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ド ティ ホアイ ジャン
Do Thi Hoai Giang

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Do Thi Hoai Giang[1]

ABSTRACT

This study investigates the impact of the Free Government Healthcare Insurance (FGHI) scheme on healthcare utilization patterns among enrolled households. Utilizing Tobit regression and Nearest Neighbor Matching (NNM), the analysis revealed a significant positive correlation between scheme enrollment and increased healthcare checkup frequency. However, demographic and geographic variations were evident in the scheme's impact, with ethnic minorities and rural households experiencing a more pronounced rise in healthcare visits compared to the majority group and urban residents. These findings underscore the necessity for tailored policy interventions to address disparities across diverse demographic and geographic strata. Moreover, the FGHI scheme demonstrated effectiveness in encouraging healthcare utilization, particularly among specific demographic groups. This study's insights advocate for more nuanced policy frameworks that consider demographic and geographic nuances, ensuring equitable access to healthcare services for all segments of society.

KEYWORDS

Free Government Healthcare Insurance, Nearest Neighbor Matching, Vietnam Healthcare

1. BACKGROUND

Poor health and the inability to access healthcare are key factors leading to and resulting from poverty. And in Vietnam, secondary and tertiary treatment are often out-of-reach for the poor because of their expensiveness as well as other developing countries. Indeed, Out-of-pocket payments for healthcare in Vietnam accounted for about 41% of total health expenditure in 2016 (Le et al., 2010). This places Vietnam within the range recommended by the World Health Organization for countries from the Asia Pacific Region, where out-of-pocket payments should not exceed 30%-40% of total health expenditure (Thành et al., 2021).

[1] Correspondence to: Do Thi Hoai Giang, School of Economics, Can Tho University. Email: hoaigiang@ctu.edu.vn

Compared to other developing countries, the high proportion of out-of-pocket payments in Vietnam indicates a significant financial burden for its population. While Vietnam has made progress in health insurance coverage, out-of-pocket payments remain a substantial component of healthcare financing, posing challenges in ensuring financial risk protection and equitable access to healthcare services (Giang et al., 2023). Therefore Vietnam government has sought to accelerate progress towards Universal Health Coverage by introducing and expanding non-profit health insurance schemes to increase healthcare coverage and financial protection through in-cash support or in-kind support (i.e., free health care services for vulnerable targeted groups). There has been a substantial transformation in the health insurance system in Vietnam since 1998. Vietnam has made significant progress towards achieving UHC through the enactment of the Law of Social Health Insurance and the provision of free or low-cost community-based services. In addition, the most up-to-date transformation is the Revised Health Insurance Law of 2014, which takes effect on January 1, 2015. And the most noticeable change in this novel amendment is the free health service subsidized by the Government. In other words, eligible people can receive a 100% subsidy from the Government as long as they have a health checkup at any public service. In conjunction with the change in the social health insurance system, it has attracted plenty of researchers' attention to various schemes such as voluntary health insurance (Cuong, 2011; Jowett et al., 2003), the Health Care Fund for the Poor (Guindon, 2014; Lê et al., 2019), health care insurance for children under 6 (Palmer et al., 2015; B. Nguyen & Lo Sasso, 2017), and health insurance reform in 2005 for nonpoor children under 6 (M. T. Nguyen, 2020).

Even though the government has targeted the low-income population with Free Health Care Cards for the Poor and has implemented health insurance reforms, out-of-pocket payments for health care in Vietnam still account for a high proportion of health expenditure, posing a substantial burden to households, particularly the poor (K. T. Nguyen et al., 2012). Therefore, the efficiency of Vietnam government's free health care scheme remains a topic of debate, and accessibility issues persist, indicating limitations in the current system. Nonetheless, it lacks empirical investigation about free government healthcare support's influence in Vietnam. To my knowledge, the only research focusing on the effect of free access to health services in public facilities in Vietnam was conducted by Nguyen, H., & Wang, W. (2012). This study, centered on children under the age of six, utilizes data from the Vietnam Household Living Standard Survey (VHLSS) conducted in 2004 and 2006. Employing a difference-in-difference analytical framework, the study revealed a substantial enhancement

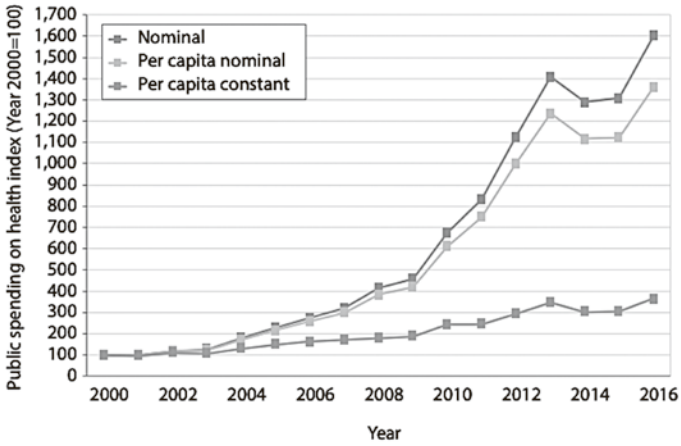
in both inpatient and outpatient care. However, it is important to note that this research predates the implementation of the revised health insurance policy in 2014. On the other hand, the most recent research focusing on the effects of the revised health insurance policy in 2014 was conducted by Thuong (2020). This investigation sought to assess the impact of the Revised Health Insurance Law of 2014 on the utilization of outpatient and inpatient care services, utilizing the propensity score matching method. To gauge the effect of the revised law, the author considered voluntary health insurance and heavily subsidized health insurance, observing a positive effect on the number of outpatient visits and inpatient admissions for the enrolled. However, considering the law's active implementation since 2015, the study conducted in 2016 using the VHLSS may not fully capture the true impact of the revised law. Therefore, my current paper is dedicated to a meticulous examination of the post-revised 2014 health insurance landscape, specifically focusing on the impact of the Free Government Healthcare Insurance (FGHI). Utilizing data from the Vietnam Household Living Standard Survey (VHLSS) in 2018, this study aims to provide a comprehensive understanding of the FGHI scheme's influence subsequent to the revision of the health insurance law in 2014. Specifically, the author focuses on the number of health checkup times and tests the theoretical prediction that free healthcare from non-contributory health insurance schemes assists in increasing the number of health checkup visits in households. Moreover, it has been noted that there is inequality in the pattern of visiting health facilities between rural and urban areas and ethnicity. Therefore, these factors causing this gap are explored in the study as well. In summary, the following questions are asked: whether households' utilization of the health care services offered by the scheme leads to any changes in their total number of health examinations; and whether the scheme affects different population groups and regions covered. Hence, this study contributes to recent works in developing countries by emphasizing the necessity of welfare systems that provide free government healthcare insurance both theoretically and practically.

To ensure comprehensiveness and facilitate cross-study comparisons, the rest of this paper was organized as follows. Section 2 summarized about the health insurance scheme. Methodology was provided in detail in Section 3. Section 4 revealed results about the impact of the FGHI scheme and continued with our discussion in Section 5. Finally, a brief conclusion was condensed in Section 6.

2. GENERAL ABOUT VIETNAM HEALTH CARE FINANCE

2. 1. Overview Of Health Financing Trends

Current health financing system, resulted from multiple policy reforms, indicates remarkable improvements in the state budget allocations for health care system. Public spending on health has increased significantly since 2010 (**Figure *1***): the average growth rate was 9% per year. This expansion in has come from two main sources: domestic government spending on health and social health insurance (SHI) expenditure. Compared to countries with similar income levels, Vietnam's total health expenditure exhibits similarity in both per capita term and as proportion of GDP. Moreover, health spending has also increased significantly since 2010 (WHO 2018).

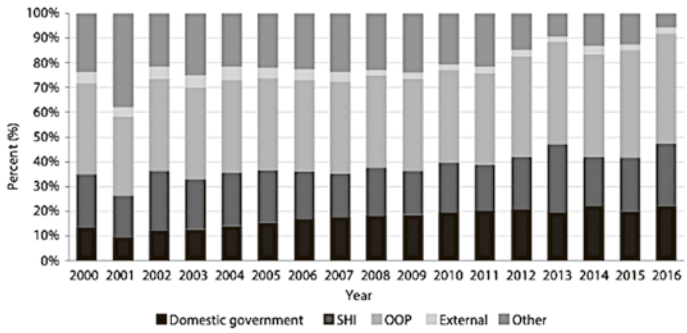


Source: WHO (2018)

Note: Per capita constant is a term used in economics, business, and statistics to measure a metric per person in constant terms or adjusted for price inflation.

Figure 1: Public spending on Health, 2000-2016

However, proportion of public spending (domestic government and SHI), as shown in Figure 2, between 2000 and 2016 had grown slowly: from approximately 35% to just over 40% Besides, the OOP has still occupied the largest share of spending (over 40% in 2016), despite policy intentions to reduce OOP spending by households. This is one of the constrains in Vietnam health care system. Vietnam was in fact among the top five countries for the largest decline in incidence of impoverishment due to OOP spending, measured based on available cross-country data (WHO and World Bank 2018).



Source: WHO (2018)

Figure 2: Composition of health spending by different source, from 2000 to 2016

State budget spending on health that is channeled toward primary care and preventive services benefits poor and rural populations, who use these services more at the commune and district levels. Effective targeting of health insurance premium subsidies has also contributed significantly to improving financial coverage for poor and vulnerable groups. Health insurance coverage rates are highest in the poorest quintile and have been increasing in all income groups. Poor and near-poor groups are subject to zero or low co-insurance payments when seeking care in district and lower levels or through referrals.

2．2．The Revised Health Insurance 2014 And the FGHI Scheme

In June 2014, the Health Insurance Law was amended through Law No.46/2014/QH13 to reclassify the eligibility categories, eliminate the voluntary scheme, and schedule premium increases, and to change the mechanism of collection of revenue and revise the benefit package. The Social Health Insurance (SHI) categories were reclassified based on source of premium payment and included a new category for household enrolment. In general, there are five target groups in the new Law:

- The people who belong to first group need to pay 4.5% of payroll tax and 20% co-payment rate. Contribution will be paid by employees and employers.
- The second group whose contributions are 100% paid by the government, and the co-payment rate reduced from 5% (2012 Law) to 0%.
- The third, fourth and fifth group's contribution are paid by partly by the government, by the social insurance fund and based on unit subscription of the family respectively. And the co-payment rate of these groups is 20%.

The ones who are eligible for second group, will receive FGHI. According to Decree 146/2018/

ND-CP, there are 17 target groups can receive this FGHI e.g., members of poor households; ethnic minority people living in areas; commune, ward or township cadres who have stopped working and are receiving monthly allowances from the state budget, etc.

3. METHODOLOGY

3. 1. Data source

To assess the impact of the Health Insurance (HI) policy on healthcare service utilization, a cross-sectional study was conducted utilizing secondary data sourced from the Vietnam Household Living Standards Survey (VHLSS). This survey, conducted biennially since 2002 by the General Statistics Office of Vietnam with support from the World Bank, serves the purpose of evaluating living standards to inform policy-making and socio-economic development planning. The dataset comprises information at both household and individual levels, encompassing a wide array of valuable data pertaining to fundamental demographic characteristics, living standards, education, healthcare, and poverty indicators. The overarching goal of the VHLSS is to systematically monitor and oversee the living standards of diverse population segments in Vietnam, evaluate the efficacy of the Comprehensive Poverty Reduction and Growth Strategy, and contribute to assessing the attainment of the Sustainable Development Goals and Vietnam's socio-economic development objectives.

In this investigation, the VHLSS 2018 dataset, encompassing 70,593 households, was utilized. Given the biennial nature of the survey and the implementation of the Revised Health Insurance (HI) Law in 2014, which took effect the subsequent year, the decision was made to analyze the 2018 VHLSS data in this study. Specifically, the focus was directed solely towards households providing information regarding their enrollment status in the FGHI support scheme during 2018. Additionally, the study incorporated data pertaining to household heads' demographics, household income, and pertinent health-related information of household members. Consequently, the total number of observations considered for analysis in this research was reduced to 33,125 households, facilitating a more focused and refined examination of the FGHI scheme's impact on healthcare utilization.

The evaluation of disparities in healthcare service utilization outcomes may be influenced by biases arising from concurrent enrollment of households in different health insurance schemes. Consequently, this study seeks to mitigate these biases by examining two distinct scenarios:

- The initial scenario involves a comprehensive comparison between the treatment

group (FGHI scheme participants) and the control group within the entire sample.

- To explore potential biases introduced by participation in other HI programs alongside the FGHI scheme, the second scenario is examined. In this case, I evaluate between treatment and control group that having at least one member enrolled in an alternative HI program.

To be specific, the treated group and control group are explained as follows:

3．2．Treatment groups

The treatment cohort comprises households whose members were beneficiaries of the complimentary healthcare service scheme throughout the calendar year of 2018. The research used this definition as criteria (households having at least one member received FGHI in 2018) to select observations for treatment groups. Hence, the treatment group, which encompasses 393 households in the overall sample, is subsequently reduced to 371 households in the second scenario.

3．3．Control groups

As the scenario detailed above, the allocation of control group is categorized as follows:

- The first control group encompasses the full sample, consisting of households with members eligible for any type of HI coverage and those devoid of any HI coverage. The total observations are 32,732 households.
- The second control group, denominated as the insured household subsample, consists exclusively of households wherein at least one member is enrolled in a HI scheme other than the FGHI. Consequently, this group encompasses a total of 27,308 households.

This stratification allows for a comprehensive evaluation of the effect of the FGHI scheme on healthcare service utilization while considering variations attributable to diverse HI enrollment statuses within households.

3．4．Outcome variable

The parameter of interest in this study was defined as "access to healthcare," operationalized as a proxy for healthcare service utilization. Access to healthcare denotes the timely acquisition of healthcare services within the healthcare system where necessary treatments can be obtained. Axelson et al (2009) and Wagstaff (2007, 2010) have previously employed the frequency of outpatient visits and inpatient admissions over a twelve-month period as metrics to gauge healthcare utilization. Hence, in evaluating the impact of Health Insurance service support, the health checkup has been employed as the primary outcome

variable in this analysis. This variable is from the following questions: (1) “Times and expenses of [NAME]'s outpatient treatment in the last 12 months?” and (2) “Times and expenses of [NAME]'s inpatient treatment in the last 12 months?”. The two questions enabled to create the variable “a number of health checkups”, which is the average of all household members’ number of outpatient and inpatient visits. Following the implementation of the revised health insurance policy in 2014, there has been a transition from a health insurance scheme based on individual insurance to one that focuses more on family-centric approach, by including new categories for household enrolment (Law on Health Insurance 46). This shift in emphasis is attributed to a modification in the target demographic for insurance coverage. Therefore, within the scope of this study, the primary objective is to examine the impact of the FGHI scheme on the utilization of healthcare services, with a specific focus on household utilization.

Additionally, to evaluate whether the impacts of the HI scheme are heterogeneous across the targeted classifications, namely ethnicity (minority–majority) and places of residence (urban–rural), the study will assess the intensity of visiting health facilities on this range of subpopulations.

3. 5. Explanatory variables

To enhance the precision of the exposure impact, it is suggested that factors relevant exclusively to the result should always be included in a propensity score model. The variables taken into consideration have been categorized in accordance with Andersen's utilization of healthcare model, which highlights those three main elements—needs, predisposing factors, and enabling factors—that determine service utilization. These control variables have been employed as determinants impacting healthcare access in a rising number of public studies. These variables include enabling factors reflecting a household’s characteristics such as "household's economic status" (yearly household income and poor status), "household size," and "ethnicity," as well as predisposing elements like "characteristics of the household head" (namely age, gender, and highest educational attainment) and residential location.

3. 6. Analytical approach

Rosenbaum and Rubin (1983) introduced the propensity score matching (PSM) method, which will help create a counterfactual group based on the probability of assignment to a particular treatment given a vector of observed covariates. As a result, this method will optimally achieve randomization to assess the impact of a treatment. Growing interest has been shown in utilizing PSM to calculate the impact of interventions on outcomes using

observational data; for instance, Cannonier et al. (2018); Yu et al. (2018); Thuong (2020) and Njagi et al. (2020). Moreover, propensity score matching is a statistical matching technique that can be applied when observations are limited. It is used to estimate the effect of a treatment, policy, or intervention by accounting for the covariates that predict receiving the treatment, thereby reducing bias due to confounding variables. PSM can be particularly useful in observational studies with limited observations, as it allows for the formation of matched sets of treated and untreated subjects who share a similar propensity score, thus enabling more robust inferences on treatment effects (Austin, 2011, Pirracchio et al., 2012, Bottigliengo et al., 2021). Therefore, the application of propensity score matching is well-suited for situations where the availability of observations is constrained, as it helps mitigate the impact of limited data on the estimation of treatment effects. Accordingly, this study employed this methodology as well.

Propensity score matching, in simple term, can be understood as a method help us to decide how to match individuals with one another. There are several methods to match observations include: Nearest Neighbor Matching, Caliper Matching, Radius Matching, Kernel Matching etc. Besides, presently, there is various code in Stata to run PSM methods such as -teffects- (StataCorp. 2013b); -pscore- (st0026); -psmatch2-; and -pstest- (within the -psmatch2- package. Previously, -psmatch2- , which was written by Edwin Leuven and Barbara Sianesi, was commonly applied. Nevertheless, in this study, we applied the “teffect” command because of its advantage is that this command accounts for the fact that propensity scores are approximated rather than known when computing standard errors.

$$numofcheckup_i = \alpha + \beta_{1i}\, FGHIscheme + \beta_{Xi}\, X_i$$

In which:

- Numofcheckup: average number of health checkup/treatment times of all members in the i^{th} household
- X_i: control variables
- β_{1i}: coefficient shows effect of the Free Government Health Insurance scheme on the outcome

4. RESULTS

4. 1. Descriptive statistics of the study sample

Table 1 delineated the principal characteristics of the three distinct research cohorts. Within the entire cohort, it was observed that 45.55% of households (HH) benefiting from the

FGHI support, constituting the treatment group, belonged to ethnic minority groups. Of this subset, 33.84% exhibited economic vulnerability, with an approximate monthly income of 15,775 thousand VND, and the highest educational attainment of the household heads was limited to primary school. In contrast, the control group demonstrated a higher educational threshold, with household heads having completed at least lower secondary school. Additionally, a notable affluence was evident within the control group, as only 6.21% of households were categorized as economically disadvantaged. The mean monthly income for households in the control group was approximately double that of the treatment group, amounting to 29,068 thousand VND. Lastly, 14.76% of households in the treatment group were situated in urban areas, while the corresponding figure for the control group residing in the municipality was 31.53%. Similarly, the analysis in the insured households subsample indicated households in the treated group experienced relatively disadvantageous conditions: 39.3% of households were poor, only 12.8% of households lived in the city, and the average monthly household income was approximately 13 million VND for four members. It presented prima facie evidence, if not conclusive, that the treatment group was considerably in a fragile position compared to the control group: low total income, low education, living in poor and rural areas.

Table 1: Households' characteristics across subpopulations

		Full sample		The insured HH subsample	
	Unit	HH receive FGHI (Treatment group)	HH do not receive FGHI (Control group)	HH receive FGHI (Treatment group)	HH do not receive FGHI (Control group)
Poor	%	33.84	6.21	34.23	7.36
Urban	%	14.76	31.53	14.29	31.72
Elders in HH	%	38.17	32.47	38.54	34.63
Ethnic group	%	45.55	14.61	46.90	16.34
HH head's gender	%	19.59	25.20	19.41	25.85
HH size	Member	4.02	3.69	4.01	3.67
HH head's education	Educational level	1.32	2.12	1.34	2.23
HH income	1,000 dong	15,774.98	29,068.90	14,845.33	29,710.19
HH head's age	Year old	50.25	52.74	50.53	53.68
Total observation	Household	393.00	32,732.00	371.00	27,308.00

Table 2 summarized the number of times all household members had access to healthcare services during 2018 across different subsamples of interest. Searching through the full

sample, the results revealed that the average number of healthcare visits per year for the treated group was 5.5, whereas the number for the control group was 4.5. It was notified that the maximum visit times of the control group were 347, triple compared to the highest visit times of households in the treated group. Similarly, the statistics from the insured subsample were not as diverse as those from the full sample.

Table 2: Descriptive statistics of outcome variables across various groups

		Observation	Mean	Standard error	Min	Max
Full sample	**HH receive FGHI (Treatment group)**	393	5.458	8.441	0	100
	HH do not receive FGHI (Control group)	32,732	4.518	7.548	0	347
The insured HH subsample	**HH receive FGHI (Treatment group)**	371	5.461	8.614	0	100
	HH do not receive FGHI (Control group)	27,308	4.733	7.853	0	347

Following a comprehensive review of the applied dataset, the analytical course proceeds by employing two distinct methodologies. Firstly, Tobit regression is engaged to elucidate the correlation between the FGHI scheme and healthcare service utilization. Subsequently, the outcomes of propensity score matching are presented. Although propensity score matching serves as the primary analytical method, Tobit regression is strategically incorporated to assess and compare the effects of the relationship across various methodologies, ensuring consistency in results.

4．2．Effect of the FGHI scheme

Firstly, I estimated a Tobit regression to analyze the relationship between the scheme and the number of checkup times. The model was statistically significant at a 1 per cent level. The Tobit estimates, given in Table 3, provided suggestive evidence indicating that the FGHI scheme and the frequency of health checkups were correlated. More specifically, households that had members enrolled in the scheme had a greater number of visits to any kind of hospital or clinic than the households that did not enroll, namely 2 number of inpatient and outpatient visits per year. Moreover, living area and ethnicity affected the interested outcome of the study, as well.

Table 3: Tobit estimation for the FGHI scheme of the full sample

	Coefficient
FGHI scheme	2.121***
Minority group	−2.211***
Interaction term: in-kind and ethnicity	−1.930**
Poor	0.966***
Education: (illiteracy as base group)	
Primary school	−0.767***
Lower secondary school	−1.845***
Upper secondary school	−1.553***
Vocational college	−1.013**
University	−0.613**
Master	−0.234
PhD	−1.127
Urban	0.871***
Total income of household	−5.06e−06***
HH head's gender	−0.139
HH head's age	0.063***
Elders in family	1.227***
HH's size	1.093***
Constant	−3.613***
Number of Observation	33,125
Prob > chi2	0.000

Note: ***p<0.01, **p<0.05, *p<0.1

Subsequently, employing Propensity Score Matching estimation facilitated the discernment of the causal effects of the government-provided free healthcare service on the frequency of healthcare checkups across diverse sample groups. Prior to delving into the exploration of results (refer to Appendix), an evaluation of the Propensity Score Matching and Nearest Neighbor Propensity Score Matching outcomes were conducted using standardized differences and variance ratios to assess the quality of matching. An ideally balanced covariate is characterized by a variance ratio of 1 and a standardized difference of 0. The findings aligned with the notion that covariates were likely balanced within my model, as evidenced by standardized differences nearing 0 post-matching and variance ratios approaching 1. Additionally, the outcomes of Nearest Neighbor Matching appeared to exhibit a higher degree of adequacy compared to those obtained through Propensity Score Matching. Hence, in this next visual inspection of matching variable plots further corroborated this inference. Table 4

provided a comprehensive summary of the Average Treatment Effects on the Treated (ATTs) and Average Treatment Effects (ATEs) associated with the government-sponsored free healthcare scheme concerning the aggregate count of health checkup occurrences. The analysis revealed a statistically significant positive influence of the policy on the frequency of outpatient and inpatient healthcare service utilization across all subpopulations examined. Specifically, the estimations indicated that the policy led to an increase in health service utilization, with the enrolled group exhibiting an augmented number of visits ranging between 1.377 (ATE) and 1.410 (ATT). Similarly, the insured household subsample and non-insured group displayed slightly higher estimated impacts, ranging from 1.065 to 1.398 in terms of visit frequencies, respectively.

Table 4: Estimated average treatment effects by Nearest Neighbor Matching on the treated and on population of FGHI scheme on healthcare utilization across different samples in Vietnam

	ATT		ATE	
	Coef.	**95% CI**	**Coef.**	**95% CI**
Full sample	1.410*** (0.488)	0.454 to 2.366	1.377** (0.557)	0.287 to 2.468
The insured HH subsample	1.398*** (0.507)	0.404 to 2.393	1.065* (0.620)	-0.151 to 2.281

Note: SEs in parentheses. ***p<0.01, **p<0.05, *p<0.1

Moreover, Table 5 provided an in-depth analysis elucidating the impact of the healthcare support scheme on household healthcare utilization concerning ethnic backgrounds and residential areas within the full sample. The findings revealed a discernible increase in both outpatient and inpatient service utilization due to the implementation of the support scheme. Furthermore, the magnitude of this impact exhibited variability among ethnic minority and majority groups as well as across distinct residential areas. For instance, among enrolled households belonging to ethnic minority communities, the FGHI scheme contributed to an increase of 0.92 (ATT) in the number of healthcare visits compared to non-enrolled households. In contrast, this impact was more pronounced among majority group households, with estimated increases ranging between 1.73 (ATE) and 1.80 (ATT) visits. Similarly, the scheme demonstrated a positive effect on healthcare utilization among households residing in rural regions, resulting in an augmented frequency of service utilization by 1.19 to 1.51 visits. However, no discernible evidence was found regarding the scheme's impact on healthcare utilization in urban areas.

Table 5: Estimated average treatment effects on the treated and on population of FGHI scheme on healthcare utilization across various samples by the Nearest Neighbor Matching

	ATT		ATE	
	Coef.	**95% CI**	**Coef.**	**95% CI**
Minority group	0.924*** (0.424)	0.093 to 1.755	0.485 (0.427)	0.477 to 2.992
Majority group	1.800*** (0.823)	0.188 to 3.413	1.735*** (0.642)	0.477 to 2.992
Urban	2.886 (2.065)	-1.161 to 6.932	0.709^{ns} (1.193)	-1.629 to 3.048
Rural	1.192*** (0.446)	0.318 to 2.067	1.516*** (0.584)	0.373 to 2.660

Note: SEs in parentheses. ***p<0.01, **p<0.05, *p<0.1

5. DISCUSSION

The primary aim of this research was to assess the impact of the FGHI scheme on healthcare service utilization within households. The study significantly contributed to the existing body of literature, particularly in the context of Vietnam, by offering empirical evidence regarding the efficacy of the government's provision of free healthcare services. Notably, the investigation revealed a favorable association between the implementation of the scheme and increased healthcare utilization among Vietnamese households in the year 2018. Nonetheless, notable variations in the strength of this effect were observed across distinct subsamples and the variables considered. Regarding the impact on ethnic characteristics, disparities emerged between minority and majority populations, suggesting a differential effect of the program. Specifically, the scheme appeared to exert a more substantial influence on healthcare utilization within majority group households compared to those belonging to minority groups. Moreover, the free healthcare services exhibited notable efficacy in rural areas, yet there was no sufficient evidence about the effect in urban areas as the result was statistical insignificant.

The study notably revealed that the Free Government Healthcare Insurance scheme exhibited a positive association with the heightened utilization of both outpatient and inpatient services across households. This finding aligned with similar conclusions drawn from previous studies. For instance, Nguyen H. and Wang W.'s research in 2012, highlighted an escalation in service utilization among preschool-aged individuals. Additionally, an assessment conducted by Thuong (2020) on the impact of the 2014 healthcare reform found that enrollment in Voluntary Health Insurance led to an increase in healthcare service

utilization by 0.55 times annually, while Heavily Subsidized Health Insurance enrollment correlated with a rise of 0.22 contacts. However, Gwatkin (2004) pointed out that the vulnerable people were "probably not" receiving the benefits as expected from the free government services as "the benefits of subsidized government health services will flow primarily to the better-off, rather than to the poor". One explanation for the positive effect on vulnerable households' service utilization under the scheme, as displayed in the study of Khe et al. (2002), might be because low-earning families were deterred from health checkups because the health-related expenditure was a substantial burden. Alternatively, the improvement among this disadvantaged population might be influenced by moral hazard behavior, as highlighted by Nguyễn V.P. (2013) and T. M. H. Nguyen (2014). Notably, Table 1 in the previous section underscored that enrolled households tended to exhibit lower incomes and lived under comparatively disadvantaged conditions compared to their unenrolled counterparts.

Regarding the effect of the FGHI scheme on ethnic minority households compared to the ethnic majority, the observed impact might have been relatively less pronounced among ethnic minorities. This observation could be rationalized through two potential explanations. Firstly, it pertains to health-seeking behavior, as highlighted by Van Toan et al. (2002) and Khe et al. (2002), indicating that individuals with minor ailments in ethnic minority groups tend to resort to self-treatment through customary practices or seek assistance from private healthcare providers. Moreover, despite the provision of free services for the insured, a requirement for at least one accompanying person during hospitalization may result in additional out-of-pocket expenses for ethnic minorities. Additionally, the residency status, whether as resident or non-resident patients, could potentially elevate the likelihood of financial hardship, as emphasized by Pekerti et al. (2017).

Furthermore, it was observed that the impact of the FGHI significantly enhanced healthcare utilization within rural households, yet it had no statistical significance within urban households significantly affected rural households but lacked statistical significance in urban areas. This aligns with the findings of Giang et al. (2023), who similarly reported overall benefits accruing to the insured. Likewise, Wagstaff (2007) demonstrated a 16% and 30% augmentation in the likelihood of utilizing outpatient and inpatient services, respectively, among economically disadvantaged individuals in Vietnam. Besides, M. P. Nguyen et al. (2023) illustrated that urban households exhibited a greater propensity to avail themselves of private health services compared to their rural counterparts. This, hence, potentially

contributed to an insufficiency of evidence to conclusively establish the scheme's impact in urban households.

Overall, this study significantly contributed to the literature by exploring the impact of Vietnam's FGHI scheme on healthcare service utilization among households. The findings underscored a positive association between the scheme and increased healthcare utilization in Vietnamese households during 2018. However, variations were observed across subgroups and variables, particularly evident in the distinct impact on majority and minority ethnic groups. While the scheme notably benefited households in rural areas, its effect in urban settings lacked sufficient evidence. Therefore, policy implication may emphasize the effectiveness of initiatives offering free healthcare services in promoting healthcare utilization. Yet, the lack of discernible impact in urban areas warrants further investigation and suggests the need for targeted interventions in these settings. Moving forward, policymakers should consider the nuanced implications uncovered in this study to design more inclusive and effective healthcare policies that address the specific needs of diverse demographic and geographic groups, thereby fostering equitable access to healthcare services for all.

A significant strength of this research is its contribution to the existing literature, especially in terms of concerning the differential effects on ethnic minority households and those in rural versus urban. However, there are several potential limitations remain that must be considered when interpreting the results. Firstly, due to constraints within the available secondary data, the study cannot separate the number of visits between outpatients and inpatients. This limitation restricts the research's capacity to draw further conclusions relevant to these types of patients. Moreover, the modeling was restricted to demand-sided factors, lacking the incorporation of supply-sided elements. However, to minimize potential biases, the model meticulously controlled for numerous factors that have been documented in the existing literature. Additionally, it is noteworthy that panel data could potentially offer a more comprehensive and informative approach for evaluating this type of impact. Furthermore, a limitation lies in the substantial discrepancy in the number of observations between the treatment and control groups, with fewer treated observations compared to the control group. However, as highlighted by Pirracchio et al. (2012), even in instances of restricted study samples or low treatment prevalence, Propensity Score Matching (PSM) might generate reliable estimates of treatment effects without significantly affecting the Type I error rate. Therefore, future research endeavors could address these limitations by

employing panel data and addressing the observational discrepancies to enhance comparative evaluations of the FGHI scheme's impact.

6. CONCLUSION

In conclusion, the findings from this study highlight the substantial impact of the FGHI scheme on healthcare utilization patterns among enrolled households. The robust statistical analyses conducted, including Tobit regression and Nearest Neighbor Propensity Score Matching collectively provide compelling evidence supporting a causal relationship between scheme enrollment and increased healthcare checkup frequency. However, the observed impact is not uniform across demographics and geographic locations. Ethnic minorities and rural households appear to benefit more from the scheme, experiencing a notable rise in healthcare visits compared to the majority group and urban residents. This underscores the necessity for tailored policy strategies to address demographic disparities and geographic variations, ensuring equitable access to healthcare services.

APPENDIX

Checking quality of PSM and NNM results:

Propensity Score Matching

tebalance summarize

note: refitting the model using the generate () option

Covariate balance summary

		Raw	Matched
Number of obs	=	33,125	786
Treated obs	=	393	393
Control obs	=	32,732	393

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
ethnic18	0.7160868	-0.0407654	1.993443	0.9943928
poor18	0.7350319	0.032412	3.854927	1.023622
edu18	-0.4122952	-.0368814	0.4836222	0.953582
urban18	-0.4056142	0.0822373	0.584175	119.481
total_income18	-0.3534315	0.0175885	0.4375567	0.9543945
female	-0.1346893	-0.0316351	0.837915	0.9541212
age18	-0.1754056	-0.0909589	123.241	0.9833875

Neighbor Nearest Matching

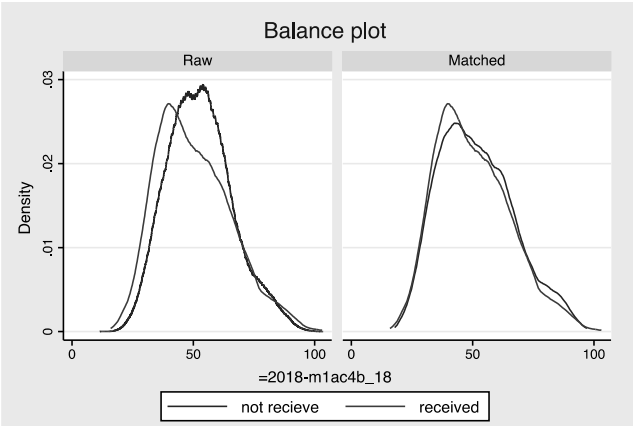
tebalance summarize

note: refitting the model using the generate () option

Covariate balance summary

		Raw	Matched
Number of obs	=	33,125	786
Treated obs	=	393	393
Control obs	=	32,732	393

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
ethnic18	0.7160868	0	1.993443	1
poor18	0.7350319	0	3.854927	1
edu18	-0.4122952	0.0016214	0.4836222	0.9962381
urban18	-0.4056142	0	0.584175	1
total_income18	-0.3534315	0.0040972	0.4375567	1.017121
female	-0.1346893	0	0.837915	1
age18	-0.1754056	-0.0006849	1.23241	1.019441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Matched
Density
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.03
0
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100
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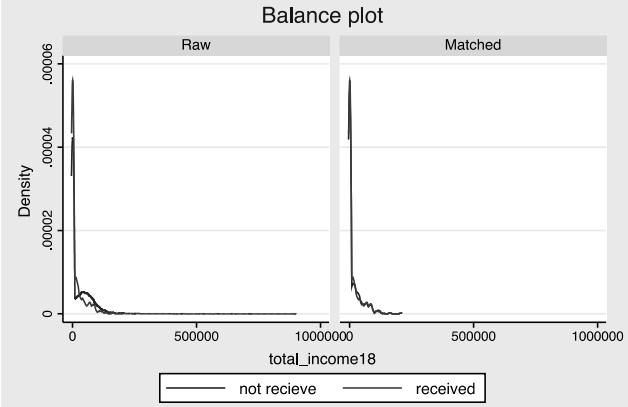
received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Matched
Density
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.00004
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0
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total_income18
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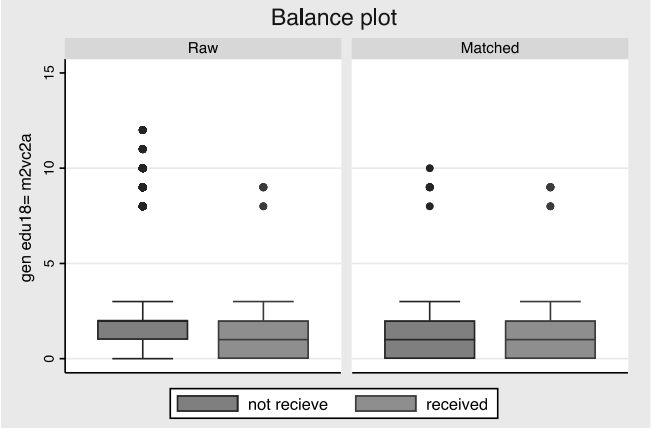
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5
10
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