The complex association of health insurance and maternal health services in the context of a premium exemption for pregnant women: a case study in Northern Ghana

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Accepted 11 October 2013

Background Health insurance premium exemptions for pregnant women are a strategy to increase coverage of maternal health services in sub-Saharan countries. We examine health insurance registration among pregnant women before or after the introduction of a premium exemption, and test whether registration increases utilization of maternal health services.

Methods Data were drawn from a retrospective cohort study of 1641 women having given birth between January 2008 and August 2010 in two impoverished districts of Northern Ghana. Among those, 1411 became pregnant after premium exemption was adopted in July 2008. We compared registration rates before and after the exemption. We used logistic regressions to measure the association between insurance registration and receipt of essential maternal health interventions in the context of the premium exemption. We tested whether this association varied across levels of the health system [e.g. hospitals and health centres (HCs) vs community health compounds (CHCs)].

Results Health insurance registration increased significantly among pregnant women after adoption of the premium exemption. Coverage of clinical and diagnostic services was high, but antenatal care (ANC) clients received only partial counselling about safe motherhood (e.g. pregnancy-related danger signs). Three out of four clients who sought ANC in hospitals and HCs delivered at a health facility vs. slightly more than 50% among clients of CHC. In hospitals and HCs, National Health Insurance Scheme (NHIS) registration was associated with higher quality of services. In CHCs, NHIS registrants received fewer diagnostic tests, were less extensively counselled about safe motherhood and were less likely to be vaccinated against tetanus toxoid than non-registered clients. Among CHCs clients, being a NHIS registrant was however associated with an increased likelihood of delivering at a health facility.

Conclusions In the context of premium exemptions, association of health insurance with use of maternal health services, and quality of services received, depends on place where pregnant women seek ANC.
Health insurance premium exemption policies may have unintended implications for health systems.

Complex effects on the quality of antenatal care (ANC) services accompanied increases in health insurance registration after the introduction of the exemption policy in Ghana. In hospital and health centers, National Health Insurance Scheme (NHIS) registrants received better quality ANC services. In community health centers, registrants were more likely to experience lower quality of ANC services.

Insured clients, even those who sought ANC at community health centers were more likely to deliver at a health facility than uninsured clients.

Future research on the rollout of insurance programmes should investigate how such initiatives impact the functioning of health facilities, as well as the delivery of health services at different levels of the health system.

Introduction

Improving maternal health is one of the millennium development goals (MDGs) for which progress has been the slowest (Paxton and Wardlaw 2011; Hogan et al. 2010). In sub-Saharan Africa (SSA), the proportion of women attending at least four antenatal consultations has remained constant (~45%) between 1990 and 2009 (United Nations 2011). User fees, i.e. cash payments required to access services at health facilities, are perceived as a key barrier to improving maternal health care. Such fees may limit the use of health services (Borghi et al. 2006; Lagarde and Palmer 2008, 2011; Palmer et al. 2004; Ansah et al. 2009; Parkhurst et al. 2006), particularly for the poorest households (Nabyonga et al. 2005; Xu et al. 2006) who often have to sell assets and/or borrow money to cover health expenses (Kruk et al. 2008, 2009). Multiple calls to ‘abolish user fees’ (Ridde and Haddad 2009; Yates 2009) have repeatedly been voiced and several countries now provide all health services for free to their population (e.g. Uganda, Liberia), while others provide free delivery services (e.g. Senegal, Burundi, Kenya and Niger).

Removing user fees also raises concerns however, because it may not be sustainable. After removing user fees, health financing generally relies on donors or on debt relief schemes. Consequently, if such sources of funding cease, free delivery or services initiatives may be discontinued (Witter and Adjei 2007). Health insurance is another approach to health financing, which possibly enables the removal of user fees at the point of care (Arhin 1995). In high-income countries, insurance contributions are often collected through payroll deductions, but this mechanism is often ineffective in low-income countries because a large proportion of the population is not formally employed. Instead, such contributions are increasingly raised through community-based health insurance (CBHI). CBHI are not-for-profit insurance schemes, in which ‘members of a community […] pool resources to share the financial risk of ill health’ (Robyn et al. 2013, p. 112). Individuals, irrespective of their employment status, can voluntarily enrol in a CBHI scheme. They are then asked to contribute a fee (premium) at periodic intervals (e.g. yearly) into the scheme. The premium is generally set at a low level in order to maximize enrolment. In return, enrolled CBHI members can access a pre-defined list of services free of charge at health facilities participating in the CBHI scheme. CBHI schemes have been put in place in a number of sub-Saharan countries (Twahirwa 2008, Dong et al. 2004). A recent systematic review of studies on the effects of health insurance indicated that CBHI schemes were a viable alternative to user fees and improved service utilization in Asia and Africa (Spaan et al. 2012).

Even low premiums, however, still constitute a barrier to CBHI enrolment among the poorest households (Onwujekwe et al. 2009; Jehu-Appiah et al. 2010; Atim 1999) and population groups most in need of health services. In particular, the effects of CBHI on maternal health may be limited if pregnant women do not register in CBHI schemes. One way to alleviate this concern is to make the premium more affordable for pregnant women, either through subsidies or premium exemptions (Meng et al. 2011). Such strategies would allow extending CBHI benefits to pregnant women, which could result in savings if these benefits help reduce the incidence of catastrophic obstetric events, adverse birth outcomes and/or subsequent childhood illnesses. In the medium term, they may also be a way to increase future contributions to the CBHI scheme if exempted pregnant women later become paying contributors after the end of their pregnancy.

On the other hand, premium exemptions for pregnant women also raise issues. First, increasing the number of exempt members may jeopardize the financial viability of a CBHI scheme (Agyepong et al. 2011; Ankrah Odame et al. 2013). Following exemptions, CBHI expenditures are increasingly likely to outpace revenues, particularly if CBHI schemes derive a large portion of their revenues from premiums and/or exempted groups experience a high burden of disease. Exemptions may also threaten the willingness to pay for CBHI among non-exempt individuals. This issue has been investigated in Ghana, South Africa and Tanzania (Goudge et al. 2012), with only very limited evidence of support for a system in which one population group (e.g. the poorest) is completely

Keywords Health insurance, user fees, premium exemption, maternal health, health systems, health facilities, Ghana

KEY MESSAGES

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exempt of CBHI contributions. Non-exempt members’ willingness-to-pay for exemptions may be further affected if exemptions lead to moral hazard, i.e. increased risk-taking among exempt members (see Yilma et al. 2012 for an example of moral hazard after CBHI registration in Ghana).

Second, health-care providers may have few incentives to promote health insurance registration among their clients if, for example, they cannot absorb the increased demand for health services that would result from the exemption programme (Robyn et al. 2013). As a result, some clients may not become aware of the existence of the exemption or may be denied opportunities to register with the CBHI scheme. Premium exemptions may also generate managerial complexity at health facilities if reimbursement for care provided under the CBHI scheme is partial or delayed, if it leads to significant administrative costs or if it increases the amount of time health workers spend on reporting and paperwork (Frimpong et al. 2011). In such contexts, health providers may occasionally revert to user fees (Agyepong and Nagai 2010; Kruk et al. 2008) or may discriminate against insured clients and preferentially provide care to clients paying in cash (Arhin 1994).

In this article, we do not investigate whether the adoption of a premium exemption for pregnant women reduces the capacity of a CBHI scheme to mobilize financial resources. Instead, we test (1) whether a premium exemption leads to increased CBHI enrolment among pregnant women and (2) whether insured pregnant women receive fewer (and possibly lower-quality) maternal health services than uninsured women (i.e. women who pay for services at the point of care).

We do so using data on a retrospective cohort of women who gave birth in two impoverished districts of Ghana’s upper East region between 2008 and 2010. During that time, the Government of Ghana adopted a premium exemption for pregnant women under the National Health Insurance Scheme (NHIS, July 2008). Previous studies of the impact of health insurance on the utilization of maternal health services in Ghana (Mensah et al. 2010) and elsewhere (e.g. Lu et al. 2012) were not conducted in the context of premium exemptions for pregnant women. They thus did not include the potentially detrimental effects described above. They also did not consider that the effects of health insurance on service utilization and the quality of services received might vary across levels of the health system (e.g. referral facilities vs community-based health-care facilities). For example, because of smaller budgets and tighter cash-flow constraints, delays in reimbursement may be more difficult to manage at lower levels of the health system. In such primary health-care facilities, providers may thus not alert their clients to the existence of a premium exemption and/or may have to offer a more limited range, or subpar quality, of services to beneficiaries of the premium exemption.

We measure change in health insurance registration among pregnant women before and after the premium exemption. Among women who became pregnant after the premium exemption was adopted, we then measure the quality of services received and the coverage of essential maternal health interventions by insurance status. Finally, we test whether the association of insurance registration with quality of care and use of maternal health services varies across different levels of the health system.

**Methods**

**Study context**

**Health insurance in Ghana**

The Ghana National Health Insurance Scheme (NHIS) was established in 2003, with a goal of ensuring equitable access to health-care services for all Ghanaians (Witter and Garshong 2009). Prior to the NHIS, health-care users were charged fees following a ‘cash and carry’ system, believed to severely restrict access to health care for the poorest (Nyonator and Kutzin 1999). The NHIS is regulated by the National Health Insurance Authority (NHIA) and is managed in decentralized District Mutual Health Insurance Schemes (DMHIS). The package of services covered is defined by the NHIA and aims to address 95% of the disease burden in Ghana. Every DMHIS identifies health providers (public, private and religious) for NHIS accreditation to deliver services to NHIS members. NHIS members are able to access the services at accredited providers without co-payments.

The NHIS is financed by a value-added tax on goods and services and annual premiums paid by users (McIntyre et al. 2008; Akazili et al. 2011). Workers in the formal sector are exempted from premium payments, but a fraction (2.5%) of their contribution to the social security and national insurance trust (SSNIT) is automatically transferred to the NHIS at the central level. They must also pay a one-time registration fee to the DMHIS prior to accessing benefits. Members who work in the informal sector pay premiums that vary from district to district and according to their income. The tax on goods and services (2.5%) is by far the largest source of NHIS revenue (~70%), followed by SSNIT contributions (~23%). Individual premium payments account for only about 5% of NHIS revenue (NHIA 2011).

In the NHIS, medicines are reimbursed by itemized fee for service. Providers, on the other hand, are reimbursed for services on the basis of the Ghana diagnosis-related groups (G-DRG). An expert committee of clinicians and administrators established the G-DRGs in April 2008. The tariffs associated with G-DRGs vary by the level of health facilities. For example, for the same procedure, low-level facilities without a doctor [e.g. community health compounds (CHCs), see below] receive lower tariffs than referral hospitals with specialist doctors (NHIA 2008). Claims are occasionally rejected by the DMHIS managers because of overcharging by health providers for a particular G-DRG or because of client ineligibility (Sodzi-Tettey et al. 2012). Providers must submit claims for services within 60 days, and scheme managers must reimburse these claims within 28 days, but delays in reimbursing provider claims are common. In recent external reviews of the health sector, it was estimated that providers were, on average, owed the equivalent of the amount they would have generated by applying user fees for 3–4 months (Witter and Garshong 2009). In two districts of the Upper East region of Ghana (where this study was conducted), only 28–45% of claims were submitted and reimbursed on time (Sodzi-Tettey et al. 2012). Delays are problematic because funds accrued from reimbursements form part of the internally generated funds (IGF) of health facilities, which are used by the service providers to supplement government budgetary allocation. IGF is increasingly becoming a significant funding source for most service providers.
There are several population groups exempt from paying premiums under the NHIS (see National Health Insurance Act 852, 2012). These include children under age 18, adults over age 70 and the poor (Jehu-Appiah et al. 2010, 2011), as well as SSNIT contributors who are retired. Since July 2008, pregnant women are also exempt from premiums under the NHIS (Ankrah Odame et al. 2013). Under this exemption, if a pregnant woman is not already insured with the NHIS, she is entitled to be insured for free for 1 year. Potential beneficiaries of the exemption can register at the office of the DHMIS. More frequently, however, their health provider registers them in the NHIS when they visit health facilities for antenatal care (ANC).

The Kassena-Nankana districts
The study is part of the baseline assessment of the Mobile Technology for Community Health (MoTeCH) project, an initiative whose main aim was to develop a mobile health (mHealth) system—the use of mobile phone applications as a platform for improving the use of maternal and newborn health services (MacLeod et al. 2012). It was carried out in the Kassena-Nankana (KN) districts (East and West) of the Upper East region of Ghana. The KN districts are characterized by a rural population with high (but declining) mortality (Binka et al. 2007; Phillips et al. 2006) and widespread poverty. The estimated population of the combined KN districts in 2008 was 179,669. Health services in KN, as in the rest of Ghana, are organized along a three-tier referral system: hospitals, health centres (HCs) and CHCs. CHCs are part of the Community Health and Planning services (CHPS) initiative (Awoonor-Williams et al. 2004; Nyonator et al. 2005). CHPS was started in 1999 by the Government of Ghana to increase access to primary health care across the country. CHPS relocates midwives and community health nurses from hospitals and HCs to CHCs located in underserved rural communities. In each CHC, basic preventive and curative services are provided (Awoonor-Williams et al. 2004; Nyonator et al. 2005).

Data sources
The data for this study come from a survey conducted between June and August 2010 among a random sample of 1641 women who had given birth in KN districts since 2008. The sampling frame for the survey was obtained from the Navrongo Demographic Surveillance System, which maintains an up-to-date list of (1) all individuals residing in KN and (2) all the births occurring in these districts (Binka et al. 1999; Oduro et al. 2012).

Study variables
The survey collected information on the socio-demographic characteristics of respondents, their recent pregnancies, as well as their use of ANC services during their most recent pregnancy and the place of delivery.

Pregnancy interval
During the survey, each respondent was asked to report the date of their most recent delivery and estimate how long their most recent pregnancy lasted in months. We then calculated the likely date of conception as the date of delivery minus the estimated pregnancy duration (from the survey). Using these data, we classified women as having conceived or delivered before or after the NHIS premium exemption was adopted (i.e. July 2008). For example, if a woman gave birth in December 2008 and reported that her pregnancy lasted 8 months, she would be classified as having conceived before the premium exemption was adopted. In total, 208 (12.7%) and 1431 (87.2%) women were classified as having conceived before and after the exemption, respectively. Two women could not be classified because of missing data on pregnancy duration (0.1%). Using data on dates of conception and delivery, we further classified respondents in three groups: women who conceived and delivered prior to the exemption, women who conceived prior to the exemption but delivered after the exemption (and thus possibly benefited from the exemption in the latter months of their pregnancy) and women who conceived after the exemption.

Health insurance status
Respondents were asked if they had ever registered with the NHIS and if so, when they first registered (including exact year and month of registration). Because there are often long delays between registration and receipt of the NHIS card, the date of registration was obtained from respondent recall and confirmed by data contained in the maternal health books. Month of registration was unknown for 18 respondents (1.1%) who reported having registered with the NHIS. One respondent reported having registered with the NHIS in 2001 (whereas the NHIS was only put in place in 2003) and was classified as having missing insurance data. We used data on dates of NHIS registration and dates of conception or delivery to construct two dummy variables: one variable taking value 1 if a woman had already registered with the NHIS before she became pregnant; one variable taking value 1 if a woman had registered with the NHIS before she gave birth.

Data on maternal health services
Measures of the utilization of ANC services included the number of ANC visits during the most recent pregnancy, the place where ANC was sought (hospital/HCs/CHCs), whether ANC was sought at multiple places (e.g. coded yes or no) and the timing of the first ANC visit (e.g. during the first trimester or later). Data on the quality of services received during ANC included an ascertainment of (1) counselling or health education and (2) diagnostic procedures received during ANC visits. Counselling was measured using seven survey items. Respondents were asked whether they received counselling about preparations for delivery, immediate initiation of breastfeeding after delivery, need for tetanus toxoid (TT) vaccination during pregnancy, danger signs during delivery, skilled birth attendance, family planning and emergency transport options for delivery. Diagnostic and clinical procedures elicited included whether the respondent was weighed, measured, whether she had her blood pressure measured, whether she received a urine test, a blood test, whether her stomach was measured, and whether a health worker listened to her foetus’ heart rate during ANC. Counselling or health education procedures were measured solely by respondent recall. Diagnostic and clinical procedures were measured both by respondent recall and...
review of the maternal health books when those were available at the time of the interview. Using these data, we constructed two summary measures taking value 1 if a respondent reported having been counselled on all topics or received all components of clinical care and 0 if she had been counselled only on some or none of these topics or had received only some or none of the clinical care components.

Respondents were also asked how many times and when they had been vaccinated against TT prior to their most recent pregnancy, and how many TT injections they had received during the most recent pregnancy. We used these data to create a categorical variable taking value 1 if the respondent was protected against TT during her most pregnancy and 0 otherwise. In addition, respondents were asked if they had received any drugs against worm infestations during their most recent pregnancy. Finally, respondents were asked about the context of their delivery. They were first asked whether they had delivered at home or at a health facility. If they had delivered at a health facility, they were then asked to name the place where the delivery happened; the reported places were subsequently classified as hospital or HCs or CHCs by study staff.

**Background covariates**

Socio-demographic characteristics included in the analysis were age (with respondents grouped into 5-year age groups), marital status (currently married/never married/divorced or widowed), educational attainment (no schooling/primary school/secondary school and higher) and ethnic group (Kassena/Nankana/other). We also included a dummy variable denoting whether the respondent’s most recent pregnancy was her first birth or a higher-parity birth.

**Study populations**

We investigate changes in NHIS registration among pregnant women before and after adoption of the premium exemption using the full sample of 1641 respondents. Specifically, we compare registration patterns between women who conceived and delivered prior to the exemption, women who conceived prior to the exemption but delivered after the exemption, and women who conceived after the exemption. Unfortunately, since only 208 women conceived before the exemption was adopted, we could not investigate the association between health insurance status and use of maternal health services or quality of ANC services received prior to the exemption due to limited statistical power. Instead, we only measure this association among the ‘restricted sample’ of 1411 women, who conceived after July 2008.

**Statistical methods**

First, we use χ² tests of association to determine whether there were significant improvements in NHIS registration between women who conceived and delivered prior to the exemption, women who conceived prior to the exemption but delivered after the exemption, and women who conceived after the exemption. Second, among women in our restricted sample, we use logistic regressions to compare the characteristics of women seeking ANC services at hospital and HCs vs. CHCs. Third, we describe the quality of ANC services received at hospital and HCs vs CHCs. Fourth, we test whether insured clients are more likely to receive all diagnostic and counselling procedures, TT vaccination and deworming at each type of health facility. Finally, we test whether insured clients of different types of health facilities were more likely to deliver at home or at a health facility. For multivariate analyses, we use logistic regressions with controls for socio-demographic, ANC characteristics and time (a categorical variable identifying the trimester of delivery), along with robust standard errors. These regressions include an interaction term between health insurance registration and place where ANC services were received. They also include dummy variables for year of delivery control for possible time trends in outcome(s) throughout the study period.

**Results**

**Increases in health insurance registration among pregnant women after the premium exemption**

Among respondents who conceived and delivered prior to the premium exemption, NHIS registration was low: only 19% [95% confidence interval (CI) = 5.4, 41.9%] of hospital/HC clients and 29.4% (10.3, 56.0%) of CHC clients had registered with the NHIS prior to their delivery (Figure 1). This proportion increased to 55–65% among women who conceived prior to the exemption but whose pregnancy lasted after July 2008 (and thus may still have been able to benefit from the premium exemption in the latter months of their pregnancy). Among women who conceived after the premium exemption, NHIS registration rates were much higher: 71–73% of women who delivered in 2008–09 were registered at the time of delivery, and this figure increased to more than 90% among women who delivered in 2010 (P < 0.01).

**Determinants of place of ANC**

Among the restricted sample, eight respondents had missing data on the place where ANC services were received. Among those with complete data, 766 (54.6%) respondents received ANC services primarily at the hospital or at HCs, whereas 637 (45.4%) did so primarily at CHCs (Table 1). Only 53 (3.8%) sought ANC services at multiple levels of the health system. Clients of hospital and HCs had higher educational levels than clients of CHCs [adjusted Odds ratio (aOR) = 0.54, 95% CI = 0.40, 0.73], and were also more likely to reside in semi-urban areas (aOR = 0.51, 95% CI = 0.38, 0.67). Clients of CHCs were more likely than clients of hospitals and HCs to have already given birth prior to their most recent pregnancy (aOR = 1.41, 95% CI = 0.97, 2.04). The place where women received ANC was not associated with having registered with the NHIS prior to becoming pregnant (aOR = 0.93, 95% CI = 0.73, 1.18).

**Coverage of maternal health services**

Figure 2 shows the content of ANC services in hospitals/HCs and CHCs. The coverage of clinical and diagnostic procedures was high across all types of facilities: virtually all clients were weighed, had their blood pressure, height, fundal height and foetal heart rate measured. Roughly 5% of clients did not have...
a blood sample taken, whereas 12–17% of clients did not have a urine sample taken. The difference in the coverage of urine sample collection between hospital/HCs and CHCs was significant at the $P < 0.01$ level. The coverage of counselling about safe motherhood was lower than clinical procedures at all facility types. Whereas women were extensively counselled about immediate breastfeeding, TT vaccination and danger signs during delivery and family planning (88–96%), only 80% of respondents were counselled about the need for financial preparations prior to delivery. Seventy-five per cent were counselled about the need to use skilled birth attendants and 65% were counselled about the need to plan emergency transport options. The coverage of deworming was high (90%), but only 70% of respondents were protected against TT during their most recent pregnancy. Among clients of hospitals and HCs, nearly 75% delivered at a health facility whereas this was the case for only about half of the clients of CHCs ($P < 0.01$).

**NHIS registration and ANC services**

The association between the quality of ANC services received and NHIS registration varied significantly by place of ANC (Figure 3). In hospitals and HCs, NHIS registrants were more likely to receive extensive counselling about safe motherhood ($aOR = 1.49, 95\% CI = 1.04, 2.15$) and a complete array of clinical/diagnostic tests ($aOR = 1.58, 95\% CI = 1, 2.52$) than women who had not registered with the NHIS by the time of delivery. NHIS registration was however, not associated with proper TT vaccination ($aOR = 1.1, 95\% CI = 0.74, 1.62$) or the receipt of deworming pills during pregnancy ($aOR = 0.99, 95\% CI = 0.53, 1.87$). In CHCs on the other hand, NHIS registration was associated with a lower likelihood of receiving extensive counselling about safe motherhood ($aOR = 0.65, 95\% CI = 0.43, 0.99$), a complete array of clinical/diagnostic tests ($aOR = 0.59, 95\% CI = 0.35, 0.99$) and the required doses of TT vaccination ($aOR = 0.6, 95\% CI = 0.37, 0.96$).

**NHIS registration and place of delivery**

The association between health insurance registration and place of delivery also varied significantly between levels of the health system (Figure 4). In hospital and HCs, health insurance registration did not affect the place of delivery ($OR = 0.78, 95\% CI = 0.51, 1.20$). In CHCs, on the other hand, insured clients were significantly more likely to deliver at a health facility than other clients ($OR = 1.67, 95\% CI = 1.06, 2.63$).

**Discussion**

In this study, we used data from a retrospective cohort of women having given birth in two impoverished districts of Northern Ghana since 2008 to investigate the consequences of NHIS premium exemptions targeting pregnant women. We found that the introduction of the premium exemption was followed by a sharp increase in health insurance registration among pregnant women. However, increases in NHIS registration after the introduction of the exemption were also accompanied by complex effects on the quality of services received by pregnant women during ANC and their subsequent delivery.
use of health facilities for delivery. In hospital and HCs, women registered with the NHIS received better quality ANC services than women who had not registered with the NHIS. At CHCs, women who registered with the NHIS were more likely to experience lower quality of ANC services than women who did not register with the NHIS. On the other hand, insured clients of CHCs were more likely to deliver at a health facility than uninsured clients.

These findings have several limitations. First, women included in our sample were not randomly allocated to receiving the premium exemption. As a result, the associations we observed between NHIS registration and quality of care/place of delivery may be due to unobserved confounders. Other health programmes implemented at the same time as the premium exemptions may have prompted increased health insurance registration and may also have stimulated health-care utilization. This may be the case of quality improvement programmes implemented by district health authorities or non-governmental organizations, for example, similarly, there may be reverse causality between quality of care and NHIS registration: facilities with the highest quality of care may attract more clients for NHIS registration. Such reverse causality may be strongest among households from wealthiest socio-economic groups, since they can afford transportation costs associated with ‘bypassing’ primary health-care facilities and seeking care at more distant hospitals and HCs. Finally, the observed associations between health insurance registration and service utilization may be due to selective enrolment.

Table 1 Determinants of the place where ANC services are received

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Hospital/HCs</th>
<th>CHCs</th>
<th>Adjusted OR (HHCs vs CHCs, 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15–19</td>
<td>82 (10.6)</td>
<td>60 (9.5)</td>
<td>Ref.</td>
</tr>
<tr>
<td>20–24</td>
<td>195 (25.6)</td>
<td>148 (23.5)</td>
<td>0.78 (0.49, 1.17)</td>
</tr>
<tr>
<td>25–29</td>
<td>192 (25.2)</td>
<td>155 (24.6)</td>
<td>0.69 (0.41, 1.17)</td>
</tr>
<tr>
<td>30–34</td>
<td>152 (20.0)</td>
<td>124 (19.7)</td>
<td>0.65 (0.37, 1.12)</td>
</tr>
<tr>
<td>35–39</td>
<td>99 (13.0)</td>
<td>89 (14.1)</td>
<td>0.65 (0.36, 1.27)</td>
</tr>
<tr>
<td>≥40</td>
<td>42 (5.5)</td>
<td>53 (8.4)</td>
<td>0.90 (0.47, 1.73)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently married</td>
<td>691 (90.4)</td>
<td>582 (91.4)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Never married</td>
<td>39 (5.1)</td>
<td>21 (3.3)</td>
<td>0.80 (0.43, 1.48)</td>
</tr>
<tr>
<td>Divorced or widowed</td>
<td>34 (4.5)</td>
<td>34 (5.3)</td>
<td>1.05 (0.63, 1.76)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>384 (50.3)</td>
<td>400 (62.8)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Primary school</td>
<td>153 (20.0)</td>
<td>132 (20.7)</td>
<td>0.91 (0.68, 1.22)</td>
</tr>
<tr>
<td>Secondary and higher</td>
<td>227 (29.7)</td>
<td>105 (16.5)</td>
<td>0.54*** (0.40, 0.73)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kassem</td>
<td>374 (49.0)</td>
<td>269 (42.2)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Nankam</td>
<td>353 (46.2)</td>
<td>337 (52.9)</td>
<td>0.99 (0.78, 1.26)</td>
</tr>
<tr>
<td>Other</td>
<td>37 (4.8)</td>
<td>31 (4.9)</td>
<td>1.10 (0.65, 1.86)</td>
</tr>
<tr>
<td><strong>Area of residence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>533 (70.0)</td>
<td>530 (83.3)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>228 (30.0)</td>
<td>106 (16.7)</td>
<td>0.51*** (0.38, 0.67)</td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First birth</td>
<td>204 (26.7)</td>
<td>123 (19.3)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Higher-order birth</td>
<td>560 (73.3)</td>
<td>514 (80.7)</td>
<td>1.41 y (0.97, 2.04)</td>
</tr>
<tr>
<td><strong>Timing of delivery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>598 (78.3)</td>
<td>485 (76.1)</td>
<td>Ref.</td>
</tr>
<tr>
<td>2010</td>
<td>166 (21.7)</td>
<td>152 (23.9)</td>
<td>1.10 (0.85, 1.44)</td>
</tr>
<tr>
<td><strong>National health insurance status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered prior to pregnancy</td>
<td>477 (62.9)</td>
<td>419 (66.6)</td>
<td>Ref.</td>
</tr>
<tr>
<td>Not registered prior to pregnancy</td>
<td>281 (37.1)</td>
<td>210 (33.4)</td>
<td>0.93 (0.73, 1.18)</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>766 (54.6)</td>
<td>637 (45.4)</td>
<td>1,374</td>
</tr>
</tbody>
</table>

Source: 2010 MoTeCH survey.

Eight respondents had missing data on the place of ANC; while a total of 37 respondents had missing data on any of the covariates listed in the table and were thus excluded from the regression in the rightmost column.

***P < 0.001, **P < 0.01, *P < 0.05, yP < 0.1.
processes. In particular, women with a preference for home-based deliveries may be less inclined to learn about the premium exemption and complete the registration process. This may be so since they are unlikely to incur expenses related to facility-based deliveries. Such selection may explain the observed positive associations between NHIS registration and facility-based deliveries among CHC clients. As in other insurance programmes, adverse selection is also a concern: pregnant women who register with the NHIS may be more at risk of adverse obstetric outcomes. This could explain, for example, the positive association between NHIS registration and the quality of services received in hospitals and HCs: if health workers identify insured women as undergoing riskier pregnancies than uninsured women, they may be more likely to counsel them extensively about delivery preparations and conduct more clinical procedures. Because few of the mothers we interviewed during the survey (n < 200) had given birth prior to the premium exemption, however, we did not have an adequate control group at our disposal to rule out such
competing explanations and estimate the causal effects of the premium exemption on NHIS enrolment and quality of services received.

Second, our data on health insurance status is crude. We only obtained information on whether respondents had ever registered and the date of first registration. We did not ask respondents whether they benefited from the premium exemption or whether they paid the premium when registering. We also did not collect data on providers’ attitudes towards the premium exemption. As a result, we are not able to decipher the specific mechanisms through which the associations between NHIS registration and health outcomes emerge. In particular, we do not know whether insured women receive fewer ANC services at CHCs because they are denied services by health workers or because CHCs experience resource constraints due to reimbursement delays, thus leading them to scale-down services. Similarly, the improved outcomes among insured women attending ANC at hospitals and HCs may be due to a different incentive structure for health workers at such health facilities. An investigation of these mechanisms would likely require in-depth qualitative interviews with patients and providers, as well as extensive observations of the process of ANC.

Third, our assessment of the quality of ANC services is largely based on respondent recall and such data may be affected by measurement error. It is, however, unlikely that such measurement error would bias measures of the association between NHIS registration and enrolment or quality of care, unless insured clients report their ANC experience more or less precisely than uninsured Patients. Our assessment of the quality of ANC services is also partial, since it was limited to a series of indicators that the MoTeCH project (within which this analysis is nested) aimed to impact. In particular, we did not investigate HIV, syphilis and malaria testing during pregnancy, nor did we investigate counselling about nutrition, sexually transmitted infections and prevention of mother-to-child transmission even though these constitute important components of a focused ANC model (Conrad et al. 2012).

Finally, we did not investigate the impact of the premium exemption on the viability of the CBHI scheme. Premium exemptions may prove detrimental if they increase costs incurred by the CBHI scheme while lowering revenue. This may be the case in Ghana, since in 2010 NHIS expenditures became greater than NHIS revenue (Lagomarsino et al. 2012). It is, however, unclear whether this may be attributable to the adoption of the premium exemption for pregnant women. Investigating the impact of a premium exemption on the financial sustainability of a CBHI scheme requires longer-term follow-up and more detailed financial information than was available in this study.

Conclusion

This article has shown that enrolment in the Ghana NHIS increased significantly after the adoption of a premium exemption for pregnant women in July 2008. The association between NHIS registration and utilization of maternal health services varied, however, across levels of the health system and outcomes. These findings have important implications for the rollout of CBHI schemes in sub-Saharan countries. First, they suggest that premium exemptions likely are an effective approach to increasing enrolment in health insurance schemes among population groups most in need of health services such as pregnant women. Premium exemptions thus constitute a potential tool towards scaling-up access to essential health interventions in countries that have established health insurance programmes. Second, our results suggest that such policy changes may have complex effects on client outcomes: they may prove beneficial at some level(s) of the health system but detrimental at others. Future investigations of the effects of CBHI reforms should thus systematically investigate heterogeneous effects across levels of the health system. Such heterogeneous effects emerge through the complex interactions of providers’ incentives, clients’ preferences, facility resources and system constraints. Extensive implementation research on the rollout of CBHI schemes is thus needed to understand how to make policy changes work towards universal coverage.

Acknowledgements

We are grateful to all participating districts, health facilities and community members for their time and support. We wish to thank the district directors, Vidha Abasika, Margareta Bawah, Anthony Aleka and Rofina Asuru for many valuable suggestions. We also thank the members of the Upper East Regional Health Management Team, District Health Management Teams and Sub-district Health Teams who made it possible for us to conduct this study, the field workers and data managers at the Navrongo Health Research Center for the data collection and data management, and to the MoTeCH project staff for contributing to the successful implantation of the study.

Funding

Bill and Melinda Gates Foundation [Grant Number: 52137].

Conflict of interest

None declared.

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