ORIGINAL RESEARCH

Evaluation of determinants of the use of health mutuals by the population of the Ziguinchor region in Senegal

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Abstract

Access to health services is a concern around the world. Different strategies were developed, but Africa's rate remains the lowest. This article aims to contribute to the population's access to healthcare, and to assess the determinants of the use of mutual health insurance by the population of the Ziguinchor region in Senegal.

Methods: The study is transversal and descriptive, carried out from July to August 2018. Through the quota method we defined the number of patients to be interviewed. Thus, by a geographic stratification according to the departments and a second-degree stratification taking into account the staff of the different hospital departments, 392 patients were selected.

Results: 73% at the Regional Hospital Center and 27% at the Regional Peace Hospital. Response rate: 97%, women 60% and men 40%. The enrollment for women (24%) is slightly higher than that for men (21%). Socio-economic factors. The rate of adherence is the highest of for patients with university level, followed by high school; income: the highest rate for patients with a monthly income between 200,000 and 500,000 FCFA, followed by patients with an income monthly between 100,000 and 200,000 FCFA. Factors linked to the provision of care: the rate of Mutual Health Insurance adherence follows distances from patients' homes. Concerning the relation to satisfaction, education, distance and information are more determining than adherence rate.

Recommendations: 1) State: actions on education and distance; 2) Sensitizing the population on mutual health insurance; 3) Urging healthcare providers to reduce waiting times and respect schedules as well as appointments.

Keywords: Mutual health insurance, Membership factors, insurance, universal coverage, care services access, healthcare providers, Senegal.

Introduction

During the colonial period, health care was free for the urban populations (6). Faced with the difficulties of the health system, reorganization was adopted for the partial recovery of costs through the participation of the populations in care costs. Despite these actions, several constraints remained, including the reduction in access to health care and the weakness of the social security system which only covers a tiny part of the African populations (1). Access to health care and services is a concern around the world. This situation is explained by the multitude of barriers, financial, geographic and socio-cultural. In Africa, with the end of the welfare state, countries subjected to the rigors of structural adjustment in the 1980s could no longer bear all the costs relating to the provision of care and services to the population. The low participation of the state in health expenditure generates about 85% of the expenditure borne by patients, resulting in increased expenditure and impoverishment of households. To help people get out of this self-sustaining poverty, situation, initiatives have been taken to improve the health sector and contribute to poverty reduction. However, the finding is less encouraging, and Africa remains the continent with the lowest rate of access to health care (8,2%) (1). Thus, the World Health Organization and the United Nations International Children's Relief Fund have agreed to help low-income countries to set up a system of pooling health risks to increase health coverage for populations and significantly reduce payment for health services at the fund. In this new impetus, many low-income countries, including Senegal, have opted for the establishment of a risk pooling system based on mutual health insurance. Developed in several African countries, it shows low population coverage (2, 7). Several studies have been carried out, particularly in the region of Ziguinchor and Kaffrine in Senegal (3, 4) to identify weaknesses and strengths in the system, to enable leaders to make corrections. We note that in Senegal, more than 80% of the informal sector haven't joined (5). It's therefore to contribute to a better knowledge of the subject and provide useful information to public decision-makers that we situate our study, in order to understand the factors likely to strengthen the coverage of mutual health insurance (MHI) in Africa, in particular, in Senegal. Thus, our objective is to assess the determinants of the use of MHI by the population of the region.

Methods

The study was carried out in the Ziguinchor region (three departments, 641,253 inhabitants (8) and two level 2 hospitals, Regional Hospital Center (RHC) and Peace Hospital (PH) in Ziguinchor. The information collected from the nursing services of the two structures enabled us to estimate the annual number of patients for the RHC at 63,756 and 43,206 for the PH. The study was cross-sectional and descriptive. The study population consisted of patients from hospitals, who are concerned with community-based health care services and coming from the region. Any patient at the Hospital who agreed to be interviewed was included in the study. However, any patient with limitations in responding or with a disability during the survey period or under the age of 18 or over 60 or receiving a Health insurance institution or budget charge was excluded from the study.

Sampling and sample size

The units in the sample were only patients from members and non-members of the MHI coming from all departments in the region for treatment. The quota method was used to define the number of patients to be interviewed,

according to the administrative departments and to the different hospital services. First, we did a geographic stratification according to the three departments of the region: the quotas of patients to be interviewed depended on the size of the populations in each department (Table 1).

Table 1: Distribution of the population according to the departments

Départements	Population	Ajusted population (11%)
Ziguinchor	330 112	293800
Bignona	318 478	283445
Oussouye	64 850	57717
Total	713440	634962

Table 2: Distribution of patients in hospital departments 2016-2017

Regional Hospital				Hospital of Peace		
Services	2016	2017	**Average**	2016	2017	**Average**
MEDECINE	2961	3525	**3243**	2961	3525	**3243**
SURGERY VICERAL	886	574	**730**	886	767	**827**
SURGERY ORTHO	1927	1669	**1798**	1927	1667	**1797**
SAU	10918	12143	**11531**	10918	12137	**11528**
MATERNITY	7671	6981	**7326**	7671	6981	**7326**
ORL	2187	2148	**2168**	2187	2148	**2168**
CARDIOLOGY	560	465	**513**	560	495	**528**
STOMATOLOGY	1265	1327	**1296**	1265	1327	**1296**
OPHTALMOLOGY	5724	7239	**6482**	5724	7239	**6482**
PHYSIOTHERAPY	465	439	**452**	465	439	**452**
CRAO	530	368	**449**	530	347	**439**
RADIOLOGY	7524	7454	**7489**	1322	2361	**1842**
LABORATORY	18856	17325	**18091**	2975	3207	**3091**
DERMATOLOGY	2126	2254	**2190**	2126	2255	**2191**
Total	63600	63911	**63756**	41517	44895	**43206**

Second, we did a second-degree stratification taking into account the staffing levels of the different departments of the two hospitals. The number of patients to be interviewed in the different departments was defined according to the number of patients in each department (Table 2). To avoid duplication, we have only presented data on the number of consultants. To determine the sample size, we set a margin of error of 5% and a confidence level of 95%. In the framework of our study, the parent population is known and according to the theorem of the centered and reduced normal distribution, when a random sample of size is not greater than 30, the distribution of the sample follows a normal distribution N of mean p and standard deviation σ (p) with

σ (p) = $\sqrt{p * [(1 - p)]/n}$. Assuming the assumption of the sample with replacement, we have: t * L with t the confidence rate that we establish at 95% and L the margin of error set at 5%. The formula for the size of the sample was thus obtained: $n = t^2 \times p(1 - p)/L^2$, p being the rate of adhesion of the population to MHI in the region. According to the regional agency for universal Disease coverage (ACMU) of Ziguinchor, it would be 39.9%. According to calculations, the minimum sample size is 369. At this figure, we weighted by adding a 10% margin to account for non-responses or recording errors. The sample size was estimated to be 405.

Variables studied

The literature review helped to choose the variables cited below. The socio-economic determinants were composed of sex, marital status, level of education, socio-professional status, association membership and income of the patients. Demographic determinants consisted of household size and patient age. The determinants linked to the use of mutual

health insurance were represented by membership in a mutual health insurance, the reasons for membership, for non-membership in MHI, the means of information on MHI, the perception of members for MHI, preference for membership in MHI and respect for the medical pyramid. Regarding services, the determinants related to the distance from the nearest health center, the competence of care providers, satisfaction with care, inequalities in relation to care and the waiting period.

Data collection

Data collection was carried out during the period from July to August 2018. We used the sphinx software for the design, layout and adjustments of the questionnaire. After designing the questionnaire, we had to train a total of eight people to collect the data. During the training, we translated the questionnaire into the local language, followed by a field test on patients not concerned by the survey, including patients from the entry office. This test step of the questionnaire allowed us to interview around 20 patients and correct shortcomings on the questionnaire, including the order of the questions and the way in which the answers were recorded. It also allowed us to determine together with the trained agents, a clear and concise message on the definition of MHI, the interest and the acceptance to participate in the study that was transmitted to patients who were not members or who have never heard of MHI, and also determine the interview time.

Data processing and analysis

We used the sphinx software to enter and codify the data. After the entry, we did a detailed proofreading, and we corrected the anomalies observed in the database. Then, the Stata software helped in the statistical analysis of data on socio-economic

and demographic characteristics, the use of MHI and the provision of care. To deepen the analyzes in order to identify the factors related to the adhesion and use of MHI, we carried out an econometric modeling. The variable to be explained is adherence to MHI. It is made up of the *yes* modality if the patient is a member of an MHI and the *no* if not. The dependent variable being a binary qualitative variable with two modalities and the explanatory variables are either qualitative or quantitative. The logistic model was chosen for the data analysis. As the study is cross-sectional, this method allowed us to compare individuals with each other. To do this, we used the following logistic regression equation: Logit$y_i = \alpha + \beta_j x_{ij} + \varepsilon_i$: y_i is the dependent variable for individual i in the sample. Here it represents MHI membership and is a binary qualitative variable with 1 if the patient is a member of a MHI and 0 if not; α is the constant that explains the random part of MHI membership; β_j represents the effect of an explanatory variable j in the model, i.e. the effect of determinants on MHI adherence; x_{ij} represents the explanatory variable j for an individual i of the model; ε_i represents the error term. In order to capture all the possible effects of the explanatory variables, we adjusted the model. Therefore, we performed the Chi-square goodness-of-fit test.

Results

In total, we surveyed 392 patients from the various hospital departments and departments in the region, including 73% surveyed at the RHC and 27% surveyed at the PH. Compared to pre-established estimates, we recorded a response rate of 97%.

Socio-economic characteristics of patients

The results of the survey showed that women made up 60% of the sample compared to 40% of men. The enrollment rate for women was slightly higher than for men. In the sample, married patients were predominantly represented, followed by single people. In contrast, the membership rate was higher among divorced people who represented only 7% of the total sample (Table 3).

Patient demographics

In our sample, the average household size was 10 people and a maximum of 30 people for larger families. The patients interviewed had in their families on average two children under 5 years old and on average two people over 60 years old. The average age of the patients was 34 years.

Factors related to the use of MHI

The results of our survey of patients in hospitals in the region showed a 23% adherence rate. Regarding patients who had no health coverage, 53% said they had never heard of universal or community health coverage.

Of those patients who had heard of it at least once, 67% said they did not have clear information about the enrollment processes, prices, location, and content of the program. The remainder said they did not trust MHI because some pharmacies and health centers would refuse members' diaries; or that they found the procedures too long or that «the program is no longer moving forward because the State is no longer providing funding» (Table 4).

The MHI encountered difficulties related to late payments of state subsidies, which limited their functioning and activities. They have a major problem related to the lack of staff. The voluntary staff in charge of the management of the MHI incurred exorbitant expenses related to travel and catering which were not reimbursed by the MHI.

Table 3 : The socio-economic characteristics of the patients surveyed

Characteristics	Member	Non Member	Total Sample
Sexe			
Female	24,15	75,85	60,46
Male	20,92	79,08	39,54
Marital status			
Single	15,38	84,62	33,16
Partner	0	100	0,26
Divorced	30,77	69,23	6,63
Married	27,03	72,97	57,4
Vidower (Vidow)	10	90	2,55
Level of Study			
No	13,64	86,36	16,84
Koranic School	25	75	10,2
Primary	15,56	84,44	11,73
Secondary	24,39	75,61	42,35
University	31,08	68,92	18,88
Socioprofessionnal Status			
Farmer/Breeder	26,47	73,53	8,67
Artisan	7,69	92,31	3,32
Other	22,22	77,78	11,48
Trader	20	80	27,3
Employee(private)	36,11	63,89	18,62
Student	18,92	81,08	18,88
Household	17,39	82,61	11,73
Associative Membership			
In the past	27,5	72,5	11,8
No	20,16	79,84	38,35
Yes	28,14	71,86	49,85
Patients Income			
Under 30	15,52	84,48	29,59
30-60	24,46	75,54	14,54
60-100	26,56	73,44	3,06
100-200	28,07	71,93	35,97
200-500	33,33	66,67	16,58
Over 500	0	100	0,26

Table 4: Factors related to the use of MHI

Characteristics	Freq.	Percent
Member of a MHI		
No	300	77.12
Yes	89	22.88
Reasons for no belonging to MHI		
Other	137	46.60
Don't Know the MHI	157	53.40
Reasons for non-MHI membership		
Proceédures too long	2	1.52
To desist	1	0.76
Pharmacies refuse notebooks	2	1.52
Lack of information	88	66.67
Lack of confidence	30	22.73
Lack of means	3	2.27
Program stopped	5	3.79
In progress	1	0.76
Means of information on MHI		
Other	17	12.98
Mass awareness	13	9.92
Member of MHI	28	21.37
The Medias	27	20.61
A relative	46	35.11
Perception des Membres aux MHI		
Good	99	84.62
Bad	4	3.42
Very good	14	11.97
Preferred membership modes of members of MHI		
Individual	10	8.70
Family	99	86.09
(Associative) group	6	5.22
Respect for the medical pyramid		
No	21	36.21
Yes	37	63.79

Factors related to the provision of care

Patients with a health center less than two kilometers from their homes have the highest adherence rate, followed by patients who have a health center between 2 and 5 kilometers from their homes and patients whose homes are more than 10 kilometers from a health center are not members of the MHI. Most of the patients surveyed admit that healthcare providers are in control of their job and therefore competent. Patients who think healthcare providers are very competent show a higher rate of 44% membership while those who think providers have no skills are not members of MHI. Likewise, the majority of respondents are satisfied with the treatments received. The results of econometric modeling have shown that the presence of people over the age of 60 in the household has a significantly negative impact on MHI membership. With regard to overall satisfaction, the majority of patients surveyed declared that they were not satisfied; 55% of them say that the waiting times are too long and that they are not well received (Table 5).

Table 5: Factors related to the provision of care

Characteristics	Member	Non Member	Total Sample
Distance to the nearest health center			
Under 2	26,58	73,42	56,89
]2-5]	19,33	80,67	38,78
]5-10]	7,69	92,31	3,32
]10-20]	0	100	0,51
Over 20	0	100	0,51
Health care provider skills			
No skills	0	100	1,81
Moderately competent	17,86	82,14	14,51
Competent	16,07	83,93	58,55
Very competent	44,33	55,67	25,13
Satisfaction with care			
Yes	23,33	76,67	84,87
No	20,69	79,31	15,13
Inequalities in relation to care			
Yes	29,25	70,75	28,57
No	21,51	78,49	71,43
Timeout			
Short	38,46	61,54	3,34
Normal	28,57	71,43	41,39
Too long	17,84	82,16	55,27

The results of the estimations showed that neither the income, nor the association membership, nor the presence of children in the household, nor the age of the patients, nor the satisfaction linked to the treatments received nor the aforementioned waiting times have significant impact on MHI membership. Regarding the level of study, the estimations carried out have shown a significant effect of the secondary level of education on the adherence to the MHI. Patients who have a level of secondary education have a 195% chance of adhering to the MHI, in contrary to patients who don't have any level of study. Likewise, the estimates of the results from the logistic regression and the robustness model have shown that variables such as household size, the presence of elderly people in the household, the perception that individuals have on MHI and their self-confidence, and the respect of the long procedures to receive care have a significant impact on the adhesion to the MHI. The significantly positive impact of the size of the household on the membership in the MHI companies shows that the larger a household, the more it adheres to MHI. Finally, the result of our data analyzes showed a significantly negative effect of adherence to the medical pyramid on MHI adherence. This means that the more restrictions there are in the procedures to be followed in order to receive care, the less the members have free choice of treating physicians and the less they adhere to the MHI. In addition, some patients felt that the posts and health centers are full of poor skills and can worsen their health in the event of illnesses that would require strong skills or emergencies. These results, little known in the literature, constitute a particular contribution of this study (Table 6).

Table 6 : Logistic Regression

Logistic regression				Number of obs	=	332
				LR chi2(6)	=	230.76
Log likelihood = -71.316718				Prob > chi2	=	0.0000
				Pseudo R2	=	0.6180

AppartenenceMS2	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Pyramidmedical	.1125208	.0543078	-4.53	0.000	.0436922	0.2897759
TailleMenage	1.143535	.0461296	3.32	0.001	1.056604	1.237618
ConfianceMS	8.769468	4.12697	4.61	0.000	3.48652	22.0574
personneAgee	.3468341	.1663387	-2.21	0.027	.1354855	.8878728
NiveauSecond	2.957122	1.42276	2.25	0.024	1.151677	7.592902
PerceptionMS	56.59515	29.61976	7.71	0.000	20.29049	157.8578
cons	.000432	.0005158	-6.49	0.000	.0000416	.0044867

Discussion

The shortcomings identified in the context of our work are of three types: representativeness bias, information bias and judgment bias. According to the literature, depending on the nature of the questions asked, the answers of those in favor can tend to be those of *biased actors* (9), which can generate judgment biases. To this end, it would imply caution in interpreting the results across the region. Studies on the determinants of MHI adhesion and use are few and lack of available data (10). The few rare studies that have addressed the subject are unanimous on a number of factors such as: education, lack of communication and low household income. In our study, the results showed that adherence is progressive depending on the level of study. These results are similar to the one carried out in Ziguinchor (3) which claims to have found a significant link between the level of education of the head of household and membership in the MHI. Also, as patients' income increases, so does their willingness to pay MHI premiums. Education has a significant impact on health. It enables highly educated people to have a high socio-economic status, improves entrepreneurial capacities (11). Thus, people with a high level of education would be likely to have health coverage and by extension, to join more in the MHI. Like education, according to the literature (10, 4), income is a key variable in the factors of MHI adherence. In contrast, in other work (2, 12), the authors have shown that they found no significant association between income and MHI membership. Demographics also play an important role in MHI membership. Household size and the presence of elderly people in the household have a significant impact on MHI membership. The significantly positive impact of household size on membership in MHI shows that the larger a household, the more it adheres to MHI.

Conversely, the presence of people over the age of 60 in the household has a significantly negative impact on MHI membership. This result is confirmed by the study carried out in the Ziguinchor region (3). It could no doubt be explained by the establishment of free programs of the State for the latter. The almost free care for people over 60 years old would prevent them and those around them from joining the MHI. In order for there to be consistency between the free programs put in place and the health coverage program by the MHI, a partial subsidy for the care of the latter would make the two programs more equitable and would prevent individuals, especially older, to anticipate not to join the MHI. Then, the state could put in place a policy of gradual subsidies in favor of large families. One of the main factors which would constitute a brake on adhesion identified through this study is the lack of information, which has also been identified in certain works (3, 2). Thus, MHI, through their unions departments, should organize more mass awareness sessions in public places, in the media and more in private than public training centers. The study did not identify a significant impact between factors related to the provision of care services and adherence to MHI, as some studies suggest (1, 3, 13). This would undoubtedly be linked to the embryonic state of the start of the MHI system in Senegal. In contrast, the patients surveyed raised huge issues that need to be addressed to support the process towards MHI maturity. The results of the study showed that the MHI adherence rate also tracks distances from patients' homes. These results are supported by various studies (12, 3) of households which indicate that low adherence is linked to the distance between the household and the health center and the residence in rural areas. This study examining factors related to MHI adherence and use, admittedly had its limitations such as representativeness

bias, information bias and judgment bias, but also had advantages. It could provide a broader knowledge of the functioning of the MHI in Senegal and help to identify the factors which would constitute a hindrance to the membership of the MHI in the region. It also provided useful information to help local policy makers and mutual managers to improve the operating system of MHI for greater membership. Indeed, our study has shown that the factors which would constitute a brake on the adhesion and the use of the MHI are essentially the lack of information, the income, the education, the large size of households and the presence in household of persons over 60 years of age.

Conclusions

Mutual health insurance is a topical issue in the health systems of African countries today. This initiative is taking on an unprecedented scale in the journey of building a resilient health system in Africa. Although the health risk coverage system through the MHI in Senegal is still in a state of initiation and requires more monitoring, it has solid foundations and considerable advantages that could serve as a reference model for other countries on the continent.

Recommendations:

1) State actions on education and distance; 2) Sensitizing the population on mutual health insurance; and 3) Urging healthcare providers to reduce waiting times and respect schedules as well as appointments.

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