Prediction Models for Utilization, Preference, and Satisfaction with the Services Provided in Primary Health Care Centers in Rural Areas

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Abstract

Background: A robust Primary Health Care (PHC) system is critical for efficient and equitable health system. There is a paucity of research addressing the predictors of its utilization and related patient satisfaction. **Aim of the study:** to develop models to identify the predictors of utilization, preference, and satisfaction with the services provided in the PHC Centers in rural areas. **Subjects and Methods:** This analytic study with prediction modeling was carried in three PHC centers in Fayoum city on a random sample of 300 attendants. Data were collected using a self-administered questionnaire with a scale for current visit and overall satisfaction. **Results:** Participants median age was 40 years, with slightly more males (56.0%); 35.7% preferred governmental health care settings, 30.0% were satisfied with the current visit, and 23.3% had an overall satisfaction with PHC services. The crowding index, being on medication, having previous hospital admission or surgery were positive predictors of PHC utilization. Having chronic disease and a private health insurance were positive predictors of PHC utilization, while being female, having sufficient income, having a crowding index 2+, and being on regular medication were negative factors. Female gender was a positive predictor of satisfaction, whereas the crowding index, having a chronic disease, and having had a previous surgery were negative predictors. **Conclusion:** The models indicate that despite high utilization, participants have low satisfaction and low preference for governmental settings. These are influenced by their personal characteristics and health status. **Recommendations:** The PHC authorities need to identify the factors underlying this low satisfaction and take proper measures for reform. Future research should explore the effects of such reforms on patients' utilization and satisfaction.

Keywords: Primary Health Care (PHC), Preference, Satisfaction & Utilization.

Introduction

Worldwide, Primary Health Care (PHC) is vital component for effective provision of healthcare services, being at the frontline of interaction between clients and the healthcare system **(Al Saffer et al., 2021)**. Nonetheless, this level of health care is still suffering many shortcomings often caused by the lack of optimal balance in the distribution of the resources allocated to healthcare services, with subsequent negative impact on its users **(Zhang et al., 2021)**. This has been reported alike in both developed and developing countries and would lead to low levels of clients' utilization and satisfaction **(Public Health England, 2019)**.

The situation is even worse in rural areas. The residents of these areas generally have lower socioeconomic levels in comparison with those living in urban areas. The majority of these populations depend on governmental subsidies. Most of them do not have health insurance whether private due to financial hardship or governmental being mostly self-employed in agriculture. Moreover, they have less access to public healthcare services particularly at secondary and tertiary levels and need to travel for long distances to reach to such settings **(Aldosari et al., 2017; Towne et al., 2021)**.

Patient satisfaction is an essential indicator of the quality of healthcare services provided **(Ameh et al., 2017; Jahan et al., 2021)** However, the measurement of patient satisfaction is not simple since it totally depends on his/her subjective evaluation of the service provided, reflecting feelings towards providers and the extent his/her needs and demands are fulfilled **(Sparkes et al., 2019)**. Thus, it has been criticized for being subjective with low validity, for the trade-off between pleasing patients and providing high-quality service, and the responses could only involve those clients with extreme experiences **(Anhang et al., 2015)** Yet patient satisfaction surveys remain as essential components of quality improvement programs in many developed countries such as the United States, United Kingdom, Canada, and Australia **(Wang et al., 2019)** Ongoing improvements of the measurement tools and scales were performed. Recently, a multimethod assessment including online surveys proved to be valid and efficient in measuring patient satisfaction **(Boylan et al., 2020)**.

The rural nurse plays an essential role in providing healthcare for citizens of small and isolated communities across the U.S. In fact, it is estimated that at least half the healthcare providers in rural areas are registered nurses. They may be the first and only point of contact for rural healthcare consumers. As demand for health care professionals in general is expected to rise, the need for rural nurses will also rise, and graduates of may find more opportunities than ever before. **(Bofarraj et al., 2020).**

Significance of the study

Egypt, being one of the developing countries, has many challenges with the healthcare services provision mostly due to shortage of resources. Hence, a robust PHC system is critical for efficient and equitable health system. Although the literature abounds with studies measuring patient satisfaction and use of PHC healthcare services, there is a paucity of research addressing their determinants and factors predicting them, particularly in the developing world. Such information is essential for stakeholders and decision-makers for improvement of the healthcare provided. (**Hamid et al., 2019**).

Aim of the study

The aim of this study was to develop models to identify the predictors of utilization, preference, and satisfaction with the services provided in the Primary Health Care Centers in rural areas.

Research questions:

• What are the factors that influencing client's satisfaction with the services provided in the Primary Health Care Centers (PHCs)?

• What are the predictors of utilization, preference, with the services provided in the PHC Centers?

Subjects and Methods

Research design: An analytic cross-sectional study design with multivariate analyses for prediction was utilized in conducting the study. This is a type of observational designs where data are collected at one point in time in order to examine the relation between an independent and a dependent variable in a defined population **(Schmidt & Brown, 2019).**

Setting: It was carried in three PHC centers, at Fayoum governorate, Egypt. They were randomly selected from a total of Five PHC centers in the city. named Keman Fares, Sheikh Hassanein, and Alhadiqa villages, at Fayoum governorate, Egypt. total time for data collection was three month started from july 2021 to the end of October 2021.

Population and sample: The sampling population consisted of all clients attending the PHC centers of the study during the time of data collection. Only

those who were unable to communicate due to physical or mental problems were excluded. The sample size was calculated to identify any factor influencing the utilization and/or satisfaction with PHC services with an Odds Ratio (OR) 2.5 or higher at 95% level of confidence and 80% study power. Using the **Demidenko (2007)** algorithm for calculation of sample size for logistic regression, the required total sample size was 276. This was increased 300 accounting for an expected non-response rate of approximately 10%. Subjects were recruited in the study using a non-probability consecutive sampling technique.

Data collection tool: Data were collected using a self-administered questionnaire developed by the researcher in view of related literature (**Hulka & Zyzanski, 1982; Suhonen et al., 2007; Ismail et al., 2020**), and based on the framework of quality care set by **Donabedian (2003)**. It consisted of three parts.

First tool: self-administered questionnaire:-

It was designed by the researchers and written in simple Arabic language. Data obtained were related to demographic characteristics of the studied such as age, gender, educational level, marital status, job type, place of residence, and income sufficiency, in addition to the history of chronic diseases, regular medications, previous hospital admission or surgery, use of health care services during last year, type of settings preferred, and having private health insurance.

Second tool: - Satisfaction with services provided in MCH:-

The second part assessed the satisfaction with the structure, process, and outcome of services used in the current visit. The structure domain assessed satisfaction with the waiting areas, examination rooms, lab/X-ray, and toilets (3 items each) in terms of availability, cleanliness, and comfort. The process domain assessed the numbers, punctuality, behavior, and competency of physicians, nurses, technicians, workers, and administration (4 items each), in addition to the examination/investigations (4 items), and pharmacy (2 items). The outcome domain assessed satisfaction with treatment success (4 items), and the occurrence of errors related to diagnosis and management (5 items).

Scoring: The responses were dichotomous either "satisfied" or "unsatisfied," scored one and zero respectively. The scores for each domain, and of the total satisfaction scale were summed-up and converted into percent scores. For categorical presentation, a total response of 60% or higher was considered "satisfied" whereas a response <60% was considered "unsatisfied."

Third tool:-asking the respondent about his/her overall satisfaction with the services:-

The third part of the tool consisted of one question asking the respondent about his/her overall satisfaction with the services. It was also on a 5-point Likert scale ranging from "Very good" to "Very poor," scored from five to one respectively. For the categorical presentation of this question, the "Very good" and "Good" responses were joined into one "Good" category, while the "Uncertain," "Poor," and "Very poor" were joined into a "Poor" category.

Validity and reliability: Once prepared, the data collection form was presented to three experts in Community Health Nursing who rigorously revised it for face and content validation. They reviewed the tool for tool comprehensiveness, relevance, proper sequence, and feasibility. The reliability was assessed by checking its internal consistency and had a Guttman split-half coefficient 0.886, indicating high level of reliability.

Pilot study: A pilot study was carried out on about 10% of the total study sample (30 clients attending the PHC centers) to evaluate the clarity and applicability of the data collection tool. It also served to estimate the time needed for filling the form, and consequently in setting a schedule for data collection. No changes were needed in the form, and thus the pilot subjects were included int the main study sample.

Fieldwork: After securing official permissions to conduct the study, the researcher met with the directors of selected PHC centers to explain the purpose of the study and the process of data collection. They were given a copy of the data collection forms to get their permission and cooperation in data collection. A schedule for data collection was set for each center during the morning shifts. The researcher then started the work by recruiting eligible subjects who were attending the center for service. They were invited to participate in the study after having a clear explanation of the study aim, and after being informed about their rights to participate or refuse. Those who consented were handed the data collection form and instructed in its filling. Help was provided for those unable to read or write through their accompanying persons or the researcher if alone. The time needed to fill the form was 20-25 minutes. The researcher was available for any queries, collected the filled forms, and checked for completeness.

Ethical considerations: The researcher got an approval of the study protocol by the Research Ethics Committee in Faculty of Nursing at Fayoum University. The study was conducted according to the Declaration of Helsinki (DoH) principles. An oral informed consent was obtained from each participant after having full information about the study aim and its procedures, and about their rights. The anonymity and confidentiality of any obtained information was secured.

Statistical analysis: Data entry and statistical analysis were carried out on the SPSS 20.0 statistical software package. Categorical variables were compared using chi-square test. Spearman rank correlation was used to assess the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the satisfaction score, multiple linear regression analysis was used and analysis of variance for the full regression models done. Loglinear regression analysis was used to identify the predictors of use and of the preference for governmental settings. Statistical significance was considered at p-value <0.05.

Results :

Table (1): Socio-demographic and health characteristics of participants (n=300)

Items	No.	%
Age:		
<40	57	19.0
40-	202	67.3
50+	41	13.7
Range	15-72	
Mean±SD	39.1±10.0	
Median	40.0	
Gender:		
Male	168	56.0
Female	132	44.0
Education:		
None	66	22.0
Basic	100	33.3
Secondary	111	37.0
University	23	7.7
Marital status:		
Unmarried (single/divorced/widow)	50	16.7
Married	250	83.3
Job:		
Employee	26	8.7
Manual Worker	159	53.0
Unemployed	115	38.3
Residence of origin:		
Rural	197	65.7
Urban	103	34.3
Income:		
Insufficient	69	23.0
Sufficient	227	75.7
Saving	4	1.3
Crowding index:		
<2	127	42.3
2+	173	57.7
Health characteristics:		
Have chronic disease	170	56.7
On regular medication	154	51.3
Visited PHC center during last year	188	62.7
Had last year hospital admission	208	69.3
Had previous surgery	225	75.0
Have a private health insurance	55	18.3
Prefer governmental setting	107	35.7

Table (2): Satisfaction with health service among participants (n=300)

Satisfied with:	No.	%
Structure: [#]		
Waiting areas	98	32.7
Examination rooms	112	37.3
Lab/X-ray	119	39.7
Toilets	91	30.3
Total structure	84	28.0
Process:		
Physicians	125	41.7
Nurses	135	45.0
Technicians	114	38.0
Workers	87	29.0
Administration	102	34.0
Examination/investigations	86	28.7
Pharmacy	97	32.3
Total process	112	37.3
Outcome:		
Treatment success	67	22.3
Errors	72	24.0
Total outcome	62	20.7
Total (current):		
Satisfied	90	30.0
Unsatisfied	210	70.0
Overall satisfaction with PHC services:		
Good	70	23.3
Poor	230	76.7

Table (3): Relations between participants' utilization of PHC during last year and their socio-demographic and health characteristics (n=300)

Items	Utilization				X^2 test	p-value
	No (n=112)		Yes (n=188)			
	No.	%	No.	%		
Age:						
<40	20	17.9	37	19.7		
40-	80	71.4	122	64.9	1.708	0.426
50+	12	10.7	29	15.4		
Gender:						
Male	59	52.7	109	58.0		
Female	53	47.3	79	42.0	0.600	0.439
Education:						
None	20	17.9	46	24.5		
Basic	41	36.6	59	31.4		
Secondary	44	39.3	67	35.6	2.689	0.442
University	7	6.3	16	8.5		
Marital status:						
Unmarried (single/divorced/widow)	11	9.8	39	20.7		
Married	101	90.2	149	79.3	6.030	0.014*
Job:						
Employee	7	6.3	19	10.1		
Worker	61	54.5	98	52.1	1.319	0.517
Unemployed	44	39.3	71	37.8		

Items	Utilization				X^2 test	p-value
	No (n=112)		Yes (n=188)			
	No.	%	No.	%		
Residence of origin:						
Rural	56	50.0	141	75.0		
Urban	56	50.0	47	25.0	19.457	<0.001*
Income:						
Insufficient	25	22.3	44	23.4		
Sufficient/Saving	87	77.7	144	76.6	0.047	0.829
Crowding index:						
<2	88	78.6	39	20.7		
2+	24	21.4	149	79.3	96.140	<0.001*
Have chronic disease	33	29.5	137	72.9	53.857	<0.001*
On regular medication	18	16.1	136	72.3	88.953	<0.001*
Had last year hospital admission	27	24.1	181	96.3	171.930	<0.001*
Had previous surgery	63	56.3	162	86.2	33.511	<0.001*
Has private health insurance	29	25.9	26	13.8	6.822	0.009*
Prefer governmental setting	50	44.6	57	30.3	6.276	0.012*

(*) Statistically significant at p<0.05

Table (4): Relations between participants' total current satisfaction with PHC and their socio-demographic and health characteristics (n=300)

	Current satisfaction				X^2 test	p-value
	Satisfied (n=90)		Unsatisfied (n=210)			
	No.	%	No.	%		
Age:						
<40	24	26.7	33	15.7		
40-	55	61.1	147	70.0	4.913	0.086
50+	11	12.2	30	14.3		
Gender:						
Male	49	54.4	119	56.7		
Female	41	45.6	91	43.3	0.126	0.722
Education:						
None	15	16.7	51	24.3		
Basic	27	30.0	73	34.8		
Secondary	38	42.2	73	34.8	5.028	0.170
University	10	11.1	13	6.2		
Marital status:						
Unmarried (single/divorced/widow)	14	15.6	36	17.1	0.114	0.735
Married	76	84.4	174	82.9		
Job:						
Employee	8	8.9	18	8.6		
Manual Worker	47	52.2	112	53.3	0.032	0.984
Unemployed	35	38.9	80	38.1		
Residence of origin:						
Rural	49	54.4	148	70.5		
Urban	41	45.6	62	29.5	7.182	0.007*
Income:						
Insufficient	19	21.1	50	23.8		
Sufficient/Saving	71	78.9	160	76.2	0.259	0.610
Crowding index:						
<2	66	73.3	61	29.0	50.613	<0.001*

	Current satisfaction				X² test	p-value
	Satisfied (n=90)		Unsatisfied (n=210)			
	No.	%	No.	%		
2+	24	26.7	149	71.0		
Have chronic disease	24	26.7	146	69.5	47.123	<0.001*
On regular medication	26	28.9	128	61.0	25.926	<0.001*
Visited PHC center last year	34	37.8	154	73.3	34.043	<0.001*
Had last year hospital admission	43	47.8	165	78.6	28.097	<0.001*
Had previous surgery	45	50.0	180	85.7	42.857	<0.001*
Has private health insurance	11	12.2	44	21.0	3.207	0.073
Prefer governmental setting	36	40.0	71	33.8	1.052	0.305

(*) Statistically significant at p<0.05

Table (5): Relations between participants' preference of governmental PHC and their socio-demographic and health characteristics (n=300)

Items	Preference of governmental PHC				X² test	p-value
	No (n=193)		Yes (n=107)			
	No.	%	No.	%		
Age:						
<40	35	18.1	22	20.6		
40-	133	68.9	69	64.5	0.615	0.735
50+	25	13.0	16	15.0		
Gender:						
Male	108	56.0	60	56.1		
Female	85	44.0	47	43.9	0.000	1.000
Education:						
None	43	22.3	23	21.5		
Basic	60	31.1	40	37.4		
Secondary	71	36.8	40	37.4	4.192	0.241
University	19	9.8	4	3.7		
Marital status:						
Unmarried (single/divorced/widow)	34	17.6	16	15.0		
Married	159	82.4	91	85.0	0.352	0.553
Job:						
Employee	16	8.3	10	9.3		
Manual Worker	104	53.9	55	51.4	0.205	0.902
Unemployed	73	37.8	42	39.3		
Residence of origin:						
Rural	136	70.5	61	57.0		
Urban	57	29.5	46	43.0	5.529	0.019*
Income:						
Insufficient	32	16.6	37	34.6		
Sufficient/Saving	161	83.4	70	65.4	12.59	<0.001*
Crowding index:						
<2	69	35.8	58	54.2		
2+	124	64.2	49	45.8	9.603	0.002*
Have chronic disease	108	56.0	62	57.9	0.110	0.740
On regular medication	112	58.0	42	39.3	9.717	0.002*
Had last year hospital admission	138	71.5	70	65.4	1.198	0.274
Had previous surgery	142	73.6	83	77.6	0.586	0.444
Has private health insurance	20	10.4	35	32.7	22.961	<0.001*

(*) Statistically significant at p<0.05

Table (6): Correlation of participants' satisfaction and evaluation scores and their characteristics

Items	Spearman's rank correlation coefficient				
	Current satisfaction with				Overall satisfaction with PHC service
	Structure	Process	Outcome	Total	
Current satisfaction with:					
Structure	1.000				.545**
Process	.679**	1.000			.664**
Outcome	.654**	.641**	1.000		.544**
Total	.888**	.894**	.825**		.683**
Overall satisfaction	.545**	.664**	.544**	.683**	1.000
Characteristics:					
Age	-.187**	-.195**	-.285**	-.257**	-.167**
Education level	.046	.130*	.159**	.122*	.045
Income	-.075	-.003	.054	-.028	-.091
Crowding index	-.426**	-.332**	-.429**	-.421**	-.227**

(*) Statistically significant at p<0.05   (**) Statistically significant at p<0.01

Table (7): Best fitting multiple logistic regression model for PHC utilization and preference of governmental settings

Items	Wald	Degree of Freedom (Df)	P-value	Odds Ratio (OR)	95.0% Confidence Interval (CI) for OR	
					Upper	Lower
PHC utilization						
Constant	8.669	1.00	0.003	0.02		
Married	3.901	1.00	0.048	0.27	0.07	0.99
Crowding index	17.311	1.00	0.000	7.10	2.82	17.89
On medication	8.984	1.00	0.003	4.84	1.73	13.58
Previous hospital admission	51.746	1.00	0.000	53.62	18.12	158.69
Had previous surgery	3.976	1.00	0.046	3.63	1.02	12.91
Have private health insurance	5.196	1.00	0.023	0.30	0.11	0.85
Nagelkerke R Square: 0.77	Hosmer and Lemeshow Test: p=0.616			Model significance: p<0.001		
Preference of governmental settings						
Constant	9.732	1	.002	13.88		
Income	9.609	1	.002	.40	.22	.71
Crowding index	7.268	1	.007	.41	.22	.79
Have chronic disease	12.729	1	.000	7.23	2.44	21.45
On medication	9.407	1	.002	.18	.06	.54
Have private health insurance	6.057	1	.014	2.53	1.21	5.30
Overall satisfaction score	11.579	1	.001	6.10	2.15	17.27
Nagelkerke R Square: 0.28	Hosmer and Lemeshow Test: p=0.247			Model significance: p<0.001		

Table (8): Best fitting multiple linear regression model for the satisfaction score

Items	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	Beta	Std. Error				Lower	Upper
Satisfaction score							
Constant	77.00	7.33		10.505	<0.001	62.57	91.43
Female gender	7.79	3.15	0.12	2.476	0.014	1.60	13.99
Crowding Index	-19.65	3.44	-0.31	-5.712	<0.001	-26.42	-12.88
Have chronic disease	-10.76	3.71	-0.17	-2.899	0.004	-18.07	-3.46
Had previous surgery	-16.56	3.99	-0.23	-4.149	<0.001	-24.42	-8.71

r-square=0.30   Model ANOVA: F=31.89, p<0.001
Variables entered and excluded: age, education, job, marital status, income, residence, on medication, previous hospital admission, used setting last year, have private health insurance

Table (1): The study included 300 participants, with slightly more males (56.0%) as presented in. The highest percentages (37.0%) were having secondary education, while only 7.7% had a university degree. Slightly more than a half of them (53.0%) were manual workers, and 38.3% were unemployed (including housewives and retired). Approximately two thirds of them (65.7%) were originally from rural areas, and 75.7% reported having sufficient income. More than a half of them were having a crowding index of two or more persons/room. As regards their health characteristics, the table illustrates that more than a half were having chronic diseases, on regular medication, and had visited a PHC center during the last year. Moreover, more than two-thirds reported had hospital admission during the last year, and 75% had previous surgery. Only 18.3% of them were having a private health insurance, and 35.7% preferred governmental health care settings.

Table (2): Shows that only less than one-third (30.0%) of the participants expressed their satisfaction with the current PHC visit, and less than one-fourth (23.3%) had an overall satisfaction with the PHC services. Their highest satisfaction was the process items (37.3%), while the lowest was with the outcome (20.7%).

Table (3): Concerning PHC utilization, points to statistically significant relations with participants' marital status, residence, and crowding index, as well as with having chronic disease, being on regular medication, had hospital admission during last year, had previous surgery, having private health insurance, and preferring governmental settings. It is evident that the percentages of those unmarried, having rural residence of origin, and having a crowding index 2+ were higher among those participants who reported utilization. Moreover, the percentages of those having chronic disease, on regular medication, had hospital admission during last year, and had previous surgery were higher among those who reported utilization of PHC services. On the other hand, the percentages of those having private health insurance and preferring governmental settings were lower among those who were utilizing PHC services. (p<0.05).

Table (4): As displayed in statistically significant relations were revealed between participants' current visit satisfaction and their residence, crowding index, having chronic disease, being on regular medication, had visited PHC center last year, had hospital admission during last year, and had previous surgery. The percentages of those having urban residence and having a crowding index <2 were higher among the satisfied participants. Conversely, the percentages of those having chronic disease, on regular medication, who visited PHC center last year, had hospital admission during last year, and had previous surgery were lower among satisfied participants (p<0.05).

Table (5): Demonstrates statistically significant relations between participants' preference of governmental healthcare settings and their residence, income, and crowding index, as well as with being on regular medication, and having private health insurance. As the table indicates, the percentages of those having urban residence, insufficient income, and having a crowding index <2, as well as having private health insurance were higher among those participants who preferred governmental settings. Conversely, the percentages of those on regular medication were lower among them (p<0.05).

Table (6): Illustrates the presence of statistically significant moderate positive correlations among the three dimensions of current satisfaction, and between them and the overall satisfaction with PHC services. The table also shows statistically significant weak to moderate negative correlations between all satisfaction scores and participants' age and crowding index. Meanwhile, the level of education correlated positively with the current visit satisfaction with process and outcome, as well as the total score. No significant correlations could be revealed with income. (p<0.05).

Table (7): The model developed by multiple logistic regression analysis identified participants' crowding index, being on medication, having previous hospital admission or surgery as independent predictors positively influencing their PHC utilization. They would increase utilization by approximately seven, four, fifty-three and three times as indicated by their Odds Rations (ORs). Conversely, being married and having private health insurance were negative predictors.

The same table also shows that participants' having chronic disease and having a private health insurance were independent predictor factors positively influencing their preference of governmental setting. They would increase their preference by approximately seven and two times as indicated by their Odds Ratios (ORs). Moreover, the overall satisfaction positively predicted the preference for governmental settings. Conversely, having sufficient income, having a crowding index 2+, and being on regular medication were negative predictors.

Table (8): As regards satisfaction, linear regression model indicates that participants' female gender was the only statistically significant independent positive predictor of the satisfaction score. Conversely, the crowding index, having a chronic disease, and having had a previous surgery were statistically significant negative predictors.

Discussion

This study sought to develop models to identify the predictors of utilization, preference, and satisfaction with PHC centers services. It shows generally low satisfaction, which seems to be higher among women, and lowered by having chronic diseases, and/or having had a previous surgery. Meanwhile, the crowding index, being on medication, and previous surgery/hospital admission, as well as having private health insurance appear to be important predictors influencing utilization and preference of service.

The present study indicates generally high rate of utilization of PHC services, where approximately two-thirds of the participants reported having visited the centers during the last year. This high rate is expected in such rural areas where the PHC center is considered the main provider of health services. It is also a major and probably only providers of certain preventive services such as the immunization. In congruence with this, **Nunu & Munyewende (2017)** reported that the majority of healthcare service seekers in South Africa do utilize PHC settings.

The present study bivariate analyses revealed that the unmarried subjects originally from rural areas, and having a high crowding reported higher rates of utilization. The multivariate analysis confirmed the independent positive impact of the unmarried status and high crowding index on PHC services utilization. These socio-demographic characteristics are indicative of a lower socioeconomic level, which is an important factor influencing utilization of PHC centers. In agreement with this, a study in China demonstrated that patients' socioeconomic circumstance were significant predictors of their selection and utilization of the PHC services **(Wan et al., 2021)**.

As regards the health-related predictors of utilization of PHC services, the current study results demonstrated that the participants having chronic disease, who were on regular medication, had hospital admission during last year, and had previous surgery reported more utilization. The independent positive impact of the factors of being on medication and having had previous hospital admission or surgery was confirmed in multivariate analysis. This finding is quite expected given the higher need for medical care among these participants and is in line with those reported by **Mitričević et al. (2021)** in a study in Serbia. Conversely, the utilization was less among those having private health insurance in the present study, and this was confirmed in multivariate analysis. It underscores the role of private sector in decreasing the load on PHC centers. A similar effect of the type of health insurance on use and trust of public PHC services was reported in a study in Iran **(Sadeghi Bazargani et al., 2020)**.

The present study has also assessed participants' satisfaction with the PHC services. According to the study results, only less than one-third of the PHC attendants in the study sample expressed their satisfaction with the services provided to them during the current visit. Even worse, their overall satisfaction was as low as less than one-fourth. The findings are quite alarming and should alert the PHCCs administration to identify the reasons underlying these high rates of dissatisfaction. In congruence with this, a study of patient satisfaction with primary care services in Saudi Arabia reported that only 28.3% of the participants were satisfied with the services provided **(AlOmar et al., 2021)**. Conversely, a study in Lebanon reported markedly high satisfaction rates with PHC services **(Hemadeh et al., 2019)**. The discrepancy could be explained by the survey methodology, where this last study was conducted through phone interviews, which would lead to interviewer's bias as mentioned by **Drake et al. (2014)**.

The area with the lowest satisfaction rate was that of the outcome of service. Thus, only around one-fifth of the respondents turned to be satisfied with the service outcomes. This indicates that the participants were least satisfied with the rates of treatment success as well as the absence of errors related to treatment. The findings could be attributed to the lack of resources as well as the level of qualification and professional training of the service providers, which would also have a negative repercussion on their behaviors in dealing with the patients. Analogous results were reported in a study of patient satisfaction in three Eastern European countries **(Ahiyevets et al., 2020)**.

As for the predictors of satisfaction, the present study bivariate analyses showed that the participants residing in urban areas and having a lower crowding were more satisfied. Meanwhile, the analyses showed negative correlations with age and crowding index, and a positive correlation with the level of education. However, the multivariate analysis identified female gender as an independent positive predictor of the satisfaction score, while the crowding index was a negative predictor. The higher satisfaction among women could be attributed to better tolerance. Moreover, the majority being housewives they may have more time to spend at the PHC center and thus may be less plaintive about long waiting time and delays of service. In line with this, a study in Brazil reported higher satisfaction with PHC services among those having no job **(Aldosari et al., 2017)**.

On the other hand, the higher satisfaction among those having a low crowding index could be due to their less utilization of the PHC services as the present study results revealed. Thus, their chances of being faced with service shortcomings and problems

that lead to dissatisfaction could be less. In the same vein, a study in Turkey reported a significant association between patients' low socio-economic level, as indicated by higher crowding index, and their satisfaction with the PHC services provided **(Hone et al., 2017)**.

The present study has also identified having a chronic disease and having had a previous surgery as significant independent negative predictors of the satisfaction score. This could be attributed to their more need for utilization of the PHC services either for follow-up and/or for dispensing medications. Therefore, their more frequent encounters with the service and service providers could make them more likely to be unsatisfied. The finding is in agreement with what was reported in a study in China, where the patients having chronic diseases were the least satisfied with the services provided in PHC centers **(Liu & Mao, 2019)**.

The current study has also investigated participants' preference of governmental healthcare settings and its predictors. The results revealed that only slightly more than one-third of them preferred governmental healthcare settings. The finding is expected given the low resources in such settings. The predictors of this preference were living in urban area, having insufficient income, having a crowding index <2, not on regular medication, and having private health insurance. However, in the multivariate analysis, the most important predictors were having chronic diseases as well as the overall satisfaction score. This is quite plausible given that the medications for chronic diseases are dispended in such settings, which would also foster participants' satisfaction. The findings are in accord with those of **Jia et al. (2020)** in a study in China, where the presence of chronic diseases was identified an important predictor of patient's preference of the type of healthcare service providers.

Lastly, the present study revealed statistically significant moderate positive correlations between the scores of each of the three dimensions of current satisfaction and its total from one side, and the overall satisfaction score from the other side. The finding adds to the reliability of the satisfaction scale used in the study. A similar approach to ensure the reliability of a scale is used in the HRQoL scale where the respondent is asked about overall quality of life after filling a 36-item scale **(RAND, 2016)**.

Conclusion

In conclusion, the developed regression models indicate that despite their high utilization of PHC services, participants have low satisfaction and low preference for governmental settings. These are influenced by their personal characteristics and health status.

Recommendations

The PHC authorities need to identify the factors underlying this low satisfaction and take proper measures for reform. Patient satisfaction surveys could help in doing this. Future research should explore the effects of such reforms on patients' utilization and satisfaction.

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