagnostic, examination, and/or hospital-centered treatment needs that cannot be provided by primary health care (Law no.10107, 2009; Mersini, 2013).

Furthermore, one of the 17 Sustainable Development Goals (SDG) approved by the UN General Assembly in 2015, specifically the third goal, is related to the "good health and well-being" of the population (INSTAT, 2023). The first point of this objective is: "By 2030, to reduce the global level of maternal mortality to less than 70 deaths per 100,000 live births" (INSTAT, 2023). So, according to this objective, the good health and well-being of women is a priority for our country as well. Under these conditions, the evaluation of the efficiency of this service provided by primary health care through women's consultant centers is very important and should be addressed.

LITERATURE REVIEW

The literature that deals with the efficiency of the primary health care system in general, with all the services it offers, through the DEA method, is wide. To illustrate this fact, we are referring to the paper of Zakowska & Godycki-Cwirkoa (2020), who make a

review of the literature for the evaluation of the efficiency of primary health care centers. They studied 54 papers that use the DEA method for efficiency evaluation. Most of these publications are from USA, Spain, UK, Greece, Brazil and Italy. They identified the inputs and outputs that were used in these works. According to them, the inputs included: personnel, primary health care center, consultations or visits, referrals or hospitalization days, pharmaceuticals or prescriptions, etc. While the outputs included: consultations or visits, patients, procedures, treatment and services, etc (Zakowska & Godycki-Cwirkoa, 2020).

A work of this nature is also the paper by Zhou et al. (2023), in which we note the use of the DEA method to evaluate the efficiency of the primary health care service, for 28 provinces in China. As input variables are used: the number of institutions, the number of beds, the number of health technicians, and as output variables: the number of outpatients and emergency visits, the number of discharged patients (Zhou et al., 2023).

In the following, we are referring to some papers that deal with the efficiency of different health care units in relation to women's health service, through the DEA method. For example, Servan-Mori et al. (2018), in their paper they used the window-DEA to evaluate technical efficiency for 233 primary health care units of the Ministry of Health of Mexico, for the 2008-2015 period. According to them, this evaluation consists on the production of maternal health care services using capital and labor resources (Servan-Mori et al., 2018).

Sharma & Sharma (2020), in their paper they analyzed the technical efficiency of the 45 aspirational districts in the Empowered Action Groups states of India, in terms of maternal health care. They use the DEA method, taking as inputs: full antenatal care (ANC) check-ups, health workers and health infrastructure; and as output, institutional deliveries (Sharma & Sharma, 2020)

Achoki et al. (2016), in their paper they evaluated the technical and scale efficiency through the DEA method in the delivery of maternal and child health care services on 72 health districts of Zambia for the year 2010. Financial resources and human resources for health are used as inputs by them, while the probability of survival to 5 years of age represents health outcomes and the coverage of key health interventions represents health outputs (Achoki et al., 2016).

Kirigia et al. (2011), in their paper they used the DEA method to evaluate the technical efficiency of 36 community health centers, 22 community health posts and 21 maternal and child health posts in Kailahun and Kenema districts of Sierra Leone for the year 2008. They use as inputs: the number of community health officers, MCH aides and state enrolled community

health nurses; and the number of support staff. While the following were used as outputs: the number of outpatient, maternal, child health and family planning visits, plus immunization visits; the number of vector control activities; and the number of health education sessions (Kirigia et al., 2011)

Amare, et al. (2020), in their paper they evaluated the technical efficiency of public hospitals in Northwest Ethiopia in relation to maternal health services provision. They use the DEA method taking as inputs: salary expenditure, non-salary expenditure, and the number of beds and as outputs: antenatal care, skilled delivery, and postnatal care for the period of July 2018 to June 2019 (Amare, et al., 2020).

Jat & Sebastian (2013), in their paper they evaluated the technical efficiency of the 40 public district hospitals from January to December 2010, in Madhya Pradesh, India, in relation to maternal healthcare services through the DEA method. The following were used as inputs in the analysis by them: the number of doctors, the number of nurses and the number of beds. While the following outputs were used: the number of women with three completed antenatal checkups, the number of deliveries, the number of cesarean-section deliveries, the number of women receiving post-natal care within 48 hours of delivery, the number of medical terminations of pregnancy, the number of male and female sterilizations, the number of inpatient admissions and the number of outpatient consultations (Jat & Sebastian, 2013).

Aloh et al. (2019), in their paper they used the DEA method to evaluate the efficiency of three mission hospitals over a five year period (2007-2011) in the Ebony state of Southeast Nigeria, on maternal and child healthcare services. The number of antenatal registrations, the number of immunization doses and the number of pediatric admissions were used as the output variables by them, while the number of hospital beds and operational costs were the input variables (Aloh et al. 2019).

MATERIALS AND METHODS

For the evaluation of the efficiency of the primary health care system in relation to the women's health service offered by the women's consultant centers in Albania, the data published by the Institute of Statistics of Albania (INSTAT) were used (Statistical Database. INSTAT, 2023). The relative technical efficiency has been estimated for the 1999-2021 period, which was the only period for which data existed in the INSTAT database, using the DEA method, through the input-oriented CCR (Charnes, Cooper and Rhodes, 1978) model (CCR-I). In the CCR-I model, the goal is to minimize inputs while producing at least the given output

levels (Cooper et al., 2007), The CCR-I model, in its multiplier form, under CRS assumption (Cooper, et al., 2004), is given below:

$$max\ z = \sum_{r=1}^{s} \mu_r y_{r0}$$

Subject to:

$$\sum_{r=1}^{s} \mu_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} \leq 0 \quad for\ j = 1\ to\ n$$

$$\sum_{i=1}^{m} v_i x_{i0} = 1$$

$$\mu_r, v_i \geq 0 \quad \forall i, r$$

Where:

y_{rj} represents the output value r $(r = 1, \ldots, s)$ of unit j,

x_{ij} represents the value of input i $(i = 1, \ldots, m)$ of unit j,

μ_r is a non-negative weight assigned to output r,

v_i is a non-negative weight assigned to input i,

s is the number of outputs,

m is the number of inputs.

DEA is an approach for evaluating the performance of a set of peer entities called Decision Making Units (DMU) (Cooper, et al., 2004). A period of one year will serve as DMU for the model. Therefore, the efficiency of the PHC system is analyzed in relation to the women's health service provided by women's consultant centers for 23 years (n = 23 DMU), enabling the evaluation of the efficiency of this system in relation to itself in time. The DEA method will determine in which years the system has been efficient in relation to this service and in which years this system has been inefficient.

The following were taken as inputs for this analysis: the number of women's consultant centers, the number of doctors and the number of midwives in women's consultant centers during the 1999-2021 period, published by INSTAT (Statistical Database. INSTAT, 2023) and presented in the graphs of figures 1 and 2 below.

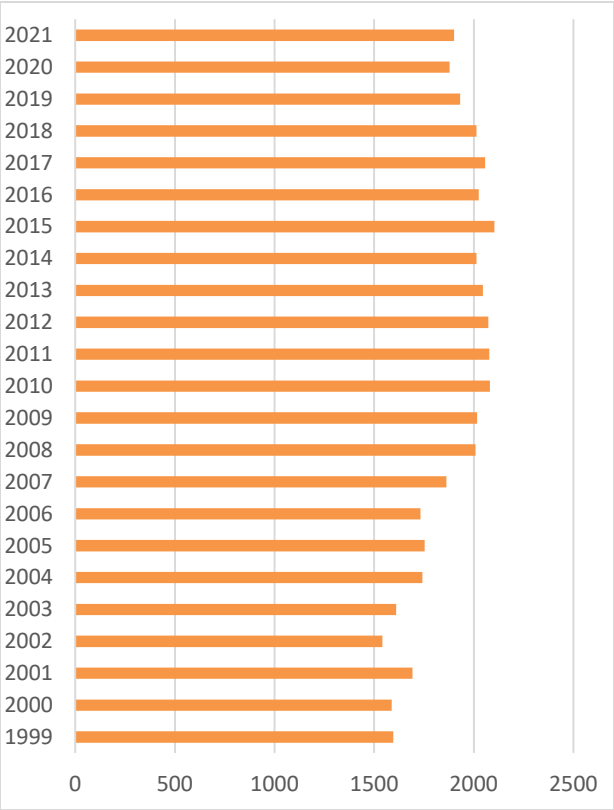

Figure 1. The number of women's consultant center during the 1999-2021 in Albania
Source: Developed by the authors (INSTAT data)

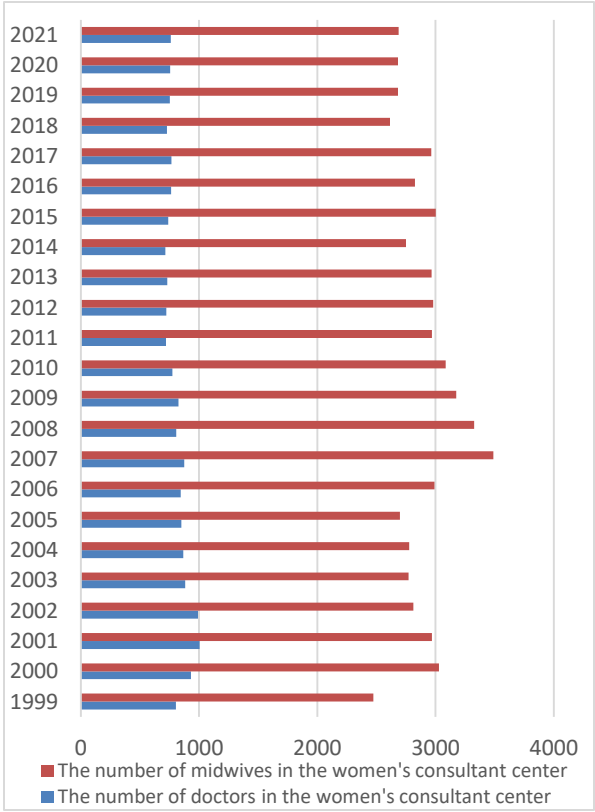

Figure 2. The number doctors and midwives in women's consultant center during the 1999-2021 in Albania
Source: Developed by the authors (INSTAT data)

As outputs, the number of gynecological visits and the number of obstetrical visits performed in women's consultant centers during the 1999-2021 period, published by INSTAT (Statistical Database. INSTAT, 2023) were used. Figure 3 shows graphically the percentages of gynecological and obstetrical visits performed in these years in women's consultant centers.

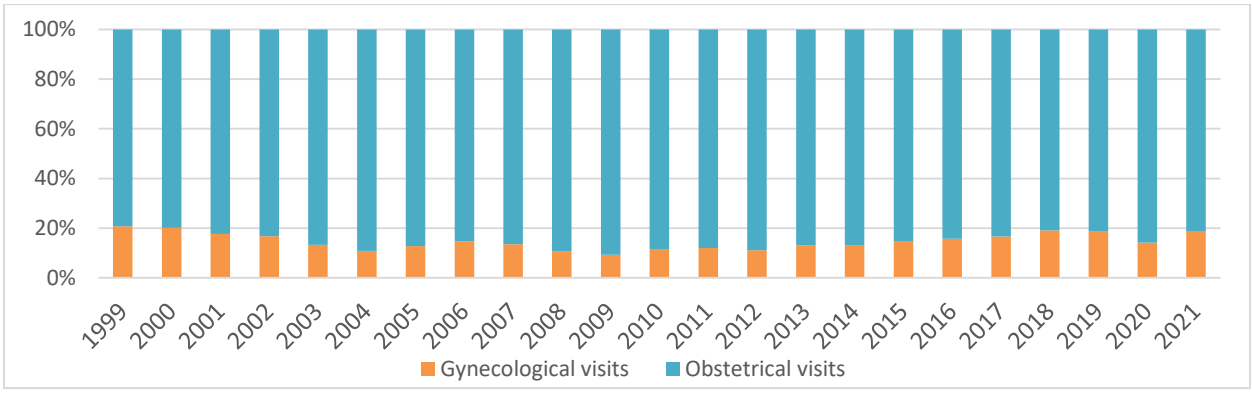

Figure 3. The percentage of gynecological and obstetrical visits in women's consultant centers during the 1999-2021 period in Albania
Source: Developed by the authors (INSTAT data)

RESULTS AND DISCUSSIONS

Table 1 shows the results of the efficiency of the primary health care system regarding the service provided for women's health through the women's consultant centers in Albania, derived from the DEA method, for the 23 years taken in this study. Data processing was done through Solver in Excel (Ragsdale, 2018).

Table 1. Results of the efficiency of the PHC system in relation to women's health during 1999-2021 in Albania

DMU no.	Year	DEA Efficiency	DMU no.	Year	DEA Efficiency
1	*1999*	1	13	2011	0.8733
2	*2000*	0.9912	14	2012	0.8089
3	*2001*	0.8771	15	2013	0.7781
4	*2002*	0.7907	16	2014	0.8147
5	*2003*	0.8076	17	2015	0.7356
6	*2004*	0.7075	18	2016	0.6683
7	*2005*	0.6883	19	2017	0.6648
8	*2006*	0.6980	20	2018	0.6069
9	*2007*	0.6488	21	2019	0.4979
10	*2008*	0.6798	22	2020	0.5398
11	*2009*	0.7092	23	2021	0.5399
12	*2010*	0.7857			

Source: Developed by the authors

From table 1 it can be seen that the PHC system in Albania in terms of women's health services offered through the women's consultant centers was efficient only in 1999, while in all the other years of the 1999-2021 period this system was inefficient. This means that in about 95.65% of the time under study, this system was inefficient. These results expressed in percentage are given in the graph of figure 4 below.

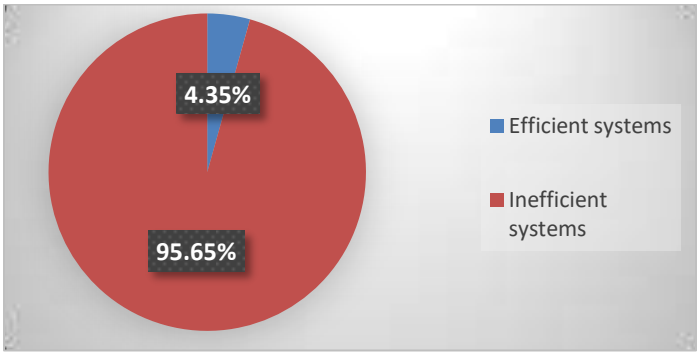

Figure 4. The percentage breakdown of the 1999-2021 period regarding the efficiency of the PHC system in relation to women's health in Albania

Source: Developed by the authors

On the other hand, from the graph given in figure 5 below, it can be seen that the results of the efficiency of the PHC system in relation to the women's health service in Albania are generally in decline during the period under study, with some small increasing tendencies in some years. Thus, the efficiency values are at the lowest levels of the entire period in the last three years 2019, 2020 and 2021, which is also the period of the Covid-19 pandemic.

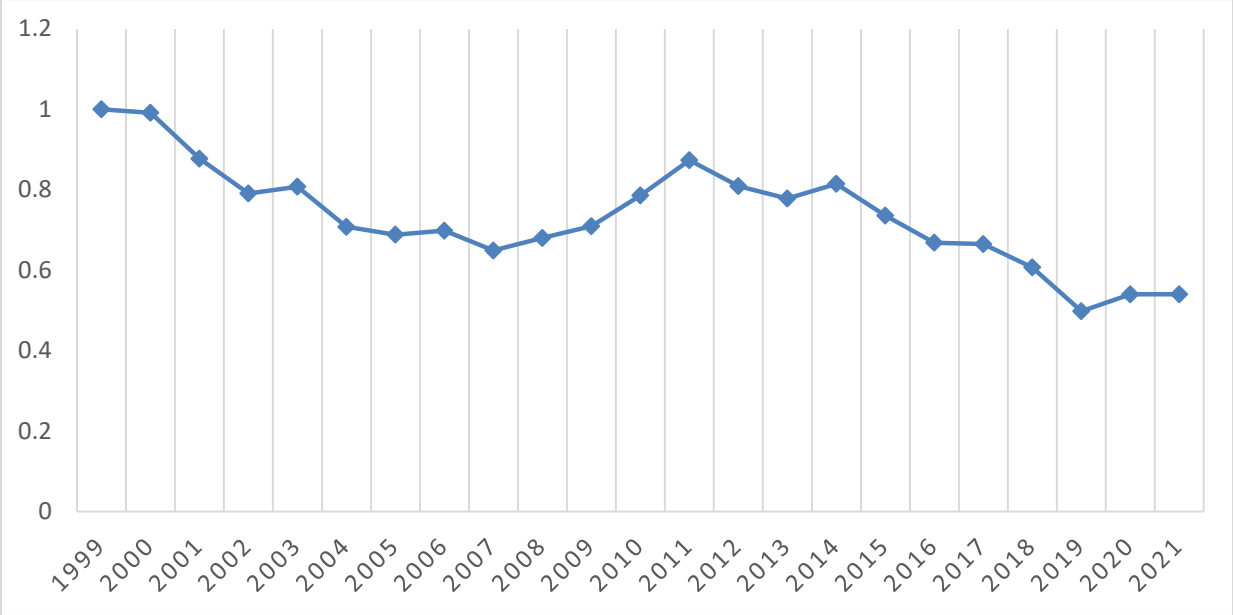

Figure 5. Fluctuations of the efficiency of the PHC system in relation to women's health during 1999-2021 in Albania
Source: Developed by the authors

From the sensitivity reports issued by Solver for the PHC system in relation to the women's health service in each of the years analyzed, it has been shown that the year 1999 serves as the reference set, which is the only year when the system has been efficient in the entire period taken under study. The corresponding weights were also taken for each year in which the system was inefficient, with the aim of creating composite units (Ragsdale, 2018). To create for each inefficient year composite units which are efficient, the values of the inputs and outputs of the system in 1999 (efficient) are multiplied with the respective weights of these years. Thus, the target values of inputs and outputs are obtained for each of the years where the system was inefficient. These weights are given in table 2 below.

Table 2. Composite unit weights

DMU no.	Year	DEA Efficiency	Weight	DMU no.	Year	DEA Efficiency	Weight
1	*1999*	1	1	13	*2011*	0.8733	0.7811
2	*2000*	0.9912	0.9862	14	*2012*	0.8089	0.7265
3	*2001*	0.8771	0.9304	15	*2013*	0.7781	0.7066
4	*2002*	0.7907	0.7639	16	*2014*	0.8147	0.7236
5	*2003*	0.8076	0.8157	17	*2015*	0.7356	0.6753
6	*2004*	0.7075	0.7611	18	*2016*	0.6683	0.6326
7	*2005*	0.6883	0.7260	19	*2017*	0.6648	0.6317
8	*2006*	0.6980	0.7326	20	*2018*	0.6069	0.5489
9	*2007*	0.6488	0.7036	21	*2019*	0.4979	0.4657
10	*2008*	0.6798	0.6815	22	*2020*	0.5398	0.5070
11	*2009*	0.7092	0.7268	23	*2021*	0.5399	0.5097
12	*2010*	0.7857	0.7564				

Source: Developed by the authors

CONCLUSIONS

From the results obtained from the sensitivity reports, for the reference sets and the relevant weights for all the years in which the PHC system in Albania in relation to women's health services has proven inefficient, the target values for the outputs and inputs have been calculated and these values are presented in tables 3 and 4 below. In these tables, the target values for the year 1999, in which the system was efficient are also given, which remain the same as the previous ones. Table 3 also shows the differences expressed in percentage between the target values for the number of gynecological visits (first output) and obstetrical visits (second output) with the corresponding values of these visits actually performed in women's consultant centers during this period.

Table 3. Target values for the number of gynecological and obstetrical visits in women's consultant centers during 1999-2021 in Albania

DMU no.	Year	Gynecological visits	Target value	Difference (in %)	Obstetrical visits	Target value	Difference (in %)
1	*1999*	94550	94550	0.00	359296	359296	0
2	*2000*	89112	93251.34	4.65	354361	354361	0
3	*2001*	71789	87975.9	22.55	334314	334314	0
4	*2002*	55103	72233.53	31.09	274492	274492	0
5	*2003*	45159	77130.03	70.80	293099	293099	0
6	*2004*	33142	71965.9	117.14	273475	273475	0
7	*2005*	38146	68644.64	79.95	260854	260854	0
8	*2006*	45427	69276.21	52.50	263254	263254	0
9	*2007*	39853	66527.31	66.93	252808	252808	0
10	*2008*	29054	64441.03	121.80	244880	244880	0
11	*2009*	26721	68726.48	157.20	261165	261165	0

12	*2010*	34707	71522.23	106.07	271789	271789	0
13	*2011*	38131	73858.77	93.70	280668	280668	0
14	*2012*	32660	68694.12	110.33	261042	261042	0
15	*2013*	38275	66814.41	74.56	253899	253899	0
16	*2014*	39502	68419.91	73.21	260000	260000	0
17	*2015*	41569	63851.3	53.60	242639	242639	0
18	*2016*	42530	59815.84	40.64	227304	227304	0
19	*2017*	45184	59734	32.20	226993	226993	0
20	*2018*	46372	51899.66	11.92	197222	197222	0
21	*2019*	38981	44037.42	12.97	167345	167345	0
22	*2020*	30231	47938.41	58.57	182169	182169	0
23	*2021*	41647	48194.72	15.72	183143	183143	0

Table 3…

Source: Developed by the authors

From this table, we notice that the differences expressed in percentage between the target values and the actual values of gynecological visits are positive for all the years in which the PHC system in relation to women's health services has been inefficient. This means that in each of these years there was room to perform more gynecological visits with the available inputs. For example, in 2000, about 93251 gynecological visits could have been performed compared to the 89112 that were performed that year, that is, about 4139 gynecological visits more could have been performed (or about 4.65% of gynecological visits more). From this table we also notice that the differences between the target values and the actual values of obstetrical visits are zero for all years. This means that in these years there was no place to perform more obstetrical visits with the available inputs.

In table 4, in addition to the target values for the number of women's consultant centers (the first input), the number of doctors and midwives in the women's consultant centers (the second and third inputs), there are also given the differences expressed in percentage of these target values with the real values.

Table 4. Target values for the number of women's consultant centers, the number of doctors and the number of midwives in women's consultant centers

DMU no.	Year	The number of women's consultant centers	Target Value	Difference (in %)	The number of doctors	Target Value	Difference (in %)	The number of midwives	Target Value	Difference (in %)
1	1999	1595	1595	0.00	805	805	0.00	2473	2473	0.00
2	2000	1587	1573.092	-0.88	931	793.9432	-14.72	3029	2439.033	-19.48
3	2001	1692	1484.099	-12.29	1003	749.028	-25.32	2969	2301.051	-22.50

4	2002	1541	1218.535	-20.93	990	614.9973	-37.88	2812	1889.302	-32.81
5	2003	1611	1301.136	-19.23	883	656.6861	-25.63	2773	2017.372	-27.25
6	2004	1742	1214.02	-30.31	866	612.7187	-29.25	2778	1882.302	-32.24
7	2005	1753	1157.993	-33.94	849	584.4414	-31.16	2699	1795.433	-33.48
8	2006	1733	1168.647	-32.57	845	589.8186	-30.20	2991	1811.952	-39.42
9	2007	1863	1122.275	-39.76	873	566.4144	-35.12	3490	1740.053	-50.14
10	2008	2008	1087.08	-45.86	807	548.6518	-32.01	3326	1685.486	-49.32
11	2009	2016	1159.373	-42.49	825	585.1382	-29.07	3174	1797.574	-43.37
12	2010	2080	1206.536	-41.99	775	608.9412	-21.43	3087	1870.698	-39.40
13	2011	2077	1245.952	-40.01	720	628.8346	-12.66	2970	1931.811	-34.96
14	2012	2072	1158.827	-44.07	723	584.8626	-19.11	2979	1796.727	-39.69
15	2013	2046	1127.118	-44.91	731	568.8588	-22.18	2966	1747.563	-41.08
16	2014	2014	1154.202	-42.69	715	582.5281	-18.53	2749	1789.555	-34.90
17	2015	2104	1077.132	-48.81	739	543.6309	-26.44	3003	1670.061	-44.39
18	2016	2024	1009.056	-50.15	762	509.2729	-33.17	2827	1564.512	-44.66
19	2017	2057	1007.676	-51.01	765	508.5761	-33.52	2965	1562.371	-47.31
20	2018	2013	875.5151	-56.51	728	441.8744	-39.30	2614	1357.46	-48.07
21	2019	1932	742.8841	-61.55	753	374.9352	-50.21	2682	1151.82	-57.05
22	2020	1879	808.6913	-56.96	756	408.1483	-46.01	2682	1253.852	-53.25
23	2021	1901	813.0151	-57.23	760	410.3305	-46.01	2689	1260.556	-53.12

Table 4…

Source: Developed by the authors

From this table, we notice that, for all the years in which the PHC system in relation to women's health services has been inefficient, the differences expressed in percentage between target values and real values for all inputs are negative. This means that the inputs have not been fully utilized during these years. For example, if we refer to the year 2000 in which the system was inefficient, for which we emphasized above that there were opportunities for more gynecological visits with the possible input levels of this year, moreover, it seems clear that these output levels could have been achieved with less inputs than were available.

Thus, the levels at which the system should have operated in 2000 for it to be efficient, for inputs and outputs, should have been around 1573 women's consultant centers, 793 doctors and 2439 midwives with which around 93251 gynecological visits could have been performed and 354,361 obstetrical visits compared to 1,587 women's consultant centers, 931 doctors and 3,029 midwives that actually functioned through which 89,112 gynecological visits and 354,361 obstetrical visits were performed. Thus, if in all the years in which the PHC system related to women's health services in Albania has been inefficient, the levels of inputs and outputs would

be equal to their target values, then in these years the system related to this service would be efficient.

From this analysis, made for the PHC system in Albania regarding the women's health service provided by the women's consultant centers for the 1999-2021 period, we noticed that there is room for improvement, which would result in an increase of the output levels, as well as an even more rational use of inputs. As such, these improvements should be carefully analyzed to predict the work for the upcoming years, with the aim of achieving a more efficient operation of this system in the future.

The results of this paper must be understood and interpreted based on the data used in it. The time period (1999-2021), in which the efficiency of the primary health care system in relation to the women's health service offered by the women's consultant centers in Albania was evaluated, was conditioned by the availability of the data in the INSTAT database until the moment of completion of this paper. As it was mentioned above, the data in this database only existed for this period. If we had the opportunity to take longer periods of time into analysis, the results would be different and there would be the possibility of comparing the system's efficiency of different periods.

In addition, the evaluation of the efficiency of the system was carried out based on some inputs (the number of women's consultant centers, the number of doctors and the number of midwives in women's consultant centers) and some outputs (the number of gynecological visits and the number of obstetrical visits performed in women's consultant centers) and therefore the conclusions are given regarding to them. If more inputs and outputs were included in the analysis, then its results would change as well.

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