



Self-medication and health insurance coverage in Mexico

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Abstract

Self-medication is a common practice in many developing countries but little is known about its determinants. This study analyzes the factors that are associated with the use of self-medication in Mexico using the Mexican Health and Aging Study, a new nationally representative survey on adults aged 50 and over. We find that self-medication is related to socioeconomic status and the lack of access to professional healthcare. Our empirical results suggest that lack of government-sponsored health insurance coverage increases the propensity to self-medicate. A 10% increase in the proportion of adults with health insurance coverage could decrease the use of pharmacy consultations by .8% for public sector workers and by 1.7% for private sector workers. Increasing health insurance coverage could reduce the demand for self-medication by making healthcare more affordable and by changing the population perceptions about the benefits of modern medicine.

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1. Introduction

In many developing countries, self-medication is a common practice due to quality concerns related to healthcare delivery systems as well as skepticism about the benefits of professional healthcare vis-à-vis traditional medicine [1]. In Mexico, self-medication has grown in recent years due to the increasing availability of over-the-counter (OTC) drugs, especially those which were previously available only by prescription.

During the late 1990s, the Mexican Ministry of Health switched more than 200 prescription drugs to OTC status. As a result, the Mexican market now has more than 500 different OTC products [2].

Mexico spends about 5.7% of its GDP on health compared to, for example, 13.7% by the US and 8.6% for Canada [3]. As such, the Mexican healthcare system faces many challenges when it comes to adequately addressing the health care needs of a rapidly growing and aging population. Many individuals delay formal medical care, underutilize preventive care, rely on alternative medicine and/or use self-medication to improve their health [1]. Consequently, it is not surprising

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that out-of-pocket medical expenditures represent the largest share of total healthcare spending in Mexico [4].

Using survey data on adults aged 50 and over from the Mexican Health and Aging Study (MHAS), this study analyzes the factors that are associated with the use of self-medication in Mexico. Following extant research, we define self-medication as having any pharmacy visits/consultations about health problems without any previous contact with other health care providers. This working definition includes OTC drugs purchased without prescription [5]. Thus, self-medication can be viewed as an alternative to utilizing the formal healthcare system. We are particularly interested in the relationship between socioeconomic status, the availability of health insurance and self-medication. Evaluating how these factors are related to self-medication could inform policymakers about how healthcare reform via increases in health insurance coverage for different groups could influence self-medication patterns.

2. Background: why self-medication matters

More than 30 million Mexicans self-medicate at least once a year and the medical community recently began to express concerns about the potential health risks of this practice [6,7]. There are several reasons for the widespread use of self-medication in Mexico. First, professional medical care is relatively unaffordable to large segments of the population. More than half of those with serious illnesses do not use medical services because they find them to be too expensive or they do not have the resources to obtain needed medical care [8]. According to survey data from the 2000 National Health Survey, total out-of-pocket medical expenditures for the most recent ambulatory curative services received was 236 pesos [9]. This amounts to about US\$ 25 (2000 US dollars), or roughly six days of full-time employment earnings. About 27% of out-of-pocket medical expenses represent consultation costs and 47.2% cover the costs of medicines. Thus, the out-of-pocket burden of professional medical care forces many Mexicans to postpone treatment or to resort to alternative medicine and/or self-medication.

Second, although professional medical care is generally more costly than self-medication, many Mexicans are skeptical of the benefits of medical care [6].

For example, Leyva-Flores et al. [8] use survey data from the 1994 National Health Survey (NHS) of Mexico and find that 70% of respondents with minor health problems did not use professional medical care because they thought it was unnecessary. There is also the perception that public healthcare facilities do not have the resources to substantially improve healthcare access, particularly for the poor and the uninsured [10].

Third, many Mexicans rely on self-medication – and alternative medicine – due to culture and/or traditions [11,12]. Leyva-Flores et al. [8] find that about one-third of those self-medicating for a health problem did so using home remedies or a combination of home remedies and medicines. Their study suggests that although self-medication and professional medical care coexist in Mexico, self-medication will continue to be practiced, particularly among the poor and those with difficulties accessing formal healthcare.

3. Conceptual framework

The conceptual framework utilized here is based on the self-medication utility maximizing model of Chang and Trivedi [5]. This model contrasts the choice to improve individual health through professional medical care (e.g., visiting a physician or hospital/clinic) or self-medication (e.g., purchasing medication at a pharmacy or consulting a pharmacist). Although generally priced lower than professional medical care, self-medication could be associated with health-related risks (e.g., side effects or injuries) and it could be less effective than professional medical care. Chang and Trivedi [5] argue that professional care is a normal good and self-medication is an inferior good. Therefore, the incidence of self-medication should fall as income increases, at least when income rises above a certain threshold beyond which individuals would begin to consult professional medical care. The model also implies that the demand between these goods is probably sensitive to relative prices. Health insurance coverage makes professional care relatively less expensive; and thus, it could lead to more medical care utilization and less self-medication.

There are also other possible mechanisms by which these relative price effects may work to affect the practice of self-medication. For example, individuals residing in rural areas face a relatively higher price of

professional care because these health services are easier to obtain in urban areas and, consequently, they are more likely to use self-medication compared to professional medical care.

Recent increases in the number of OTC drugs in Mexico have a theoretically indeterminate effect. It is possible that as the number of drugs switched from prescription to OTC increases, the demand for self-medication increases because professional medical care is no longer needed to access better drugs [2]. However, this trend also increases uncertainty as to the effectiveness of self-medication as it becomes more difficult to monitor the use of these drugs. Increasing uncertainty may in turn reduce the use of self-medication.

4. Data and methodology

We used data from the first wave of the Mexican Health and Aging Study ($n = 15,156$), a nationally representative prospective panel study covering both urban and rural areas in all 31 states of Mexico and the Federal District. The sampling framework of MHAS was based on the household listings from the fourth quarter of the 2000 Encuesta Nacional de Empleo (ENE, National Employment Survey). The survey was funded by the US National Institute on Aging and fielded by the Instituto Nacional de Estadística, Geografía e Informática (INEGI). MHAS was designed to be comparable to the US Health and Retirement Study (HRS).

ENE households were eligible for MHAS if they included at least one resident born prior to 1951 (i.e., adults aged 50 and older in 2000). If more than one eligible person lived in a household, one was randomly selected to be part of MHAS prior to the start of fieldwork [13]. The spouse or partner of sampled respondents also was enrolled in MHAS regardless of age. The first wave of the study was conducted during June–September 2001 and detailed data were collected on chronic conditions and symptoms, use of health care services by type of provider, health insurance coverage by program and demographic background and socioeconomic status indicators (employment, income and wealth) [14]. The core interviews lasted for about 80 min.

Our final sample ($n = 12,311$) included respondents aged 50 and older who had no missing responses on all the variables employed. Thus, we excluded 1088 observations due to missing responses and 1757 observations

because these respondents were spouses or partners below the age of 50. Spouses or partners born before 1951 are not representative of the MHAS target population of Mexicans aged 50 and over in 2000 and, as a result, each of these cases has a sampling weight equal to zero. The vast majority of observations excluded due to missing values are the result of proxy responses from close family members, who were not asked questions related to personal perspectives/viewpoints of the selected respondent (e.g., self-reported health status) (1032 out of 1088). The rest of the observations with missing values (56 out of 1088) were either due to non-responses or the refusal to answer questions for health insurance status, pharmacy visits, assets and income. Given the small percentage of observations with missing data in at least one item, we opted to perform a complete-case analysis because the loss of precision and bias in our estimates is likely to be minimal, and we have no reason to believe that these observations are not missing at random [15].

We used logistic regression to analyze how health, demographic and socioeconomic factors are related to self-medication. Logit models are more convenient than probit or linear probability models because the estimated coefficients can be easily converted to odds-ratios. Moreover, the linear probability model can lead to predictions outside the zero–one probability range and the error term is heteroscedastic [16].

Our empirical specification follows the structure employed by Andersen and Davidson [17] and Andersen et al. [18] to analyze healthcare utilization. Self-medication is determined by individual predisposing characteristics (age, gender, schooling and ethnic background), the need for services (health status), enabling factors at the individual level (health insurance and income/assets) and factors at the community/contextual level (urban/rural residence).

We measure self-medication by whether survey respondents consulted a pharmacist – or considered consulting a pharmacist – about health problems within the last year. These consultations occurred without any previous contact with other health care providers and our working definition includes OTC drugs purchased without prescription [5]. A model based on hypothetical rather than actual use of self-medication allows us to better control for the unmeasured severity of health conditions, which could lead to biased parameter estimates.

The regressors included in the model were age categories, gender, self-reported health status, marital status, number of children, whether the respondent is a US return migrant, whether the respondent speaks an indigenous language, urban/rural residence, years of schooling, income/assets quintile categories and health insurance coverage status. Similar empirical specifications to the one proposed here have been employed to analyze the demand for healthcare in both developed and developing countries [5,19]. Most of the variables discussed above have been linked theoretically and empirically to health care utilization in other studies [18].

In the case of Mexico, the US return migrant variable is relevant and it is included in our model because previous research has argued that if a migratory flow is positively selected (i.e., immigrants have above-average skills and better health) then return migrants will have relatively higher skills to those that decide not to return [20]. Thus, elderly return migrants are likely to have different human and health capital endowments than non-migrants. These endowment differences might result in distinct utilization rates of self-medication and professional medical care between

those who have lived and worked in the US and those who have never migrated for work.

Lastly, given the different choices available for health insurance coverage in Mexico, the following health insurance categories are used: private insurance, ISSSTE/PEMEX, IMSS and uninsured. ISSSTE/PEMEX refers to government-provided health insurance for government and state oil industry (PEMEX) workers and IMSS is government-provided insurance for private sector workers [21].

5. Empirical results

Table 1 reports the descriptive statistics of the variables used in the logistic regressions, by whether or not respondents consulted a pharmacist within the last year, or whether or not they would consider consulting a pharmacist for a minor health problem in the future. All the means, proportions and estimated models are weighted to appropriately reflect the sampling design of MHAS. The *P*-values of the differences in means/categories are reported in columns 6 and 11 of

Table 1
Descriptive statistics

Variable	Consulted a pharmacist in the last year					Would go to a pharmacist for minor health problem				
	Yes (n = 1419)		No (n = 10892)		P-value	Yes (n = 940)		No (n = 11371)		P-value
	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
Age (years)										
50–59	0.497	0.500	0.464	0.499	0.199	0.478	0.499	0.467	0.499	0.732
60–69	0.312	0.463	0.303	0.460	0.696	0.287	0.452	0.305	0.460	0.495
70–79	0.141	0.348	0.165	0.371	0.153	0.187	0.390	0.161	0.367	0.274
≥80	0.049	0.216	0.068	0.252	0.111	0.049	0.215	0.067	0.250	0.247
Female	0.524	0.499	0.541	0.498	0.507	0.498	0.500	0.542	0.498	0.150
Fair or poor health	0.755	0.430	0.619	0.486	0.000	0.678	0.467	0.633	0.482	0.112
Married	0.694	0.461	0.685	0.465	0.699	0.666	0.472	0.687	0.464	0.465
Number of children	6.757	3.723	5.919	3.720	0.000	6.340	3.633	5.998	3.735	0.137
Return US migrant	0.095	0.293	0.073	0.261	0.081	0.137	0.344	0.072	0.259	0.001
Indigenous language	0.115	0.319	0.072	0.259	0.029	0.066	0.248	0.078	0.268	0.412
Urban area	0.344	0.475	0.491	0.500	0.000	0.451	0.498	0.476	0.499	0.399
Years of education	2.811	3.390	4.221	4.361	0.000	3.370	3.869	4.098	4.303	0.001
Assets (Mexican pesos)	263712	404731	370802	843653	0.000	319672	444205	360601	822165	0.111
Income (Mexican pesos)	1942	30246	4374	44451	0.085	3892	21723	4102	43995	0.891
IMSS insurance	0.276	0.447	0.395	0.489	0.000	0.324	0.468	0.384	0.486	0.033
ISSSTE/PEMEX insurance	0.068	0.252	0.135	0.342	0.000	0.066	0.249	0.131	0.337	0.000
Private insurance	0.023	0.149	0.026	0.158	0.680	0.039	0.194	0.024	0.154	0.233
Other insurance	0.015	0.120	0.023	0.149	0.154	0.018	0.133	0.022	0.146	0.703
Uninsured	0.618	0.486	0.422	0.494	0.000	0.552	0.497	0.438	0.496	0.000

Table 1. After applying sampling weights, about 11.7% of the selected population has visited a pharmacist and 5.7% would consider consulting a pharmacist for a minor health problem. The descriptive statistics show that there are no differences in age, gender or marital status between those who visited a pharmacist and those who did not.

Those who consulted a pharmacist were more likely to report being in fair or poor health compared to non-consulters (75.5% versus 61.9%; $P = .000$). Note, however, that this difference narrows (67.8% versus 63.3%; $P = .112$) and it is statistically insignificant for those considering visiting a pharmacist. This suggests that there are substantial health-related differences between actual and potential users of self-medication, with larger differences in health status for actual rather than potential users.

A higher proportion of return US migrants and indigenous language speakers rely on self-medication. The differences by return migration status are particularly interesting because they are consistent with recent research showing that returning US migrants have a lower probability of being covered by health insurance [22]. Lack of health insurance may force many returning US migrants to rely on self-medication instead of formal medical care.

Roughly 34% of those consulting a pharmacist resided in urban areas compared to 49% of those that did not consult a pharmacist. Mexicans resorting to self-medication have relatively fewer years of education, lower income and less accumulated assets. Moreover, the proportion of uninsured Mexicans that have consulted a pharmacist is 61.8% compared to 42.2% who have not used these services. Those with some type of health insurance are less likely to resort to self-medication, particularly those covered through IMSS or ISSSTE/PEMEX. Thus, visiting a pharmacist is related to socioeconomic status and the lack of access to formal professional healthcare. These findings, however, do not take into account how different socioeconomic and demographic variables are related to the practice of self-medication in a multivariate setting.

Table 2 reports the logistic regression coefficients and standard errors for those consulting a pharmacist and for those who would go to a pharmacist for a minor health problem. Age is negatively related to whether a person consults a pharmacist, which is likely capturing generational (cohort) effects in the

use of self-medication. Note, however, that age has no effects on the hypothetical decision of considering self-medication. This provides further evidence that actual and potential users differ substantially in their demographic characteristics. The hypothetical self-medication model allows us to better account for biases resulting from the unmeasured severity of health conditions.

Individuals in poor or fair health are less likely to have consulted a pharmacist ($P < .001$). However, this coefficient loses its statistical significance when one considers hypothetical rather than actual pharmacy consultations.

Return US migrants are more likely to resort to self-medication than their non-migrant counterparts. Return migrants probably have less access to formal medical care due to the fact that they migrated to work in the US and, thus, have less information about the system or are not vested in the Mexican health insurance system [22].

Years of education are negatively related to the use of self-medication. Thus, those with more schooling are probably better informed about the risks inherent in self-medication than those with less schooling. The result is also consistent with the finding that those with more schooling have higher utilization rates of professional medical care [23].

To evaluate income and assets, we created quintile categories and used the lowest quintile dummy as the reference category. The quintile categories for income are less than Mexican pesos 0, 0–750, 751–1875, 1876–4278 and 4279 and above, and for assets they are less than US\$ 47,000, 47,000–148,167, 148,168–285,500, 285,501–552,059 and 552,060 and above. The findings show that there is little evidence that being in a given income quintile is related to self-medication. This result holds even if the assets quintiles are excluded from the logistic regressions.

Notably, assets – which measure wealth – are related to self-medication. Those in the second, third and fourth quintiles of assets are less likely to resort to self-medication than those in the first and fifth quintiles. These findings imply that those with fewer assets are more likely to rely on self-medication as a less expensive substitute for professional medical care. That is, poorer individuals may rely on self-medication as an alternative to regular medical care, just as users of alternative medicine rely on these non-conventional

Table 2
Logit models of actual and hypothetical visits to a pharmacist

	Consulted a pharmacist in the last year (coefficient)	Would go to a pharmacist for minor health problem (coefficient)
Age (years)		
60–69	–0.145 (0.121)	–0.160 (0.142)
70–79	–0.481*** (0.154)	–0.036 (0.189)
≥80	–0.771*** (0.251)	–0.530 (0.342)
Female	–0.139 (0.110)	–0.152 (0.137)
Fair or poor health	0.527*** (0.121)	0.154 (0.141)
Married	–0.086 (0.122)	–0.204 (0.150)
Number of children	0.027* (0.014)	0.011 (0.016)
Return US migrant	0.299* (0.155)	0.625*** (0.176)
Indigenous language	0.259 (0.202)	–0.261 (0.247)
Urban area	–0.187 (0.115)	0.110 (0.139)
Years of education	–0.049*** (0.017)	–0.040* (0.021)
Income (Mexican pesos)		
0–750	0.139 (0.155)	0.241 (0.199)
751–1875	0.164 (0.163)	0.126 (0.192)
1876–4278	0.031 (0.175)	0.493** (0.199)
≥4279	–0.021 (0.184)	0.183 (0.232)
Assets (Mexican pesos)		
47000–148167	–0.250* (0.148)	0.141 (0.189)
148168–285500	–0.275* (0.165)	–0.077 (0.194)
285501–552059	–0.328* (0.169)	0.245 (0.187)
≥552060	–0.188 (0.198)	0.175 (0.218)
IMSS insurance	–0.503*** (0.131)	–0.390*** (0.150)
ISSSTE/PEMEX insurance	–0.713*** (0.192)	–0.858*** (0.214)
Private insurance	0.049 (0.315)	0.376 (0.335)
Other insurance	–0.693* (0.369)	–0.455 (0.544)
Constant	–1.690*** (0.229)	–2.717*** (0.305)
Wald Chi-squared	154.690***	89.911***
Observations	12311	12311

Robust standard errors are in parentheses.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

therapies when they cannot afford conventional medical care due to cost [24]. On the other hand, those in the highest asset quintile have access to formal medical care and are likely to use self-medication as a complement to their professional medical care. Many wealthier individuals are likely to be consumers of all types of health care, including self-medication and even alternative medicine [24].

It is also interesting that the coefficient estimates for the assets' categories are mostly opposite in sign between those who have actually consulted a pharmacist and those planning to consult a pharmacist. The

coefficients for the assets' categories are statistically insignificant for those planning to consult a pharmacist. The results imply that wealth levels do not seem to be related to hypothetical questions about pharmacy consultations. An economic interpretation of this result is that response homogeneity across wealth categories arises because hypothetical intentions are costless [25].

The logistic regression results also show that those with IMSS or ISSSTE/PEMEX insurance are less likely to rely on self-medication than the uninsured. Thus, health insurance can serve as a significant deterrent to the use of self-medication. The availability of

Table 3

Discrete changes (marginal effects) and elasticities of consulting and considering consulting a pharmacist, by income, assets and health insurance coverage

	Consulted a pharmacist in the last year		Would go to a pharmacist for minor health problem	
	Discrete change	Elasticity	Discrete change	Elasticity
Income (Mexican pesos)				
0–750	0.001	0.002	0.014	0.055
751–1875	0.008	0.015	0.006	0.023
1876–4278	–0.004	–0.007	0.028	0.088
≥4279	–0.008	–0.015	0.010	0.033
Assets (Mexican pesos)				
47000–148167	–0.022	–0.049	0.007	0.029
148168–285500	–0.024	–0.048	–0.004	–0.013
285501–552059	–0.029	–0.059	0.013	0.045
≥552060	–0.017	–0.031	0.009	0.029
IMSS	–0.044	–0.172	–0.018	–0.141
ISSSTE/PEMEX	–0.053	–0.081	–0.032	–0.104
Private insurance	0.005	0.001	0.022	0.009

private and other insurance is not related to pharmacy visits.

Given the policy importance of income/assets' categories, and IMSS and ISSSTE/PEMEX insurance, we estimated the discrete changes (marginal effects) and elasticities of consulting and considering consulting a pharmacist and report them in Table 3. The main policy-relevant result of importance to our study is that obtaining IMSS or ISSSTE/PEMEX healthcare coverage (changing from 0 to 1) could decrease the probability of pharmacy consultations by .044 and .053 percentage points, respectively. The hypothetical probability of consulting a pharmacist would change by .018 and .032 percentage points. The elasticity measures imply that increasing the proportion of individuals obtaining health coverage under IMSS or ISSSTE/PEMEX by 10% could decrease the use of pharmacy consultations by 1.72 and .81%, respectively. The impact on hypothetical pharmacy consultations would be 1.41% for IMSS and 1.04% for ISSSTE/PEMEX coverage.

We also performed Chi-squared tests to evaluate the statistical significance of a set of interactions between health insurance categories and age, assets and income. That is, it is possible that the health insurance effects on self-medication vary by age, assets or income categories. The interaction effects were statistically insignificant, suggesting that the impact of health insurance coverage on self-medication is fairly uniform across the socioeconomic spectrum.

6. Conclusion

According to MHAS data, roughly one of every eight Mexican adults aged 50 and over has consulted a pharmacist within a year prior to the interview date. There are substantial health-related differences between actual and hypothetical users of self-medication, with larger differences in health status for actual rather than potential users. Mexicans resorting to self-medication have relatively fewer years of education, lower income and fewer accumulated assets. They are also more likely to reside in rural areas and more likely to be uninsured. Those covered by government-sponsored insurance are less likely to rely on self-medication. Thus, self-medication is clearly related to socioeconomic status and the lack of access to formal professional health-care.

US return migrants are more likely to resort to self-medication and this result is consistent with recent research showing that US migrants are less likely to be covered by health insurance than non-migrants. This in turn may force many returning US migrants to rely on self-medication instead of formal medical care. Return migrants have less access to formal medical care due to either a lack of information about the Mexican health-care system, or due to having a lower probability of being included in the Mexican health insurance system [22].

Government-sponsored health insurance could deter the practice of self-medication. Increasing the proportion of individuals obtaining health coverage under IMSS or ISSSTE/PEMEX by, for example, 10% could decrease the use of pharmacy consultations by 1.72 and .81%, respectively.

Our main results are consistent with the conjecture that improving access to the healthcare system can reduce the practice of self-medication in Mexico. While many Mexicans will continue to self-medicate according to their traditional beliefs, improved insurance coverage should reduce the demand for self-medication by both making healthcare more affordable and by overcoming skepticism of the potential benefits of modern medicine.

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