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Willingness to pay for a hypothetical HIV/AIDS insurance in Iran

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Abstract

Introduction: In contrast to regional trend, human immunodeficiency virus (HIV) continues to be a serious health concern in Iran. Access to antiretroviral therapy is free in the country, and can result in a heavy economic burden for public sector in the near future. The purpose of this study was to investigate the willingness to pay for hypothetical HIV/acquired immunodeficiency syndrome (AIDS) insurance in people living in Tehran.

Material and methods: A cross-sectional survey was conducted among 400 participants, aged over 23 years in 2018. The survey was conducted using multi-stage cluster sampling, and included questions on socio-demographics, exposure to HIV risk, and willingness to pay for a hypothetical insurance scheme.

Results: The majority of participants expressed a willingness to pay for hypothetical insurance coverage within the 3-6 million IRR range, with the largest group (20.1%) willing to pay between 1-2 million IRR ($US 66-133). Fewer than half of the participants (45.3%) were willing to pay for insurance coverage, with significant variations observed among socio-demographic subgroups. The primary reason cited by participants for declining to purchase insurance was their perception of the low risk of HIV infection. After investigating socio-demographic factors, exposure to HIV risk was associated with a 9.1% higher odds of WTP (OR = 0.913; 95% CI: 816-0.968%, $p < 0.01$).

Conclusions: This analysis provided initial estimations of willingness to pay for HIV/AIDS insurance in Iran. The findings can provide evidences, which can contribute to planning for a sustainable delivery of HIV treatment.

Introduction

Human immunodeficiency virus (HIV) that can lead to acquired immunodeficiency syndrome (AIDS), continues to be a serious global health concern. There is no cure for HIV infection; however, with antiretroviral drugs, the disease progress can be controlled. The virus is transmitted via an exchange of variety of body fluids from infected persons, such as blood, breast milk, semen, and vaginal secretions [1]. Therefore, having unprotected sex with infected people, sharing infected needles, receiving septic blood products, and mother-to-child transmission during pregnancy or breastfeeding, can transmit the virus to uninfected individuals [2].

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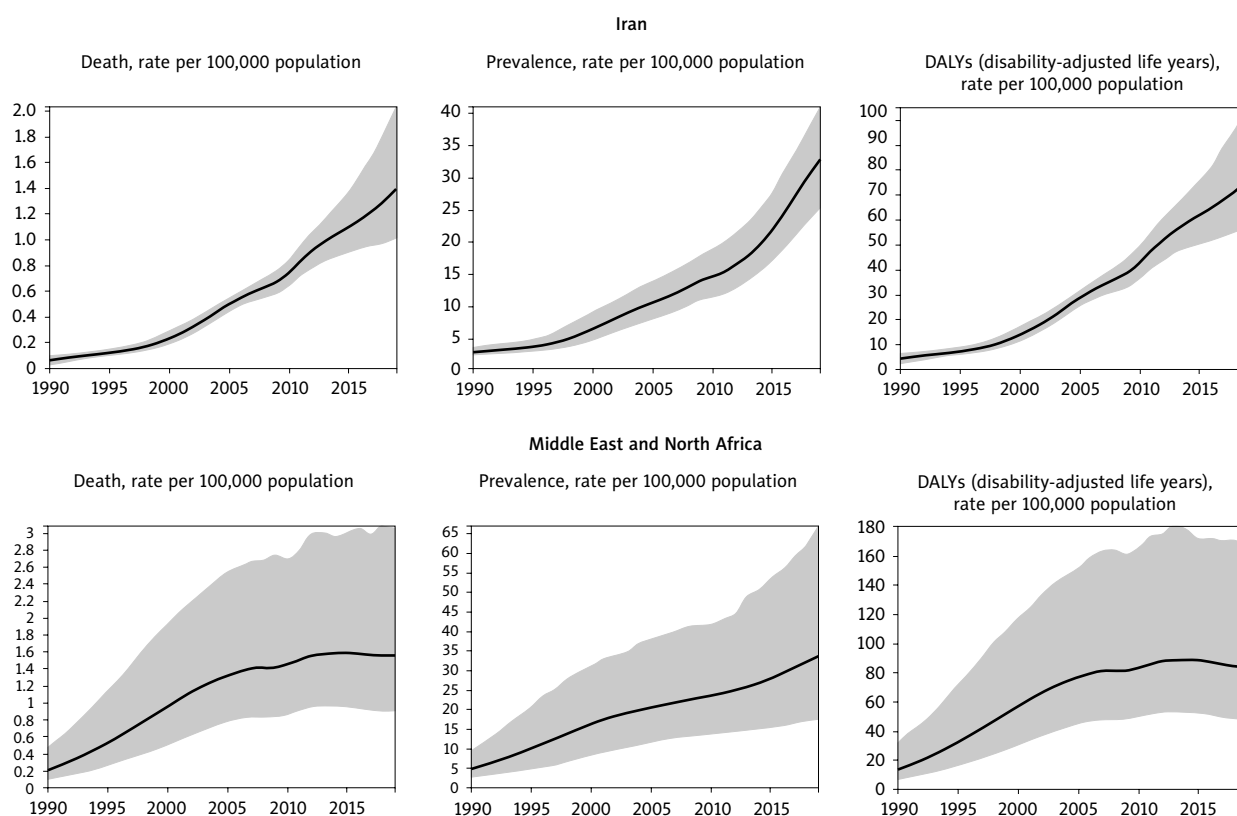
Iran

Middle East and North Africa

Figure 1. Trends for burden of AIDS in MENA region and Iran (Source: IHME, 2021)

Even though implementing interventions to engage people who inject drugs in HIV care and treatment decreased the rate of HIV prevalence, HIV transmission rate through unprotected sexual relationships has increased in recent years [3, 4]. The prevalence of HIV/AIDS in Iran is concentrated among these groups, and neglected focused epidemics have the potential to evolve into general epidemics [3]. World Health Organization estimated that only 30% of people living with HIV/AIDS in the Eastern Mediterranean region knew their HIV status by 2016 [5]. Although there is no accurate information on the prevalence of AIDS in Iran [6], there are some estimates. Institute for Health Metrics and Evaluation reports the burden of different causes of diseases for countries [7]. According to these information, growing trend of AIDS burden in the Middle East and North Africa regions has been controlled since 2010, while the rate of the disease tend to increase in Iran (Figure 1).

Given that the cost of treating AIDS in Iran is covered by the government [3], increasing the prevalence of AIDS [3, 8] will impose a heavy burden on social insurances. On the other hand, due to long-term costs of HIV/AIDS medical interventions, imposing these costs on individuals can lead to adverse economic and social impacts. Annually, 7.5% of Iranian households (approximately, 1.9 million households) face catastrophic healthcare expenditures [9] that led to poverty spreading. In 2015, the incidence of impoverishing

health expenditure in Iran was estimated as 0.5% (more than 129,000 households) [10].

Another aim of this study was to explore the possibility of private insurance schemes for HIV/AIDS patients. Insurances provide financial support, risks' sharing, reduce the expected loss [11], and finance healthcare services. However, the first step to initiate a new insurance scheme is a market analysis [12]. Willingness to pay (WTP) is widely used in commercial, clinical, or social studies to estimate potential demand for non-market goods or services [13-15]. The concept of willingness to pay has been very common in health economic evaluation studies and cost-benefit analysis. Over the past two decades, this method has become a dominant methodological tool for estimating payment capacity of specific population for non-market or qualitatively different products [16-18].

WTP is likely mediated by individual and cultural aspects that determine how utility of insurance is perceived as well as ability to pay. However, the main challenges of WTP for a hypothetical HIV/AIDS insurance (HHAI) are the affiliation procedure (mandatory or voluntary) and participation method. These raise a number of questions, for which the current study attempted to provide answers: What percentage of individuals are willing to pay for a HHAI? What are the socio-demographic characteristics of people who are willing to pay for a HHAI? Does being at

greater risk of HIV/AIDS affect people WTP for a HHAI? How much the people would pay for a HHAI?

Material and methods

Data collection and participants

This cross-sectional study was conducted in Tehran in 2018. The sample included 400 adults aged over 23 years who were selected by multi-stage cluster sampling to represent the general population. The average age of entering the labor market in Iran is 28 years, and the participation rate for people under 24 is less than 26.1%. Inclusion criteria for the study were age at least 23 years, which increased the chance of being employed and participants could more reliable state WTP. In the first step, according to livability indicators [19], Tehran was stratified into five zones and two municipal districts were selected randomly from each zone. Subsequently, a neighborhood and randomly selected street were chosen, and participants were interviewed in public passageways and popular gathering places.

In addition to the minimum age, inclusion criteria for participation comprised of being resident of Tehran, willingness to participate, and having independent income. Eligible participants were interviewed by trained research staff with a master's degree in social welfare management.

Measures

A review of literature shows that studies had different approaches to calculating the willingness to pay. The revealed preferences and stated preferences are two approaches for WTP estimation [20]. This study utilized the stated preferences approach to investigate people's willing to pay for HHAI as a hypothetical non-market insurance scheme. Contingent valuation (CV) method is the most frequently used way for eliciting WTP for non-market goods [21]. In this approach, respondents are asked questions to find out the maximum amount they would like to spend on a hypothetical product or service. To fulfill the conditions of this method, a questionnaire was designed including participants' socio-demographics characteristics, exposure to HIV risk, and questions directly related to WTP for HHAI.

Socio-economic status

Household income and participant's education level were considered as two main socio-economic factors. Household income was assessed using an open-ended questions, and the highest educational degree received by participants was regarded as their educational status based on international standard classification of education (ISCED-97). Then, education levels were categorized into three categories, including low level with under secondary level (ISCED 0-2), medium or second stage of secondary level (ISCED 3,4), and high level or third level (ISCED 5-7).

Risk of exposure to HIV/AIDS

According to a WHO report on behaviors and conditions that put people at higher risk of contracting HIV [1], short questions (9 items) were developed to assess participants HIV/AIDS risk exposure. Respondents answered the items with a 5-point Likert scale. This section items consisted of the following questions: What do you know about the ways of HIV transmission?; What is your perception of the risk of HIV infection?; Have you been in contact with someone with HIV/ AIDS?; How much do you pursue HIV/AIDS-related information (books, articles, social media, etc.)?; How many times have you used dental services in the last three years?; How many times have you visited for cupping in the last three years?; What does your friends and relatives think about unprotected sex?; How many tattoos do you have?; Are you currently using any illicit drugs?

Willingness to pay

WTP for HHAI was estimated by using an open-ended CV questionnaire. After describing hypothetical HIV/AIDS insurance, the respondents were asked to state their maximum WTP with answers 'yes' or 'no'. In a question: If there is HIV/AIDS insurance, would you be willing to pay for it? (yes or no), the participants could accept or reject HHAI price (bid), with an additional question: If yes, how much would you be prepared to pay for it annually? The answers ranged from 500 to 30,000 thousands Iranian rials (IRR) in nine categories based on a pilot study. If the answer was 'no' to the first question, the reasons for unwillingness was investigated using semi-structured questions.

Statistical analysis

Descriptive statistics for categorical variables were reported using frequencies and percentages. Continuous variables were summarized as median and interquartile ranges (IQR). Differences in socio-demographic characteristics of the participants who were/were not willing to pay for an insurance were assessed using Pearson chi-squared test (χ^2) for categorical variables, such as sex, marital status, education, and point bi-serial correlation test, and continuous variables included age, household income, and exposure to HIV/AIDS risk. Multivariate logistic regression analysis was applied to assess effects of socio-demographic variables and exposure to HIV/AIDS risk on WTP. Odds ratios (ORs) and their confidence intervals were reported. Significance level was set at 0.05. Statistical analysis was performed using Stata v. 14.0 (Stata Corporation, Texas, USA).

Results

The respondents' socio-demographic characteristics are described and summarized in Table 1. Age of the participants ranged from 23 to 68 years (median, 35 years; interquartile range, 28-45 years). Out of 400 participants, 181

Table 1. Respondents' characteristics of WTP

Factor		Total	Unwilling to pay	Willing to pay	(χ^2 test, df) or z-score, p-value
		n (%) or median (IQR)	n (%) or median (IQR)	n (%) or median (IQR)	
Overall sample		400 (100.0)	219 (54.7)	181 (45.3)	
Age (year)		35 (28.0-45.0)	33.9 (27.0-39.5)	40.7 (30.0-49.5)	5.79 $p < 0.0001$
Sex					
	Female	173 (43.0)	93 (53.7)	80 (46.2)	(0.36, 1) $p = 0.54$
	Male	227 (57.0)	126 (55.5)	101 (44.5)	
Marital status					
	Married/couple	206 (51.5)	147 (67.1)	59 (32.6)	(61.62, 1), $p < 0.001$
	Single	150 (37.5)	51 (23.3)	99 (54.7)	
	Divorced	21 (5.25)	4 (1.8)	17 (9.4)	
	Widowed	23 (5.75)	17 (7.8)	6 (3.3)	
Education					
	Illiterate	15 (3.7)	2 (1.1)	13 (5.9)	(17.49, 5), $p < 0.005$
	Primary education	38 (9.5)	13 (7.2)	25 (11.4)	
	Secondary education	138 (34.6)	57 (31.7)	81 (37.0)	
	Post-secondary non-tertiary	53 (13.3)	22 (12.2)	31 (14.2)	
	First stage of tertiary	112 (28.1)	58 (32.2)	54 (24.7)	
	Second stage of tertiary	39 (9.8)	25 (13.9)	14 (6.4)	
	No answer	4 (1.0)	1 (0.5)	3 (1.7)	
Household income (thousands IRR)		25,103 (23,996-26,210)	22,931 (21,648-24,214)	27,732 (25,910-29,554)	4.33, $p < 0.001$
Exposure to risk of HIV		21 (19.0-23.0)	31.8 (31.3-32.4)	30.7 (29.9-31.5)	−2.43, $p < 0.01$

P-values are based on χ^2 test for categorical variables, and point bi-serial correlation for continuous variables;

df - degree of freedom

(45.3%) reported that they were willing to pay for HIV/AIDS insurance. Table 1 further compared various characteristics of the respondents, and revealed that those with willingness to pay were older, more educated, and with higher household incomes. The decision to purchase HHAI was conversely correlated with the risk: the more at risk, the less likely to purchase the insurance.

More than a third (38.29%) of those who were unwilling to pay for an insurance felt less at risk for HIV, and nearly a quarter of unwilling respondents (23.42%) were reluctant to contribute to HIV/AIDS insurance because of their belief in prevention. Figure 2 shows the main reasons the participants declined to buy an insurance. Additionally, some respondents (6.7%) were aware of AIDS treatment drugs available to patients free of charge.

The majority of respondents expressed their WTP within the 1-6 million IRR range, with 20.1% willing to pay between 1-2 million IRR ($US 66-132) followed by with 18.4% for the 5-6 million IRR ($US 331-398) categories based on market exchange rate for $US in 2018. Willingness to pay can be represented by the area under a demand curve [22]. In Figure 3,
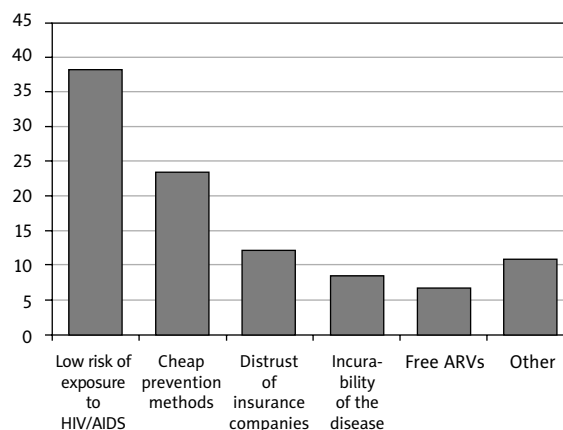

Figure 2. Reasons for unwillingness to pay for HIV/AIDS (percentage)

the demand curve for HHAI was plotted based on the calculated willingness to pay. This curve shows a relationship between the HHAI price (bid) and the cumulative demand, which was considered as the number of respondents who
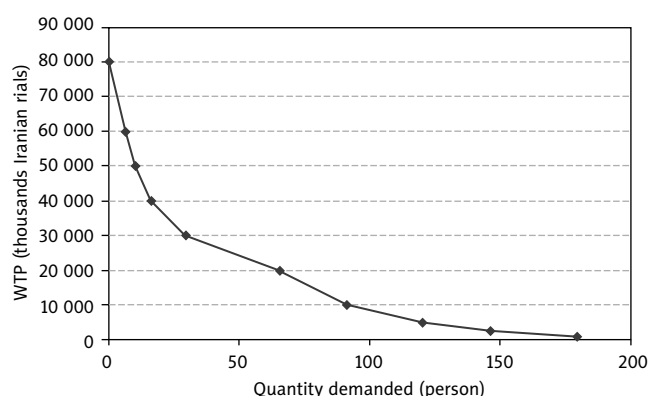
Figure 3. Demand curve for a hypothetical HIV/AIDS insurance

Table 2. Logistic regression model predicting odds of WTP for HIV/AIDS insurance

Dependent variable	Odds ratio[a]
Age (centered at mean)	0.947 (0.923-0.971)**
Sex (ref. female)	0.844 (0.536-1.332)
Marital status (ref. married)	
Single (unmarried, divorced, widow)	2.627 (1.631-4.232)*
Education (ref. medium)	
Low	1.023 (0.468-2.238)
High	0.868 (0.505-1.491)
Household income (in log form)	2.787 (1.521-5.11)**
Exposure to HIV risk	0.913 (0.816-0.968)**

[a]Odds ratios with 95% confidence interval
*$p < 0.05$; **$p < 0.01$

were ready to purchase the insurance at a higher price. It was obvious that for an insurance with price above 80,000 thousands IRR (equal to 531 US$, based on market exchange rate in 2018), there was no demand for a HHAI. Furthermore, more than half of the respondents (59.66%) preferred to pay the premium annually.

The results show statistically significant differences in WTP among socio-demographic sub-groups, including marital status, education, and household income. There was not a significant difference in WTP between male and female participants. Table 2 presents the results of multivariate logistic regression analysis as odds ratios in 95% confidence intervals. The results of logistic regression analysis indicated that the odds of reporting WTP were significantly higher for single participants (OR = 2.627; 95% CI: 1.631-4.232%, $p < 0.05$), and for respondents with higher household incomes (OR = 2.787; 95% CI: 1.521-5.110%, $p < 0.01$). After investigating socio-economic factors, one point increase in the risk exposure to HIV/AIDS reduced the odds of WTP for insurance by 9% (OR = 0.913; 95% CI: 816-0.968%, $p < 0.01$).

Discussion

The prevalence of HIV among the general population in Iran shows an increasing trend [3, 8], which can expose a significant number of people to HIV infection in the near future. By now, healthcare policy in Iran facilitate patients' access to antiretroviral treatment free of charge. However, the increasing number of people living with HIV/AIDS should be a warning sign for the public sector, which already cover the costs of HIV/AIDS treatments in Iran. To the best of our knowledge, there is little research investigating willingness to pay for HIV/AIDS-related services [23-26]. This study examined people willing to pay for a hypothetical HIV/AIDS insurance in Tehran and its related factors. The findings show that 45.3 percent of the participants presented willingness to pay for HIV/AIDS insurance. This ratio is much less than the willingness to pay for public health insurance in Iran [21]. The mean age of the respondents who were willing to pay was significantly lower than that of other group. This shows that despite the increasing HIV/AIDS risk of young people, they is little willingness to insure themselves against HIV/AIDS. This is important because the risk of HIV infection through sexual transmission in Iran is rising in recent years, which poses a serious economic threat for the public health resources [27].

It is noteworthy that the reasons for more than 90 percent of participants to refuse the insurance were motives other than free antiretroviral drugs treatment (e.g., low-risk of exposure to HIV/AIDS, distrust of insurance companies, cheap prevention methods, and incurability of the disease). It can be assumed that the respondents were likely to be able to pay for HIV/AIDS insurance premiums. On the other hand, it may highlight the need to improve literacy in public health regarding HIV/AIDS. A meta-analysis study showed that limited health literacy is prevalent in Iran [28], and promoted health literacy can increase the perceived need for insurance by raising awareness about the ways of transmission and to recognize the risks of individuals. Diversified financial resources in healthcare enhance the possibility of providing desirable services and health services utilization, especially in countries with unreasonable out-of-pocket health payments, such as Iran [29].

Clear income gradients were found in people's WTP, and those with higher household income showed higher odds of WTP. Therefore, confirming previous studies [25, 30], individual capacity to pay for insurance premiums is strongly associated with socio-economic factors, such as family economic condition. Also, regression analysis revealed that singles were more likely to purchase HIV/AIDS insurance than married people. It should be noted that singles compared with married participants reported more household incomes, and this difference was statistically significant.

After investigating demographic characteristics and socio-economic status, participants with high-risk exposure to HIV expressed lesser willingness to pay for an insurance. This is in line with previous studies [31-33], which showed a direct relationship between the risk aversion and the pur-

chase of risky insurance. This finding may be interesting for policy-makers as well as private insurance companies.

In line with the literature [34-36], the findings show that the demand for insurance is higher among low-risk individuals, and they can be considered as potential customers for HHAI. In the growing market of insurance industry in Iran, new types of insurances policies are introduced every year. In addition to its limited effects on the insurance industry, this diversity also positively affects various sectors of economy. Private insurance companies will invest in public education and facilitated access to HIV/AIDS prevention devices to avoid treatment costs. As a result, in Iran where government resources are highly unstable, the health system can greatly benefit from it. In addition, the possibility of buying and selling HIV/AIDS insurance creates a general understanding that everyone may be at risk. This public awareness can also lead to a reduction in stigma of AIDS patients who are in need for support, attention, and assistance [37, 38].

Limitations of the study

The present study had some limitations, including sample selection that could limit generalizability of the results. Also, the measurement method was considered as limitation. We were not certain if it was reasonable to provide equal weight to all sub-items of the exposure to risk of HIV scale. Ideally, each items had to be assigned a weight indicating the level of importance in affecting WTP. In addition to the features applied in this analysis, further examination of willingness to pay using other socio-economic factors, attitudinal variables, and insurance schemes would provide understanding of people's willingness to pay for HIV/AIDS insurance. Despite these limitations, since little is known about willingness to pay for antiretroviral drugs, this study may provide evidence that could contribute to planning for sustainable provision of the treatment service.

Conclusions

This analysis provided first estimates of WTP for a hypothetical HIV/AIDS insurance in Iran. It seems that although HIV/AIDS as a serious disease continues to spread in the country and the number of affected patients is on rise, less than half of the respondents of the current study were willing to pay for a hypothetical HIV/AIDS insurance. It may potentially lead to economic burden on health system in future. However, the assessment of WTP for HHAI will play a key role in preparing an appropriate health insurance policy, and may help to ease financial burden of the disease for the public health system.

Disclosures

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