

# Socioeconomic Determinants of Unmet Healthcare Needs in Iran

**Sajad Vahedi**

Ahvaz Jondishapour University of Medical Sciences

**Amin Torabipour**

Ahvaz Jondishapour University of Medical Sciences

**Amirhossein Takian** (✉ [takian@tums.ac.ir](mailto:takian@tums.ac.ir))

Tehran University of Medical Sciences

**Saeed Mohammadpur**

Iran University of Medical Sciences

**Alireza Oliaeemanesh**

Tehran University of Medical Sciences

**Mohammad Mehdi Kiani**

Tehran University of Medical Sciences

---

## Research article

**Keywords:** Iran, Healthcare services, Access, Unmet need

**Posted Date:** March 23rd, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-18662/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

**Version of Record:** A version of this preprint was published on March 6th, 2021. See the published version at <https://doi.org/10.1186/s12889-021-10477-6>.

# Abstract

**Background:** Unmet need is a critical indicator of access to healthcare services. Despite concrete evidence about unmet need in Iran's health system, no recent evidence of this negative outcome is available. This study aimed to measure the subjective unmet need (SUN), the factors associated with it and various reasons behind it in Iran.

**Methods:** We used the data of 13005 respondents over the age of 15 from the Iranian Utilization of Healthcare Services Survey in 2016. SUN was defined as citizens whose needs were not sought through formal healthcare services, while they did not show a history of self-medication. The reasons for SUN were categorized into availability, accessibility, responsibility and acceptability of the health system. The multivariate logistic regression was used to determine significant predictors of unmet need and associated major reasons.

**Results:** About 17% of the respondents (N=2,217) had unmet need for outpatient services. Nearly 40% of the respondents chose only accessibility, 4% selected only availability, 78% chose only responsibility, and 13% selected only acceptability as the main reasons for their unmet need. Low education was associated with higher responsibility-related SUN, while it could also reduce acceptability-related SUN. While SUN and responsibility-related SUN were prevalent among lower economic quintiles and people with higher outpatient needs, having a complementary insurance was associated with decreased SUN and responsibility-related SUN. The elderly and those with basic insurance had lower chances to face with responsibility-related SUN, while employed individuals were at risk to experience SUN.

**Conclusion:** It seems that Iran is still suffering from unmet need for outpatient services, most of which emerges from its health system performance. The majority of the unmet health needs could be addressed through improving financial as well as organizational policies. Special attention is needed to address the unmet need among individuals with poor health status. **Keyword:** Iran, Healthcare services, Access, Unmet need

## Background

As one of the most fundamental dimension of social justice, access to healthcare services is often considered as a pillar of equity in any healthcare system [1, 2]. Evaluating access to required healthcare services is the key factor for healthcare policy makers to address inequalities in the healthcare delivery and boost health outcomes [3, 4]. However, access is a relatively complex and multidimensional concept that could not be directly measured [5]. The literature emphasizes on unmet healthcare need as a critical indicator of access to healthcare services [6]. This measure provides insights into the barriers faced by people when they seek medical care, which can in turn reflect financial, physical, and cultural accessibility of healthcare services [7]. Unmet need could be defined as 'the differences between services judged necessary to deal appropriately with health problems and services actually received' [8]. Hence, the need

is considered unmet if individuals could not receive required treatment that was believed to improve their health condition.

Two main approaches exist to measure unmet need for healthcare services: clinical and subjective [8]. In the clinical approach, which in its optimistic manner is based on clinical guidelines, judgments of healthcare professionals are used to determine whether the person has received appropriate care or not [6]. While this approach could lead to the underestimation of the wider concept of unmet need, it seems to well operate only in smaller scales such as a clinic or a hospital. In the second approach, a subjective evaluation of the individuals' healthcare needs and whether they have received necessary care during the specified time period are used to determine unmet need [9]. Given the wider concept of need and also the possibility of implementing healthcare surveys in widespread settings [6], previous studies have used subjective measurement of unmet need as an easy way to estimate access to required healthcare services within various settings.

Unmet need for healthcare services could be also categorized according to its different causes such as accessibility, availability and acceptability of the services [10]. Unmet need due to accessibility is related to financial barriers to access required services [6]. Availability refers to unmet need related to the organizational aspect of the healthcare system such as waiting lists, services unavailable when required, and services unavailable in an area [9]. Unmet need due to acceptability could be emerged when individuals are not able to take time off work or cultural conditions [11]. While availability and accessibility of healthcare services are related to the health system performance, acceptability of the services is defined by expectations and circumstances of clients of the health system [6, 9, 11].

Most of research evidence on unmet need for healthcare services comes from high-income countries in North America [12, 13], Europe [6, 9, 14], and Asia [11, 15]. The studies revealed that the level of unmet need and accessibility-related unmet need were negligible in the Western European countries and Canada. In contrast, South Korea and Serbia showed higher levels of unmet need due to accessibility of healthcare services. In Iran, a previous study [16] reported huge unmet need. Nonetheless, the study did not differentiate among accessibility, availability and acceptability of unmet need. The main objectives of the current research were to create new evidence on the level of subjective unmet need and its reasons, as well as to determine various predictors of this unwanted outcome and its reasons in the Iranian health system.

## Methods

This is a cross-sectional study. We conducted a secondary analysis of the data obtained from the Iranian Healthcare Utilization Survey (IrUHS) of 2016. The IrUHS included all individuals in both ordinary and group households living in urban and rural areas of Iran. The planned sample size in this survey was 22 470 households comprising 76674 individuals. IrUHS consisted of two questionnaires entitled Household Questionnaire (to collect household socio-demographic and healthcare needs information) and Individual

Questionnaire (to gather detailed information of healthcare utilization). The data collection was based on face-to-face interviews with the surveyed individuals [17].

The participants were asked about their outpatient and inpatient healthcare needs in the household questionnaire. Respectively, 2 weeks and 12 months preceding the interviews were considered as the recall period for outpatient and inpatient healthcare needs. The participants with a history of healthcare needs were asked about the utilization of healthcare services in the individual questionnaire. The respondents older than 15 years who had outpatient healthcare needs (13005 individuals) were included in this research.

## Measuring Subjective Unmet Need And Its Reasons

Subjective unmet need (SUN) in this research was indirectly defined by the following question: "Was there any time during the past 2 weeks that you utilized outpatient healthcare services?" Two groups of respondents were formed; those who used healthcare services and those who did not. In the latter group, those who had self-medication were considered as the individuals with met healthcare needs and were added to the former. Hence, the individuals with unmet healthcare needs were considered those who did not use formal healthcare services and did not have a history of self-medication in the last two weeks.

Those who did not utilize healthcare services were asked about the reasons for not using the services. This was performed through ten questions in the individual questionnaires. According to the previous literature on the reasons for unmet healthcare, the answers to these questions were categorized into three main reasons for unmet healthcare needs. The first group of responses decreased the accessibility of health care services through lower affordability (Accessibility). The second group of responses dealt with the waiting list and availability of healthcare services (Availability). Similar to previous studies [6, 18], the unmet need due to accessibility and availability accounted for the responsibility of the health system. The third group was about the personal circumstances of the responders such as the postponement of healthcare needs due to lack of free time or other circumstances (Acceptability).

## Variables

Andersen's Behavioral Model of Health Services Use was used to explore potential determinants of subjective unmet need. This model assumes that utilization of healthcare services is a function of predisposing, enabling and need factors [19, 20]. According to the model, predisposing factors include demographic characteristics such as age, sex, marital status and family size, plus social structure such as employment, education and ethnicity. Moreover, material resources such as income, health insurance and distance from healthcare services were considered as enabling factors. Severity of illness, self-rated health and multiple chronic conditions were also considered as the need factors in this model [20].

Considering Anderson's model, predisposing factors included in this study were sex (male/female), age (< 30, 30–59, and  $\geq$  60 years), marital status (married/unmarried), educational status (illiterate, primary, secondary, and diploma or higher), and employment status (employed/unemployed). On the other hand, area of residence (urban/rural), economic status (poorest, poor, middle, rich and richest), and health insurance (basic and complementary) were included as enabling factors. Furthermore, the number of outpatient healthcare needs (one/two or more) was used as a need factor.

## Statistical Analysis

The principal component analysis was used to create economic status by using asset data such as having a separate kitchen, central heating, telephone usage, computer, Internet access at home, owning a motorcycle or a car, and whether the person owned a house or not. This statistical scheme has been widely used in previous studies [19, 21, 22]. The Pearson's chisquare test was also used to analyze the differences between the respondents with unmet and met healthcare needs. A logistic regression analysis with maximum likelihood was used to analyze the determinants of unmet healthcare needs and their major reasons. We also calculated the odds ratios (OR) and 95% confidence intervals (CIs). The results were considered statistically significant when the p-value was  $\leq 0.05$ . The analysis was performed by using the Stata/SE version 12.0.

## Results

### Descriptive Results

While 17.05% of the respondents aged 15 and older had unmet need for outpatient healthcare services, 82.95% of them met their healthcare needs through formal care or self-medication. The characteristics of the population reporting unmet and met healthcare needs are presented in Table 1. There was a statistically significant difference between the individuals with met and unmet healthcare needs with regard to different variables. Although there was no difference between male and female participants in terms of unmet and met healthcare needs, different frequencies were observed among various age groups. The highest percentage of the individuals with unmet healthcare needs was in the age group of 30–59 years.

Table 1

Characteristics of the population reporting unmet and met healthcare needs in Iran 2016

	Unmet healthcare needs	Met healthcare needs	p-value
	<b>2,217 (17.05)</b>	<b>10788 (82.95)</b>	
<b>Predisposing factors</b>			
Sex:			0.156
Male	918 (17.61)	4,292 (82.39)	
Female	1,299 (16.66)	6,496 (83.34)	
Age:			0.000
Under 30	433 (14.95)	2,462 (85.05)	
30–59	1,282 (18.13)	5,786 (81.87)	
60 and above	502 (16.50)	2,540 (83.50)	
Marital status:			0.030
Married	1,659 (17.06)	8,061 (82.94)	
Widowed or divorced	262 (19.02)	1,115 (80.98)	
Single	296 (15.51)	1,612 (84.49)	
Education:			0.000
Illiterate	700 (20.31)	2,746 (79.69)	
Primary	636 (18.96)	2,717 (81.87)	
Secondary	336 (15.96)	1,768 (84.04)	
Diploma or higher	545 (13.28)	3,557 (86.72)	
Employment status:			0.097
Employed	559 (16.74)	2,542 (83.26)	
Unemployed	1,658 (18.02)	8,246 (81.98)	
<b>Enabling factors</b>			
Area of residence:			0.000
Urban	1,349 (15.50)	7,349 (84.50)	
Rural	868 (20.15)	3,439 (79.85)	
Economic status:			0.000

	Unmet healthcare needs	Met healthcare needs	p-value
	<b>2,217 (17.05)</b>	<b>10788 (82.95)</b>	
Poorest	622 (23.65)	2,008 (76.35)	
Poor	458 (17.73)	2,125 (82.27)	
Middle	438 (16.90)	2,153 (83.1)	
Rich	397 (15.26)	2,203 (84.74)	
Richest	302 (11.61)	2,299 (88.39)	
Basic health insurance:			0.064
Yes	2,063 (16.89)	10,150 (83.11)	
No	154 (19.44)	638 (80.56)	
Complementary health insurance:			0.000
Yes	281 (11.44)	2,174 (88.56)	
No	1,936 (18.35)	8,614 (81.65)	
Need factors			
Number of outpatient needs:			0.000
One	1,451 (13.92)	8,969 (86.08)	
Two or above	766 (29.63)	1,819 (70.37)	

Regarding marital status, widowed or divorced individuals and single ones had respectively the highest and lowest prevalence of unmet healthcare needs. While significant differences were observed among the individuals of different education levels, there was no significant difference between the employed and unemployed persons. The largest percentages of the respondents with unmet healthcare needs were living in rural areas. With increasing economic quintiles, the frequency of unmet healthcare needs for healthcare services was decreasing, until the greatest unmet need was found in the poorest quintile. The respondents that had health insurance (basic and complementary) showed significantly lower unmet healthcare needs. The highest unmet healthcare needs were observed among the individuals with two or more outpatient needs.

Table 2 presents the main reasons that the respondents expressed for their unmet healthcare needs. While about 40.32% of the individuals chose only accessibility, acceptability (12.76%) and availability (3.65%) were solely considered as the other main causes of unmet healthcare needs. Furthermore, the majority of individuals (78.35%) simultaneously chose accessibility and availability as the main reasons.

Table 2

The main reasons why respondents did not meet their healthcare needs, Iran 2016

Reason why respondent did meet their healthcare needs	N	%
Only Accessibility	894	40.32
Only Availability	81	3.65
Accessibility and Availability (Responsibility of healthcare system)	1,737	78.35
Only Acceptability	283	12.76
No response	197	8.88

## Socioeconomic Determinants Of Unmet Healthcare Need

Three models of multivariate logistic regression were used to show the association of predisposing, enabling and need factors with unmet healthcare needs (Table 3). There was no significant association between sex and overall unmet need, as well as the unmet need arisen from responsibility or acceptability of the healthcare system. While older individuals had lower odds to experiencing unmet need due to the responsibility of the healthcare system (0.71 [0.55–0.92]), there was no significant association between the age groups and unmet need in other estimated regression models. Moreover, we found no significant relationship between marital status and unmet need in the three estimated regression models. Although having a lower education level significantly increased the likelihood of overall unmet need and unmet need due to the responsibility of the health system, individuals with lower levels of education had a lower chance to experience unmet need due to acceptability. Employed subjects had a greater chance of facing with unmet need in all the regression models, but this was only significant for overall unmet need (1.18 [1.01–1.36]).

Table 3

Multivariate logistic regression models for unmet need and its different categories of reasons, Iran 2016

	Overall unmet need		Unmet need due to responsibility of healthcare system		Unmet need due to Acceptability	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Sex						
Male	1		1		1	
Female	0.90 (0.78–1.02)	0.11	0.89 (0.77–1.03)	0.11	0.94 (0.73–1.22)	0.65
Age						
Under 30	1		1		1	
30–59	1.19 (1.00–1.42)	0.05	1.13 (0.93–1.36)	0.23	1.30 (0.92–1.85)	0.14
60 and above	0.84 (0.67–1.05)	0.13	0.71 (0.55–0.92)	0.01	1.42 (0.93–2.17)	0.11
Marital status						
Married	0.86 (0.72–1.04)	0.13	0.87 (0.71–1.07)	0.20	0.85 (0.59–1.23)	0.39
Unmarried	0.89 (0.69–1.16)	0.41	0.86 (0.64–1.16)	0.32	1.04 (0.63–1.73)	0.87
Single	1		1		1	
Education						
Illiterate	1.23 (1.02–1.48)	0.03	1.56 (1.26–1.93)	0.00	0.63 (0.43–0.91)	0.01
Primary	1.18 (1.00–1.39)	0.05	1.46 (1.21–1.76)	0.00	0.67 (0.49–0.92)	0.01
Secondary	1.00 (0.84–1.20)	0.96	1.19 (0.97–1.46)	0.10	0.70 (0.50–0.99)	0.05
Diploma or higher	1		1		1	

	Overall unmet need		Unmet need due to responsibility of healthcare system		Unmet need due to Acceptability	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Employment status						
Employed	1.18 (1.01–1.36)	0.03	1.17 (0.99–1.37)	0.06	1.15 (0.86–1.53)	0.35
Unemployed	1		1		1	
Area of residence						
Urban	1		1		1	
Rural	1.08 (0.96–1.21)	0.20	1.07 (0.94–1.21)	0.29	1.06 (0.84–1.34)	0.61
Economic status						
Poorest	1.88 (1.54–2.29)	0.00	2.35 (1.87–2.96)	0.00	0.96 (0.63–1.47)	0.85
Poor	1.42 (1.16–1.73)	0.00	1.72 (1.36–2.18)	0.00	0.95 (0.66–1.37)	0.78
Middle	1.38 (1.14–1.68)	0.00	1.76 (1.39–2.22)	0.00	0.78 (0.55–1.11)	0.17
Rich	1.34 (1.11–1.63)	0.00	1.53 (1.21–1.93)	0.00	1.08 (0.77–1.52)	0.65
Richest	1		1		1	1
Basic health insurance						
Yes	0.82 (0.65–1.02)	0.08	0.76 (0.60–0.97)	0.03	1.14 (0.67–1.93)	0.64
No	1		1		1	
Complementary health insurance						

	Overall unmet need		Unmet need due to responsibility of healthcare system		Unmet need due to Acceptability	
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Yes	0.75 (0.63–0.89)	0.00	0.60 (0.49–0.74)	0.00	1.14 (0.86–1.52)	0.35
No	1		1		1	
Number of outpatient needs						
One	1		1		1	1
Two or above	2.58 (2.29–2.90)	0.00	3.06 (2.69–3.47)	0.00	1.05 (0.79–1.40)	0.72

There was no significant association between area of residence and overall unmet need and their different reasons. Economic status was found to be associated with overall unmet need and unmet need due to responsibility of the healthcare system. In this regard, the poorest quintile presented the largest odds for overall unmet need (1.88 [1.54–2.29]) and unmet need due to the responsibility of the healthcare system (2.35 [1.87–2.96]). In terms of health insurance, individuals with basic health insurance had a lower chance of facing with unmet need due to the responsibility of the healthcare system (0.76 [0.60–0.97]), while those who had complementary insurance showed a lower chance of unmet need in the first (0.75 [0.63–0.89]) and second (0.60 [0.49–0.74]) models. The number of outpatient needs, as a need factor, was another significant predictor of unmet healthcare need in the first and second regression models. The individuals with two or more outpatient healthcare needs had a higher odd to experience overall unmet need (2.58 [2.29–2.90]) and unmet need due to the responsibility of the healthcare system (3.06 [2.69–3.47]).

## Discussion

This study aimed to measure unmet need for outpatient healthcare services and to explain the factors associated with them and their different reasons in Iran. Our research indicated that 17.05% of those who had outpatient healthcare needs could not access to required healthcare services or ignored self-medication to meet their healthcare needs. A previous study conducted in Iran [16] showed that almost 36% of individuals in need did not seek any outpatient healthcare services, which is far from our findings. It seems that the research did not adjust unmet need for self-medication. According to both definitions, the prevalence of unmet need in Iran is much higher than it was reported in the previous studies in Europe [6, 9, 23]. Let alone, some studies in South Korea [11, 15] reported a higher rate of unmet need in comparison to those in our research. As subjective unmet need is a normative issue as well as a multi-

dimensional outcome [24], the discrepancy between different studies could be justifiable. Compared to most previous studies that reported annual prevalence, we reported biweekly subjective unmet need for outpatient healthcare services that could provide a more precise picture of this unwanted outcome in Iran.

Taking into consideration the reasons behind unmet healthcare need could help decrease its occurrence [24]. We observed that financial reasons in the accessibility frame solely related to nearly 40% of the overall unmet need for outpatient healthcare services. In addition, while about 4% of the studied people forgot their needs due to the availability of healthcare services, most of them collectively experienced unmet need due to accessibility and availability of healthcare services that was highly related to the organization and financing of the healthcare system. The private sector has a critical role in providing sophisticated outpatient healthcare services in Iran [25] and can increase the availability and accessibility barriers to access to required services[26]. Hence, the need for appropriate and evidence-based policies in both healthcare organization and financing is clear to decrease most of unmet need in Iran. We advocate more attention to facilitate access to the outpatient sector within the ongoing Health Transformation Plan to decrease unmet need in Iran[27]. On the other hand, only about 12% of observed unmet need was categorized as unmet need due to acceptability of healthcare services. This kind of unmet need is strongly related to the expectations and circumstances of the clients, which is likely to decrease through increased health literacy [28]. Previous studies carried out in other settings reported different reasons for unmet need. While in some European countries [29] and Canada [30] acceptability or availability of healthcare services caused unmet need, in Serbia [6] and South Korea [11] unmet need due to accessibility were prevalent.

We found that education was the only significant factor that modified unmet need in the three estimated models. While less educated individuals suffered from unmet need and those caused by the performance of the health system, they showed, rather unexpectedly, a lower chance to expose unmet need due to accessibility. Less educated people suffered from financial strains that made them vulnerable to unmet need due to the performance of the health system. Nevertheless, their needs were not overlooked due to healthcare services acceptability. This might be associated with lower expectations of the health system among this group. This finding is inconsistent with the results of previous studies in Iran [31] and Europe [9], in which no significant association was found between education and unmet need, and the studies carried out in Canada [12, 18] that showed higher education could increase unmet need. Nonetheless, a large number of previous studies [6, 11, 29, 32] affirmed the positive association between lower education and overall and system-related unmet need. In the present study, gender and marital status had no significant association with unmet need and their different causes. A recent study in Iran also found no significant relationship between these factors and outpatient healthcare utilization [33]. Among other predisposing factors, we found that employed people were in a higher risk of facing with overall unmet need and the ones caused by the responsibility of the health system, which is in line with the previous studies [6, 11]. Moreover, the elderly had a lower odd to experience unmet need due to the responsibility of the health system.

As far as enabling factors were concerned, our research revealed that lower economic status was accompanied with higher odds of overall unmet need and unmet need due to performance of health system. This might indicate that poor individuals predominately suffered from unmet need due to the health system responsibility. In line with our finding, other studies [34] [9, 11, 14, 31] also showed that lower economic status was associated with a higher degree of overall unmet need as well as system-related unmet need. Poor people not only had lower affordability but also might live in areas with worse access to healthcare services, which might in turn make them vulnerable to unmet need. Our study also showed that having complementary insurance could not only decrease the probability of overall unmet need, but also bring down unmet need related to the health system. The odds ratio of basic health insurance was significant only in the second model. Further, we observed that basic health insurance significantly decreased only unmet need due to the responsibility of the health system. As complementary health insurance might not be accessible to disadvantaged groups, policy makers need to do their utmost efforts to create inclusive basic insurance programs to tackle unmet need effectively. Previous studies [32, 35] also confirmed the protective effect of health insurance against unmet need. Similar to other studies [9, 11, 12, 14], poor health status and the larger number of needs for outpatient healthcare services were the strongest predictors of unmet need in the first and second regression models. Compared with the individuals who had one outpatient need, those with two or more outpatient needs were in a higher risk of facing with overall and system-related unmet need. This indicates that the Iranian health system presumably suffers from high degrees of horizontal inequity, at least within its outpatient sector.

## **Rigor Of Study**

Despite providing valuable evidence on the feature of unmet need in Iran, this study had some limitations that need to be acknowledged. First, we used the IrUHS to measure the unmet need related to healthcare services. This survey was intrinsically designed to study the utilization of healthcare services that could decrease comparability of our results with those of previous studies. However, it provided an opportunity to estimate unmet need in the two weeks prior to the survey that could reduce recall bias. Second, this cross-sectional study could not necessarily bring any causality association between different predictors and unmet need, which is required to be studied in the long-term. Third, this study did not use supply-side variables such as provider's characteristics that might modify the unmet need. Finally, we only studied the unmet need in the outpatient sector that could not reflect a complete picture of such an unwanted outcome in the entire health system of Iran. Hence, the status of unmet need in the inpatient sector, especially after HTP, needs to be addressed in future studies. Nevertheless, this study brought new evidence on the main causes of unmet healthcare needs and provided policy implications to tackle this negative outcome in the outpatient health sector in Iran.

## **Conclusion**

Exploring unmet healthcare needs could assist policy makers to evaluate access to healthcare services. This study revealed that Iran is still suffering from unmet need in its outpatient sector. Less educated individuals were at a higher risk to experience overall unmet need as well as system-related unmet need, whereas they showed a lower chance of facing with acceptability-related unmet need, simultaneously. While overall and system-related unmet need was prevalent among employed individuals and disadvantaged groups, both basic and complementary health insurances might provide protection against unmet need. As poor health status was a major determinant of outpatient unmet need, greater attention is required to reduce horizontal inequity in the health system of Iran that is predominantly arising from the accessibility of healthcare services. Since the country has been gearing up towards the implementation of Sustainable Development Goals (SDGs), particularly Universal Health Coverage (UHC) by 2030, more emphasis on system-related policies such as improvement of the financing and organization of healthcare services are essential to reduce most of the unmet need and bridge the UHC gap in Iran.

## **Abbreviations**

SUN

Subjective Unmet Need

IrUHS

Iranian Healthcare Utilization Survey

## **Declarations**

### **Ethics approval and consent to participate**

This study was approved by the ethical committee of Tehran University of Medical Sciences

### **Consent for publication**

Not applicable

### **Availability of data and materials**

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

### **Competing interests**

The authors declare that they have no competing interests

### **Funding**

Financial support for this study was provided by Health Equity Research Center (HERC) and Tehran University of Medical Sciences (IR.TUMS.VCR.REC.1397.1035).

## Authors' contributions

SV, AHT and AO conceived the study. SV designed, obtained data, performed data analysis and interpretation and drafted the 1st version of manuscript. AT helped data analysis and interpretation. SM helped in study design and data analysis. MMK provide administrative, technical, or material support AHT supervised the study, revised the manuscript, provided intellectual support, and is guarantor. All authors read and approved the final draft.

## Acknowledgments

We would like to thank National Institute of Health Research (NIHR) in Iran for their support and free access to the IrUHS' original data.

## References

1. Goddard M, Smith P: Equity of access to health care services:: Theory and evidence from the UK. *Social science & medicine* 2001, 53(9):1149-1162.
2. Menzel PT: Justice and fairness: a critical element in U.S. health system reform. *The Journal of law, medicine & ethics : a journal of the American Society of Law, Medicine & Ethics* 2012, 40(3):582-597.
3. Hanney SR, Gonzalez-Block MA, Buxton MJ, Kogan M: The utilisation of health research in policy-making: concepts, examples and methods of assessment. *Health Res Policy Syst* 2003, 1(1):2-2.
4. Andersen RM, Davidson PL, Baumeister SE: Improving access to care in America. In: *Changing the US health care system: key issues in health services policy and management*. edn. San Francisco: Jossey-Bass; 2007: 3-31.
5. Gulliford M, Figueroa-Munoz J, Morgan M, Hughes D, Gibson B, Beech R, Hudson M: What does 'access to health care' mean? *J Health Serv Res Policy* 2002, 7(3):186-188.
6. Popovic N, Terzic-Supic Z, Simic S, Mladenovic B: Predictors of unmet health care needs in Serbia; Analysis based on EU-SILC data. *PLoS One* 2017, 12(11):e0187866.
7. Schokkaert E, Steel J, Van de Voorde C: Out-of-Pocket Payments and Subjective Unmet Need of Healthcare. *Appl Health Econ Health Policy* 2017, 15(5):545-555.
8. Carr W, Wolfe S: Unmet needs as sociomedical indicators. *International journal of health services : planning, administration, evaluation* 1976, 6(3):417-430.
9. Fjaer EL, Stornes P, Borisova LV, McNamara CL, Eikemo TA: Subjective perceptions of unmet need for health care in Europe among social groups: Findings from the European social survey (2014) special module on the social determinants of health. *Eur J Public Health* 2017, 27(suppl\_1):82-89.
10. Nelson CH, Park J: The nature and correlates of unmet health care needs in Ontario, Canada. *Soc Sci Med* 2006, 62(9):2291-2300.

11. Hwang J: Understanding reasons for unmet health care needs in Korea: what are health policy implications? *BMC Health Serv Res* 2018, 18(1):557.
12. Sibley LM, Glazier RH: Reasons for self-reported unmet healthcare needs in Canada: a population-based provincial comparison. *Healthc Policy* 2009, 5(1):87-101.
13. Allin S, Grignon M, Le Grand J: Subjective unmet need and utilization of health care services in Canada: what are the equity implications? *Soc Sci Med* 2010, 70(3):465-472.
14. Cavalieri M: Geographical variation of unmet medical needs in Italy: a multivariate logistic regression analysis. *International journal of health geographics* 2013, 12:27.
15. Kim J, Kim TH, Park EC, Cho WH: Factors influencing unmet need for health care services in Korea. *Asia Pac J Public Health* 2015, 27(2):NP2555-2569.
16. Hajizadeh M, Connelly LB, Butler JR, Khosravi A: Unmet need and met unneed in health care utilisation in Iran. *International Journal of Social Economics* 2012, 39(6):400-422.
17. Ali Akbari Saba R, Safakish M, Rezaie Ghahroodi Z, Khabiri Nemati R, Zahedian A, Khosravi A, Ghosouri S, Mirmohammad M, Zanganeh M, Ahmadnezhad E: Utilization of Health Services (UHS). In. Tehran: Ministry of Health and Medical Education; 2016.
18. Bataineh H, Devlin RA, Barham V: Unmet health care and health care utilization. *Health Econ* 2019, 28(4):529-542.
19. Kazanga I, Munthali AC, McVeigh J, Mannan H, MacLachlan M: Predictors of Utilisation of Skilled Maternal Healthcare in Lilongwe District, Malawi. *Int J Health Policy Manag* 2019, 8(12):700-710.
20. Andersen RM: Revisiting the Behavioral Model and Access to Medical Care: Does it Matter? *Journal of Health and Social Behavior* 1995, 36(1):1-10.
21. Vahedi S, Rezapour A, Mohammadbeigi A, Khosravi A: Economic Inequality in Outpatient Healthcare Utilization: The Case of Iran. *J Res Health Sci* 2018, 18(3):e00424.
22. Amini Rarani M, Rashidian A, Khosravi A, Arab M, Abbasian E, Khedmati Morasae E: Changes in Socio-Economic Inequality in Neonatal Mortality in Iran Between 1995-2000 and 2005-2010: An Oaxaca Decomposition Analysis. *Int J Health Policy Manag* 2017, 6(4):219-218.
23. Holleder A, Wildner M: [Unmet Medical Need in Germany: Analyses of EU-SILC-Survey from 2005 to 2014]. *Deutsche medizinische Wochenschrift (1946)* 2019, 144(1):e1-e11.
24. Smith S, Connolly S: Re-thinking unmet need for health care: introducing a dynamic perspective. *Health economics, policy, and law* 2019:1-18.
25. Mehrdad R: Health system in Iran. *JMAJ* 2009, 52(1):69-73.
26. Soltani S, Takian A, Akbari Sari A, Majdzadeh R, Kamali M: Financial Barriers to Access to Health Services for Adult People with Disability in Iran: The Challenges for Universal Health Coverage. *Iran J Public Health* 2019, 48(3):508-515.
27. Piroozi B, Takian A, Moradi G, Amerzadeh M, Safari H, Faraji O: The effect of Iran's health transformation plan on utilization of specialized outpatient visit services: An interrupted time series. *Medical journal of the Islamic Republic of Iran* 2018, 32:121-121.

28. Mårtensson L, Hensing G: Health literacy – a heterogeneous phenomenon: a literature review. *Scandinavian Journal of Caring Sciences* 2012, 26(1):151-160.
29. Pappa E, Kontodimopoulos N, Papadopoulos A, Tountas Y, Niakas D: Investigating unmet health needs in primary health care services in a representative sample of the Greek population. *Int J Environ Res Public Health* 2013, 10(5):2017-2027.
30. Chen J, Hou F: Unmet needs for health care. *Health reports* 2002, 13(2):23-34.
31. Hajizadeh M, Connelly LB, Butler JR, Khosravi A: Unmet need and met unneed in health care utilisation in Iran. *Int J Soc Econ* 2012, 39(6):400-422.
32. Zavras D, Zavras AI, Kyriopoulos, II, Kyriopoulos J: Economic crisis, austerity and unmet healthcare needs: the case of Greece. *BMC Health Serv Res* 2016, 16:309.
33. Abouie A, Majdzadeh R, Khabiri R, Hamedi-Shahraki S, Emami Razavi SH, Yekaninejad MS: Socioeconomic inequities in health services' utilization following the Health Transformation Plan initiative in Iran. *Health Policy Plan* 2018.
34. Ro YS, Shin SD, Jeong J, Kim MJ, Jung YH, Kamgno J, Alain EMG, Hollong B: Evaluation of demands, usage and unmet needs for emergency care in Yaoundé, Cameroon: a cross-sectional study. *BMJ open* 2017, 7(2):e014573.
35. Yoon YS, Jung B, Kim D, Ha IH: Factors Underlying Unmet Medical Needs: A Cross-Sectional Study. *Int J Environ Res Public Health* 2019, 16(13).