RESEARCH ARTICLE

Effects of community-based health insurance on modern family planning utilization in Ethiopia [version 1; peer review: 1 approved with reservations]

Girma Kassie, Bekele Tefera

Department of Monitoring, Evaluation and Learning, Pathfinder International, Addis Ababa, 12655, Ethiopia

Abstract

Background: Community-based health insurance (CBHI) has been established in a number of developing countries to expand access to modern health care service. However, few studies have focused on health care utilization of CBHI members in Ethiopia. Accordingly, the aim of this study was to assess the effect of CBHI on modern family planning (FP) utilization as part of its routine outcome monitoring activities.

Methods: The USAID Transform: Primary Health Care project, conducted a continuous monitoring follow up visit using a multistage sampling technique in its four major targeted regions. A total of 3433 households were selected and 3313 women of reproductive age (15-49 years) were interviewed. The questionnaire captured the CBHI status of each household and FP use data from randomly selected women. Microsoft Access database was used to enter the data, which was then transferred to SPSS Version 20 for further analysis.

Results: In total 50.8% of married women (aged 15-49 years) were found to be enrolled in CBHI. Current modern FP use is 47.5% among married women in project-supported areas. Modern FP use is 50.9% among married women who are exposed to CBHI schemes, versus 44.1% among women who are not exposed to CBHI which is statistically significant.

Conclusions: Modern FP utilization among insured women was higher compared with uninsured women. While FP methods are provided for free, CBHI enrolment improves FP use among women of child-bearing age. Women who have access to CBHI may frequently visit health facilities seeking services for themselves and their families, during which they may be introduced to FP services. This in turn may improve their awareness and attitude towards FP. The results will increase awareness for program implementers of the benefits of CBHI schemes in FP programming, particularly in rural settings, and provide an opportunity to increase lifelong returns in Ethiopia.

Keywords

Family planning, utilization, CBHI, Ethiopia
Introduction
In 2011, the Government of Ethiopia introduced a community-based health insurance (CBHI) program and implemented it using a phased-in approach. The program was first piloted in 2011–2013, within 13 woredas (districts) of the four most populous regions: Oromia, Amhara, SNNP and Tigray. Prompted by its success, lessons learned, and viability of implementing the scheme as concluded in the evaluation carried out of the 13 pilot CBHI schemes in 2014/15, the Government decided to scale-up the CBHI program to other woredas. Currently, CBHI is being implemented in a total of 512 woredas in six regions and two city administrations. CBHI is a health insurance scheme that pools resources from citizens (members) in the informal sector in the form of contributions into a collective fund, which is managed by a scheme management body, generally functioning under the woreda health bureau, and governed by board members drawn from CBHI scheme members and other key stakeholders as appropriate. USAID has been supporting the Government of Ethiopia in health sector financing reforms in Ethiopia, including CBHI implementation since their inception through its consecutive projects. In continuation of this assistance, USAID recently launched a new 5-year activity, the Health Financing Improvement Program, 2018–2023 to support health sector financing. Additionally, the USAID Transform: Primary Health Care project provides technical support in its focus woredas towards the initiation, launching and operationalization of CBHI schemes.

CBHI is believed to considerably increase the demand for health care services because the financial burden on households and/or individual beneficiaries at the time of seeking health care will be removed as CBHI schemes cover these costs. The design of Ethiopian CBHI learned from the experience of other countries, and has recorded notable progress in several community health outcomes over the past 10 years. Family planning (FP) is a proven strategy to reduce maternal and child mortality and morbidity among women of reproductive age. CBHI contributes to the improvement of health seeking behaviour, health care utilization and service quality. Different evidence suggests that CBHI membership has positive effects on health care utilization. Despite this positive pattern, the overall health risk profile of those who have enrolled in the scheme does not seem to be very different from those who have not yet enrolled.

There is no specific evidence of the role of CBHI in improving modern FP utilization. The main aim of this study was to evaluate the effect of CBHI on modern FP utilization.

Methods
Study background
The USAID Transform: Primary Health Care project conduct continuous monitoring follow up visits using a multistage sampling technique in its four major targeted regions. The project had been supporting 360 woredas in its four major target regions and established 29 clusters-level offices (CLOs) and considers all CLOs. The sample technique was a combination of simple random and random-walk technique. A sampling frame was prepared by listing the woreda health offices (WorHOs) under each CLO, health centers (HCs) under each WorHOs and Health Posts (HPs) under each HC. A total of 164 WorHOs, 328 HCs and 694 HPs were selected randomly in proportion to the size of the region. A HP is found in a kebele (village), which is the lowest administrative area in Ethiopia. If the HP was randomly selected for the project continuous household survey, then the kebele associated with the selected HP was chosen for the next stage of sampling.

After getting the associated list of kebeles, prepared the list of gotts from the HP associated kebeles in consultation with the health extension worker (HEW) and selected one gott randomly from each associated kebeles. A gott is a geographic area under the kebele covering on average 250 households. The survey team utilized a list of households under the selected gotts from the health post registry book. The list of the households served as a sampling frame for the selection of the households. The survey team selected five households from each Got using a random-walk technique in person at their household. If there was more than one eligible respondent found in a household, simple random sampling was used to select one eligible respondent. Of the total planned 3433 households, data were collected and analyzed from 3313 women of reproductive age in the households.

The sample size requirements were based on estimates for the proportion of modern methods of FP utilization on the day of the monitoring follow-up visit at 95% confidence. The sample size determines used in double population proportion formula. For the purpose of this analysis, our definition of modern FP included oral contraceptives, emergency contraceptives, injectable contraceptives, contraceptive implants, and IUDs.

Data collection was conducted from October 1 to December 31, 2017 and 3313 women of reproductive age (15–49) were interviewed. A household questionnaire was developed in consultation with program technical advisors. Regional and CLO staff members received training to use the survey questionnaire and were responsible for data collection in their respective catchment.

Data processing and analysis
The data management process was managed by the monitoring, evaluation and learning teams at regional and country office levels. Microsoft Access database was used to enter the data, which was then transferred to SPSS Version 20 for analysis. A total of 10% of the questionnaire was selected and re-entered and cross-checked for data consistency and completeness. It was observed that about 99% of the questionnaires were entered accurately. Data cleaning was performed to check for frequencies, accuracy, consistencies and missing values. Frequencies, proportion, and summary statistics were used to describe the study population in relation to the study variables. Significance tests performed using the cut-off values set is p<0.05 with 95% confidence interval (CI).

Ethical consideration
This report used project data that has been collected as part of the annual random follow-up monitoring visit to households
in project areas and the result was not linked to individual identifiers. The results of the study did not distinguish respondents’ race, age, health information, religion, sex and sexual orientation or any other social groups. Therefore, the study did not require ethical clearance by a human research ethics committee. However, the project obtained permission to implement and assess progress from the regional health bureaus of Amhara, Oromia, SNNPR and Tigray.

The assessment questionnaires of CBHI effect on modern family planning directly related to their program monitoring and meant to inform the program. The interviews were not intended to develop or contribute to generalizable knowledge. Participants were informed about the purpose of the survey, project approaches to enabling the responsive, iterative implementation that has taken place project life cycle. After discussion and understanding of the purpose the project obtained oral consent from each participant, since participants were fearful of being identified.

Results
Family planning usage
A total of 3313 reproductive age women found in 3433 households were included in the study. Among the study participants, 50.8% of married women aged 15–49 were found to be in a household already enrolled in CBHI. Current modern FP use is 47.5% among married women in project-supported areas (Table 1). De-identified raw data are available on Open Science Framework12.

Table 2 presents respondents’ contraceptives prevalence rate of different methods. The table shows that 50.2% of the respondents utilized any method of FP, 49% used modern methods and 0.5% of the respondents utilized permanent methods.

Table 3 presents family planning prevalence rate among young married women. The table shows that 53.5% of young women are currently using any method of contraceptives and 16.4% of respondents are using long-acting reversible contraceptives.

Effect of CBHI on FP usage
Modern FP use is 52% among married women who are exposed to CBHI schemes, versus 44.1% among women who are not exposed to CBHI. The effect of CBHI on family planning utilization is statistically significantly (p=0.002). While family planning methods are provided for free, CBHI enrolment improves family planning use among women of child bearing age. Women who have access to CBHI may frequently visit health facilities seeking services for themselves and their families, during which they may be introduced to family planning services. This in turn may improve their awareness and attitude towards family planning. As a result, women who are part of CBHI may have better FP utilization rate compared to women who are not.

Discussion
This study revealed that CBHI impacted modern family planning utilization among insured and uninsured women. Modern family planning utilization among insured women was higher compared with uninsured women. The positive results of the CBHI schemes in encouraging health care utilization suggests that CBHI can be effective instrument for achieving universal health coverage, together with other policy tools13. According
to the findings of Shimelis, CBHI membership has a potential to increase healthcare utilization\(^5\). Similarly, Giedion et al.\(^5\) reviewed 23 studies and found differences in how CBHI affected service access and utilization among different population groups. Nevertheless, the evidence indicates that, overall, the CBHI universal health coverage scheme improves access and utilization of services\(^5\). Similar evidence showed that the trend of outpatient service care increased for insured households, while it declined for the uninsured\(^4\). The finding of this study showed that women with CBHI improved modern family planning utilization among uninsured women of child-bearing age. The government of Ethiopia is rolling out CBHI to improve community financial protection when receiving health facility service and utilization as well as of health care service improvements\(^4,10,16,17\). Although FP methods are provided for free, women who have access to CBHI may frequently visit health facilities seeking services for themselves and their families, during which health care provider might be introduced to FP services and their importance. Studies show that the number of outpatient visits per insured household member increased, while for uninsured households in the CBHI districts the corresponding members are reduced their visits\(^4,10\). This in turn may improve their awareness and attitude towards family planning.

The limitation of this study was not allowed the casual effect of factors that contribute their association. Except for respondents, characteristics such as perception about CBHI and age, this study did not allow a link with other potential causes that may affect utilization of modern FP methods. Despite these limitations, the study provided a comprehensive opportunity to overview the effect of CBHI-related utilization of modern FP methods.

**Conclusion and recommendation**

The present study showed that more than half of the respondents are currently using modern FP methods. CBHI enrolment was significantly associated with use of FP. Child-bearing women who were not exposed to the CBHI scheme should be the target audience. Moreover, it needs communication strategy that will provide information about the contribution of CBHI on FP utilization. The results of this study will help program implementers be aware of the benefits of the CBHI scheme in FP programming particularly in rural settings, and the opportunity to increase lifelong returns in Ethiopia.

**Data availability**

**Underlying data**

Open Science Framework: Effects of community-based health insurance on modern family planning utilization in Ethiopia. https://doi.org/10.17605/OSF.IO/ZS2T3\(^2\).

This project contains the raw responses to the survey for each participant in file HH 2017.sav.

**Extended data**

Open Science Framework: Effects of community-based health insurance on modern family planning utilization in Ethiopia. https://doi.org/10.17605/OSF.IO/ZS2T3\(^2\).

This project contains the survey questionnaire in file HH FUV Checklist.pdf.

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

**Grant information**

This study was funded by the United States Agency for International Development under the terms of Award No. AID-663-A-17-00002 (Transform: Primary Health Care). The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of Pathfinder International or the U.S. Agency for International Development. The research publication was sponsored by The Bill and Melinda Gates Foundation (OPP1181398).

_The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript._

**Acknowledgements**

USAID Transform: Primary Health Care project is a USAID-funded health programme implemented by Pathfinder International and John Snow, Inc. (JSI) in partnership with the health sector at various levels (FMOH, RHBs of Amhara, Oromia, SNNP and Tigray, woreda health offices, health centers, health posts and kebeles) and due acknowledgement is forwarded to the above institutions. Our deep gratitude also goes to data collectors who showed their commitment to collect data during the survey.

**References**


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*Underlying data* refers to the raw data collected during the study, which includes individual responses to the survey questions. *Extended data* includes additional files such as the survey questionnaire. *Grant information* details the funding body and their role in the study. *Acknowledgements* recognize the contributions of key stakeholders and funders. *References* cite the studies and sources used in the research.
7. Modern health care use includes utilization of health care services from health posts, health centers, private/NGO clinics, and public/private/NGO hospitals.


The paper aims at evaluating the effect of introduction and enrollment to CBHI on modern FP utilization in Ethiopia. Overall the paper is interesting as it picks a relevant area of exploration which cuts across two relevant concepts ‘having access to CBHI’ a key tool for universal health coverage and ‘utilization of modern FP’ which is an intervention that addresses a synergy of multiple sustainable development goals. The authors made a great introduction of the context (Ethiopia) as it relates to the introduction and scale up of the CBHI program reaching 512 woreda from initial 13 pilot woreda. Unfortunately, the authors did not describe the status of or trend of FP utilization in Ethiopia, neither describing the socio-economic concepts and factors that affect both utilization and access to FP services as well as CBHI, quiet an important dimension when it comes to the discussion of CBHI and utilization of health care. The study has also used the routine CBHI monitoring data, which were limited to very few variables to inform more about the effectiveness or association between CBHI use and FP use. This led to a narrow result and the discussion section as there was lack of key elements tying/ or explaining the effect of CBHI to utilization of modern FP. However, the authors have shown reasonable knowledge and understanding of the relevant points with good explanations.

Specific Comments:

Methodology:
The data from this study is a result of a cross section survey conducted in well-sampled population of women in areas where CBHI program was implemented using the routinely collected monitoring checklist. The sampling and study recruitment is well described. However, the tool used to collect monitoring data was limited to the CBHI purposes and did not include other variables that may have an effect on the use of FP services beyond the CBHI. Furthermore, the lack of comparison data (intervention vs control or pre vs post intervention) limited the ability to establish any causal relationship between the CBHI and FP use. The statistical analysis is descriptive and is limited to married women excluding unmarried women. Other factors that may have an effect on the FP use were not accounted for in the analysis.
Results:
The results section was brief, reflecting on less variables/factors the authors chose to explore. Few misrepresentations including a mismatch of the contents in the table and the results explanation, the use of FP methods reported to be 47.5% is not shown in Table 1 as outlined. It would also make sense for me to present tables with; A. include the descriptive statistic table for participants with their demographic, social, economic and reproductive health related information comparing between FP use status (users vs non users), B). Combine table 2 and 3, C. Ensure the data presented include both CBHI users and non users, D) Account for other variables that may have an effect on the use of FP beyond the CBHI status, and E) use regression analysis to establish independent factors for the use of FP methods.

It will be clearer to the readers if the authors outline the following terms clearly, women of reproductive age, young women, married women and unmarried women it gets confusing with which group within the participants are we explaining. The fact that married women were first described rather than all participants it deviates the scope (maybe a systematic description of the whole sample then focus on age groups the married vs unmarried, these factors themselves do affect the use of FP regardless of being in an insurance scheme)

Discussion & Conclusion
The brief discussion on this section reflects on the few variables/factors explored to answer the study question and hence difficult to draw a meaningful conclusion. The study limitations should be taken into account as the conclusion statements are presented.

The use of the economic term “life returns” should be clearly elaborated rather than just using it (it masks a lot of exactly what are these returns which could be a stronger talking point, also it risks a questionable thought of returns to scale in demand for health care in insured people)

The conclusion is addressing the overview provided by the study, this could be widened as the paper limits itself on its initial role of just monitoring and inform its project (method section). Few grammatical errors are also of note and should be counter checked in the final paragraphs of both the discussion and conclusion sections.

Summary
The paper has many strengths in;

- It’s an important public health issue and the current global focus of universal health coverage (CBHI) and sustainable development goals (family planning)
- Its large sample size selected from multiple regions and the household survey gives weight to the sample and ability to infer it to the population.
- The paper has enough information to demonstrate the likelihood of the association rather than the causal-effect relationship.

The manuscript strength would be improved, if the following would be done;

- Clearly define the study population
- Include other variables that may have an influence on the use of FP services
- Think of using conceptual framework that demonstrate the factors and path to FP use.
- Present data in a more scientific way (tables)
- Use relevant statistical methods
- Account for other variables during statistical analysis
- Use conclusion statements that reflects on the study strength and limitation.
Is the work clearly and accurately presented and does it cite the current literature? 
Partly

Is the study design appropriate and is the work technically sound? 
Partly

Are sufficient details of methods and analysis provided to allow replication by others? 
Partly

If applicable, is the statistical analysis and its interpretation appropriate? 
Partly

Are all the source data underlying the results available to ensure full reproducibility? 
Partly

Are the conclusions drawn adequately supported by the results? 
Partly

**Competing Interests:** Joseph John Obure worked for Pathfinder International in Tanzania office between April 2015 to January 2017. However, I did not and do not have any affiliation with this project. Neither the research team who are currently Pathfinder employees in Ethiopia.

**Reviewer Expertise:** Maternal, reproductive and Newborn Health

**We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however we have significant reservations, as outlined above.**

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**Author Response 05 Sep 2019**

**Bekele Tefera,** pathfinder international, Addis Ababa, Ethiopia

**Dear Joseph Obure and Carl Mhina**

Thank you for your detailed review and attention dated 30 August, 2019. We have carefully checked the comments and revised the manuscript accordingly. Our responses are given in a point by point manner below.

Sincerely,

Author Team

**Methodology:**

**Reviewer comment (RC) 1:** The data from this study is a result of a cross section survey conducted in well-sampled population of Women in areas where CBHI program was implemented using the routinely collected monitoring checklist. The sampling and study recruitment is well described. However, the tool used to collect monitoring data was limited to the CBHI purposes and did not include other variables that may have an effect on the use of FP services beyond the CBHI. Furthermore, the lack of comparison data (intervention vs control or pre vs post intervention) limited the ability to establish any causal relationship between the CBHI and FP use. The statistical analysis is descriptive and is limited to married women excluding unmarried women. Other factors
that may have an effect on the FP use were not accounted for in the analysis.

**Response (R) 1:**
Thank you for providing the opportunity to clarify. We agree with your point, but it is important to understand the nature of the data. USAID Transform: Primary health care project implemented different thematic areas jointly (12 different thematic areas together). The primary mechanism for outcome monitoring and evaluation relied on the baseline and end line data conducted by external evaluator. In 2017, following an external evaluation, program implementer and USAID mission in Ethiopia agreed that if TRANSFORM: PHC relied on facility and community level surveys to measure the program outcomes; it would have to wait until mid- or end-of-project evaluations to understand how to optimize the contributions made to reproductive health in Ethiopia. By then, the opportunity to adapt in response to the results would have passed. For this program, meaningful monitoring would require engaging a range of actors with the power to turn this evidence into learning and action in real time. The follow up visit focused on progress outcome, not focused with comparison groups (interventions vs control). The checklist allows the project to gain insight into progress in service delivery (e.g., FP by method, CBHI related, maternal child health, gender related, quality improvement related, malaria related major indicators etc. for decision-making) and change in health outcomes in target areas at the household level (e.g., modern contraceptive prevalence rates, percent of women with children between 0 and 11 months old who had at least four or more antenatal care visits at a health facility, percent of women with children between 0 and 11 months old who had delivered with the assistance of skilled birth attendants and the percent of children between 12 and 23 months old that are fully vaccinated). The checklist is integrated into routine program activities, and contains indicators that can be measured objectively. The checklist has focused program related indictors but no individual characteristic because of the objective of the follow up visit. We have mentioned in the method section about the primary role of the checklist for monitoring and inform its project. In this analysis we extracted only FP and CBHI related indictors. The project has remained three years in implementation and in the future we will compare yearly progress. In the method of analysis because of the nature of the variable, we have limited our analysis in descriptive statistics because we don’t have individual characteristics to do analytical or regression analysis. We have mentioned all this as a limitation of the study. But know I have tried to do simple traditional logistic regression analysis based on your recommendation, but not that comprehensive to see the causal effect of CBHI on family planning utilization.

**Results:**
**Reviewer comment (RC) 2:** The results section was brief, reflecting on less variables/factors the authors chose to explore. Few misrepresentations including a mismatch of the contents in the table and the results explanation, the use of FP methods reported to be 47.5% is not shown in Table 1 as outlined. It would also make sense for me to present tables with;
A). include the descriptive statistic table for participants with their demographic, social, economic and reproductive health related information comparing between FP use status (users vs non users),
B). Combine table 2 and 3,
C). Ensure the data presented include both CBHI users and non-users,
D). Account for other variables that may have an effect on the use of FP beyond the CBHI status, and
E). use regression analysis to establish independent factors for the use of FP methods.
It will be clearer to the readers if the authors outline the following terms clearly, women of reproductive age, young women, married women and unmarried women it gets confusing with which group within the participants are we explaining. The fact that married women were first
described rather than all participants it deviates the scope (maybe a systematic description of the whole sample then focus on age groups the married vs unmarried, these factors themselves do affect the use of FP regardless of being in an insurance scheme)

Response (R) 2: Thank you for pointing this out. Yes, we observe fewer variables addressed in this analysis because of the limited number of variables in the follow up checklist and also have mismatched the content of the table, this mismatch was corrected accordingly.
A). Yes, now corrected with limited variables. Table 1 explains the characteristics of the respondents.
B). Corrected, table 2 and 3 merged together for reader clarity.
C-E). Table 3 present logistic regression analysis to see the difference of CBHI users vs non-users and their FP utilization. For clarity about the study participants, the reviewer comment is totally accepted and corrections have been made accordingly. The study participants are all reproductive age group women (15-49 years), they might be married or unmarried. Our analysis focused on 3313 reproductive age women; we have mentioned in the method section and also the first paragraph of the results section. The details of the point you highlighted have been addressed accordingly. But the survey check list only focused on merged indicators rather than individual characteristics, as we have mentioned above, so this analysis has a shortage of important factors to analyse and mention as a limitation of the survey checklist.

Discussion & Conclusion:
Reviewer comment (RC) 3: The brief discussion on this section reflects on the few variables/factors explored to answer the study question and hence difficult to draw a meaningful conclusion. The study limitations should be taken into account as the conclusion statements are presented. The use of the economic term “life returns” should be clearly elaborated rather than just using it (it masks a lot of exactly what are these returns which could be a stronger talking point, also it risks a questionable thought of returns to scale in demand for health care in insured people). The conclusion is addressing the overview provided by the study, this could be widened as the paper limits itself on its initial role of just monitoring and inform its project (method section). Few grammatical errors are also of note and should be counter checked in the final paragraphs of both the discussion and conclusion sections.

Response (R) 3: Thank you for pointing this out and highlighting the importance of the inclusion of this information. This detail has been added in the revised version of the manuscript.

Competing Interests: NA