Multiple chronic conditions and healthcare utilisation within the context of national health insurance

Frederik Booysen, Miracle Ntuli, Prudence Kwenda

(School of Economic and Business Sciences, University of the Witwatersrand)

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Chronic disease and its burden on the health systems of developing countries is on the increase worldwide. The consequent rise of multiple chronic conditions is likely to see healthcare utilisation increase, with important implications for the responsiveness of health systems. This challenge is particularly relevant to South Africa with its quadruple burden of disease and the pending implementation of national health insurance. This study applies Propensity Score Matching to data for a cohort of adults from the National Income Dynamics Study to assess how the occurrence of multiple chronic conditions and access to medical aid affect patterns of healthcare utilisation. At 22.2%, the overall cumulative prevalence of multiple chronic conditions is relatively high. The presence of multiple chronic conditions is characterised by a significantly higher utilisation of healthcare, specifically of public clinics. Whereas access to medical aid does not significantly increase aggregate healthcare utilisation among adults with multiple chronic conditions, it does significantly shift utilisation from public to private sector care. In particular, utilisation shifts away from public clinics toward general practitioners. The preference for private over public care among adults with multiple chronic conditions who have access to medical aid is substantive in terms of economic significance. As things stand, the increasing burden of multiple chronic conditions on healthcare services will fall on the under-resourced public healthcare sector, with likely negative consequences for quality of care. Under the proposed national health insurance system, which will extend medical aid coverage to the larger population, this burden is likely to shift to the better resourced, but smaller private healthcare sector, which may impact negatively on access and quality of care. Under both scenarios, it is necessary that the South African health system continue to be re-engineered to address the challenges posed by the epidemic of multiple chronic conditions.

JEL classification: I11, I13, I18, C21

Keywords: health insurance; healthcare utilisation; multiple chronic conditions; Propensity Score Matching; South Africa

1. Introduction

Chronic diseases and their burden on the health systems of developing countries are on the increase worldwide (Hajat & Stein, 2018). The consequent rise of multiple chronic conditions is likely to see healthcare utilisation increase (Jankovic et al., 2018; Lee et al., 2015; Lehnert et al, 2011), with important implications for the responsiveness of health systems. This challenge is particularly relevant to South Africa with its quadruple burden of disease and skewed access to healthcare services (Mayosi et al., 2009). Target 3.8 of the Sustainable Development Goals (SDG) aims to achieve universal health coverage, including financial protection for all and access to quality essential health services (Hogan et al., 2018; Schmidt et al., 2015). In its quest to achieve universal health coverage, South Africa is in the process of embarking on the implementation of national health insurance (NHI). Under the proposed scheme, a single payer will purchase healthcare services mandated as prescribed minimum benefits from providers in both the public and private healthcare sectors.

Universal health coverage is envisaged to bridge historical inequalities in access to quality healthcare. However, the implementation of NHI may have some unintended consequences that negatively affect the relatively well resourced private healthcare sector's ability to respond to the possible shift in utilisation. As such, it is important to understand how an expansion in health insurance coverage may impact on patterns of healthcare utilisation, which is the one objective of this paper. Concomitantly, the increase in multiple chronic conditions could potentially result in an increase in healthcare utilisation, which should be met by a responsive health system. For this reason, this paper also investigates the impact of multiple chronic conditions on healthcare utilisation and how insurance coverage among those with multiple chronic conditions may impact patterns of healthcare utilisation.

Currently, the literature on health insurance, multiple chronic conditions and healthcare utilisation is sparse in South Africa. Yet, it is important for informing strategies to address the country's challenges in the health sector, especially the proposed NHI scheme. While Ataguba and Goudge (2012) do explore the impact of health insurance coverage on healthcare utilisation, the effect of the interaction between access to health insurance and multiple chronic conditions on healthcare utilisation remains unexplored. This study fills this gap by applying a matching estimator to data for a cohort of adults in South Africa observed in the country's National Income Dynamics Study (NIDS).

This paper is structured as follows. Section 2 discusses the data, section 3 presents the estimation method, sections 4 and 5 present and discuss the results, while section 6 concludes.

2. Data

The study employs individual-level data for a cohort of adults interviewed in South Africa's nationally representative National Income Dynamics Study (NIDS). The cohort comprises all 9,915 adults (aged 15 years and older) interviewed in both 2008 (baseline) and 2017 (wave 5). The key variables employed in the analysis were constructed as follows:

Health care utilisation: The use of health care services is quantified using responses to two questions. Question J3 asks respondents, "When last did you consult someone about your health", while Question J4 ask respondents, "Where did this consultation take place". The binary outcome variable takes on a value of 1 if the person consulted someone about their health in the past month and zero otherwise. In addition to overall utilisation, a distinction is made between public sector care (public clinics and hospitals) and private sector care (general practitioners and private clinics and hospitals).

Multiple chronic conditions: The health module in the adult questionnaire includes two questions that can be used to identify the prevalence of multiple chronic conditions. Question J13 asks respondents, "Have you ever been told by a doctor, nurse or healthcare professional that you have [condition]", while Question J14 ask respondents, "Do you have any other major illnesses or disability not mentioned above". The conditions recorded in the former responses include tuberculosis, high blood pressure, diabetes or high blood sugar, stroke, asthma, heart problems and cancer. The responses to the latter question were recorded as psychological or psychiatric disorders, HIV/AIDS, epilepsy, emphysema and Alzheimer's. Together, the list includes a total of twelve conditions. The presence of multiple chronic conditions represents cases where two or more of these conditions have ever been recorded over the ten-year span of the survey. A distinction is made between individuals with no conditions, a single condition and more than two conditions.

Medical insurance: Question J30 asks respondents, "Are you covered by medical aid?" The binary variable for access to medical insurance is coded as yes (=1) or no (=0).

3. Method

This study employs the propensity score matching (PSM) approach for the empirical analysis. The underlying idea is to compute the treatment effect of participating in a particular program. This requires information on an individual's outcome (Y) realised when participating in the program (treated) and when they do not (non-treated). Unfortunately, in practice an individual is only observed in one state. To identify the effect of interest, PSM is often applied to construct, for a treated individual, an artificial non-treated comparison individual/s (i.e. counterfactual) based on observable characteristics - X (Gertler et al., 2016). If X contains many variables, it may be difficult for some treated individuals to find a non-treated match with exact X values. To avoid this curse of dimensionality, the propensity score ($P(X) = \Pr(T = 1|X)$, i.e. the probability of treatment conditional on X is used for the matching process (Rosenbaum and Rubin, 1983; Gertler et al., 2016). A treated individual will be matched with a non-treated individual/s with the closest propensity score (c.f. Caliendo & Kopeinig, 2008; Gertler et al., 2016). The mean difference in outcomes between treated individuals and their matched non-treated counterparts gives the treatment effect of interest. This is the average treatment effect on the treated (ATT):

$$\tau_{ATT}^{PSM} = E_{P(X)|T=1}\{E[Y(1)|T = 1, P(X)] - E[Y(0)|T = 0, P(X)]\} \quad (1)$$

The supposition is that the matching satisfies two properties – common support and conditional independence. Common support implies a reasonable amount of overlap in the distribution of the estimated propensity scores for treated and non-treated groups. The conditional independence assumption (CIA) assumes that the ATT is unbiased provided there are no unobservable characteristics that affect both programme participation and the outcome (Caliendo & Kopeinig, 2008; Khander et al., 2010; Ataguba & Goudge, 2012).

This study is interested in estimating the effect of having multiple chronic conditions or access to medical aid on health care utilisation. Accordingly, we have two treatment states: having multiple chronic conditions and access to medical aid. Logit models are used to estimate corresponding propensity scores, i.e. the probability of having multiple chronic conditions or having access to medical aid. The covariates X for the multiple chronic conditions treatment model are age, gender, marital status, education, employment status, population group, quintiles of household income, household size and geographic location. For the medical aid

treatment model, the same covariates are employed together with the presence of multiple chronic conditions.

Equipped with the propensity scores, we match the treated to the non-treated individuals using the calliper radius algorithm. This matching algorithm partly resolve the shortcoming of nearest neighbour matching; that NN can lead to poor matches if there is a large difference in propensity scores between a treated individual and their closest non-treated neighbour, by pre-setting a tolerable maximum propensity score distance (see Caliendo & Kopeinig, 2008; Khander et al., 2010; Ataguba & Goudge, 2012). Radius matching compares the propensity score for a treated individual to that of all non-treated neighbours whose propensity scores lie within the tolerable calliper range (Dehejia & Wahba, 2002; Caliendo & Kopeinig, 2008). For the radius, we use the product of the propensity scores' mean and its standard deviation. This method trades off reduced variance from using more information with increased bias from possibility of poorer matches (Caliendo & Kopeinig, 2008). After matching the treated to their non-treated counterparts, we compute the ATT on our outcomes of interest, i.e. health care utilisation. We further distinguish between those who have access to medical aid by their chronic condition status. This enables us to assess if the estimated treatment effect of having medical aid access is sensitive to health status.

Three criteria are employed to assess the quality of matching. First, two-sample t-tests are employed to determine if each individual covariate differs statistically significantly between the treatment and control groups pre- and post-matching. Balance requires that there are no statistically significant post-matching differences. Secondly, a likelihood ratio (LR) test is used to determine if the set of covariates still explain any difference in the new treatment-control assignment as opposed to the original treated-untreated assignment. The matching estimator meets the quality criterion when the post-matching pseudo-R^2 is very low and the LR-test returns a statistically insignificant value, as opposed to a meaningful pseudo-R^2 and significant LR-test reported before matching. The third yardstick is mean standardized bias (SB), i.e. the difference in the sample means in the sub-samples of treated and matched subjects as a percentage of the square root of the average sample variances in the two groups, which generally should fall in or below the 3-5 percent range (Caliendo & Kopeinig 2008). We use Stata's *psmatch2* routine to implement our propensity score matching analysis (Leuven & Sianesi, 2018).

4. Results

Table 1 illustrates that the cumulative prevalence of multiple chronic conditions in the cohort increased more than four-fold over the approximate ten-year period. Table 2 shows the strong age-related gradient to the cumulative prevalence of multiple chronic conditions in the cohort. Within each age group, the cumulative prevalence of multiple chronic conditions is markedly and significantly greater among females compared to males. Hypertension (high blood pressure) is by far the most prevalent condition among those with multiple chronic conditions, followed by diabetes, tuberculosis, heart disease and asthma (Table 3).

Table 4 shows that thirty percent of the cohort had visited a healthcare provider in the past month. Overall healthcare utilisation is significantly higher among those with access to health insurance. There is a stark sectoral divide in utilisation. Those with health insurance almost exclusively use private healthcare services (93.6%), mainly general practitioners (83.4%), while approximately three quarters of those without health insurance use public healthcare services (mainly clinics – 63.0%).

According to Table 5a, overall healthcare utilisation is substantially higher in adults with multiple chronic conditions, especially for public sector healthcare. Of those with multiple chronic conditions, three quarters use the public healthcare sector, in particular public clinics, while approximately one in five use a general practitioner in the private sector (Table 5b).

The propensity score matching analysis passed all three tests for the quality of matching. In regards to overall healthcare utilisation and multiple chronic conditions, the average treatment effect on the treated is positive and highly significant, both in statistical and economic terms (Table 6). Overall utilisation is 22.5 percentage points higher among those with multiple chronic conditions. This substantial treatment effect is predominantly confined to the public sector (20.8 percentage points), particularly public clinics, the use of which increased by 16.1 percentage points. At 1.7 percentage points, the increase in the utilisation of private sector healthcare, although statistically significant, is marginal in economic terms. This marginal impact is only statistically significant for private clinics (0.8 percentage points).

In net terms, access to health insurance has a positive and statistically significant effect on overall healthcare utilisation, with utilisation increasing by 11.4 percentage points (Table 7a). This net effect, although positive, is not statistically significant for those with multiple chronic conditions, only for those with no chronic condition or a single chronic condition. Most interesting, however, is the opposite signs on the treatment effects for public and private

healthcare. Being treated with health insurance see public sector use decline, while private sector use increase. Table 7b shows that the decline is particularly pronounced for public clinics, but is also statistically significant for public hospitals. In turn, the increase is particularly pronounced for general practitioners, but is also statistically significant for private hospitals. These negative public sector treatment effects and positive private sector treatment effects are more pronounced among those with multiple chronic conditions, although not by a statistically significant margin.

5. Discussion

Under the current healthcare financing system, increases in the incidence of multiple chronic conditions will see a substantial increase in healthcare utilisation, especially in public sector clinics and hospitals. While primary prevention through public health programmes should remain the frontline response, it is also necessary to consider the potential role of fixed-dose combination medication, telemedicine and healthcare models and systems that facilitate multi-condition diseases management (Hajat & Stein, 2018). Particularly relevant for South Africa, given its limited resource setting, may be the consideration of the implementation of community-based chronic disease self-management programmes (CDSMP) (Ahn et al., 2013) as part of its initiative to re-engineer primary healthcare. These increasing burdens of chronic care in the public healthcare sector are bound to also raise concerns regarding quality of care, specifically further increases waiting times, which is a real likelihood given the country's shortages of healthcare professionals.

The findings presented here propose that there are two main effects of an expansion in health insurance coverage on healthcare utilisation. On the one hand, utilisation stands to shift from the public to the private healthcare sector. On the other hand, overall healthcare utilisation stands to increase. For those with multiple chronic conditions, however, the former effects are offsetting, with no significant increase in overall healthcare utilisation. Propensity score matching studies have also documented positive impacts of health insurance on healthcare utilisation generally (Erlangga et al., 2019; Gnawali et al., 2009; Jean & Kwon, 2013; Kim et al., 2015; Van der Wielen et al., 2018) and on maternal health services specifically (Bonfrer et al., 2016; Gouda et al., 2016; Wang et al., 2017). Ataguba and Goudge (2012), in the only other South African study adopting a matching approach, also found insurance coverage to

significantly increase visits to private facilities, but report insurance coverage to not significantly affect visits to public facilities or to any public or private facility.

Increases in healthcare utilisation resulting from expanded health insurance coverage are attributed to the problems of adverse selection and moral hazard. The universal nature of the proposed national health insurance scheme stands to enhance risk pooling and thus address concerns of adverse selection. The use of coinsurance, co-payments and deductibles to address ex-post moral hazard may however defeat the overarching goal of universal health coverage, which leaves monitoring, managed care and gatekeeping as policy response. Even gatekeeping, however, may prevent access to needed healthcare (Bhattacharya et al., 2014). Yet, ex-post moral hazard may have benefits. Insurance coverage may encourage the consumption of extra preventive care (Jerant et al., 2013), while health insurance also has a beneficial income effect (Bhattacharya et al., 2014; Nyman, 1999; Nyman et al., 2018; Pauly, 1968). Combined with incentives for primary preventive care, beneficial ex-post moral hazard may in the longer term work towards addressing the epidemic of multiple chronic conditions.

The implementation of national health insurance may however also have other unintended consequences that negatively affect the private healthcare sector's ability to respond to the possible shift in utilisation. Chief amongst these is the proposed capitation-based provider payment system for general practitioners, which may result in the emigration of doctors and the closure of unprofitable practices. The resultant supply-side constraint may impact negatively on quality of healthcare services, especially waiting times.

This study has various shortcomings. First, information on the intensity of healthcare utilisation, such as visits per annum, and on out-of-pocket payments would allow a more nuanced view of the potential impact of an expansion in health insurance on the health system. Second, the reliance on self-report for the diagnosis of chronic conditions may introduce measurement error in the prevalence of multiple chronic conditions, resulting in an underestimation of the extent of this health challenge. Third, private insurance policies are not completely equivalent to the package of benefits to be provided under national health insurance. A less comprehensive set of benefits may have a lesser or different effect on patterns of healthcare utilisation. Finally, it is important to point out that PSM relies on the CIA assumption for a causal interpretation of the results. As is widely known, this assumption is generally difficult to satisfy due to the presence of unobserved characteristics. Consequently, our analysis does not have a strict causal interpretation but do nevertheless provide important

insights into the link between health care utilisation patterns and having multiple chronic conditions or medical aid access.

There are various avenues for further analysis. The availability of panel data allows the application of econometric approaches combining propensity score matching with difference-in-difference techniques. Such PSMDD approaches allow the researcher to address selection bias attributed to both observables and to un-observables (Cheng et al., 2015; Erlangga et al., 2019). The fact that the effects of health insurance are not always equally distributed across the population (Gnawali et al., 2009; Gouda et al., 2016; Van der Wielen et al., 2018), calls for further sub-group analysis by parameters such as sex, income and urban-rural residence to explore potential heterogeneity in treatment effects.

6. Conclusion

As things stand, the increasing burden of multiple chronic conditions on healthcare services will fall on the under-resourced public healthcare sector in South Africa, with likely negative consequences for quality of care. Under the new national health insurance system, which will extend health insurance coverage to the larger population, this burden is likely to shift to the better resourced, but smaller private healthcare sector, which may also impact negatively on access and quality of care. Under both scenarios, it is necessary that the South African health system continue to be re-engineered to address the challenges posed by the epidemic of multiple chronic conditions.

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Table 1: Cumulative prevalence of multiple chronic conditions, by year

	None	1	2	3+	Multiple
2008	78.45	16.58	4.13	0.85	4.97
2017	50.34	27.48	14.25	7.93	22.17

Note: Weighted. Sample (n=9,915)

Table 2: Cumulative prevalence of multiple chronic conditions, by age and sex

Age (years)	Male	Female	Total
15-29	3.73 (0.60)	5.36 (0.66)	4.57 (0.45)
30-39	8.50 (0.95)	15.62 (0.98)	12.52 (0.70)
40-49	14.98 (1.51)	25.38 (1.26)	21.40 (0.98)
50-59	29.26 (2.01)	40.14 (1.52)	35.72 (2.21)
60-69	40.91 (2.67)	48.43 (1.80)	45.63 (1.49)
70+	39.88 (3.38)	53.51 (2.16)	48.85 (1.83)
Total	16.14 (0.62)	25.90 (0.56)	23.12 (0.48)

Note: Wave 5 (2017). Weighted. Standard errors in parentheses.

Table 3: Cumulative prevalence of multiple chronic conditions, by condition

Condition	1	2	3+	Multiple
Hypertension	41.21 (0.86)	69.02 (1.22)	84.41 (1.54)	73.43 (0.99)
Diabetes	5.24 (0.39)	30.85 (1.21)	49.03 (2.13)	36.06 (1.07)
Tuberculosis	12.75 (0.58)	25.11 (1.14)	36.02 (2.04)	28.24 (1.01)
Heart disease	6.12 (0.41)	17.41 (1.00)	46.52 (2.12)	25.76 (0.98)
Asthma	10.09 (0.52)	15.05 (0.94)	34.90 (2.03)	20.74 (0.91)
HIV	4.54 (0.36)	13.18 (0.89)	18.65 (1.66)	14.75 (0.79)
Stroke	1.11 (0.18)	4.78 (0.56)	18.73 (1.66)	8.78 (0.63)
Cancer	2.50 (0.27)	5.00 (0.57)	13.46 (1.45)	7.43 (0.58)
Epilepsy	1.32 (0.20)	2.71 (0.42)	10.31 (1.29)	4.89 (0.48)
Psychiatric	2.26 (0.26)	4.06 (0.52)	4.86 (0.91)	4.29 (0.45)
Alzheimer's	0.45 (0.11)	0.87 (0.24)	0.26 (0.21)	0.69 (0.18)
Emphysema	0.17 (0.07)	0.25 (0.13)	0.56 (0.31)	0.34 (0.13)

Note: Wave 5 (2017). Weighted. Standard errors in parentheses.

Table 4: Health care utilisation, by medical insurance

	A. Utilisation rate				B. Composition	
	No medical insurance	**Medical insurance**	**Total**	**F-test (p-value)**	**No medical insurance**	**Medical insurance**
Overall:	29.43 (0.49)	32.77 (1.53)	30.02 (0.47)	7.26 (p=0.007)		
Public sector:	22.64 (0.45)	1.87 (0.44)	18.98 (0.40)	399.20 (p<0.001)	76.93 (0.79)	5.71 (1.22)
Public clinic	18.54 (0.42)	1.38 (0.38)	15.52 (0.37)	316.90 (p<0.001)	63.00 (0.90)	4.21 (1.05)
Public hospital	4.10 (0.21)	0.48 (0.22)	3.46 (0.18)	53.56 (p<0.001)	13.93 (0.64)	1.49 (0.63)
Private:	6.13 (0.26)	30.70 (1.51)	10.45 (0.31)	970.68 (p<0.001)	20.83 (0.76)	93.68 (1.28)
General practitioner	5.05 (0.23)	27.34 (1.46)	8.97 (0.29)	909.23 (p<0.001)	17.18 (0.70)	83.42 (1.96)
Private hospital	0.43 (0.07)	2.29 (0.49)	0.76 (0.08)	63.23 (p=0.063)	1.47 (0.22)	7.01 (1.34)
Private clinic	0.64 (0.08)	1.06 (0.33)	0.71 (0.08)	3.44 (p=0.118)	2.18 (0.27)	3.25 (0.93)

Notes: Wave 5 (2017). Standard errors in parentheses.

Table 5a: Health care utilisation, by multiple chronic conditions

	Multiple chronic conditions			
	No condition	**One condition**	**Multiple conditions**	**F-test (p-value)**
Overall:	18.95 (0.58)	36.22 (0.86)	52.52 (1.16)	398.68 (p<0.001)
Public sector:	9.35 (0.43)	23.62 (0.76)	39.91 (1.14)	439.76 (p<0.001)
Public clinic	7.25 (0.38)	19.53 (0.71)	33.43 (1.10)	374.43 (p<0.001)
Public hospital	2.10 (0.21)	4.09 (0.35)	6.47 (0.57)	37.91 (p<0.001)
Private:	9.29 (0.43)	11.42 (0.57)	12.26 (0.76)	7.83 (p<0.001)
General practitioner	8.15 (0.40)	9.74 (0.53)	10.12 (0.70)	4.37 (p=0.012)
Private hospital	0.76 (0.13)	1.01 (0.17)	0.30 (0.12)	3.40 (p=0.033)
Private clinic	0.37 (0.09)	0.67 (0.14)	1.82 (0.31)	18.39 (p<0.001)

Notes: Wave 5 (2017). Utilisation rate. Standard errors in parentheses.

Table 5b: Health care utilisation, by multiple chronic conditions

	Multiple chronic conditions		
	No condition	**One condition**	**Multiple conditions**
Public sector:	49.34 (1.71)	65.22 (1.33)	75.98 (1.29)
Public clinic	38.25 (1.67)	53.93 (1.39)	63.65 (1.45)
Public hospital	11.08 (1.07)	11.29 (0.88)	12.32 (0.99)
Private:	49.05 (1.71)	31.53 (1.30)	23.35 (1.28)
General practitioner	43.03 (1.70)	26.88 (1.24)	19.28 (1.19)
Private hospital	4.04 (0.67)	2.79 (0.46)	0.58 (0.23)
Private clinic	1.97 (0.47)	1.85 (0.37)	3.47 (0.55)

Notes: Wave 5 (2017). Composition. Standard errors in parentheses.

Table 6: Impact of multiple chronic conditions on health care utilisation

	No multiple chronic conditions	**Multiple chronic conditions**	**ATT**	**(SE)**	**t-statistic**
Overall:	36.93	59.48	+22.55	(1.39)	16.22
Public sector:	28.14	49.01	+20.86	(1.35)	15.35
Public clinic	24.94	41.11	+16.17	(1.32)	12.20
Public hospital	3.20	7.89	+4.69	(0.68)	6.81
Private:	8.06	9.81	+1.74	(0.84)	2.07
General practitioner	6.89	7.73	+0.83	(0.76)	1.09
Private hospital	0.51	0.54	+0.03	(0.21)	0.16
Private clinic	0.65	1.53	+0.87	(0.31)	2.80

Note: Wave 5 (2017). Propensity score matching (PSM) with radius caliper matching algorithm.

Table 7a: Impact of medical insurance on health care utilisation, by multiple chronic conditions

	No medical insurance	**Medical insurance**	**ATT**	**(SE)**	**t-statistic**
Overall:					
No condition	18.14	32.13	+13.99	(2.75)	5.08
One condition	31.92	42.15	+10.23	(4.12)	2.48
Multiple conditions	42.91	49.35	+6.43	(6.17)	1.04
Total	27.31	38.73	+11.42	(2.19)	5.20
Public sector:					
No condition	6.21	0.89	-5.31	(1.47)	3.61
One condition	18.28	4.57	-13.70	(3.12)	4.38
Multiple conditions	27.58	7.05	-20.53	(5.22)	3.93
Total	14.94	3.28	-11.66	(1.52)	7.66
Private:					
No condition	10.68	31.01	+20.32	(2.38)	8.52
One condition	13.27	37.58	+24.30	(3.15)	7.70
Multiple conditions	11.78	41.66	+29.88	(4.67)	6.39
Total	11.31	35.22	+23.91	(1.74)	13.73

Note: Wave 5 (2017). Propensity score matching (PSM) with radius caliper matching algorithm.

Table 7b: Impact of medical insurance on health care utilisation, by multiple chronic conditions

	No medical insurance	**Medical insurance**	**ATT**	**(SE)**	**t-statistic**
Public clinic:					
No condition	5.09	0.44	-4.64	(1.34)	3.46
One condition	16.02	3.59	-12.42	(2.98)	4.16
Multiple conditions	21.13	3.83	-17.29	(5.02)	3.44
Total	11.95	2.18	-9.76	(1.42)	6.87
Public hospital:					
No condition	1.11	0.44	-0.66	(0.65)	1.02
One condition	2.25	0.98	-1.27	(1.33)	0.96
Multiple conditions	6.44	3.22	-3.24	(2.97)	1.09
Total	2.99	1.09	-1.89		
General practitioner:					
No condition	9.90	29.21	+19.30	(2.33)	8.28
One condition	11.85	33.98	+22.13	(3.03)	7.29
Multiple conditions	10.51	37.17	+26.66	(4.42)	6.02
Total	10.41	32.38	+21.96	(1.68)	13.03
Private hospital:					
No condition	0.21	1.34	+1.12	(0.58)	1.92
One condition	1.01	2.94	+1.92	(1.05)	1.83
Multiple conditions	0.05	1.28	+1.22	(1.08)	1.13
Total	0.40	1.96	+1.56	(0.49)	3.15
Private clinic:					
No condition	0.55	0.44	-0.10	(0.40)	0.27
One condition	0.40	0.65	+0.24	(0.70)	0.35
Multiple conditions	1.20	3.20	+1.99	(1.86)	1.07
Total	0.49	0.87	+0.37	(0.40)	0.94

Note: Wave 5 (2017). Propensity score matching (PSM) with radius caliper matching algorithm.