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Abstract

We assess the impact of health insurance on the utilization of maternal health care services in Egypt. A propensity score matching is used to control for baseline differences in the characteristics of the insured and uninsured women, to determine the difference in health care utilization between the two groups that is attributed solely to the health insurance coverage. The results yield that the national health insurance has a strong positive impact on most of the maternal healthcare indicators. Public health insurance coverage increases the likelihood of receiving antenatal care by about 7%, delivering in a public health facility by 8%, and the likelihood that a newborn receive vitamin A dose after delivery by 8.2%. However, women who are less educated, from a poor household, and rural regions, are less likely to be covered by a health insurance. The findings of this study would guide intervention measures that aim at improving health care utilization especially among the poor and other vulnerable groups.

JEL Classification: I14, I15.

Keywords: Maternal Care Utilization, Health Insurance, Propensity score matching, Egypt.

ملخص

نقوم بتقييم أثر التأمين الصحي على استخدام خدمات الرعاية الصحية للأمهات في مصر. يتم استخدام مطابقة درجات الميل للسيطرة على الاختلافات الأساسية في خصائص المؤمن عليه وغير المؤمن عليه من النساء، لتحديد الفرق في استخدام الرعاية الصحية بين المجموعتين الذي يعزى فقط إلى تغطية التأمين الصحي. وتنتج النتائج أن التأمين الصحي الوطني له تأثير إيجابي قوي على معظم مؤشرات الرعاية الصحية للأمهات. وتزيد تغطية التأمين الصحي العام من احتمال تلقي الرعاية السابقة للولادة بحوالي 7 في المائة، وتسجل في مرفق صحي عام بنسبة 8 في المائة، واحتمال حصول المولود على جرعة من فيتامين أ بعد الولادة بنسبة 8.2 في المائة. ومع ذلك، فإن احتمال حصول النساء اللواتي يتلقين تعليما أقل من الأسر المعيشية الفقيرة والمناطق الريفية على تغطية صحية أقل. وستسترشد نتائج هذه الدراسة بتدابير التدخل التي تهدف إلى تحسين استخدام الرعاية الصحية وخاصة بين الفقراء وغيرهم من الفئات الضعيفة.

1. Introduction

A considerable fraction of women in Egypt report low levels of maternal health care utilization, with 17% of women have not received regular antenatal care (four visits or more to health care provider), and 13% did not receive any medical assistance during delivery (El-Zanaty & Way, 2015). Regular medical care during pregnancy, and at delivery, is life-saving and is crucial to both women and child health. In a recent study, Liu et al. (2015) examined the effect of regular antenatal care on the probability of post-partum maternal hospitalization during the first six months after birth in Taiwan. They find a strong negative impact of antenatal care on the probability of post-partum maternal hospitalization. Other studies suggested that regular access to maternal care help women to maintain a healthy weight after delivery, limits excessive hospitalization and postpartum smoking, and increases the likelihood of well-baby visits (Conway & Kutinova, 2006; Reichman et al., 2010).

Increasing access to maternal care is one of the main goals of the United Nations Millennium Development Goals (Goal number 5), and the new Sustainable Development Goals (Goal number 3). Paying for medical care is a major access barrier for receiving health care in Egypt (Rashad & Sharaf, 2015). The Government of Egypt has developed the Health Insurance Agency (HIA) with the objective of achieving equitable access to medical care and protecting households from encountering catastrophic health payments. The HIA covers 55% of the Egyptian population (Health insurance Agency Egypt, 2013), and the Egyptian Government aims to expand the insurance coverage to the entire population within the next ten years.

To date, little is known about the nationwide impact of health insurance coverage on maternal health care utilization in Egypt. Though few studies have assessed the effect of national health insurance in Egypt [see for e.g. (Elgazzar, 2009; Ellis et al., 1994)], none has examined its impact on maternal care utilization, and the current study aims to fill this gap in the literature. This research question is germane from a policy perspective given that a significant proportion of women do not receive the necessary medical care during pregnancy, and the Egyptian Government allocates around 6% of government expenditure to health (World Development Indicators, 2016) and it has been relying on public insurance to promote access to healthcare for decades.

Evaluating the causal impact of public health insurance on maternal health care utilization is challenging, and requires an adequate identification strategy to address the selection bias problem. Women with lower health status are more likely to seek for insurance coverage. Accordingly, standard regression methods will only capture the mere correlation between health insurance and maternal health care utilization and would yield biased estimates. To estimate the causal impact of public health insurance on maternal health care utilization, we implement a propensity score matching (PSM) analysis to reduce the potential bias resulting from the self-selection into the insurance. The PSM analysis limits the selection bias in health insurance by constructing an artificial comparison group, where individual are matched based on their propensity to become insured (Bonfrer et al., 2016; Gertler et al., 2011; Wang et al., 2016).

2. Data and Methodology

This paper uses data from the most recent round of the Demographic and Health Survey (DHS) for Egypt conducted in the year 2014. The DHS is an international survey conducted in many developing countries. The survey has data for a rich set of indicators in the areas of population, health, and nutrition. The DHS has a complex survey design that involves stratification based on the level of urbanization and clustering, where villages are the primary sampling unit for rural and districts/towns are the primary sampling unit for urban areas (El-Zanaty & Way, 2015). In this paper, we use a nationally representative sample of 9,960 women at reproductive age (between 15- 49). The DHS survey includes detailed information on women education,

women employment status, place of residences, age, the number of children, employment status, household assets, and insurance status and its type. The recent DHS surveys include wealth index as a measure of economic affluence and it is based on assets ownership estimated using principal component analysis by the DHS team.

Assessing the impact of health insurance could be subject to a sample selection problem, with the selectivity of women with poor health into health insurance. In addition, women with health insurance coverage are more likely to be from high-income groups, more educated, and are more likely to live in urban regions. These selection factors complicate the comparison of the insured and uninsured women and could cause bias unless they are carefully controlled for. To estimate the impact of health insurance on maternal health care utilization in Egypt, we conduct a PSM analysis. The merit of the PSM technique is that it reduces the bias due to confounding variables when estimating the treatment effect by simply comparing outcomes between the treatment and control groups. Formally, the propensity score (PS) could be defined as in Equation (1).

$$PS_i = Prob\ (E = 1|Z_i) \quad (1)$$

Where PS_i is the probability that a woman i is insured by the General Insurance Authority ($E = 1$), conditional on all the observed characteristics (Z) of the woman that can be utilized to balance potential confounders across the control group and consequently lowers any estimation bias. Probit regression model is utilized to estimate the PSs for each woman based on a number of fundamental characteristics such as woman's age, education level, economic status, employment status, number of children, and place of residence.

We examine the impact of public insurance on six key outcomes of maternal health care utilization. These include receiving regular antenatal care, delivery in a health facility, delivery in a public health facility, baby's postnatal check within two months after delivery, mother's check up after delivery, and a child's receipt of vitamin A dose within two months after delivery. We conduct a balancing test to ensure that the units in the treatment and comparison group have similar characteristics.

3. Results

Table 1 depicts the differences in selected background characteristics between the insured women and uninsured women. The insurance coverage was considerably higher for women with higher education than for less educated women. It is noticeably higher among women in the highest wealth quintile. In addition, Table 1 presents the results of the probit model which estimates the probability that a woman enrolls in the national health insurance based on observed characteristics. The results suggest that women's education level, place of residence (urban vs. rural), economic status, employment status, and age are important determinants of national health insurance enrollment in Egypt. The analysis yields that the balancing property between the treatment and comparison groups is satisfied, and consequently, the difference in outcomes could be attributed to the health insurance coverage.

After estimating the probability that each woman is enrolled in the insurance program, our sample now consists only of women in the enrolled and non-enrolled groups for which we found a match in the other group. Table 2 compares the average maternal health care outcomes for the insured women and their matched comparison in the control group. The results yield that the national health insurance has a strong positive impact on most of the pregnancy healthcare indicators. National health insurance coverage increases the likelihood of receiving antenatal care by about 7%, the likelihood of delivering in a public health facility by 8%, and the likelihood that a newborn receives vitamin A dose after delivery by 8.2%. Although the effect of the health insurance was in the expected direction, we find no statistically significant impact on postnatal care for either the mother or the child. The current analysis is not free from

limitations. One limitation is that the matching is based on observed characteristics. Therefore, we have to assume that there are no systematic differences in the unobserved characteristics between the insured and uninsured women, which might be considered a strong assumption.

4. Conclusion

Using the most recent round of the DHS, we investigated the impact of health insurance coverage on maternal health care utilization in Egypt. We contribute to the existing literature by applying a PSM technique, which limits the potential selection bias found in earlier studies. The analyses show that having health insurance increases maternal care utilization. Without the health insurance, 7% of mothers would not have received the recommended four or more antenatal care visits during pregnancy, and 4% of pregnancies would not take place in a health facility. Our results are in line with the findings of several related studies such as Ellis et al. (1994) and Elgazzar (2009). The findings of this study support the proposed reforms in Egypt that call for governmental expansion of the insurance coverage to increase the access to health care and improves population health.

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Figure 1: Propensity Score Graph

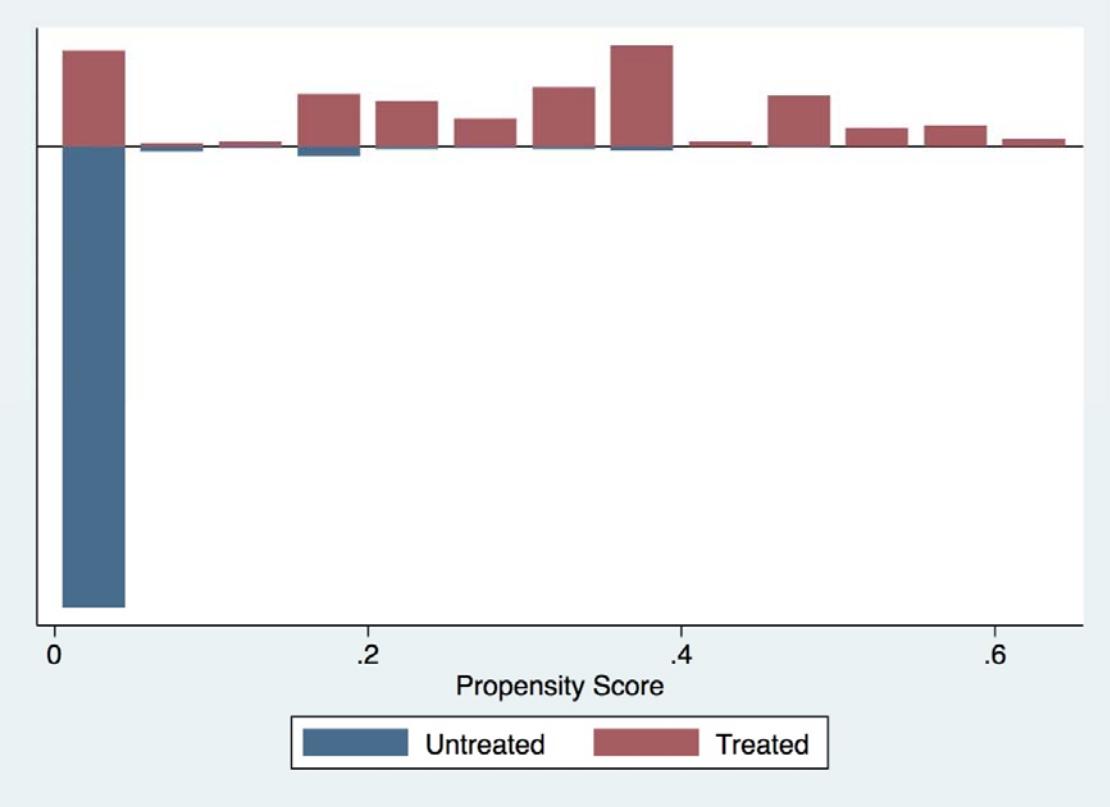

Table 1: Descriptive Statistics by Insurance Status

	Uninsured		Nationally Insured		Probit Model
Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Coefficients**
Outcomes					
Received antenatal care regularly (4 time or more)	.8266148	.3785979	.9339934	.2487044	
Deliver in public health facility	.2652945	.4415108	.3168317	.4660108	
Deliver in any health facility	.8760315	.3295613	.9471947	.2240145	
Baby postnatal check within 2 months	.3372325	.4727875	.4686469	.4998415	
Baby received vitamin A dose after delivery	.288934	.4532891	.3898305	.4885404	
mother checked up after delivery	.8231835	.3815315	.9108911	.2853722	
Control Variables					
Mother's education					
primary	.0917196	.2886434	.029703	.1700475	1.13*
secondary	.5968889	.490546	.4026403	.4912408	1.55*
higher	.1294698	.3357351	.5643564	.4966612	2.03*
Place of residence					
rural	.6046666	.4889454	.4686469	.4998415	0.026*
Wealth Quintile					
poorer	.1937779	.3952756	.0924092	.2900819	0.13
middle	.2092384	.4067842	.1617162	.3687993	0.13
richer	.208195	.4060363	.310231	.4633533	0.43*
richest	.1970028	.3977533	.3762376	.4852422	0.53*
Number of children at 5 or younger	1.517.974	.8479748	1.438.944	.6526067	.017
Is Mother employed?					
yes	.0738312	.2615085	.8052805	.3966397	1.74*
Mother's age					
20-35	.8205749	.3837272	.762069	.4265528	0 .05
35+	.118709	.3234621	.2275862	.4199988	0.53*

*: significant at 5%

Table 2: National Insurance Impact using PSM

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Received antenatal care regularly (4 time or more)	Unmatched	.93639576	.825875788	.110519972	.022680448	4.87
	ATT	.93639576	.866906803	.069488956	.021895264	3.7
Deliver in a public facility	Unmatched	.32155477	.264958148	.056596622	.026662108	2.12
	ATT	.32155477	.242320755	.079234015	.033716955	2.35
Deliver in any health facility	Unmatched	.950530035	.874237884	.076292152	.019835322	3.85
	ATT	.950530035	.913267494	.037262541	.019282125	1.93
Baby postnatal check within 2 months	Unmatched	.459363958	.33285109	.126512867	.028469198	4.44
	ATT	.459363958	.428335214	.031028744	.035983626	0.86
Baby received vitamin A dose after delivery	Unmatched	.381625442	.288622507	.093002935	.027387001	3.40
	ATT	.381625442	.298636555	.082988886	.034925109	2.38
Mother checked up after delivery	Unmatched	.908127208	.821638938	.086488271	.022947032	3.77
	ATT	.908127208	.866270644	.041856564	.023857426	1.75