The Dilemma of Underutilized Health Insurance: A Matched Case-Control Study Investigating Reasons in Iran's Free Universal Health Insurance

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Abstract

Background: In May 2014, the Iranian government announced it would cover all uninsured Iranians. Despite free-of-charge insurance, the studies found that the coverage still needed to be completed (93%). This study aimed to understand why certain population groups remain without insurance despite the accessibility of free-of-charge coverage. This issue is not unique to Iran; it is prevalent in many other countries where, despite free coverage, not all individuals avail themselves of it, thereby exposing themselves to risks.

Methods: In a matched case-control study, 89 non-insured patients were compared with 178 hospital-based controls with health insurance (2:1). The samples were recruited at one of the leading public hospitals in the country (Imam Khomeini Hospital Complex in Tehran) in 2019. Two insured controls were selected and matched for age (± five years) and sex for each person without insurance. A conditional logistic regression was performed to assess the magnitude of effects and the goodness of fit test used to examine the model.

Results: Unemployment (Odds Ratio (OR)=8.33, 95% Confidence interval (CI): 1.05-50.0), being single (OR=3.69, CI: 1.18-11.55), low economic status (OR=1.85, CI: 1.02-3.33) and attitude towards performance of health insurance (OR=0.86, CI: 0.75-0.99) were affected not having health insurance.

Conclusion: Approaches that cover the entire population may struggle to ensure no one is left without needed services. There is a need for greater focus on vulnerable groups to achieve universal health coverage conscientiously. Moreover, improved services and education can positively shape public perceptions of insurance efficacy, affecting their enrollment choices.

Keywords: Health sector reform; Financial protection; Health insurance; Universal health coverage

Introduction

Universal Health Coverage (UHC) is defined as "all people have access, without discrimination, to

nationally determined sets of the needed promotive, preventive, curative, rehabilitative and pallia-

tive essential health services, and essential, safe, affordable, effective, quality and accessible medicines and vaccines, while ensuring that the use of these services does not expose the users to financial hardship, with a special emphasis on the poor, vulnerable, and marginalized segments of the population" (1). To achieve this UHC goal by 2030: 1) all people, independent, have at a minimum 80% coverage of essential health services and 2) 100% financial protection from out-of-pocket payments for health services (2). Social or universal health insurance is one way to reach the UHC goal of providing adequate financial protection (3).

In the past two decades, governments have made health services available through supportive mechanisms and population coverage in social insurance designs (4). However, many low and middle-income countries still need to be challenged by financing health systems since limited revenue collection for health and fragmentation of health insurance are two main problems that make health expenditures insufficient (5). Weak health financing policies can result in excessive out-of-pocket payments for health care. This spending restricts healthcare utilization and exposes them to financial risks (6). One of the best ways to protect vulnerable people against these high costs of health care services is to create a strong partnership among government, insurance organizations and people (7-10).

In Iran, the health system is insurance-based, which significantly affects health system performance (11). The country has been using the benefits of universal coverage of primary health care services since the 1990s (12). In 1994, Parliament passed the "Universal Health Insurance Act." Since then, several initiatives have been performed to improve insurance coverage to protect people against financial risks and healthcare costs (13). In many countries, including Iran, health systems provide two main health service packages: basic and complementary. The basic package supports essential health services. Identifying these services is one of the problems that insurance organizations face. About 30%-35% of health sector costs are allocated to these services, and the government funds a significant part of these costs. The second package supports medical care services financed by a separate contract with individuals (9, 14-16). The main insurance funds in the country for a basic package of services are 1) The Social Security Organization (SSO), 2) The Armed Forces Medical Services Insurance Organization, and 3) The Iran Health Insurance Organization (IHIO). While the first two funds cater to specific employee groups, OHIO is one of the country's insurance policies for low-income people and people not covered by other insurance (9, 11, 13).

The massive movement of the health sector reform in Iran to achieve UHC commenced in May 2014. One of the primary goals of this reform was financial protection for all citizens. The initiative, the Health Transformation Plan (HTP), was initially launched at the time of endorsement of the long-term roadmap of the country's health. It stood as one of the foremost domestic agendas of the government and allocated significant resources to itself (17). Hence, the possibility of insurance for all segments of society without payment of insurance premiums was established. Essentially, insurance coverage for all individuals was provided by public resources, and people only needed to register for it. The insurance coverage was 81.9 per cent before the HTP. After that, despite being covered under the IHIO, insurance coverage still needed to reach full coverage. However, these insurance organizations have achieved acceptable coverage, about 93%; according to the latest report, 7% of people are not covered by insurance coverage (18).

Moreover, in recent years, about 50% of healthcare costs have been paid directly by the household (out-of-pocket payment) (19). However, the out-of-pocket payment in 2017 was 32.5% based on the Statistical Center of Iran report in the National Health Account report of 2017. This study is significant for two main reasons. Firstly, it can identify the reasons behind the lack of universal insurance coverage in Iran, who is left uncovered, and why. Secondly, many countries undergo similar experiences in achieving UHC. This study can shed light on the challenges associated with the universal approach, which aims to provide all segments of society with access

to insurance-covered services. We aimed to clarify the main reasons for not being under health insurance coverage, focusing on free and low-cost insurance. The main reason for this study is the importance of health insurance coverage for protecting vulnerable people and the lack of complete health insurance coverage despite diverse insurance plans, including low-cost and even free policies.

Methods

In a matched case-control study, 89 non-insured patients were compared with 178 hospital-based controls with health insurance (2:1). Two controls were selected, matched for age (± five years) and sex for each person without insurance. The criterion for choosing cases was the lack of health insurance, and the controls had one of the basic health insurances. The samples were recruited at Imam Khomeini Hospital Complex in Tehran, Iran, in 2019, a referral center with almost 1,300 beds that provides a full range of care facilities to patients from all over the country.

Individuals were selected from different hospital wards, including the infectious, gynecological, internal, surgical, coronary, neurological, digestive, and endocrinology wards to minimize the selection bias. A random sampling method was used to select controls so that for each case chosen from a ward, two matched controls were selected from the same ward. The data collection tool was a questionnaire including demographic information, insurance information, and the attitude of study subjects towards health insurance consisting of whether it is 1) need and eligibility and 2) performance, self-rated health, and economic status.

A conditional logistic regression analysis with a significance level of 0.05 was investigated. The analysis employed a systematic approach to model development. Initially, a full model encompassing all variables was constructed. Subsequently, a stepwise process was undertaken over three stages, eliminating variables with high p-values. This process led to the derivation of a final model comprising five variables. The model's goodness of fit was assessed through the pseudo-R^2 value obtained from the McFadden test. The Likelihood Ratio test's p-value was utilized to confirm the similarity between the final and previous models, thereby validating the chosen model.

Ethical approval for this study was obtained from the School of Public Health at Tehran University of Medical Sciences, Ethics Committee, under study number IR.TUMS.SPH.REC.1397.100. Informed consent was obtained from all participants before interviewing them.

Results

Table 1 illustrates the characteristics of the study subjects. 60.7% of the total samples were women, and 39.3% were men. The mean age of the cases was 36.3 years with a Standard Deviation (SD) of 10.5 and 40.1 for controls with a SD of 9.4. The youngest and oldest study subjects were 17 and 65, respectively. The mean score of attitudes towards insurance performance was 1.33 in cases with a Standard Error (SE) of 0.23 and 2.26 in controls with an SE equal to 0.18. Moreover, the attitude on the necessity and eligibility was 0.72 in the cases (SE=0.11) and 1.12 in the controls (SE=0.09).

The level with the baseline sample size was used as the reference for estimations to estimate the odds ratio in variables with more than two levels. Since the economic status variable in the population does not have a normal distribution and the distribution is skewed, the median was used to consider the cut-off point for the variable classification rather than the mean; it is not affected by outliers. For this purpose, the median of the control group was selected because it had a better economic representation of the community than the case group.

In the univariate analysis, the low economic status was a predictor for not having health insurance. However, there was no significant difference in insurance coverage between the self-employed and the unemployed group. In addition, the two groups had no significant difference in self-rated health status. For each unit increase in the attitude towards performance of insurance score, the odds

of not being insured decrease by 0.16. For each unit increase in attitudes on the necessity and eligibility, the odds of not being insured is 0.25 times. Table 2 presents the adjusted effects of variables in both the full and finalized models. Ultimately, four variables remained significant. The final model demonstrated an acceptable goodness-of-fit, and the P-value obtained from the LR test indicated no difference from the previous model. However, in this updated model, the history of hospitalization was retained, characterized by a P-value of 0.08.

As illustrated in the table, the variables are as follows: attitude towards the performance of health

insurance (Odds Ratio (OR) = 0.86, 95% Confidence Interval (CI): 0.75-0.99), high economic status (OR = 0.54, CI: 0.3-0.98), being single (OR = 3.69, 95% CI: 1.18-11.55), and being employed (OR = 0.12, CI: 0.02-0.95).

It's worth noting that referencing the level with a larger sample size for better interpretation, mainly concerning economic status and employment, is recommended. Therefore, when examining these two variables, it's preferable to state that low economic status (compared to high economic status) has an OR of 1.85 with a CI of 1.02-3.33, and unemployment (compared to employment) shows an OR of 8.33 with a CI of 1.05-50.0.

Table 1: Characteristics of cases and controls and the crude estimate of their relationship with being insured

Variable	Categories	Case	Controls	Odds Ratio (95%CI)
Sex	Male	35(39.3)	70(39.3)	Ref
	Female	54(60.7)	108(60.7)	1(0.59-1.6)
Resident	Rural	4(4.5)	4(2.2)	Ref
	Urban	85(95.5)	174(97.8)	0.49(0.12-2.0)
Relevance to the head of household	Spouse	39(43.8)	96(53.9)	Ref
	Head of household	32(36.0)	68(38.2)	1.16(0.66-2.03)
	Children—daughter-in-law or son-in-law	18(20.2)	14(7.9)	3.16(1.43-6.98)
Marital status	Married	66(74.2)	155(87.1)	Ref
	Widowed-divorced	9(10.1)	14(7.9)	1.51(0.62-3.66)
	Single	14(15.7)	9(5.1)	3.65(1.51-8.86)
Education	Illiterate or primary school	19(21.3)	22(12.4)	Ref
	Middle or high school	47(52.8)	102(57.3)	0.53(0.26-1.08)
	University level	23(25.8)	54(30.3)	0.49(0.22-1.08)
Occupation	Unemployed, student or housewife	49(55.1)	84(47.2)	Ref
	Self-employed	39(43.8)	65(36.5)	1.03(0.61-1.75)
	Retired or employed	1(1.1)	29(16.3)	16.9(2.23-128.08)
Economic status *	Low	50(56.2)	56(31.5)	Ref
	Up	39(43.8)	122(68.5)	0.36(0.21-0.61)
Self-rated health	Very poor to normal	41(46.1)	69(38.8)	Ref
	Good and very good	48(53.9)	109(61.2)	0.74(0.44-1.24)
Hospitalization history (last year)	No	70(78.7)	130(73.0)	Ref
	Yes	19(21.3)	48(27.0)	0.73(0.40-1.35)

*The economic status considered income of family per capita. This indicator did not have a normal distribution; the median was used to define a cut-off point for classifying people. The median of the control group was 3,125,000 Rials, considered the cut-off point

Table 2: Adjusted effect of variable on insurance coverage through Conditional logistic Regression

Variable		Full model		Final model	
		Odds Ratio (95%CI)	*P*-value	Odds Ratio (95%CI)	*P*-value
Attitude towards the performance of insurance		0.90(0.74-1.10)	0.32	0.86(0.75-0.99)	0.04
Attitude on the necessity of insurance and eligibility		0.85(0.59-1.22)	0.39	Omitted from model	NR
Economic status		0.54(0.28-1.04)	0.06	0.54(0.30-0.98)	0.045
Self-rated health		1.06(0.73-1.54)	0.77	Omitted from model	NR
Marital status[1]	Widowed-Divorced	0.84(0.32-2.21)	0.71	0.93(0.35-2.42)	0.88
	Single	3.51(0.98-12.53)	0.053	3.69(1.18-11.55)	0.02
Education[2]	Middle or high school	0.56(0.23-1.37)	0.20	Omitted from model	NR
	University degree	0.92(0.26-3.26)	0.89	Omitted from model	NR
Occupation[3]	Self-employed	1.31(0.45-3.79)	0.62	1.37(0.48-3.86)	0.55
	Retired or employed	0.87(0.01-0.75)	0.02	0.12(0.02-0.95)	0.04
Hospitalization history (last year)		0.51(0.24-1.08)	0.07	0.53(0.26-1.09)	0.08

NR: Not relevant.1) baseline: Married 2) baseline: illiterate or primary school 3) baseline: unemployed, student or housewife

Discussion

This study aimed to determine the reasons for not using free health insurance. Therefore, the variables of unemployment (OR = 8.33), low economic status (OR = 1.85), being single (OR = 3.69), and attitude towards the performance of insurance (OR = 0.86) were the significant variables affecting insurance coverage in this study.

The findings of this study indicate that specific segments of the population remain uninsured. These include unemployed individuals who belong to lower economic classes and those who are single or not part of a family unit, thus unable to benefit from insurance coverage through other family members. These highlights societal segments being left behind and necessitates attention to these groups.

An important point to note is that in the data analysis of this study, the second-order interactions of variables were evaluated, all of which held significance. However, they were not reported because they did not alter the direction of the relationship

between independent variables (qualitative interaction).

Having the economic status is effective in the purchase of insurance. For people with a lower economic status, the odds of not being insured are 1.85 times higher than those with a higher economic status. This can be due to structural factors coming with economic hardship, considering that insurance is free under HTP. Many studies highlight lower insurance coverage in low economic groups, including basic, private or supplementary health insurance (20-25).

This study was conducted in a public hospital, where the diversity of individuals' economic statuses under study is expected to be limited. If the study were not based in a hospital setting, the odds ratio obtained for this variable likely indicates a larger magnitude.

Another effective variable on insurance was marital status. In this study, being single increases the chance of having no insurance compared to the married group by 3.69 times. One of the reasons for this difference and the risk of being single can be due to a lack of support in the family. Married

people tend to have health insurance for reasons such as the need to protect their children (26), cover through their spouse (22), and more concern about catastrophic health expenditures. This finding was consistent with many other studies (22, 25-30).

The finding shows that having formal jobs is a substantial factor for insurance. Employment and economic status are somehow related, and both variables are significant in this study. The employment mechanism in Iran is such that if someone is employed in the formal sector, health insurance will cover themself and their family, so almost all these individuals are insured. Several other studies also have pointed to this effect (23, 25, 30-34).

This finding suggests that individuals' attitude towards insurance performance is not favourable. Another study has also pointed out that whatever individuals are aware of the services provided by insurers, and the more they bring benefits to them, the willingness of individuals to insure increases (19). Therefore, this attitude is crucial in deciding whether to be insured.

There was no significant difference between education levels between the two groups. Many studies have found a significant relationship between the level of education and having insurance, but this was not observed in this study for the reasons mentioned above (20, 23, 25, 35-39).

The self-rated health status was not significant in this study. However, other studies have reported a negative correlation between self-rated health and the willingness to purchase insurance (20, 34, 40). A review study indirectly pointed out that the method and mechanisms of insurance purchasing significantly affect decision-making or even ignore insurance coverage. This, of course, does not correspond with the results of this study (20). Notably, to prevent selection bias, the sampling of this study was from most of the hospital wards and according to the size of the patients in each ward. Moreover, to provide compensating bias, the controls were taken from the same wards to offer the possibility of unbiased comparison.

Conclusion

There exist various approaches to mitigate health inequalities. One is the intervention across the entire population, known as the universal approach. Two other approaches include the proportionate, which intervenes based on the extent to which individuals lack access, and the targeted approach, which covers specific groups. The HTP has adopted the universal approach, aiming to benefit society. However, this study demonstrates that specific community segments still need universal insurance coverage despite this approach. It is essential to consider policies to ensure the benefits of universal coverage leave no one behind. Another aspect is that by providing high-performing insurance services and informing the public, their perception of insurance can improve; otherwise, they may not opt for insurance.

Journalism Ethics considerations

The authors have entirely observed ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.).

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Conflict of interest

The authors declare that there is no conflict of interest.

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