

Enrolling in health insurance in Senegal

*Quantitative Research on the Effect of Educational Level on Enrollment in Health Insurance in Senegal
and the Mediating Effect of Family Size, Wealth, and Place of Residence.*

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Preface

Before you is the master thesis titled “Enrolling in Health Insurance in Senegal: A Quantitative Research on the Effect of Educational Level on Enrollment in Health Insurance in Senegal and the Mediating Effect of Family Size, Wealth, and Place of Residence”. This thesis is written to finalize my master's degree in Arbeid, Organisatie en Management, building upon my bachelor's degree in Beleid en Management van de Gezondheidszorg and my master's degree in Healthcare Management.

First, I would like to thank my friends and family for their support during this process. Thank you for hearing my complaints, providing advice, and alleviating my stress. A special thanks to my father for reading the draft version of my thesis. Second, I would like to express my gratitude to my supervisor, Joost Oude Groeniger, who has provided me with valuable feedback and advice. I want to thank him for his time, patience, and thoughtful guidance. This helped me to bring my thesis, my capabilities, and knowledge to a higher level. I would also like to thank my second supervisor Jeroen van der Waal for his feedback on my proposal. Additionally, I want to acknowledge Noortje Berendsen, my fellow master's student, for diligently reviewing all my drafts and providing helpful feedback.

With this thesis, I finish my student journey at the Erasmus University Rotterdam and the Erasmus School of Social and Behavioural Sciences. My experience as a student at this university and faculty has not only been educational but enjoyable at every step. I hope you find this thesis insightful and enriching.

Sara de Jong

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Abstract

Access to affordable, high-quality healthcare is not as widespread worldwide as commonly perceived. Health insurance serves as a tool to improve healthcare access. In Senegal, enrollment in health insurance faces significant challenges. This research examines the relationship between educational level and enrollment in health insurance in Senegal, while also considering the mediating effects of family size, wealth, and place of residence. These variables were chosen based on relevant literature, which has shown associations with both education and enrollment. Four hypotheses were derived from the literature and tested using data from the Demographic Health Survey (DHS), with a total of 38,917 respondents included in the analyses. Various logistic and linear regression analyses were performed. The results indicate that the hypothesis suggesting a positive effect of educational level on enrollment in health insurance is rejected, which contradicts findings in the literature. Several reasons for this unexpected outcome are identified, such as government funding. Furthermore, the results reveal that family size, wealth, and place of residence do not mediate the relationship; instead, they exhibit a suppressor effect. In conclusion, the findings of this study indicate that educational level does not significantly influence enrollment in health insurance schemes, and this association is not mediated by family size, wealth, and place of residence. Future research may employ a mixed-method approach to investigate detailed reasons for enrollment or non-enrollment. Additionally, using more recent or older data could reveal changes in the association over time.

Keywords: educational level, enrollment, family size, wealth, and place of residence.

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1. Introduction

Here I am, on a hospital ship in the middle of the ocean, reflecting on the last three months I spent in Senegal. I feel privileged to have had the opportunity to be a part of the wonderful mission of Mercy Ships: 'Bringing hope and healing to the forgotten poor'. We helped sick patients who would otherwise not have been able to receive treatment. Personally, I am used to going to the hospital whenever necessary. I pay for mandatory insurance to be able to access healthcare easily. However, it is interesting to note that access to high-quality healthcare is not as universal around the world as one might expect.

According to the World Health Organization (WHO), health is defined as 'the state of complete physical, mental, and social well-being and not merely the absence of a disease or infirmity' (Leonardi, 2018). It is associated with different aspects of the life of an individual and to improve this, people might need to make use of health care. Unfortunately, over one billion people worldwide lack access to affordable, high-quality healthcare, resulting in poor health that significantly impacts their well-being. To break this vicious circle, an efficient and equitable healthcare system is essential (Asfaw & Jütting, 2007). Different methods exist for financing necessary care. For example, some countries use tax, while others use health insurance. Health insurance is a recognized tool to finance healthcare of acceptable quality in low- and middle-income countries (LMIC). This is because the risks are pooled so that unforeseeable healthcare costs are transferred to fixed premiums (Asfaw & Jütting, 2007).

Among the risks faced by poor households, health shocks pose to be the greatest threat to their livelihoods (Jütting, 2003). Shocks, such as death, illness, or accidents, are adverse events that could have big consequences on the income of a household (Jacoby & Skoufias, 1997). They may result in direct expenditure for medicine, treatment, and transportation, as well as indirect costs such as a reduction in labor supply (Asfaw, 2003). The associated expenses can be substantial, leading to an income shortfall caused by the shocks (Jütting, 2003). Health insurance serves as a means to reduce vulnerability to these shocks by providing better access to care and minimizing the financial consequences (Dillon, 2013).

Senegal is a country with a significant number of poor households and it is classified as a low-income country (Soors et al., 2010). Poverty is widespread, and people face various illnesses and health risks, such as Malaria and Diarrhea. Challenges related to income, access to healthcare facilities, and supply hinder the healthcare system's performance in this country. Besides, the coverage of health insurance is low (Asfaw & Jütting, 2007). Due to the lack of health insurance and financial constraints, people have to rely on strategies such as selling assets and letting children work when they encounter health risks (Jütting 2003; Jacoby & Skoufias, 1997).

Education plays a significant role in the decision to enroll in health insurance. Studies by Asfaw and Jütting (2007) and Dong et al. (2009) both conclude that individuals with lower levels of education are less likely to enroll in a health insurance plan. Dong et al. (2009) conducted research on the reasons why enrolled individuals drop out of health insurance memberships. They concluded that household heads with lower education were more likely to discontinue their memberships. Asfaw and Jütting (2007) explored various factors influencing the decision to enroll in health insurance. They concluded that higher-educated households in Senegal are more likely to have health insurance coverage (Asfaw & Jütting, 2007).

The relationship between education and enrollment can be influenced by other mechanisms as well. For instance, Criel and Waelkens (2003) observed that an inability to afford premium payments was a reason for dropping out or not enrolling in health insurance schemes. They conducted their research on enrollment in Uganda. Ozawa et al. (2016) conducted a discrete choice experiment on the decision to enroll in health insurance in Cambodia, reporting factors such as affordability and accessibility as reasons for enrollment or non-enrollment. In quantitative research on reasons for enrolling in health insurance, Mladovsky et al. (2014) found that family size is an important factor influencing enrollment decisions. In conclusion, factors such as wealth, place of residence, and family size may also influence the decision to enroll or not enroll in health insurance schemes.

There is empirical evidence indicating that the level of education influences enrollment in health insurance schemes. However, there is limited clarity regarding the extent to which this relationship is mediated by different factors. By gaining a better understanding of the mechanisms that explain this relationship, ways to improve access to healthcare of acceptable quality can be identified. Hereby enhancing the well-being of individuals in low-income countries like Senegal. Therefore, this research contributes to the existing literature on the effect of education on enrollment in health insurance, with a focus on examining the mediating factors: wealth, place of residence, and family size.

This research aims to gain insight into the relationship between education and enrollment in health insurance. Hereby, the explanation of this relation by different mediating factors has a central role. The main question in this research is: ***To what extent is the relationship between educational level and enrollment in health insurance explained by wealth, place of residence, and family size?***

In the following chapter, the theoretical framework will be elaborated upon. The third chapter will provide an explanation of the research methodology. Subsequently, the results will be presented, followed by a discussion chapter. Finally, a concise conclusion will be provided.

2. Theoretical Framework

In this chapter, first, the setting is described. Second enrollment in health insurance schemes in Senegal is elaborated on. Next, the relationship between educational level and enrollment is explained. Following, the mediators are clarified. Finally, the conceptual model and the confounders are described.

2.1 Setting

Senegal is a low-income country located on the coast of West Africa. In 2003 it had a total population of around twelve million of whom almost 50% lived in urban areas (Shiohata, 2010; Asfaw & Jütting, 2007). Illiteracy is common and a large amount of the population has a low level of education (Duflo, 2004). The performance of the Senegalese healthcare sector is hindered by factors such as inequalities in access to care, shortage, and allocation issues. This leads to high morbidity rates, low life expectancy, limited access to basic health care, and a high incidence of catastrophic health expenditure (Asfaw & Jütting, 2007).

Senegal is divided into 11 regions and 56 districts (Witter et al., 2010). The healthcare system in Senegal operates at three different levels: the health district, the region, and the central level. First, the health district has health posts as well as a health care center. The regional level is linked to the administrative division of a region. Last, the central level is directly attached to the Ministry of Health (PNDS, 1999). The private sector also plays an important role in the healthcare system., with both for-profit and non-profit providers serving the population (Jütting, 2003). Various types of healthcare organizations exist, including national hospitals, regional hospitals, Centres de Santé (CS), and Postes de Santé (PS). There is a scarcity of doctors, with only one doctor available per 17,000 inhabitants. Most of the healthcare facilities are located in Major cities such as Dakar (Witter et al., 2010).

As in most low-income countries, healthcare finance in Senegal poses a significant challenge. Approximately 40% of the health expenditure is financed by the private sector. The role of insurance is minimal, resulting in a significant portion of healthcare expenses being paid out-of-pocket (Asfaw & Jütting, 2007).

2.2 Enrollment in Health Insurance in Senegal

In Senegal, there are different health insurance schemes available. At first, the Social Security Fund (Caisse de Sécurité Sociale or CSS) provides benefits for families, work-related accidents, and income protection against serious illness. But this does not cover all healthcare needs. Other organizations manage health insurance depending on the population category. For example, private company

employees are covered by their company's insurance, while public sector employees and their families receive 80% coverage from the state. Children under five years old and elderly individuals over 60 years old have access to free healthcare through a public medical assistance scheme. Self-employed individuals and workers in the informal sector can opt for private health insurance (Asfaw & Jütting, 2007). Community-based health insurance (CBHI) is also utilized to enhance healthcare access, particularly for the poor. CBHI strengthens the demand side and facilitates easier access to care for those in need (Ministère de la Santé, 2004; Mladovsky, 2014).

In Senegal, illness does not always lead to a demand for healthcare due to various reasons. Firstly, some individuals may not perceive the need for medical assistance. Secondly, those who recognize the need for healthcare may face challenges in translating that need into demand. Difficulties such as transportation, affordability, availability of medicine, and the cost of medication are major obstacles (Asfaw & Jütting, 2007). According to Asfaw and Jütting (2007), insured individuals experience fewer difficulties in accessing healthcare compared to the uninsured. Their analysis of the potential role of health insurance in poverty reduction revealed that slightly over 5% of the respondents were covered by some form of health insurance. The majority had mandatory insurance coverage, while others had voluntary insurance (Asfaw & Jütting, 2007).

2.3 The Influence of Education on Enrollment in Health Insurance

As stated in the introduction, education affects enrollment in health insurance (Asfaw & Jütting, 2007; Dong et al., 2009). Asfaw & Jütting (2007) found that higher-educated households in Senegal were more likely to have health insurance. Dong et al. (2009) observed that household heads with lower education were more prone to dropping out of health insurance plans. Jehu-Appiah et al. (2011) conducted research in Ghana and concluded that higher education increased the odds of enrolling in health insurance, possibly due to higher income and a better understanding of health insurance information. Chankova et al. (2008) did research on enrollment in health insurance in West Africa. Data from surveys from Ghana, Mali, and Senegal was examined. They concluded that the education level of the household head affects enrollment in health insurance (Chankova et al., 2008). According to Basaza et al. (2008), who conducted research on enrollment in health insurance in Uganda, lower-educated individuals might have difficulty understanding the benefits of health insurance when they are not sick. For example, they do not understand the pooling principle. The pooling principle means that insurance needs to be paid even if the insured persons are not sick. Money has to be paid for the care of others. If an insured person gets sick, the premiums other people pay will make sure that the costs of the care are covered. If not explained clearly, lower-educated people might have difficulties understanding these benefits, which is a reason not to enroll or to drop out (Basaza et al., 2008).

Based on this literature, the following hypothesis (H1) can be formulated: ***Educational level is positively related to enrollment in health insurance.*** This suggests that individuals with higher levels of education are more likely to enroll in health insurance schemes.

2.4 Factors that Influence this Relationship

Multiple researchers looked into factors that might influence the relationships between educational level and the decision to enroll in health insurance. These factors include income, place of residence, family size, distance from the healthcare facility, trust in health insurance schemes, availability and clarity of information, affordability, and travel expenses (Asfaw & Jütting, 2007; Mladovsky et al., 2014; Dong et al., 2009; Ozawa et al., 2016). Studies conducted in different contexts have explored these factors and their impact on health insurance enrollment, but there is still a lack of clarity regarding their specific influence on the relationship between educational level and enrollment. Asfaw & Jütting (2007) examined various factors that influence the decision to enroll in a health insurance plan. Mladovsky et al. (2014) and Dong et al. (2009) focused specifically on enrollment in community-based health insurance in low- and middle-income countries. Ozawa et al. (2016) analyzed enrollment decisions in health insurance in Cambodia.

Therefore, while research has been conducted on the factors influencing health insurance enrollment, there is still a lack of clarity regarding how these factors mediate the relationship between educational level and enrollment decisions. Gaining a better understanding of these mediating factors would provide valuable insights for improving enrollment rates and ultimately enhancing the well-being of the Senegalese population

2.5 Wealth, Place of Residence, and Family Size

As stated above, different factors influence the decision to enroll in health insurance. In this research, the relationship between educational level and health insurance is going to be studied by looking into different mediating factors. The factors that are looked into are wealth, place of residence, and family size. These determinants are chosen because of their differences between educational levels and because of their relationship with the decision to enroll in health insurance.

First, wealth. Wealth measures the value of all the assets of worth owned by a household (Zissimopoulos & Karoly, 2007). According to Hartog & Oosterbeek (1998), lower-educated people have a higher chance to be less wealthy. In their research, they focused on the influence of education on health, wealth, and happiness (Hartog & Oosterbeek, 1998). Research conducted in Senegal by Garenne (2015) indicated that higher-educated individuals performed better on the wealth index, often due to higher income and greater ability to acquire health. The researcher used the wealth index

of DHS and stated that higher educated people performed better on this index (Garenne, 2015). Households with less wealth may lack the necessary assets to pay for health insurance premiums (Asfaw & Jütting, 2007). Dixon et al. (2011), in their study on enrollment in health insurance schemes in Ghana, found a positive relationship between wealth and enrollment in health insurance. Less wealthy people have fewer resources to enroll in health insurance (Dixon et al., 2011). So, less wealthy people have lower enrollment in health insurance (Parmar & Banerjee, 2019). Conversely, wealthier individuals have more resources available to them, making it easier to enroll in health insurance schemes (Dixon et al., 2011)

Based on this literature, the following hypothesis (H2) can be formulated: ***The positive relation between educational level and enrollment in health insurance is mediated by wealth.*** Higher educational attainment may lead to increased wealth, which, in turn, facilitates the ability to afford health insurance and thus increases enrollment rates.

Second, is the variable place of residence. Sy (2013), analyzed poverty in Senegal and stated that people with higher education have more opportunities to improve their living conditions. Duboz et al. (2021) found that higher-educated individuals are more likely to have the means to change their place of residence, which often results in a higher likelihood of living in urban areas with better living conditions. These researchers conducted mixed-method research on urban and rural life in Senegal (Duboz et al., 2021). Kennedy et al. (2006) looked into the advantages of living in urban areas and they stated that the living conditions in these areas in Senegal are better. Consequently, individuals with higher education are more likely to reside in urban areas, while those with lower education are more commonly found in rural areas (Duboz et al., 2021). The availability of healthcare facilities is also influenced by place of residence. Rural areas generally have fewer healthcare facilities compared to urban areas (Witter et al., 2010). Van der Wielen et al. (2018) highlighted the challenges faced by individuals in rural areas, such as large distances to healthcare facilities and limited accessibility due to poorly maintained roads. The lack of transportation options further hinders access to healthcare facilities for rural residents, potentially impacting their decision to enroll in health insurance (Van der Wielen et al., 2018).

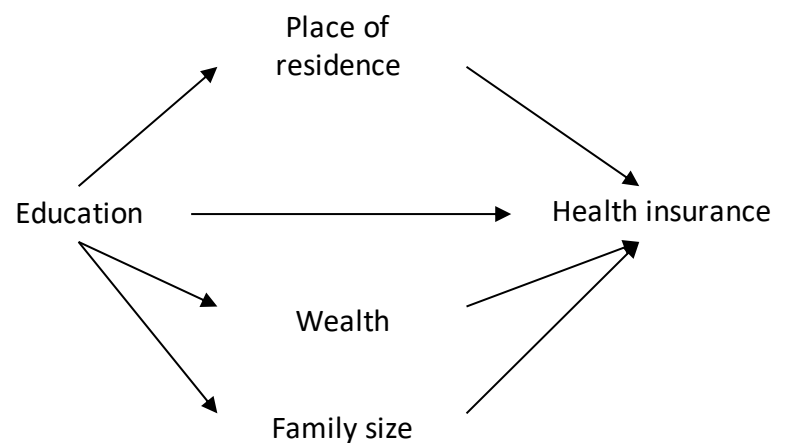
Based on these findings, the following hypothesis (H3) can be formulated based on this literature: ***The positive relation between educational level and enrollment in health insurance is mediated by place of residence.*** Higher-educated individuals, who are more likely to reside in urban areas with better access to healthcare facilities, may have greater opportunities and incentives to enroll in health insurance compared to their lower-educated counterparts living in rural areas with limited healthcare resources.

Third, the variable family size. In Senegal, households tend to be large, with nearly 50% of households consisting of nine or more individuals (Beauchemin et al., 2018). According to Sidibe et al. (2020), who conducted research on family planning in Mali and Senegal, lower-educated individuals are more likely to have larger families. They state that family planning is used more frequently in households where at least one of the parents is higher educated (Sidibe et al., 2020). This may be attributed to factors such as less knowledge about family planning or the need for more children to generate income (Ozawa et al., 2016). Asfaw & Jütting (2007) found that larger households are more vulnerable to catastrophic expenditures, as the healthcare needs of a larger family can be financially burdensome. However, despite their higher healthcare needs, larger families are less likely to be enrolled in health insurance schemes (Asfaw & Jütting, 2007). On the other hand, smaller families tend to have more resources available to allocate toward health insurance enrollment (Ozawa et al., 2016).

Considering these findings, the following hypothesis (H4) can be formulated: ***The positive relation between educational level and enrollment in health insurance is mediated by family size.*** Lower-educated individuals with larger families may face greater financial constraints in allocating resources toward health insurance enrollment compared to higher-educated individuals with smaller families. Family size, therefore, influences the availability of resources for health insurance enrollment, potentially mediating the relationship between educational level and enrollment in health insurance.

2.6 Conceptual Model

Image 1 is the model that is used in this research. At first, the effect of the educational level on enrollment in health insurance was examined. The focus was on determining the total effect of educational level on enrollment in health insurance, without considering any mediating factors. Subsequently, the mediating effect of three factors, wealth, place of residence, and family size, was investigated.



2.7 Confounding Variables

Sex, and receiving funding were taken into account as confounding variables. In countries like Senegal, there may be disparities in educational opportunities between men and women, with men being more likely to receive higher education (Kuépié, 2016). Additionally, the healthcare needs and demand for care can vary between men and women. Women might demand more care than men, they, for example, need care to give birth or to use contraceptives (Zegeye et al., 2021). By controlling for sex as a confounding variable, there is aimed to eliminate any biases that could arise due to these gender-related differences and isolate the specific effect of educational level on enrollment in health insurance. Following, financial constraints, such as the inability to pay health insurance premiums, can be a barrier to enrollment. If respondents receive general funding from the government, it can potentially alleviate their financial limitations and increase their ability to afford health insurance (Criel and Waelkens, 2003). Moreover, receiving funding may also provide individuals with better opportunities to pursue higher education, as financial resources can contribute to educational attainment (Hartog & Oosterbeek, 1998). By including the variable of receiving funding and controlling for it, there is aimed to account for its potential influence on the relationship between educational level and enrollment in health insurance. Considering and controlling for these confounding variables strengthens the validity of the findings and enhances the robustness of the research conclusions.

3. Method

In this chapter, the research method, data, operationalization, procedure, descriptive statistics, and data analysis are described. Finally, validity, reliability, and ethical concerns are elaborated on.

3.1 Research Method and Data

Quantitative research is used to answer the research question. In this type of research, numerical data is analyzed to test the relationship between the independent variable (educational level) and the dependent variable (enrollment in health insurance) (Bryman, 2016), while also examining the effect of the mediating factors (wealth, place of residence, and family size) (Bryman, 2016).

In this research, secondary data is used. This means that data collected by others is analyzed to answer the research question (Vartanian, 2010). Secondary data is often of high quality and less time-consuming compared to gathering data specifically for a particular research (Bryman, 2016). Data from the Demographic Health Surveys (DHS) is utilized. DHS is a repeated, cross-sectional household survey that collects comparable data on various indicators over time in different countries. One of the goals of DHS is to produce high-quality data. It collects information on the demographic and socioeconomic indicators of households, like health insurance, education, family size, wealth, and place of residence on an individual level. The data set of 2019 in Senegal is specifically used, with fieldwork conducted from April 2019 until December 2019. A total of 41,050 household members participated in the data collection process, which involved conducting interviews at the respondents' homes. Permission from DHS was obtained to access the data and ensure its use for scientific purposes.

3.2 Operationalization

The different variables are measured using various questions or statements in the dataset. In this paragraph, the operationalization of the different variables is explained.

The dependent variable, enrollment in a health insurance plan, is measured by a multiple-choice question with two answer options. The question asks whether a member is enrolled in **none** of the health insurance schemes. The answer options are as follows: 0) No, or 1) Yes. This means that if a respondent answers with no, he or she is enrolled in health insurance. Therefore the answer options are recoded into 0) Yes, and 1) No. In this case, the reference category 0) Yes, indicates that a respondent is not enrolled in health insurance.

The independent variable, educational level, is measured using the question: ‘What is the highest level of education you have achieved?’ The response options include 0) No education, 1) Primary, 2) Secondary, 3) Higher, 6) Other, and 8) Don’t know. For this research, the variable educational level is categorized into three groups: 0) No education, 1) Primary, 2) Secondary & Higher. The categories 6) Other and 8) Don’t know are excluded from the analysis.

Next, to measure wealth, DHS employs a wealth index based on questions related to consumer items such as household ownership, dwelling characteristics, toilet facilities, and drinking water source. Through a components analysis, each household asset is assigned a factor score, which is then standardized. The scores are standardized and are divided into wealth quintiles, 1) Poorest, 2) Poorer, 3) Middle, 4) Richer, and 5) Richest (*The DHS Program - Research Topics - Wealth Index*, n.d.). For this research the categories are recoded into 0) Poorest, 1) Poorer, 2) Middle, 3) Richer, and 4) Richest. Fourth, place of residence is measured by asking respondents about the type of place they reside in. The survey provides two options: 1) Urban and 2) Rural. These options are recoded as 0) urban, and 1) Rural. Lastly, Family size is measured on a scale of 0-99. But for this research, a scale of 0-28 is utilized. Respondents are asked to provide the number of household members.

The first control variable is the sex of the respondents, which is measured by asking about their gender. The variable had two answer options, 1) Male and 2) female. These are recoded into 0) Male and 1) Female. The funding variable is measured by asking whether the respondent receives general funding. Not a lot is known about what type of funding it is or about when people receive the funding. The multiple-choice question offers four answer options: 1) Senegal, 2) International, 3) No, and 4) Don’t know. For this research, the fourth answer option is excluded from the analysis.

3.3 Procedure

The statistical program SPSS version 28 was used to analyze the data. At first, two categories from the variable educational level were removed, namely 6) other and 8) don’t know, as they were not suitable for inclusion in this analysis. This resulted in the identification of 297 missing data points, leaving 40.753 respondents. The “don’t know” option for the receiving funding variable was also excluded from the dataset. After this step, 40.586 respondents remained. During the examination of the descriptive statistics, it was decided not to include respondents with a family size larger than 28 in the analysis. This is due to the limited number of such cases, which could potentially bias the results. As a result, a total of 38.917 respondents were included in the final dataset.

After identifying the control variables, descriptive statistics and frequencies were analyzed separately for each variable. These are described in paragraph 4.1. Following data sorting and cleaning, logistic and linear regression analyses were performed to test the hypothesis. A mediation analysis was conducted, which requires a relationship between the independent variable (x) and the dependent variable (y). Linear regression analysis was used when the independent had a normal distribution, while logistic regression was performed when the dependent variable (y) was dichotomous (Gail et al., 1984). Logistic regression calculates odds ratios to predict the dependent variable. So the results are based on conservative estimates, which is an important point of attention. A mediating effect is indicated when the odds ratio decreases after adding a mediator. Conversely, adding an additional variable leads to an increase in the odds ratio, thereby weakening the potential mediating effect (Gail et al., 1984).

First, a logistic regression analysis was performed to examine the total effect between educational level and enrollment in health insurance, testing H1. Second, the relationship between education and the different mediators was analyzed. Linear regression analysis was conducted to explore the relationship between educational level and family size. To perform this analysis, dummy variables for educational level and the control variables of sex and funding were used. Similarly, a linear regression analysis was performed to investigate the relationship between educational level and wealth. Wealth is an ordinal variable, but still, a regression analysis is performed for ease of interpretation. Logistic regression analysis was used to examine the relationship between educational level and place of residence.

Next, logistic regression analysis was employed to assess the effect of the mediators on enrollment in health insurance while adjusting for educational level. This step involved analyzing the mediating effect of each individual factor separately: family size, wealth, and place of residence. Finally, all three mediators were included simultaneously in the analysis to examine their collective influence on the effect of education on enrollment in health insurance. The differences in coefficients were evaluated to estimate the effect of the mediators. The coefficient of the total effect (educational level → enrollment) was compared with the coefficients obtained after adding the mediators. Throughout these analyses, the control variables were taken into account.

3.4 Validity, Reliability, and Ethical Concerns

External validity refers to the extent to which the results can be generalized to industries or settings with similar characteristics (Bryman, 2016). It should be noted that while Senegal is an LMIC, the findings of this study cannot be directly extrapolated to other LMICs. Other African countries may share some similarities in characteristics, but they have different health insurance systems (Xu et al.,

2003). Factors such as the availability and affordability of health insurance, social protection policies, and the overall healthcare system can influence enrollment patterns among different educational groups. Therefore, caution should be exercised in generalizing the results to these countries. However, other LMICs can consider the findings as they seek ways to enhance enrollment in health insurance schemes while maintaining a critical and objective perspective. Furthermore, the results of this study may not be applicable to more developed countries, as the total effect and the mediating factors may have different effects in such contexts (Heyneman, 1980). Internal validity pertains to whether the results adequately address the research question (Bryman, 2016). In this study, internal validity is enhanced by utilizing data sets that contain the necessary variables to answer the research question. Reliability refers to the ability to replicate the research. Quantitative research, such as this study, benefits from standardized data collection protocols which allow for reproducibility (Bryman, 2016). Given the large sample size and standardized questions used, it is likely that similar results would be obtained if the data were gathered again.

To ensure the protection of respondents, and prevent harm, their privacy is respected highly. The data in the data set are anonymized, and measures are taken to maintain respondent confidentiality. The DHS program follows strict ethical guidelines, where informed consent is obtained from participants who voluntarily choose to take part in the survey. Respondents have a right to accept or decline further participation. The data files are identified using numerical codes rather than names to maintain anonymity (*The DHS Program - Protecting the Privacy of DHS Survey Respondents*, n.d.).

4. Results

This chapter presents the findings of the analysis conducted in this study. Firstly, the descriptive statistics and the impact of confounding variables on enrollment are briefly discussed. Subsequently, the results of each step in the analyses are elaborated upon.

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics for various categorical variables in the dataset. As shown in the table, the majority of the respondents have no education (59.9%). Among the respondents, 83.6% are not enrolled in a health insurance scheme, while 16.4% are enrolled. The majority of the respondents, 65.5%, live in rural areas. Table 2 provides the descriptive statistics for the scale variable “Family size”. The minimum value recorded for family size is 1, indicating the smallest family size observed in the dataset. The maximum value is 28, representing the largest family size observed in the dataset.

Table 1. Descriptive Statistics - Categorical Variables

Variable	Categories	Percent (%)
Educational level	No Education (0, ref.)	59.9
	Primary (1)	24.9
	Secondary & Higher (2)	15.2
Enrollment in health insurance	Yes (0, ref.)	83.6
	No (1)	16.4
Place of residence	Urban (0, ref.)	34.5
	Rural (1)	65.5
Wealth index	Poorest (0, ref.)	27.7
	Poorer (1)	24.1
	Middle (2)	20.4
	Richer (3)	15.6
	Richest (4)	12.5
Sex	Male (0, ref.)	46.0
	Female (1)	54.0
Funding	Senegal (0, ref.)	45.1
	International (1)	16.5
	No (2)	38.5

Table 2. Descriptive Statistics - Scale Variables

	Min	Max	Mean	Median	SD
Family size	1	28	12.11	11	8.42

4.2 Confounding Variables

The estimated effect of the confounding variables on enrollment in health insurance schemes is presented in Table 3. Logistic regression analysis revealed an odds ratio (OR) of .696 (95% CI = .656 - .739, $p < .001$) for individuals who do not receive funding. This effect is significant, indicating that the odds of enrolling in health insurance are lower when there is no funding compared to when an individual receives funding. Females have slightly lower odds of enrolling in health insurance than males, but this effect is not significant (OR = .957, 95% CI = .907 - 1.010, $p = .110$). These confounding variables were considered in all the regression analyses, controlling for their potential influence on the relationship between other variables and enrollment in health insurance.

Table 3 - Confounding Variables

	OR	95% CI	P
Funding			
Senegal fund (Ref.)			
International (1)	.745	.689 - .806	<.001
No (2)	.696	.656 - .739	<.001
Sex			
Male (Ref.)			
Female (1)	.957	.907 - 1.010	.110

4.3 Educational Level and Health Insurance

Table 4 presents the results of the logistic regression analysis, which examines the total effect of educational level on enrollment in health insurance. It is important to note that the total effect does not imply causation in this research. Individuals with a secondary or higher level of education have an odds ratio of .910 (95% CI = .844 - .981, $p = .014$). This suggests that their odds of enrolling in health insurance are .910 times as high compared to those with no education. The negative association indicates a lower likelihood of enrollment. The OR for individuals with a primary level of education is .548 (95% CI = .510 - .589, $p < .001$). This suggests that their odds of enrolling in health insurance are lower compared to those with no education. The negative effect suggests a decreased likelihood of enrollment. Therefore these findings indicate that H1, which proposes a positive relationship between educational level and enrollment in health insurance, cannot be accepted.

Table 4 - Total Effect of Educational Level on Health Insurance

	OR	95% CI	P
No (Ref.)			
Primary (1)	.548	.510 - .589	<.001
Secondary & Higher (2)	.910	.844 - .981	<.014

Note: The control variables were taken into account in the analyses.

4.4 Educational Level and the Mediators

Table 5 presents the results of the analyses examining the effect of educational level on the mediators. Firstly, the linear regression demonstrates a statistically significant negative association between educational level and family size. Both individuals with primary education ($B = -.648$, 95% CI = $-.789 - -.507$, $p < .001$) and those with secondary or higher education ($B = -1.444$, 95% CI = $-1.614 - -1.273$, $p < .001$) have significantly smaller family sizes compared to those with no education. The Beta coefficient decreases as the level of education increases, indicating that higher-educated individuals tend to have smaller families.

Secondly, the linear regression reveals a statistically significant positive association between educational level and wealth. Individuals with primary education ($B = .402$, 95% CI = $.372 - .431$, $p < .001$) have a lower level of wealth than those with secondary or higher education ($B = .994$, 95% CI = $.958 - 1.030$, $p < .001$). The beta coefficient increases as the level of education rises, indicating that higher-educated individuals are more likely to have higher levels of wealth.

Lastly, the logistic regression demonstrates a statistically significant negative association between educational level and place of residence. The odds of living in a rural area are lower for individuals with secondary or higher educational levels (OR = $.257$, 95% CI = $.242 - .273$, $p < .001$), indicating a decrease in the likelihood of residing in rural areas for those with higher levels of education.

Table 5 - The Estimated Effect of Educational Level on the Mediators

	Family size			Wealth			Place of residence		
	B	95% CI	P	B	95% CI	P	OR	95% CI	P
No (Ref.)									
Primary (1)	-.648	-.789 - -.507	<.001	.402	.372 - .431	<.001	.495	.471 - .520	<.001
Secondary & Higher (2)	-1.444	-1.614 - -1.273	<.001	.994	.958 - 1.030	<.001	.257	.242 - .273	<.001

Note: The control variables were taken into account in the analyses.

4.5 The Mediators and Enrollment in Health Insurance

Table 6 provides the results of the regression analyses estimating the effect of the mediators on the dependent variable, enrollment in health insurance. The first logistic regression shows a non-significant association between family size and enrollment. The OR is .997 (95% CI = .992 - 1.001, $p = .157$), suggesting that family size does not have a significant impact on enrollment. The second logistic regression analysis reveals a significant positive association between wealth and enrollment. The OR for the “Poorer” category is 1.151 (95% CI = 1.060 - 1.250, $P < .001$), indicating that individuals in this category have higher odds of enrolling in health insurance compared to the reference category (“Poorest”). Similarly, the OR for the “Richer” category is 1.689 (95% CI = 1.547 - 1.844, $p < .001$), demonstrating that individuals in this category have even higher odds of enrolling. The table shows that the OR increases as the wealth category improves, suggesting a positive relationship between wealth and enrollment. The third logistic regression analysis shows a negative and statistically significant association between place of residence on enrollment in health insurance. The OR for individuals living in rural areas is .695 (95% CI = .657 - .734, $p < .001$), indicating that the odds of enrolling in health insurance are lower for individuals residing in rural areas compared to those living in urban areas.

Table 6 - The Estimated Effect of the Mediators on Enrollment in Health Insurance

	OR	95% CI	P
Family size			
Number of household members	.997	.992 - 1.001	.157
Wealth			
Poorest (Ref.)			
Poorer (1)	1.151	1.060 - 1.250	<.001
Middle (2)	1.207	1.207 - 1.315	<.001
Richer (3)	1.689	1.547 - 1.844	<.001
Richest (4)	3.080	2.819 - 3.365	<.001
Place of residence			
Urban (Ref.)			
Rural (1)	.695	.657 - .734	<.001

Note: The control variables were taken into account in the analyses.

4.6 Educational Level, Enrollment in Health Insurance, and the Mediator's

Table 7 and table 8 present the results of logistic regressions analyzing and examining the indirect estimated effects, considering the various mediators. First, the table displays the estimated effects

after including each mediator separately, followed by an analysis considering all three mediators simultaneously.

Regarding the mediator family size, the ORs decrease when including the mediator. For individuals with a secondary or higher level of education, the OR becomes .903 (95% CI = .837 - .974, $p = .008$), which is lower than the OR of .910 (95% CI = .844 - .981, $p = .014$) without considering family size. When the OR is closer to 1 after adding a mediating factor, there is a mediating effect. In this case, the OR decreases, and therefore family size does not partly clarify the relationship between educational level and enrollment in health insurance. Therefore H4 (**The positive relation between educational level and enrollment in health insurance is mediated by family size**) is rejected.

Moving on to wealth as a mediating factor. The OR for individuals with a secondary or higher level of education is .641 (95% CI = .592 - .695, $p < .001$) when wealth is included as a mediator. This is lower compared to .910 (95% CI = .844 - .981, $p = .014$) without considering wealth. Hence, wealth does not partially clarify the relationship between educational level and enrollment in health insurance. Consequently, H2 (**The positive relation between educational level and enrollment in health insurance is mediated by wealth**) is rejected.

Similarly, place of residence as a mediating factor. The OR for individuals with a secondary or higher level of education becomes .785 (95% CI = .726 - .849, $p < .001$) when considering place of residence as a mediator. This is lower compared to the OR of .910 (95% CI = .844 - .981, $p = .014$) without considering place of residence. Therefore, place of residence does not partially clarify the relationship between educational level and enrollment in health insurance. Hence, H3 (**The positive relation between educational level and enrollment in health insurance is mediated by place of residence**) is rejected.

Lastly, when all three mediators are analyzed together, the OR decreases. For individuals with a secondary or higher level of education, the OR becomes .639 (95% CI = .589 - .693, $p < .001$). This is lower compared to .910 (95% CI = .844 - .981, $p = .014$) without considering the three mediators. These findings confirm that the variables do not partially clarify the relationship between educational level and enrollment in health insurance. Therefore, confirming the rejection of H2, H3, and H4.

Table 7. The Mediating Effect

	Family size			Wealth			Place of residence			All mediating factors		
	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p	OR	95% CI	p
No (Ref.)												
Primary (1)	.546	.508 - .587	<.001	.473	.440 - .509	<.001	.507	.472 - .546	<.001	.472	.439 - .509	<.001
Secondary & Higher (2)	.903	.837 - .974	.008	.641	.592 - .695	<.001	.785	.726 - .849	<.001	.639	.589 - .693	<.001

Note: The control variables were taken into account in the analyses.

Table 8. The Estimated Effect of the Mediators on Enrollment in Health Insurance

	OR	95% CI	p
Family size	.995	.991 - 1.000	.036
Poorest (Ref.)			
Poorer (1)	1.204	1.108 - 1.308	<.001
Middle (2)	1.321	1.211 - 1.442	<.001
Richer (3)	1.927	1.761 - 2.107	<.001
Richest (4)	3.798	3.459 - 4.170	<.001
Urban (Ref.)			
Rural (1)	.635	.599 - .672	<.001

Note: The control variables were taken into account in the analyses.

5. Discussion

In this chapter, first, the unexpected outcomes and the contribution to scientific theory are discussed. Next, there is elaborated on the contribution of this research to practice. Finally, limitations and suggestions for future research are addressed.

5.1 Unexpected Outcomes and Contribution to Scientific Theory

This research has provided theoretically relevant insights into the knowledge about enrollment in health insurance schemes in Senegal. It has contributed to the understanding of the influence of educational level on enrollment and of the mediating effect of family size, wealth, and place of residence. The data set used in this study was the comprehensive and easily accessible DHS data set. Its rich content allows for various studies to be conducted using different data sets, and regular data collection enables the possibility of conducting longitudinal studies.

The first remarkable outcome of this research is the rejection of H1 (***Educational level is positively related to enrollment in health insurance***). Contrary to the literature mentioned in the introduction and the theoretical framework, this study found that educational level does not have a positive association with enrollment in health insurance. Individuals with primary or secondary and higher education have a lower chance of enrolling compared to those with no education. This finding contradicts the belief that higher educational attainment leads to increased enrollment in health insurance schemes. Previous studies by Asfaw and Jütting (2007) and Dong et al. (2009) suggested that people with a lower educational level are less likely to be enrolled in health insurance schemes. Similarly, Brugiavindi and Pace (2016) conducted research in Ghana and concluded that educational attainment strongly influences enrollment, with lower-educated individuals facing barriers due to limited literacy skills. However, a study conducted in Nepal did not find significant differences in enrollment based on educational levels in their observational study on the association between information, education, and communication with enrollment in health insurance. The reason why this remarkable outcome occurred is not described (Acharya et al., 2020). Another relevant study by Hartog and Oosterbeek (1998) examined the influence of education on wealth. They discovered a non-monotonic pattern in their research, where secondary education had a stronger influence than higher education. They didn't find an explanation for their remarkable results (Hartog & Oosterbeek, 1998). Although their research focused on the influence of education on wealth, rather than enrollment, their findings may provide some insight into the unexpected outcomes observed in this study. Therefore, this research contributes to the existing literature by providing a different perspective on the effect of educational level on enrollment in health insurance schemes.

However, the reason behind the higher enrollment rate among individuals without education can be attributed to several factors. One possible reason is the availability of funding. Within the dataset, it is observed that some individuals receive financial support from the Senegalese government or international institutions, which increases their likelihood of enrolling in health insurance. Funding provides assistance in paying the insurance premiums, making it more feasible for individuals with lower education levels, who are often less wealthy, to afford health insurance (Chankove et al., 2008). Within this dataset, the specific reasons for individuals receiving funding are not known, but it is possible that those with lower education levels and limited financial resources are prioritized for assistance, enabling them to access health insurance. Another factor that might contribute to the higher enrollment among individuals without education is risk aversion. Research by Saw (1996) suggests that lower-educated individuals tend to be less risk-averse. They may be more willing to pay the higher premiums associated with health insurance, as they perceive the potential financial risk of healthcare expenses to be greater. Individuals with higher education levels may have greater financial resources to cover healthcare costs in case of need, leading to a higher tolerance for risk. Lower-educated individuals, who are often less wealthy, may be more cautious and prefer to mitigate the risk by enrolling in health insurance. A following factor might be the lack of alternative options. It is possible that for individuals without an education, enrolling in health insurance schemes is perceived as the only viable option for accessing healthcare services. They may lack the financial means to pay for healthcare out-of-pocket, and health insurance provides a safety net for them in case of medical emergencies or the need for regular healthcare (Schoen et al., 2013). Or the decision to enroll in health insurance may be influenced by the opinions or experiences of family members or community members. Even if individuals themselves do not have an education, their family or community members, who do may emphasize the importance of health insurance and encourage enrollment (Jehu-Appiah et al., 2011).

Another noteworthy finding is the absence of a mediating effect from the variables wealth, family size, and place of residence on the relationship between educational level and enrollment in health insurance. As stated in the results chapter, the chance of enrolling in health insurance decreases when these variables (“Family size”, “Wealth”, and “Place of residence”) are included as mediators. As a result, H2 (**The positive relation between educational level and enrollment in health insurance is mediated by wealth**), H3 (**The positive relation between educational level and enrollment in health insurance is mediated by place of residence**), and H4 (**The positive relation between educational level and enrollment in health insurance is mediated by family size**) are rejected. These variables

appear to have a so-called suppressor effect on the association, meaning that their inclusion in the regression analysis strengthens the negative relationship between educational level and enrollment. The effect between an independent and dependent variable increases by including suppressing variables in the regression analysis (MacKinnon et al., 2000).

The concept of a suppressor effect was introduced by Horst (1941) and can be defined as: 'A variable which increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation' (Conger, 1974, pp. 36-37). Rucker et al. (2011) describe a suppressor as a variable that, when omitted, undermines the total effect. Therefore, accounting for it in a regression enhances the predictive utility of the other variables (Rucker et al., 2011). In this case, wealth, family size, and place of residence amplify the effect of educational level on enrollment in health insurance. Therefore, this research contributes to the existing literature by providing detailed information on the suppressor effect of family size, wealth, and place of residence on the relationship between education and enrollment. It suggests that, in this particular study, these variables have a suppressor effect, rather than a mediating effect. However, it is important to acknowledge that the suppressor effect has limitations, as it only provides a limited increase in validity.

Overall, these findings shed light on the complex dynamics influencing enrollment in health insurance and contribute to our understanding of the relationship between educational level and enrollment. The presence of funding and risk aversion among individuals without education, as well as the suppressor effect of wealth, family size, and place of residence, provide valuable insights into the factors that influence health insurance enrollment in Senegal.

5.2 Contribution to Practice

The findings of this research have practical implications as they provide insights into the factors that influence enrollment decisions in health insurance schemes. The Senegalese government can utilize these results to develop strategies aimed at increasing enrollment rates. As mentioned in the introduction, enrolling in health insurance schemes is crucial for financing healthcare of acceptable quality and improving overall health conditions, particularly in a low-income country like Senegal (Asfaw & Jütting, 2007). Despite the lack of a positive association between educational level and enrollment, it is important to note that education does have a positive correlation with an individual's wealth. Besides, wealth does have a positive association with enrollment. Therefore, the government can focus on improving the educational system in Senegal, with the aim of enhancing overall wealth and potentially increasing enrollment rates. Additionally, since place of residence appears to have a positive association with enrollment, the government could explore solutions to facilitate enrollment

for individuals residing in rural areas. This may involve initiatives such as providing transportation to healthcare facilities or establishing healthcare facilities in these remote areas.

Furthermore, healthcare insurance companies can leverage the research findings to understand the reasons behind low enrollment rates among certain populations (Asfaw & Jütting, 2007). They can tailor their marketing strategies to target higher-educated individuals, such as creating specific advertisements or offering incentives that resonate with this group. Additionally, offering discounts or other incentives for larger families may help increase enrollment among households with more members.

By applying the insights gained from this research, both the government and healthcare insurance companies can work towards improving health insurance enrollment rates and promoting better access to healthcare services in Senegal.

5.3 Limitations and Future Research

This research has several limitations that should be taken into consideration. Firstly, it is important to acknowledge that this study is based on a quantitative approach using a secondary dataset, which has its inherent limitations. One limitation is the relevance of the data set, as it was collected in 2019. Given the rapidly changing social, economic, and health landscapes, it is crucial to consider the temporal context of this study. Future research could benefit from using more up-to-date datasets, particularly considering the potential impact of the COVID-19 pandemic on variables such as education, wealth, and enrollment in health insurance (Dia et al., 2020). According to Ozili (2020), the COVID-19 pandemic affected social interactions and impacted the economy. Social distancing created fear among citizens and impacted work-related activities (Ozili, 2020). Therefore, exploring the influence of education and wealth on enrollment post-pandemic might yield different results. It is recommended that future studies use at least the dataset from 2021, or the most recent available dataset to ensure the relevance of the findings.

Secondly, utilizing a secondary dataset limits the researcher's control over the operationalization of variables and the order of questions. Because of this, there was little influence on the operationalization of the variables and no influence on the questions that were asked. For example, the question regarding enrollment in health insurance schemes could have been formulated differently, such as by directly asking respondents if they are enrolled in a health insurance scheme. By using better-formulated questions, the potential bias and misunderstanding among respondents can be reduced.

Moreover, sample representativeness. This study relied on a specific dataset from DHS with around 40,000 respondents. This might not have fully captured the entire population or certain subgroups within Senegal. The sample may not be fully representative of the diverse population, potentially introducing sampling biases that could affect the validity of the findings (Kish, 1965).

Another limitation is the use of logistic regression analysis. Although logistic regression is suitable for working with dichotomous variables, the interpretation of the effects based on odds ratios can be challenging. The results rely on conservative estimates due to the principle of non-collapsibility (Gail et al., 1984). Therefore it is difficult to estimate the precise effects of independent variables on the dependent variable or the mediating effect of the mediators on the total effect. The results in this study are not necessarily suffering from the usage of logistic regression, hence, other, more complex, models might need a more accurate analysis method. Lastly, this research only considered a limited number of confounding variables, namely sex and receiving funding. It is important to recognize that there may be other variables that could have a confounding effect on the relationship between educational level, mediating factors, and enrollment in health insurance. These unmeasured confounders could potentially impact the results and limit the ability to draw definitive conclusions. Future research should aim to include a broader range of potential confounding variables to gain a more comprehensive understanding of the factors influencing enrollment.

To further explore the reasons behind the lack of significant relationships between educational level and enrollment, a combination of quantitative and qualitative research can be employed. Mixed-method research can offer a more comprehensive understanding by gathering both numerical data and in-depth insights from individuals (Bryman, 2016). Conducting interviews or focus groups with individuals of varying educational levels can shed light on their perspectives and reasons for enrolling or not enrolling in health insurance. This approach can reveal contextual factors specific to the Senegalese population. Additionally, future research could extend its scope beyond Senegal and compare the effect of educational level and mediating factors on enrollment across different LMICs. By conducting cross-country comparisons, patterns and variations in enrollment can be identified, providing a broader perspective on the factors influencing health insurance uptake. Such comparison can also facilitate knowledge sharing and learning between countries, potentially leading to policy and practice improvements in increasing enrollment rates. Moreover, future research can delve deeper into the issue of access and affordability of health insurance schemes. Investigating the influence of factors such as premium costs, financial literacy, and perception of value for money on enrollment decisions can help identify strategies to improve accessibility and reduce financial barriers for individuals with different educational backgrounds.

6. Conclusion

This research aimed to answer the following research question: ***To what extent is the relationship between educational level and enrollment in health insurance clarified by wealth, place of residence, and family size?*** There can be concluded that educational level does not positively influence enrollment in health insurance schemes. Furthermore, this negative relationship is not mediated by wealth, family size, or place of residence. Instead, these factors have a suppressing effect, strengthening the negative association between educational level and enrollment.

However, it is important to note that educational level does have associations with other variables. A higher level of education is associated with greater wealth, smaller family sizes, and a higher likelihood of residing in urban areas. Additionally, wealth and place of residence do have associations with enrollment in health insurance. Higher levels of wealth are associated with increased enrollment while residing in rural areas is associated with decreased enrollment. Family size, on the other hand, does not show a significant association with enrollment in health insurance schemes.

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Appendix I. Ethics and privacy checklist



CHECKLIST ETHICAL AND PRIVACY ASPECTS OF RESEARCH

INSTRUCTION

This checklist should be completed for every research study that is conducted at the Department of Public Administration and Sociology (DPAS). This checklist should be completed *before* commencing with data collection or approaching participants. Students can complete this checklist with help of their supervisor.

This checklist is a mandatory part of the empirical master's thesis and has to be uploaded along with the research proposal.

The guideline for ethical aspects of research of the Dutch Sociological Association (NSV) can be found on their website (http://www.nsv-sociologie.nl/?page_id=17). If you have doubts about ethical or privacy aspects of your research study, discuss and resolve the matter with your EUR supervisor. If needed and if advised to do so by your supervisor, you can also consult Dr. Bonnie French, coordinator of the Sociology Master's Thesis program.

PART I: GENERAL INFORMATION

Project title: Enrolling in health insurance in Senegal

Name, email of student: Sara de Jong, 502556sj@eur.nl

Name, email of supervisor: Joost Oude Groeniger, oudegroeniger@essb.eur.nl

Start date and duration: 01-04-2023, 3 months

Is the research study conducted within DPAS YES

If 'NO': at or for what institute or organization will the study be conducted?
(e.g. internship organization)

PART II: HUMAN SUBJECTS

1. Does your research involve human participants. YES

If 'NO': skip to part V.

If 'YES': does the study involve medical or physical research? NO
Research that falls under the Medical Research Involving Human Subjects Act ([WMO](#)) must first be submitted to [an accredited medical research ethics committee](#) or the Central Committee on Research Involving Human Subjects ([CCMO](#)).

2. Does your research involve field observations without manipulations that will not involve identification of participants. NO

If 'YES': skip to part IV.

3. Research involving completely anonymous data files (secondary data that has been anonymized by someone else). YES

If 'YES': skip to part IV.

PART III: PARTICIPANTS

1. Will information about the nature of the study and about what participants can expect during the study be withheld from them? YES -
NO
2. Will any of the participants not be asked for verbal or written 'informed consent,' whereby they agree to participate in the study? YES -
NO
3. Will information about the possibility to discontinue the participation at any time be withheld from participants? YES - NO
4. Will the study involve actively deceiving the participants? YES -
NO
Note: almost all research studies involve some kind of deception of participants. Try to think about what types of deception are ethical or non-ethical (e.g. purpose of the study is not told, coercion is exerted on participants, giving participants the feeling that they harm other people by making certain decisions, etc.).
5. Does the study involve the risk of causing psychological stress or negative emotions beyond those normally encountered by participants? YES -
NO
6. Will information be collected about special categories of data, as defined by the GDPR (e.g. racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, genetic data, biometric data for the purpose of uniquely identifying a person, data concerning mental or physical health, data concerning a person's sex life or sexual orientation)? YES - NO
7. Will the study involve the participation of minors (<18 years old) or other groups that cannot give consent? YES - NO
8. Is the health and/or safety of participants at risk during the study? YES -
NO
9. Can participants be identified by the study results or can the confidentiality of the participants' identity not be ensured? YES -
NO
10. Are there any other possible ethical issues with regard to this study? YES -
NO

If you have answered 'YES' to any of the previous questions, please indicate below why this issue is unavoidable in this study.

What safeguards are taken to relieve possible adverse consequences of these issues (e.g., informing participants about the study afterwards, extra safety regulations, etc.).

Are there any unintended circumstances in the study that can cause harm or have negative (emotional) consequences to the participants? Indicate what possible circumstances this could be.

Please attach your informed consent form in Appendix I, if applicable.

Continue to part IV.

PART IV: SAMPLE

Where will you collect or obtain your data?

I will obtain the data from DHS

Note: indicate for separate data sources.

What is the (anticipated) size of your sample?

41,050 is my anticipated sample size

Note: indicate for separate data sources.

What is the size of the population from which you will sample?

12,2 million is the population size

Note: indicate for separate data sources.

Continue to part V.

Part V: Data storage and backup

Where and when will you store your data in the short term, after acquisition?

The onedrive from eur

Note: indicate for separate data sources, for instance for paper-and pencil test data, and for digital data files.

Who is responsible for the immediate day-to-day management, storage and backup of the data arising from your research?

I am responsible

How (frequently) will you back-up your research data for short-term data security?

Everytime I used it to analyze data or to look into the data

In case of collecting personal data how will you anonymize the data?

Note: It is advisable to keep directly identifying personal details separated from the rest of the data. Personal details are then replaced by a key/ code. Only the code is part of the database with data and the list of respondents/research subjects is kept separate.

PART VI: SIGNATURE

Please note that it is your responsibility to follow the ethical guidelines in the conduct of your study. This includes providing information to participants about the study and ensuring confidentiality in storage and use of personal data. Treat participants respectfully, be on time at appointments, call participants when they have signed up for your study and fulfil promises made to participants.

Furthermore, it is your responsibility that data are authentic, of high quality and properly stored. The principle is always that the supervisor (or strictly speaking the Erasmus University Rotterdam) remains owner of the data, and that the student should therefore hand over all data to the supervisor.

Hereby I declare that the study will be conducted in accordance with the ethical guidelines of the Department of Public Administration and Sociology at Erasmus University Rotterdam. I have answered the questions truthfully.

Name student: Sara de Jong



Date: 20-03-2023

Name (EUR) supervisor: Joost Oude Groeniger



Date: 22-03-2023

Appendix II. Syntax

* Encoding: UTF-8.

RECODE HV025 (1=0) (2=1).

EXECUTE.

RECODE HV106 (0=0) (1=1) (2 thru 3=2).

EXECUTE.

FILTER OFF.

USE ALL.

SELECT IF (SH123C < 8).

EXECUTE

RECODE HV009 (29 thru 99=999) INTO RHV009.

VARIABLE LABELS RHV009 'Rhousehold members'.

EXECUTE.

RECODE HV025 (2=1) (1=0) INTO RHV025.

VARIABLE LABELS RHV025 'RType place of residence'.

EXECUTE.

RECODE HV270 (2=1) (3=2) (4=3) (5=4) (1=0) INTO RHV270.

VARIABLE LABELS RHV270 'RWealth'.

EXECUTE.

RECODE SH123C (2=1) (3=2) (8=8) (1=0) INTO RSH123C.

VARIABLE LABELS RSH123C 'RFunding'.

EXECUTE.

RECODE HV104 (2=1) (1=0) INTO RHV104.

VARIABLE LABELS RHV104 'Rsex'.

EXECUTE.

RECODE SH20FAY (0=1) (1=0) INTO RSH20FAY.

VARIABLE LABELS RSH20FAY 'RHealthinsurance'.

EXECUTE.

RECODE RHV106 (0=2) (1=1) (2=0).

EXECUTE.

DESCRIPTIVES VARIABLES=HV009 RHV106 RHV025 RHV270 RSH123C RHV104
RSH20FAY

/STATISTICS=MEAN STDDEV MIN MAX.

FREQUENCIES VARIABLES=RHV104 RHV106 RHV025 RHV270 RSH123C HV009
RSH20FAY

/STATISTICS=MEAN MEDIAN

/ORDER=ANALYSIS

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RSH123C RHV104
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RSH123C RHV104 RHV106
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV106)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

SPSSINC CREATE DUMMIES VARIABLE=RHV106
ROOTNAME1=Education
/OPTIONS ORDER=A USEVALUELABELS=YES USEML=YES OMITFIRST=NO.

SPSSINC CREATE DUMMIES VARIABLE=RHV104
ROOTNAME1=Sex
/OPTIONS ORDER=A USEVALUELABELS=YES USEML=YES OMITFIRST=NO.

SPSSINC CREATE DUMMIES VARIABLE=RSH123C
ROOTNAME1=Funding
/OPTIONS ORDER=A USEVALUELABELS=YES USEML=YES OMITFIRST=NO.

REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT HV009
/METHOD=ENTER Education_1 Education_2 Education_3 Sex_1 Sex_2 Funding_1
Funding_2 Funding_3.

REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS CI(95) R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT RHV270
/METHOD=ENTER Education_1 Education_2 Education_3 Sex_1 Sex_2 Funding_1
Funding_2 Funding_3.

LOGISTIC REGRESSION VARIABLES RHV025

/METHOD=ENTER RHV106 RHV104 RSH123C
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV106)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RHV104 RSH123C HV009
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RHV104 RSH123C RHV270
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV270)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RHV104 RSH123C RHV025
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV025)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RHV104 RSH123C RHV106 HV009
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV106)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY
/METHOD=ENTER RHV104 RSH123C RHV106 RHV270
/CONTRAST (RSH123C)=Indicator(1)
/CONTRAST (RHV104)=Indicator(1)
/CONTRAST (RHV106)=Indicator(1)
/CONTRAST (RHV270)=Indicator(1)
/PRINT=CI(95)
/CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

LOGISTIC REGRESSION VARIABLES RSH20FAY

