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Inequalities in healthcare utilisation: a decomposition analysis based on financial protection against health risks in Senegal

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Abstract

Background: Developing countries are characterised by lack of financial protection against health hazards that can lead to health inequity. Improving horizontal equity in the utilisation of health care requires a better understanding of the factors that influence it. This study used Senegal as a case to examine healthcare utilisation disparities and their determinants.

Methods: The study used the most recent Demographic and Health Survey (2017) from Senegal. Frequencies, a logit model and an extension of Blinder-Oaxaca decomposition (proposed by Fairlie) were employed to examine healthcare utilisation gap between covered and uncovered people as well as factors explaining this gap.

Results: The results of the logistic regression show that healthcare utilisation increases with quintiles of economic well-being; people covered by an insurance or fee exemption scheme use more health care services than those not covered. Women, urban people, children aged under five years and elderly (60 and +). Results from Blinder-Oaxaca decomposition suggests a difference in healthcare utilisation between covered and uncovered people. 39% of these disparities are explained by the distribution of observed characteristics (age, area of residence, economic well-being, education) while 61% of these disparities are explained by differences in coefficients. This component may be related to discriminatory practices in favour of the persons covered.

Conclusion: The results also raise the issue of the fragmentation of coverage schemes that can lead to differences in the care packages offered. Public authorities need to make efforts to reduce social inequalities and have an important stewardship role across all branches of society to ensure that policies and actions in other sectors improve health equity.

Introduction

As health problems are highly concentrated in the most disadvantaged populations, the question of equity in health policies is very acute. There is a health-related poverty trap at both micro- and macroeconomic levels: a family hit by illness of one of its members can become permanently impoverished because of loss of income associated with the illness and the cost of access to care [1] [2] [3]. In 2008, the *Commission on Social Determinants of Health* reported that the life chances of children worldwide varies dramatically depending on where they were born [4]. Within countries, health and illness also follow a social gradient: the lower the socioeconomic position, the worse the health [4].

As mentioned by Berthelemy and Seban [5], the literature on the issue of health distribution in developing countries focuses on two major issues. On one hand, some studies analyse the within-population distribution of the benefits of public health spending. However, since the benefit incidence literature only considers public expenditure, it does not directly address the question of access to health, and furthermore considers issues of inequality instead of equity [5]. On the other hand, many studies inspired by Wagstaff et al. [1] take the equity dimension into account and analyse the concentration of access to

healthcare by using the concentration index [6]. However, these studies often focus on disparities related to income and no other socioeconomic dimensions such as financial protection against health hazards. To fill this gap, a growing number of studies have used a method called the decomposition of Oaxaca and Blinder [7] [8] to tackle variables such as spatial variations of health care utilisation, wealth-based gaps, evolution of health care use over time, and ethnic disparities in access to social services [9] [10] [11]. There is a gap in the literature that deals with the disparities in health care utilisation based on the degree of protection against health hazards. This study tries to fill this gap by using a model inspired by Andersen [12].

Indeed, many countries have made significant efforts to reduce inequities in access to health care. Universal Health Coverage (UHC) has become an overarching international goal aimed at reducing exclusion from health systems of certain segments of the population. UHC is both a public health objective and an imperative for economic and social development, as shown by its place in the sustainable development goals (SDG3).

In Senegal, the National Health and Social Development Plan (PNDSS 2019–2028) aims to progress towards the objective of UHC through its two dimensions: extending the coverage of services (infrastructure, human resources, etc.) in underserved areas, and the expansion of financial protection through a policy called *"Couverture Maladie Universelle"* (CMU). Senegal has launched various initiatives aimed at protecting the population against health risks (for example, user fee exemptions for the elderly called SESAME plan, for children under 5 years old and caesarean section) alongside existing initiatives consisting of multiple compulsory schemes and voluntary and social assistance [13]. However, the proportion of the population effectively covered remains below the planned target of reaching 75% in 2017. At the end of June 2019, it was estimated that 45.39% of the Senegalese population were covered by a scheme of social health protection in one form or another [14]. Yet, this figure hides disparities according to the socioeconomic characteristics of the populations (area of residence, wealth, level of education, etc.). According to the most recent Demographic and Health Survey (DHS) [15], 83% of surveyed households were not covered by any health insurance. Community-based health insurance (CBHI) was the most widely used type of health insurance, accounting for 3% of surveyed households. 2% of respondents were covered by budget allocations for civil servants and their families. Nearly 2% of those surveyed were covered by a regime called 'Institutions de Prévoyance Maladie' (IPM) that is intended for workers in the private sector and their families. The share of population benefiting from IPM-type health insurance policies was higher in the regions of Dakar (5%) and Saint-Louis (3%), compared to other regions. The percentage of children aged 0–4 years covered by the Free Health Care Initiative is higher in urban areas (63%) than in rural areas (48%) [15]. This coverage increases from the lowest quintile to the highest: while in the households of the lowest quintile, around 40% take advantage of this insurance, the percentages are 58% in the middle quintile and 64% in the highest. The DHS also showed inequalities in mortality, morbidity and the use of health care, as well as inequalities in income, education, gender [18]. In the same vein, examination of the national health accounts (NHA) showed that the current expenditure of the insurance mechanisms was dominated by the IPM over the period 2014–2016 with an average of 16,6 billion FCFA (29.606.707$), or 37.2%, and private insurance companies with 16.7 billion

FCFA (29785061$), or 37%. It should also be noted that CBHI expenditures increased by 3% over the period [16].

In this context, this study aims to analyse whether adherence to a health coverage scheme impacts inequalities in the utilisation of health services among Senegalese populations, and to identify the factors that contribute to widening or reducing the gap in health service utilisation by comparing the mean probability of using health services between those covered and those not covered by a financial protection plan. Socio-demographic, health- and wealth-contributing factors are also included in the analysis.

Methodology

This study uses data from the fifth stage of the continuous demographic and health survey (EDS-Continue) carried out in 2017 by the National Agency for Statistics and Demography in collaboration with the Ministry of Health and Social Action from Senegal. They are drawn from a representative sample of the national population by place of residence (rural / urban) and region. It covers 8,800 households (4,092 in urban areas and 4,708 in rural areas). In particular, the DHS adopted a stratified two stage cluster design and samples selected for enumeration were ensured to be representative of the country.

The outcome variable of interest is a binary indicator of whether an individual has resorted to a consultation in the past 12 months [17] [18]. The outcome variable is dichotomized into 1 when a household member answered ‘yes’ to the above question, and otherwise into 0 if ‘no’. As indicated in Section 1, in Andersen’s model the decision to seek treatment is considered to be explained by three categories of variables: predisposing factors (demographic characteristics such as age, sex, level of education), capacity factors (socioeconomic characteristics such as income, ability to travel to health facilities, availability of services) and need factors. There is a broad consensus that suggests that disparities in healthcare utilisation can be reduced by measures aimed at improving the opportunities and life situations of deprived people [19] [9] [20] [1] [21] [6] [22] [23] [24] [25] [26]. Thus, as an input variable, each coverage scheme is modelled as a modality which is compared to the reference (no coverage). As control variables, we consider the quintiles of economic well-being. These are based on the information available on the ownership of household assets and on the housing and environmental conditions to analyse inequalities in reproductive health care services, level of education, needs variables (sex and age), place of residence (rural/urban) and household size [20] [1] [21] [6] [22] [23] [24] [25] [26].

Analytical Model

Although the objective of this research was to determine the disparities in the use of health care between covered and uncovered household members, we were also interested in the impact of the different coverage schemes existing in Senegal on healthcare utilisation. Thus, this reduces the utilisation decision into a binary choice set, making it possible to estimate the determinants of healthcare utilisation with a logit model. [27] [28]

$$U_i = \begin{Bmatrix} 1\ if\ household\ member\ use\ healthcare \\ 0\ otherwise \end{Bmatrix} \quad (1)$$

We generalized this set of choice as $i = (0,1)$, with U an indirect utility derived from choosing any of the two alternatives. The log odds of a household member using healthcare at least once can thus be expressed as:

$$Ln\left(\frac{P(U_i)}{1-P(U_i)}\right) = X_i\alpha + \mu_i \quad (2)$$

Where X represents a vector of determinants of healthcare utilisation, $P(U_i)$ is the probability of healthcare utilisation, $\frac{P(U_i)}{1-P(U_i)}$ represents the odds ratio (OR), α states the coefficients to be estimates by maximum likelihood and μ the error term. The estimation of a logit model was used to analyse the determinants of health care utilisation. Firstly, we decomposed the 'health protection scheme' variable into the various existing schemes in Senegal. This choice is justified by the desire to take into account the heterogeneity and fragmentation of information resulting from the comparison within the health risk coverage. Thus, the influence of each scheme on the probability of using health care was estimated only under control of variables of needs (age and gender). This first step allowed for a descriptive analysis so to highlight the differences in the utilisation of care by sex and age. Secondly, socio-economic and demographic variables were added (level of economic well-being, area of residence, household size, level of education) to measure the specific effect of coverage on the probability of using health care. The results of the first two regressions are shown in Table 1 below.

Decomposition of Difference in the Use of Healthcare Services

To decompose the difference between the covered and the uncovered samples in the utilisation of healthcare services, we used Fairlie's [29] [27] proposed extension of Oaxaca's [7] and Blinder's [8]

decomposition technique. The decomposition method proposed by Oaxaca and Blinder is in fact only applicable when the dependent variable is continuous (wage gaps between two population or according to gender). However, decision of using health care services is a binary choice (See Equation 1). Following Fairlie [29] [30], the decomposition of the difference of probability of healthcare utilisation between the two group can be expressed as:

$$\bar{P}_{UC} - \bar{P}_{Unc} = \underbrace{\left[\sum_{i=1}^{NC} \frac{\varphi(X_i^C \hat{\beta}^C)}{N^C} - \sum_{i=1}^{Nnc} \frac{\varphi(X_i^{nc} \hat{\beta}^C)}{N^{nc}}\right]}$$

$$+ \left[\sum_{i=1}^{NnC} \frac{\varphi(X_i^{nC} \hat{\beta}^C)}{N^{nC}} - \sum_{i=1}^{Nnc} \frac{\varphi(X_i^{nC} \hat{\beta}^{nC})}{N^{nC}}\right] \quad (3)$$

Where: φ stands for a cumulative distribution function from a logistic distribution, $\bar{P}_{Uk}$ stands for the average probability of using healthcare services in the group k and N^k stands for the sample size for group k = C (covered group); nC (uncovered group). The first term in the bracket represents that part of the gap in the dependent variable that is due to group differences in the distribution of X. The second bracket represents the gap arising from differences in group processes that determines the level of Y, as well as the proportion of the group difference captured by unobserved endowments. Using the coefficients (β) from the Logit regression of the whole sample, the contribution of a characteristic can be expressed as follows, considering that the number of individuals is the same in both groups [27].

$$\frac{1}{N_{nC}} \sum_{i=1}^{N_{NC}} F\left(\hat{d}^* + X_{1i}^C \hat{\beta}_1^* + X_{2i}^C \hat{\beta}_2^*\right) + F\left(\hat{d}^* + X_{1i}^{nC} \hat{\beta}_1^* + X_{2i}^C \hat{\beta}_2^*\right) \quad (4)$$

Thus, the contribution of each variable to the difference in healthcare use is equal to the change in the predicted average probability of health care utilisation by replacing the distribution of variable X_1 of the 'uncovered' group with that of the 'covered' group, while keeping the distributions of the other variables (characteristics) constant. The relative contribution of a characteristic can be positive or negative. A negative value suggests that that factor contributes to a decrease in the difference in health care utilisation that is attributed to a difference in the distribution of observable characteristics between covered and uncovered persons. An important characteristic of this technique is that the sum of the contributions of the individual variables will be equal to the total contribution of all variables evaluated with the full sample [30].

Results

An exploratory analysis of the data (Fig. 1) shows that almost 85% of the individuals in the sample were not covered. Of those covered, 60,07% have sought care. Out of a total sample of 78,950 individuals, 60,42% responded that they had not used the care. The sample is composed of 47% men and 53% women and there are 59,51% of the whole sample who live in rural areas. (See appendix 1 for more details).

A. Determinants of Health Service Utilisation

In this section, we present the results of the determinants of utilisation of healthcare with a focus on the differences of the different schemes as well as socioeconomic variables. We performed a stepwise backward variable selection option for filtering out ‘insignificant’ variables.

Table 1
Determinants of the utilisation of healthcare services: Odds ratios

	Model 1		Model 2	
Variables	Coefficients	Odds Ratios	Coefficients	Odds Ratios
Types of schemes (reference = no coverage)				
CBHI (community)	0.237***	1.268***	0.232***	1.261***
	(0.0411)	(0.0521)	(0.0416)	(0.0525)
CBHI (professional)	0.618***	1.854***	0.379***	1.461***
	(0.0696)	(0.129)	(0.0709)	(0.104)
CBHI (complementary)	0.745***	2.107***	0.498***	1.646***
	(0.165)	(0.348)	(0.167)	(0.275)
IPM (private sector employees)	1.092***	2.981***	0.773***	2.166***
	(0.0788)	(0.235)	(0.0804)	(0.174)
Budget allocation	0.983*** (0.0654)	2.672***	0.631***	1.880***
		(0.175)	(0.0675)	(0.127)
Private insurance company	1.364***	3.911***	0.966***	2.627***
	(0.159)	(0.621)	(0.161)	(0.423)
IPRES (pensioned private sector)	0.913***	2.492***	0.609***	1.839***
	(0.131)	(0.327)	(0.134)	(0.246)
FNR (civil servants pensioned)	0.572**	1.771**	0.247	1.280
	(0.235)	(0.416)	(0.239)	(0.306)
Free healthcare for children under 5 years	1.397***	4.045***	1.321***	3.746***
	(0.0354)	(0.143)	(0.0357)	(0.134)
SESAME Plan	1.091***	2.977***	0.940***	2.559***
	(0.151)	(0.450)	(0.152)	(0.390)
Age (reference = 6–59 years)				
0–5 years	0.0516**	1.053**	0.0248	1.025
	(0.0236)	(0.0248)	(0.0244)	(0.0250)

Source: Authors' calculation from the DHS 2017. Note: *** is significant at $p < 0.01$, ** is significant at $p < 0.05$, * is significant at $p < 0.10$. Standard Deviation in (.)

	Model 1		Model 2	
60+	0.651***	1.917***	0.536***	1.709***
	(0.0299)	(0.0573)	(0.0306)	(0.0523)
Gender (Reference = man)	0.441***	1.555***	0.440***	1.552***
Woman	(0.0151)	(0.0235)	(0.0153)	(0.0237)
Area of residence (Ref = Urban)			−0.391***	0.676***
Rural			(0.0161)	(0.0109)
Household size			−0.0171***	0.983***
			(0.000938)	(0.000922)
Economic well-being (reference = poorest)				
Poorer			0.166***	1.180***
			(0.0214)	(0.0253)
Middle			0.193***	1.213***
			(0.0227)	(0.0276)
Richer			0.263***	1.301***
			(0.0239)	(0.0311)
Richest			0.494***	1.639***
			(0.0259)	(0.0425)
Educational level (reference = none)				
Primary school			−0.419***	0.658***
			(0.0235)	(0.0155)
Secondary			−0.503***	0.605***
			(0.0329)	(0.0199)
High			−0.378**	0.685**
			(0.163)	(0.112)
Constant	−1.319***	0.267***	−0.521***	0.594***
	(0.0255)	(0.00683)	(0.0382)	(0.0227)

Source: Authors' calculation from the DHS 2017. Note: *** is significant at $p < 0.01$, ** is significant at $p < 0.05$, * is significant at $p < 0.10$. Standard Deviation in (.)

	Model 1		Model 2	
Observations	78,950	78,950	78,950	78,950

Source: Authors' calculation from the DHS 2017. Note: *** is significant at p < 0.01, ** is significant at p < 0.05, * is significant at p < 0.10. Standard Deviation in (.)

The results of the first model (after controlling only for age and gender) show that the probability of using health care was significantly higher among covered people, regardless of the type of scheme. In particular, children under the age of five, SESAME plan beneficiaries and those insured in the formal private sector (health insurance institution) were more likely to use health care (with odds-ratios of 3.746, 2.559, 2.166, respectively; significant at the 1% threshold). This confirms the intuition that removal of the financial barrier, all else being equal, facilitates primary access to healthcare. An interesting result is that the probability of using health care for community-based health insurance is not very high (OR = 1.268 significant at the 1% threshold) compared to other formal coverage schemes (Table 1, column 2). Moreover, intuition is also confirmed with respect to age and gender characteristics. The probability of using care is greater among women and in older populations. Similarly, with regard to the age variable, children under five (benefiting from user fee exemption) and people aged 60 and over (also benefiting from fee exemption under the SESAME plan) have a greater probability of using health care than individuals aged between 6 and 59 years who do not benefit from an exemption measure for this age group, other variables remaining constant.probability of using healthcare services. Thus, this suggests an effect of coverage independent of the socio-economic conditions of those uncovered. However, there is a decrease in the Odds ratio attached to the different health coverahe schemes between models 1 and 2. This shows that the socio-economic situation of people not covered also explains their low health care utilisation. Furthermore, the probability of health care utilisation increases with the quintiles of economic well-being (with increasing odds ratios of 1,180, 1,213, 1,301 and 1,639 for the poorer, the middle, the richer and the richest, respectively) and is lower for people living in urban areas. This probability decreases with the level of education. Thus, the probability of using health care is lower for educated people. Finally, the probability of using care decreases with household size and people in rural areas have a lower probability of using care than people living in urban areas (OR = 0,676 significant at the 1%).We have also grouped all the financial protection schemes into the 'covered' group and the rest into the 'uncovered' group. This recoding was carried out for the purposes of decomposition, ensuring that the structure of the results of the logit analysis did not change. Indeed, the results do not change. The probability of seeking care is lower among the uncovered, increases with the economic well-being quintile and is higher among women. This probability decreases with the size of the individual's household and is lower in rural areas and among educated people, all other things being equal (See Appendix 2).These estimates highlight disparities in the use of health care between those covered and not covered by health protection scheme. The decomposition based on Fairlie's methodology allows the gap to be quantified and explained. The results show a difference in health care utilisation of 24.2%, with 60.1% for the covered compared to 35.9% for the uncovered.After adjustment for socio-economic and demographic

conditions (Table 1, column 3), the structure of the results does not change. Being covered by a scheme increases the probability of using healthcare services. Thus, this suggests an effect of coverage independent of the socio-economic conditions of those uncovered. However, there is a decrease in the Odds ratio attached to the different health coverahe schemes between models 1 and 2. This shows that the socio-economic situation of people not covered also explains their low health care utilisation. Furthermore, the probability of health care utilisation increases with the quintiles of economic well-being (with increasing odds ratios of 1,180, 1,213, 1,301 and 1,639 for the poorer, the middle, the richer and the richest, respectively) and is lower for people living in urban areas. This probability decreases with the level of education. Thus, the probability of using health care is lower for educated people. Finally, the probability of using care decreases with household size and people in rural areas have a lower probability of using care than people living in urban areas (OR=0,676 significant at the 1%).

B. Decomposition Analysis of the Probability of the Utilisation of Healthcare Services

This section examines how much of the difference in use of healthcare between covered and uncovered by a financial protection scheme is attributable to a difference in the distribution of observable characteristics. Our results show that 38.8% of the care use gap is explained by the unequal distribution of characteristics between the two groups. Indeed, the care utilisation gap would decrease by approximately 39% if socio-economic and demographic conditions were uniform between the two group.

Table 2
Decomposition analysis of the difference of health care utilisation gap

Probability (covered)	**0,601**		
Probability(uncovered)	0,359		
Difference (1)	0,242		
Total explained (2)	0.094		
% explained (1/2)	**38.8%**		
Variable contribution	coefficients	SD	% explained
Household size	0.002**	(0.001)	2.1
Area of residence	0.014***	(0.001)	14.9
Economic well-being	0.012***	(0.001)	12.8
Gender	−0.001***	(0.000)	−1%
Education	0.013***	(0.001)	13.8
Age	0.054***	(0.004)	57.4

Source: Author's calculation from the DHS 2017. Note: *** is significant at $p < 0.01$, ** is significant at $p < 0.05$, * is significant at $p < 0.10$. Standard Deviation in (.)

Of all the variables included in the analysis of the determinants of the utilisation of healthcare, age, area of residence, economic well-being and educational attainment are the most salient features in explaining the disparities that exist on average between the two groups. Age explains 57.4% of the difference in the utilisation of care between the two groups. The positive sign of this contribution suggests that those uncovered are most represented in the 6–59 age group, which increases the difference in healthcare utilisation between the two groups. The area of residence explains 14.9% of the difference in healthcare utilisation attributable to all characteristics. This result suggests that the high concentration of people without health coverage in rural areas explains their low probability of using health care. 12.8% of the difference attributed to all characteristics is explained by economic well-being. This result suggests that the low level of economic well-being (ownership of a television, a bicycle or a bike, housing characteristics such as the source of drinking water supply, the type of toilet used and the flooring material) of people without coverage explains their low probability of using care. The level of education explains 13.8% of the difference in care use attributable to these characteristics. Household size explains 2.1% of the difference in care use attributable to the distribution of characteristics. This positive result suggests that the persons not covered often come from large families, thus reducing their likelihood of using health care. Gender contributes only slightly to the difference in care use (–1%). However, this negative result is interesting because it suggests that the distribution of women in favour of those insured reduces disparities in the probability of using care.

In sum, Fairlie's decomposition approach shows that 38.8% of the difference in healthcare utilisation is explained by observable characteristics (economic well-being, residence area, gender, age, education level). As a corollary, 61.2% of this difference is attributable to estimated coefficients, i.e., the impact of characteristics on the probability of using care. This unexplained part of the difference is often linked to discriminatory practices.

Discussion

Our results corroborate many findings on the existence of health inequalities between socioeconomic strata, with the richest being more likely to use health care than the poorest [31] [1], [6] [32] [11], [10]. In addition, women, people over 60 years of age and children under five years of age are more likely to use care. This is largely consistent with the idea of horizontal equity: people with more health needs should have higher access to health care. On the other hand, people living in urban areas are more likely to use care than those living in rural areas, as shown by several studies [33] [34]. One explanation for this difference emerges when we look at the disparities in the distribution of health resources (physical and human) across the territory with a high concentration in urban areas that are relatively easy to access compared to rural areas [35]. The negative effect of rural areas on the probability of using healthcare services can partly be explained by the use of traditional medicine and self-medication. Our results also show that the probability of using health care decreases with education level. This could be due to the fact that educated people use self-medication at early signs of illness. Although our results do not show this, it can be justified by the fact that more educated individuals have a greater ability to adopt

preventive attitudes and responses and thus have a better understanding of the impact of risk behaviours.

As in the studies by Wang and al[36] and Do and Al.[19] our results confirm that people with insurance, or more largely, people covered by a financial protection scheme, have a higher probability of using care than those without it, with the difference in use amounting to 24.2%. According to the methodology proposed by Fairlie, 38.8% of the difference in care use between the two populations is attributable to the difference in observable characteristics between the two groups. Among all the observable characteristics, age plays the most important role, alongside residential background, economic well-being and educational attainment. Thus, the age distribution between the two populations is responsible for 57.4% of the difference in care use between the two groups. Our results thus confirm the greater utilisation of care for people considered vulnerable, particularly children and pensioned people. In other words, the age distribution between those covered and those not covered increases the inequalities between the two groups. In the same vein, the distribution of the standard of living, of the area of residence and of the level of education, are in favour of the people covered. On the other hand, the distribution of gender between the two groups reduces the difference in the use of care between the two groups.

The difference in health care use that is not explained by the difference in the distribution of observable characteristics represents the part attributable to differences in estimated coefficients. Approximately 61.2% of the observed difference in the utilisation of healthcare use between covered and non-covered persons is due to an effect of observable characteristics. Thus, the analysis of the determinants of care use within the two groups confirms a difference in these effects. The negative effect of the (rural) area of residence on the probability of using care is somewhat more pronounced for the non-covered than for the covered. The positive effect of the level of well-being on the probability of utilisation care is greater among those covered. For gender, women who are not covered have a higher probability of using care than women who are covered. For education level, regardless of the level considered, people without coverage are slightly more likely to use care than those without coverage. The age effect is much more pronounced among those covered, especially in the 0–5 age group. Thus, this result confirms those obtained by the Fairlie decomposition and thus suggests different impacts on the probability of using care.

Furthermore, this unexplained component can be linked to discriminatory practices against those who are not covered, and it also suggests the omission of certain relevant variables, including socio-professional status, which to a large extent determines whether a person obtains health coverage, the perception of the quality of care, and the existence of alternatives to modern care such as traditional medicine. Notwithstanding this limitation, our results allow us to draw important policy lessons in the extension of health insurance and, in a broader perspective, of Universal Health Coverage. The main recommendation is to bring people together in the same scheme in order to address health disparities as suggested by the negative impact of gender on inequalities in the use of care and the different impacts of different schemes on the likelihood of using care. The continuation of the dynamic thus makes it possible, on the

care demand side, to standardise the utilisation of healthcare between different age groups and between men and women. On the supply side, correcting the gap in human and material resources between urban and rural areas makes it possible to close the gap in physical accessibility to health care. In the same vein, attention must be paid to the social determinants of health, particularly in terms of access to drinking water, improved sanitation facilities and the living environment of individuals. Concretely, this is done through the multiplication of multisector initiatives with a high impact on the health of populations in order to eliminate the existence of socio-economic gradient. Although it is difficult to succeed in unifying the different coverage schemes because of the advantages of each, it is possible to establish links between them by identifying the potential of the different coverage schemes in order to establish a sustainable extension of health risk coverage. As suggested by Coheur et al. [37], these synergies are: financial, functional and management, governance, policy, and linkages in the provision of health services. With regard to financial articulation, the problem of financial sustainability of CBHI due in part to the low contributory capacity of individuals to insure can be addressed by transfers from compulsory schemes and beyond government subsidies. This is the case in Colombia, where 69% of the financing of the subsidised schemes is provided by the government and 24% by subsidies from compulsory schemes. This 24% constitutes one-twelfth of total employee contributions of compulsory schemes. These financial arrangements have increased the coverage rate from 28% in 1992 to 80% in 2007. Articulations can also allow a reduction in transaction costs and the definition of a single package of benefits to meet equity requirements. Indeed, contractualisation is a process that entails significant transaction costs when each regime negotiates contracts separately. This would eventually allow a uniform package to be defined and would compensate for disparities in the attractiveness of benefit packages [37].

This study is not exempt from limitation. It would benefit from considering an outcome that brings together a plurality of providers (traditional practitioners, doctors), as well as including direct measures of geographical accessibility variables. However, these limitations are due to data constraints and that the method chosen only allows disparities between two groups to be seen. On the other hand, the cross-sectional nature of the data can be a limitation. Nevertheless, the data set is representative at a national level and the model used is widely used in the literature.

Conclusion

These findings confirm the presence of inequalities in health care utilisation, based on the financial protection scheme, to the detriment of uncovered households in the use of healthcare services. Results confirm that being covered from health hazards favours the use of health care regardless of the scheme considered (public insurance, private insurance, community insurance, exemption from payment). The results of this study highlight the existence of health disparities due to the desire to extend health coverage to the population as a whole. Yet, among these inequities, some are desirable if they are relative to needs (especially equity for women, children and the elderly). The results also raise the issue of the fragmentation of coverage schemes that can lead to differences in the care packages offered. Finally, results confirm that public authorities need to make efforts to reduce social inequalities – thus, to act on social determinants – in order to achieve the objective of equity inherent to UHC. This requires an active

engagement of many policy sectors, not only of the public health and health care systems, but also of education, social protection, living conditions, knowing that the contribution of the health care system to the improvement of health status is deemed to be minor. Leaders in healthcare have an important stewardship role across all branches of society to ensure that policies and actions in other sectors improve health equity.

Abbreviations

CBHI: Community-based health insurance; CMU: *Couverture Maladie Universelle*; OR: Odds ratio; PNDSS: *Plan National de Développement sanitaire et social*; SDGs: Sustainable Development Goals; UHC: Universal Health Coverage; WHO: World Health Organisation

Declarations

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Authors' contributions

MS conceived the study. MS IT, FF and EP designed the study. MS analysed the data and draft the manuscript. MS IT, FF and EP subsequently revised the manuscript and approved the final draft for submission.

Ethics approval and consent to participate

The study used purely secondary data (i.e. the Senegal Demographic and Health Survey) which is a publicly available data at the Measure DHS website upon request (http://www.dhsprogram.com). Thus, the usage of the data is covered by the ethics approval secured by Measure DHS for the collection of the initial data.

Availability of data and materials

The data that support the findings of this study are publicly available and can be accessed upon request from Measure DHS website (www.dhsprogram.com)

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests in the context of this research

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Figures

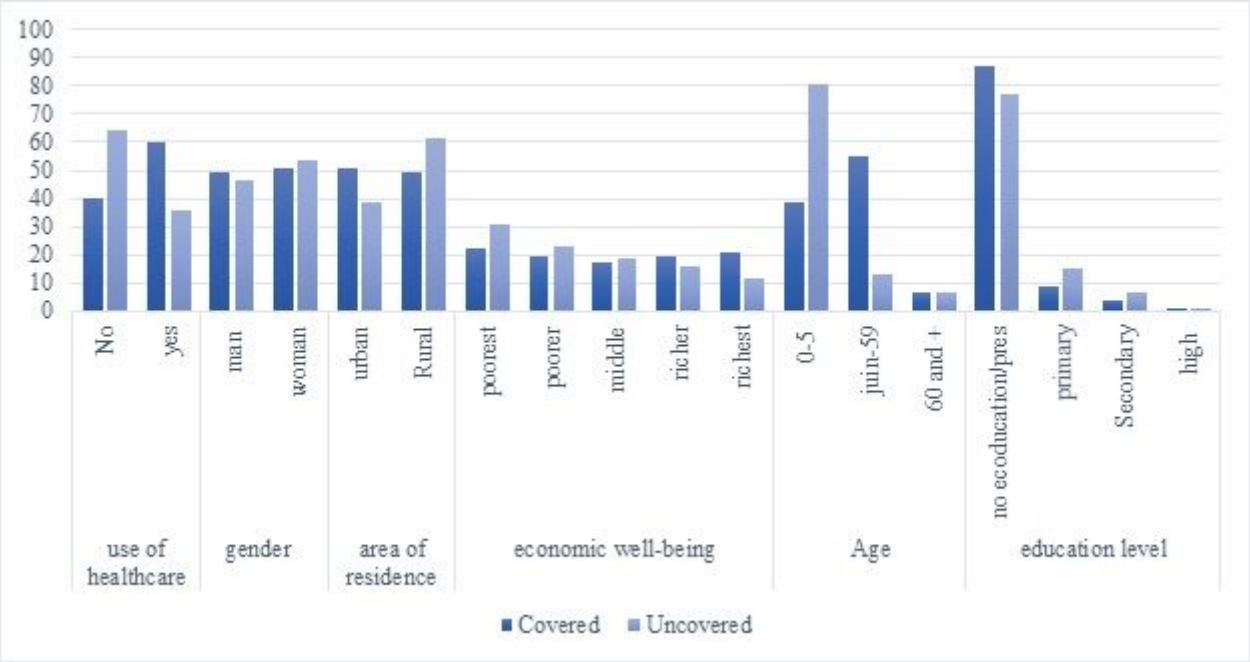

Figure 1

Distribution of characteristics by group. Source: Authors' calculations from the DHS data set (ANSD, 2017)

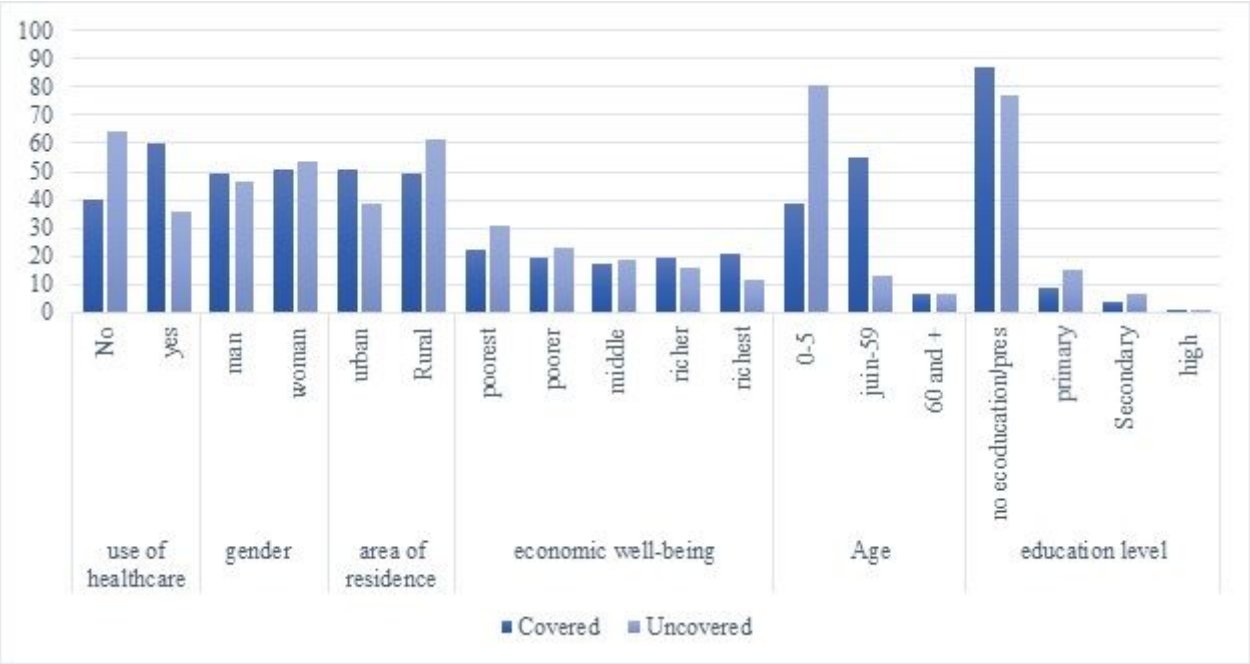

Figure 1

Distribution of characteristics by group. Source: Authors' calculations from the DHS data set (ANSD, 2017)

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