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Effect of community based health insurance on healthcare services utilization in Ethiopia: a systematic review and meta-analysis

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Abstract

Background Community based health insurance (CBHI) is characterized by voluntary involvement, pooling of health risks and of funds occur within a community. It is becoming increasingly popular way to increase the use of healthcare services in low- and middle-income nations. Understanding the effect of CBHI on the level of health services utilization is a paramount for evidence based decision making. Hence, this study aimed to estimate the pooled effect of CBHI on health services utilization in Ethiopia.

Methods Studies were searched from PubMed, Google scholar, Web of Science, Research4life, Science Direct, African Journal Online and national websites for grey literatures. We were adhered to the PRISMA guidelines. Cross sectional and quasi experimental studies were included. Studies were screened, and critically appraised for quality using Joanna Briggs Institute Critical Appraisal tools. The data were extracted using Microsoft excel and exported to STATA 17 and RevMan 5.4.1 for further analysis. Heterogeneity between studies was assessed using Cochran's Q statistic and quantified with I^2. A random-effects model was used to estimate the pooled effect size. Subgroup analysis was done to show variations of the effect sizes across study years.

Result A total of 1501 studies were identified, out of which only 14 of them were included in the final meta-analysis. Health services utilization among CBHI members and non-members was 69.1% [95%CI (57.1–81.1%)] versus 50.9% [95%CI (40.6–61.3%)] respectively (difference in the effect was 18.2%). The CBHI members were nearly three folds more likely to utilize health services as compared with their counterparts [OR = 2.54, 95%CI: (1.81, 3.57). On average, CBHI users had 1.14 increased health facility visits as compared to non-insured, mean difference (MD) = 1.14 visits with 95% CI (0.65–1.63).

Conclusion The CBHI has a significantly increased health service utilization in Ethiopia. Hence, it will have a great contribution to meet the health for all agenda in resource limited countries.

Keywords Community based health insurance, Systematic review, Meta-analysis, Ethiopia

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Introduction

Community based health insurance (CBHI) is a form of micro health insurance targeted to low-income people. It is characterized by voluntary community involvement, pooling of health risks and of funds occur within a community or a group of people, membership premiums are often a flat rate and independent of individual health risks, and operates on a non-profit basis [1]. In low- and middle-income nations, CBHI is becoming increasingly popular way to increase the use of healthcare services and shield households from going bankrupt due to out-of-pocket costs [2]. The CBHI offers protection against the detrimental effects of user fees and a promising avenue towards universal health-care coverage [2]. As a result CBHI is suggested as a viable long-term strategy to alleviate the burden of high morbidity and mortality rate, commonly in lower and middle income countries including Ethiopia [3, 4]. Evidences showed that health insurance increased outpatient and inpatient care services utilization by 1.26 and 0.51, respectively [5]. The CBHI may have a potential role in prevention of non-communicable chronic diseases as it leads to increased chances of screening and early detection [6]. Coverage of CBHI had increased healthcare services utilization, in terms of number and timing of visits [7].

On the other hand, theoretical and practical evidences suggest that the CBHI model, relying only on voluntary, small-scale schemes with little or no subsidization of poor and vulnerable groups, can play only a limited role in helping countries move towards universal health coverage (UHC) [1]. The CBHI can at best provide only a complementary role as part of a national health financing strategy toward UHC, hence cannot be expected to provide a major source of funding or coverage. In this case, evidences found no significant difference in an overall mortality between members and nonmembers [1, 8].

In Ethiopia, CBHI pilot schemes was first launched in January 2011, in the largest four regions (Tigrai, Amhara, Oromia and SNNP regions) in an attempt to reduce access barriers to healthcare and provide financial protection against health shocks. It was applied on 13 districts covered in average 140,000 population of per district [9]. After a successful 3-year pilot implementation, the Ethiopian government decided to expand the CBHI scheme implementation. In 2022, a meta-analysis study indicated that the overall coverage of CBHI scheme in Ethiopia was 45% (95% CI 35%, 55%) [10]. Still the country is striving to increase the coverage of CBHI among the population. Beside this, studying the change in health services utilization among insured and non-insured is crucial for future recommendations. Synthesis of concrete evidences using systematic review and meta-analysis based on all available individual studies provide better quality data as input for decision making, planning and improving the future health of the nation. There is a study which assessed the pooled impact of CBHI on universal health coverage in Ethiopia [11]. However, the above study missed important studies [12–16] while synthesizing evidences on the topic. There is also a need to estimate the average frequency of health facility visits, not only the prevalence of health services utilization. Hence, there is a need to estimate the pooled effect of CBHI on the level of health services utilization and frequency of health facility visits. The objective of this review was to estimate the overall effect of CBHI on health care services utilization in Ethiopia.

Methods

We employed a systematic review and meta-analysis to synthesize evidences on the topic. To avoid duplication of similar previous studies, we checked the title at Database of the best Evidence-Based Health Care (https://www.epistemonikos.org/). We were adhered to the preferred reporting items for systematic review and meta-analysis (PRISMA) 2020 guidelines.

Protocol registrations

The protocol to conduct this systematic review and meta-analysis was registered at PROSPERO with the registration ID of CRD42023487052. Some amendments were made to the protocol during the review process based on the nature of actual literatures found.

Eligibility criteria

Both published and unpublished cross sectional and quasi experimental studies conducted in Ethiopia and written in English were included. Population, exposure, comparison, and outcome (PECO) were also applied to the frame the eligibility criteria. Population: included households, women, and children: exposure: CBHI members, comparator: non CBHI member and outcome: health services utilization. Studies which was done before the establishment of CBHI in Ethiopia or didn't assessed the level health services utilization among both groups were excluded from this study.

Information sources and search strategy

Studies were searched from PubMed, Google scholar, Web of Science, Research4life, Science Direct, and African Journal Online. We also look for gray literatures and preprints from Addis Ababa university website and medRxiv, PrePubMed, & Research square respectively. Two investigators (FDB and YT) had independently searched each database and website from 28 October and 03 December 2023 using the following keywords "effect", "impact", "role", "community based health insurance", "health services utilization", "Ethiopia" and Boolean operators "OR" and "AND" (S1).

Variables and measurements

The outcome variable was health service utilization which was measured as using or seeking any health services (checkups, preventive and promotion, curative and rehabilitative) made by at least one household member at least once from healthcare facility before each survey [17–21].

Community-based health insurance: is a scheme in which community members prepay for healthcare services, entitled to own the scheme, and control its management. It focuses on solidarity and mutual collective pooling of resources to share the financial costs of healthcare services [18].

Study screening and selection

After searching all relevant studies, duplicates were removed by using Endnote X9. Eligibility of studies was screened using their titles, abstracts and full texts reading. Two authors (NK and SD) independently screened the studies. In case of disagreements, third body (MA) involved.

Quality assessment

The quality of individual studies was assessed using Jonna Bridge Institute quality assessment criteria. Two authors (FDB and YT) independently assessed the quality of each study and scored out of eight points. Then the scores were averaged, converted into percent and ranked as poor quality/ high risk of bias (≤49%), moderate quality/moderate risk of bias (50–69%) and high quality/low risk of bias (≥70%) according to JBI criteria to rank risk of bias [22, 23].

Data extraction

Two authors (FDB and MA) independently extracted the data from included studies using a MS excel spreadsheets. The extracted data included the following information: authors' names, study year, publication status, publication year, study design, sample size, number of insured and non-insured, number of persons/households who used healthcare services (among insured and non-insured separately), mean frequency of health facility visits, and standard deviation.

Data analysis and synthesis

We assessed the presence of any publication bias using graphical (funnel plot) and statistical methods (Egger test) at alpha (α) of 0.05 significance level. The Egger's test indicated there was no small-study effects ($p=0.60$). We performed meta-analysis to form pooled effect of CBHI on health services utilization using proportion or prevalence and mean frequency of health care services utilization. Descriptive statistics were used to summarize the characteristics of included studies. Meta-analyses was performed using random-effects model to obtain pooled estimate of the impact of CBHI on healthcare utilization. Sensitivity analysis was performed to check change in the pooled estimate after omitting a single study at a time. Cochran's Q statistic at $p<0.05$ and I^2 test were used to assess the presence and degree of heterogeneity among the studies, respectively. A heterogeneity test (I^2 test) results for studies were considered no, low, moderate, and high degrees of heterogeneity for 0%, 25%, 50%, and 75% respectively. Sub-group analysis by study periods was also done to present the variation of health services utilization across study years. We used Stata 17.0 and RevMan 5.4.1 to conduct statistical analyses and considered α (alpha) of 0.05 as cut off to declare the presence statistical significance.

Result

Study selection

A total of 1501 studies were identified from electronic data bases, out of which 748 were duplicated. After screening by their title, 384 studies were excluded because of unrelated titles and conducted outside Ethiopia. Furthermore, 355 studies were excluded based on eligibility criteria. Finally, 14 (fourteen) studies [12–16, 19–21, 24–29] were found to meet the eligibility criteria (Fig. 1).

Characteristics of included studies

A total of 14 (fourteen) studies were included for final analysis and synthesis. Most (13/14) of the studies were cross sectional studies, while one was a quasi-experimental study. Most of the studies were conducted in four regions of Ethiopia including Tigray, Amhara, Oromia and SNNP regions. The studies were conducted between 2014 and 2022 and majority (11/14) of them were published between 2020 and 2023. A total of 18,371 households (8,846 CBHI members and 9,525 non CBHI members) form all studies were included to determine the final pooled effect sizes (Table 1).

Pooled effect size

Out of 14 studies, ten of them used prevalence or proportion of health care services utilization to assess the impact of CBHI membership on the level of health services utilization. Two studies [15, 16] compared the mean number of health facility visits among insured and non-insured populations. The remaining two studies [21, 24] used both prevalence of health care services utilization and mean number of health facility visits. The pooled prevalence of health services utilization among all study populations [12–14, 19–21, 24–29] (insured and non-insured) was 56.3%, 95%CI (44.3–68.4%) (Fig. 2).

We have computed pooled effect sizes for the two populations (CBHI insured and non-insured) separately. The

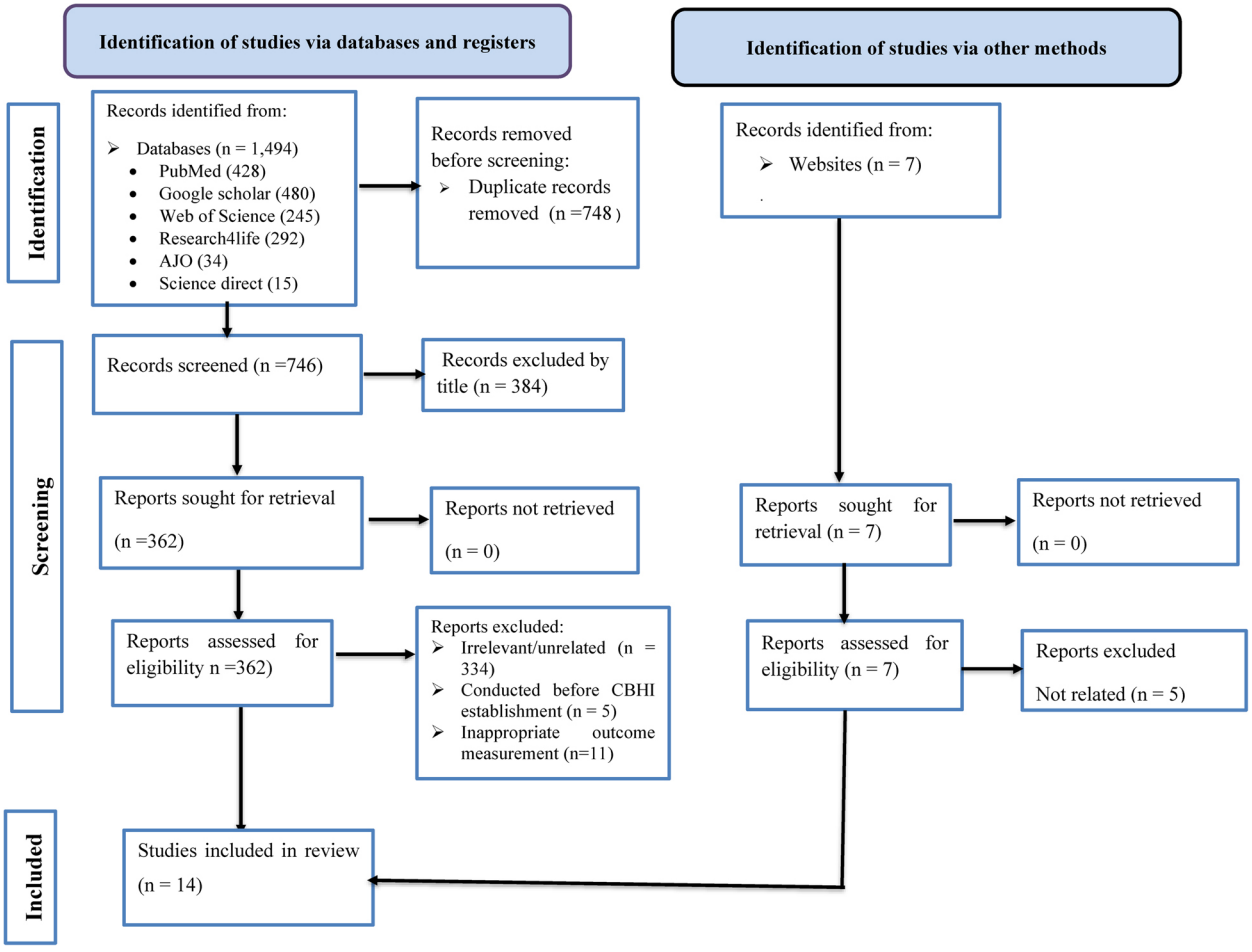

Fig. 1 PRISMA flow chart

Table 1 Characteristics of included studies

S.N	First Author	Study Year	Publication year	Regions	Population	Study design	Sample size	JBI score
1.	Alemayehu et al.	2020	2023	National	Households	cross-sectional	3,449	75%
2.	Atnafu et al.	2017	2022	Amhara	Children	cross-sectional	226	73%
3.	Bekele M	2015	2015	National	Households	cross-sectional	2,987	54%
4.	Dagnaw et al.	2021	2022	Amhara	Households	cross-sectional	658	76%
5.	Demissie et al.	2017	2020	Sidama	Households	cross-sectional	405	78%
6.	Fetene et al.	2020	2023	Amhara	Households	Quasi-experimental	673	65%
7.	Geta et al.	2022	2023	Oromia	Households	cross-sectional	356	82%
8.	Merga et al.	2019	2023	National	Women	cross-sectional	3,919	69%
9.	Segahu et al.	2018	Unpublished	Oromia	Households	cross-sectional	270	54%
10.	Simieneh et al.	2016	2021	Amhara	Children	cross-sectional	410	76%
11.	Tesfay et al.	2014	Unpublished	Tigray	Households	cross-sectional	400	52%
12.	Tilahun et al.	2016	2018	Amhara	Households	cross-sectional	594	72%
13.	Abenet et al.	2018	Unpublished	Amhara	Households	cross-sectional	376	56%
14.	Mussa et al.	2019	2023	Amhara	Households	cross-sectional	5,398	74%

finding revealed that the pooled prevalence of health services utilization among CBHI insured was 69.1%, 95%CI (57.1–81.1%) (Fig. 3) while it was 50.9%, 95%CI (40.6–61.3%) among non-insured (Fig. 4). The difference in the effect size between the two groups was 18.2%, which implies CBHI insured had 18.2% increased level of health services utilization than non-insured.

We also computed the odds ratio using Review Manager (RevMan) 5.4.1 to see the strength of association between CBHI membership and level of health services

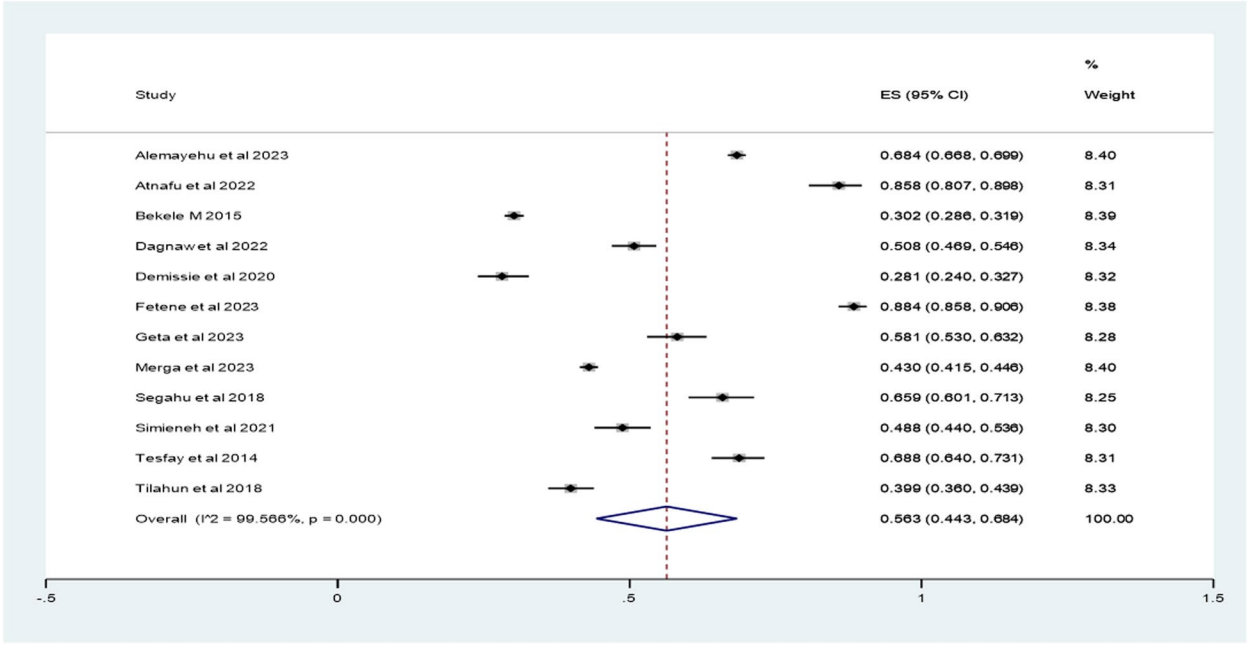

Fig. 2 Overall prevalence of health services utilization among general population in Ethiopia, SRMA, 2024

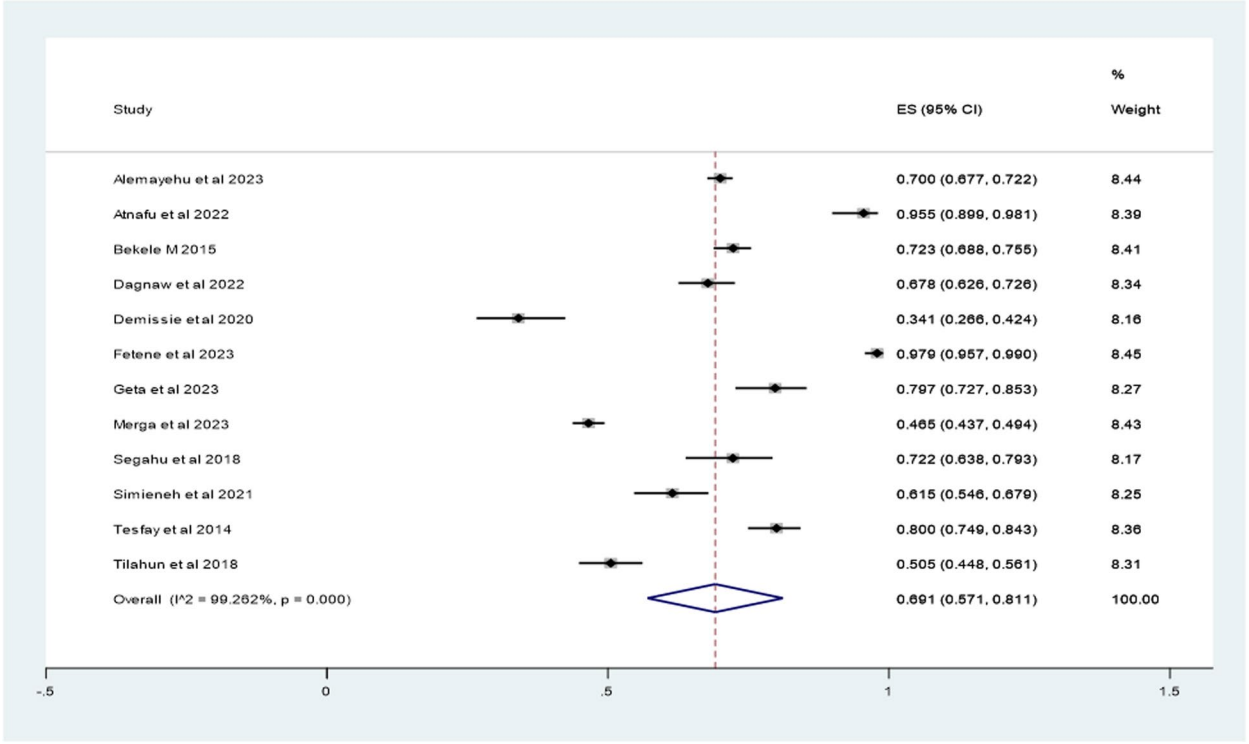

Fig. 3 Health service utilization by CBHI insured population in Ethiopia, SRMA, 2024

utilization. Accordingly, CBHI members were nearly three folds more likely to utilize health services as compared with their counterparts [OR=2.54, 95%CI: (1.81, 3.57) (Fig. 5).

The difference in the mean number of health facility visits between CBHI insured and non - insured was estimated using evidences from four studies [15, 16, 21, 24]. Accordingly, the overall mean difference (MD) of health facility visits was 1.14 visits with 95%CI (0.65–1.63). The finding

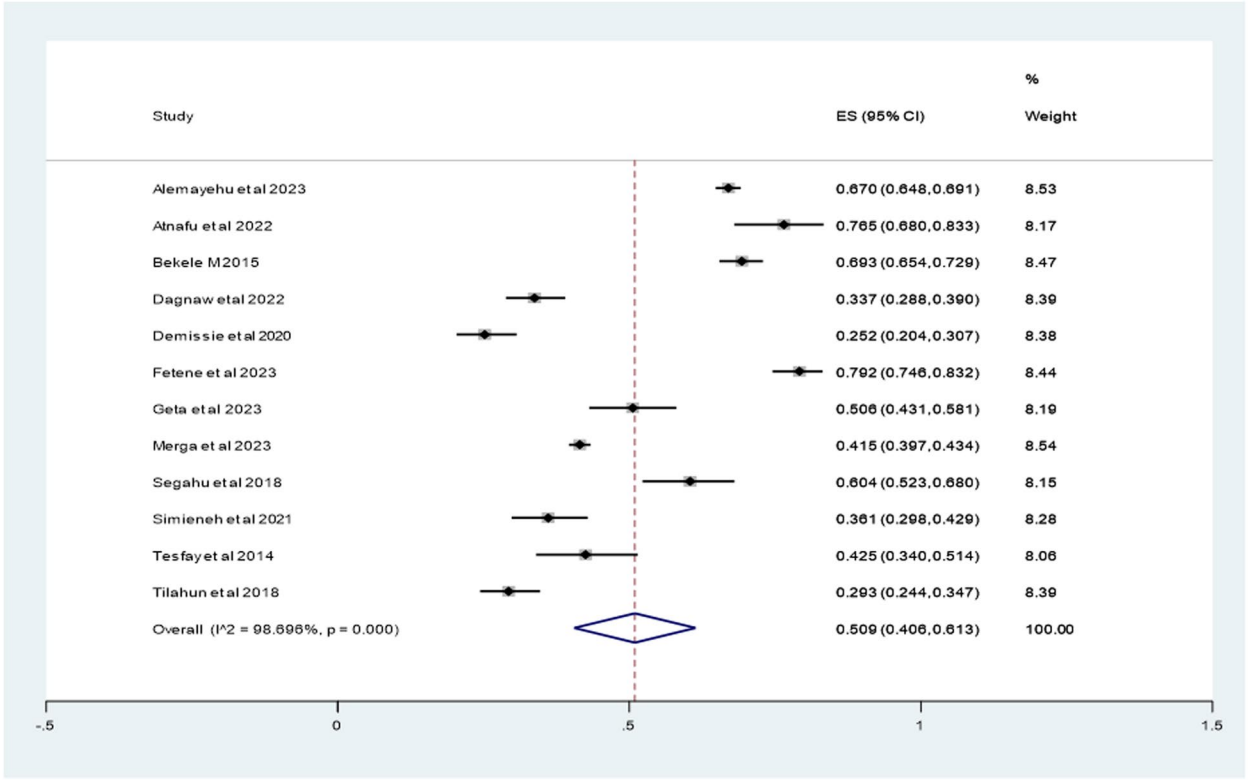

Fig. 4 Health service utilization by non CBHI insured population in Ethiopia, SRMA, 2024

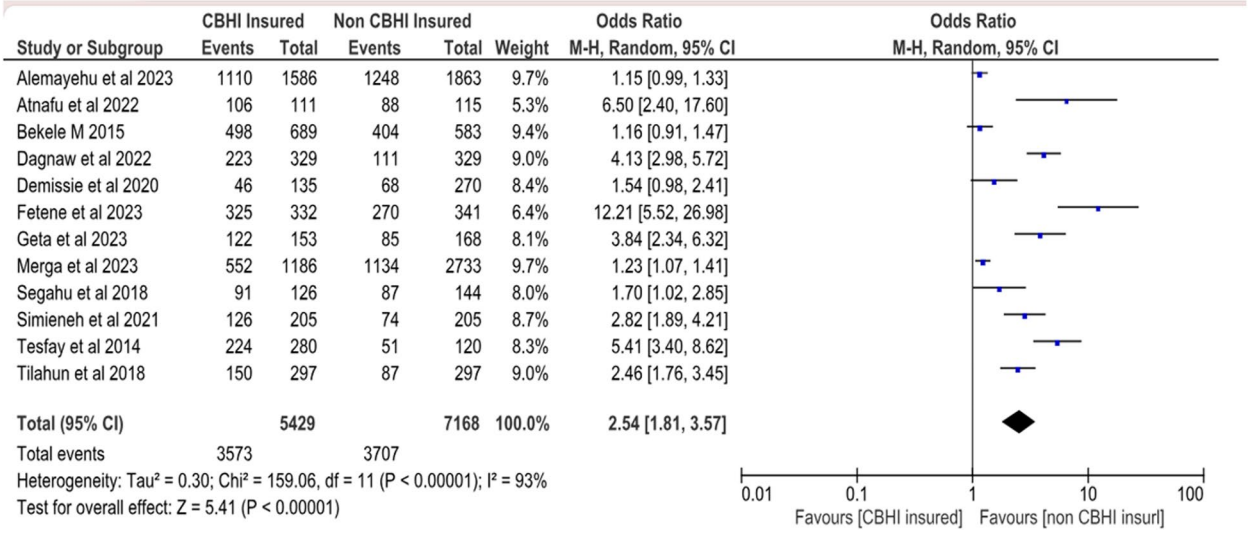

Fig. 5 Effect of CBHI on health services utilization in Ethiopia, SRMA, 2024

revealed that CBHI users had 1.14 increased health facility visits as compared with non-insured (Fig. 6).

Subgroup analysis by study years

Subgroup analysis was done to compare the levels of outcome variable across study years (studies conducted before and after 2017). The finding revealed that the overall level of health services utilization was higher after 2017 [62.4%, 95% CI: (47.1–77.8%)] than before 2017 [50.2%, 95%CI: (32.6–67.9)] (Fig. 7). Similar differences were observed among CBHI insured 65.8% (before 2017) versus 72.4% (after 2017) (Fig. 8) and non-insured populations 46.5% versus 55.4% before and after 2017 respectively (Fig. 9). We also computed odds ratio for subgroup analysis, and found almost the same odds ratio estimates implying constant relationship between CBHI

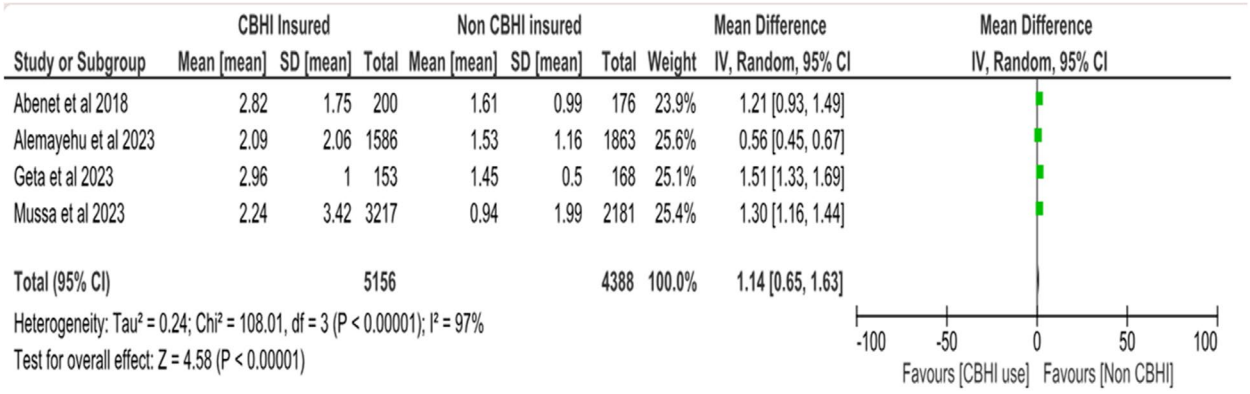

Fig. 6 Effect of CBHI on number of health facility visits in Ethiopia, 2024

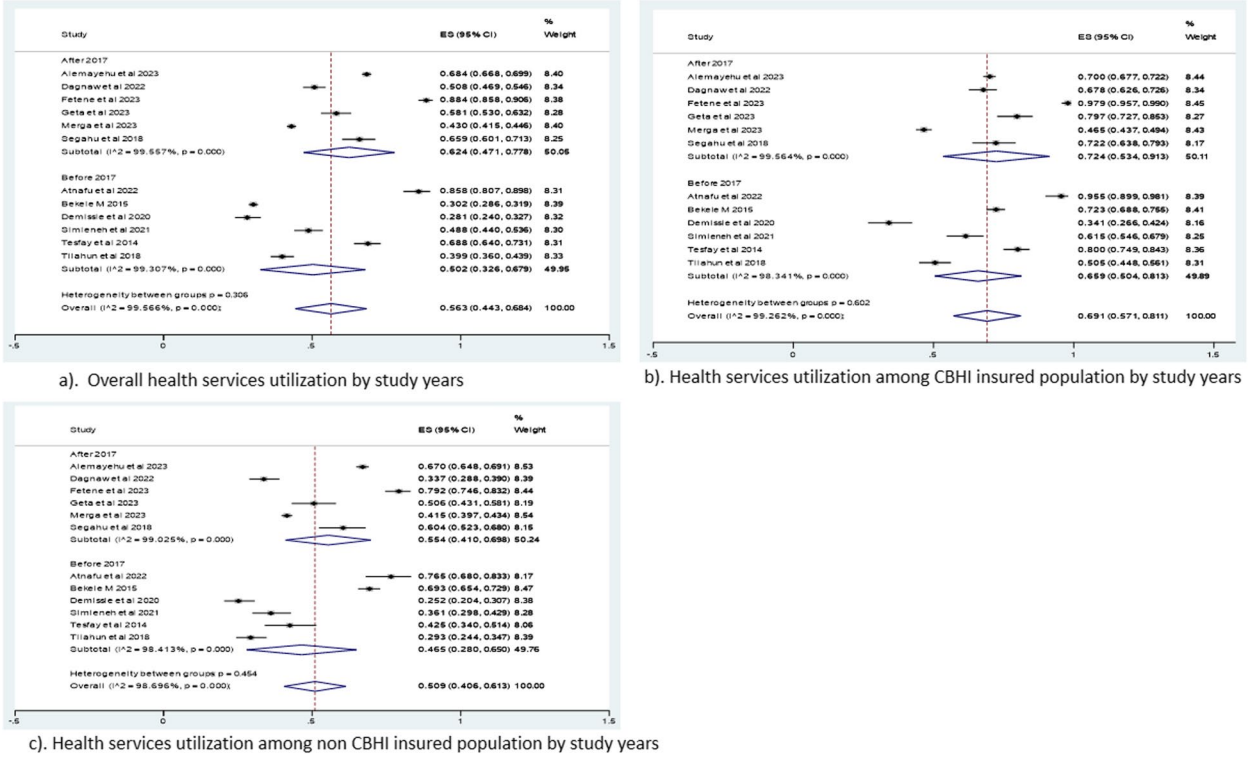

Fig. 7 Overall health services utilization by study years in Ethiopia, 2024

membership health service utilizations at different time i.e. before 2017 [OR = 2.57: 95%CI (1.54, 4.31)] and after 2017 [OR = 2.54: 95%CI (1.56, 4.13)] (Fig. 10).

Discussion

This review estimated the effect of CBHI membership on healthcare service utilization in Ethiopia. Health services utilization was found 56.3%, 95%CI (44.3–68.4%), 69.1% [95%CI (57.1–81.1%)], 50.9% [95%CI (40.6–61.3%)] among the general population, ensured and non-ensured respectively. The 18.2% gap in utilization signifies a substantial impact of CBHI program. The CBHI members were nearly three folds more likely to utilize health services as compared with their counterparts. On average the CBHI users had 1.14 increased health facility visits as compared to non-insured, mean difference (MD) = 1.14 visits with 95% CI (0.65–1.63).

The finding of this study was supported by similar study conducted in Iran, which found that utilization of health services increased (inpatient services increased by 0.51% whereas the utilization rate of outpatient services increased by 1.26%) among insured people [5]. In line with the current finding, SRMA study conducted in low- and middle-income countries which revealed that CBHI-insured households had increased healthcare services utilization nearly by two folds [4]. Evidence from

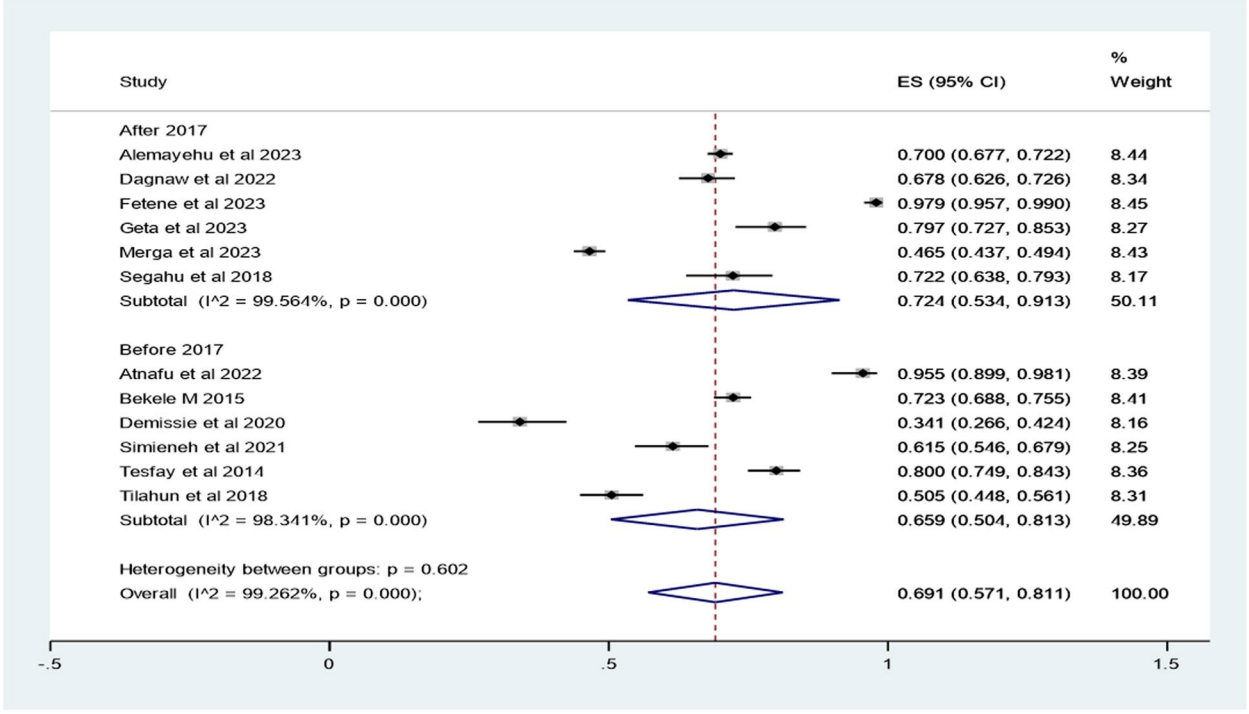

Fig. 8 Health services utilization among CBHI insured population by study years in Ethiopia, 2024

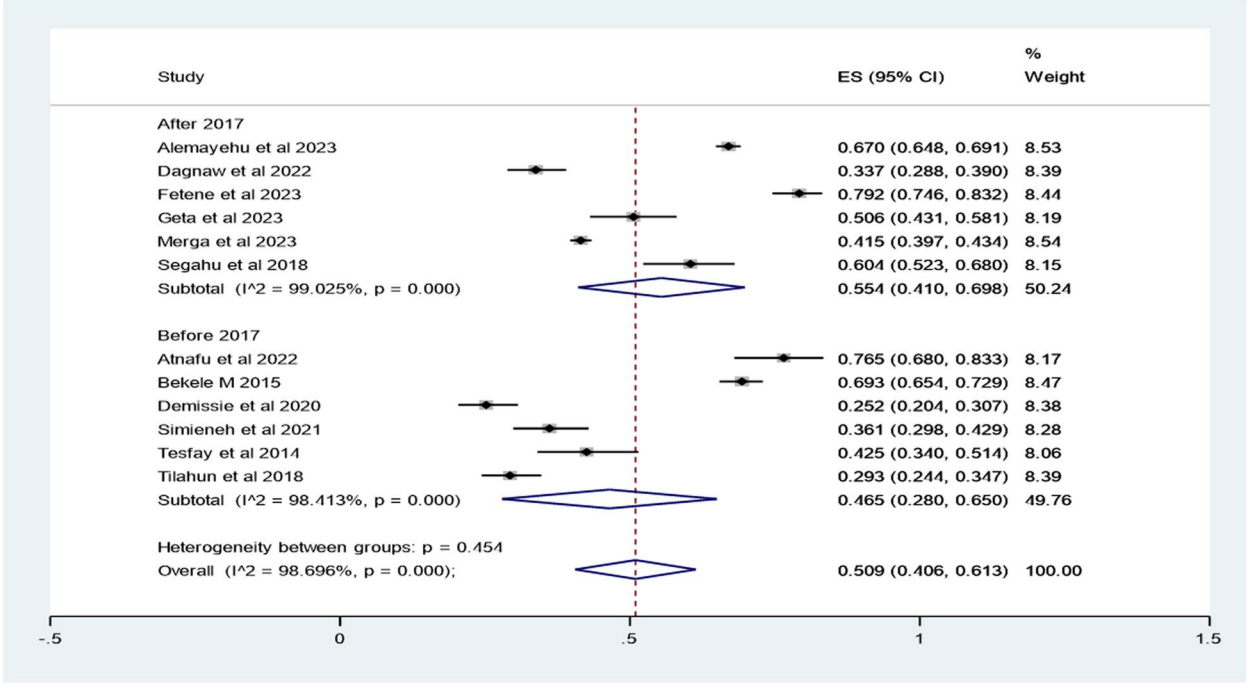

Fig. 9 Health services utilization among non CBHI insured population by study years in Ethiopia, 2024

another systematic review in Africa and Asia showed that CBHI and social health insurance (SHI) improved health services utilization and protect members financially by reducing their out-of-pocket expenditure, and that CBHI improves resource mobilization too [2]. Our finding was also in line with the result reported by similar study carried out in West Africa which found positive impact of health insurance on access to health services for mothers and children [30]. Moreover, a systematic review carried out in India found consistent finding, in which

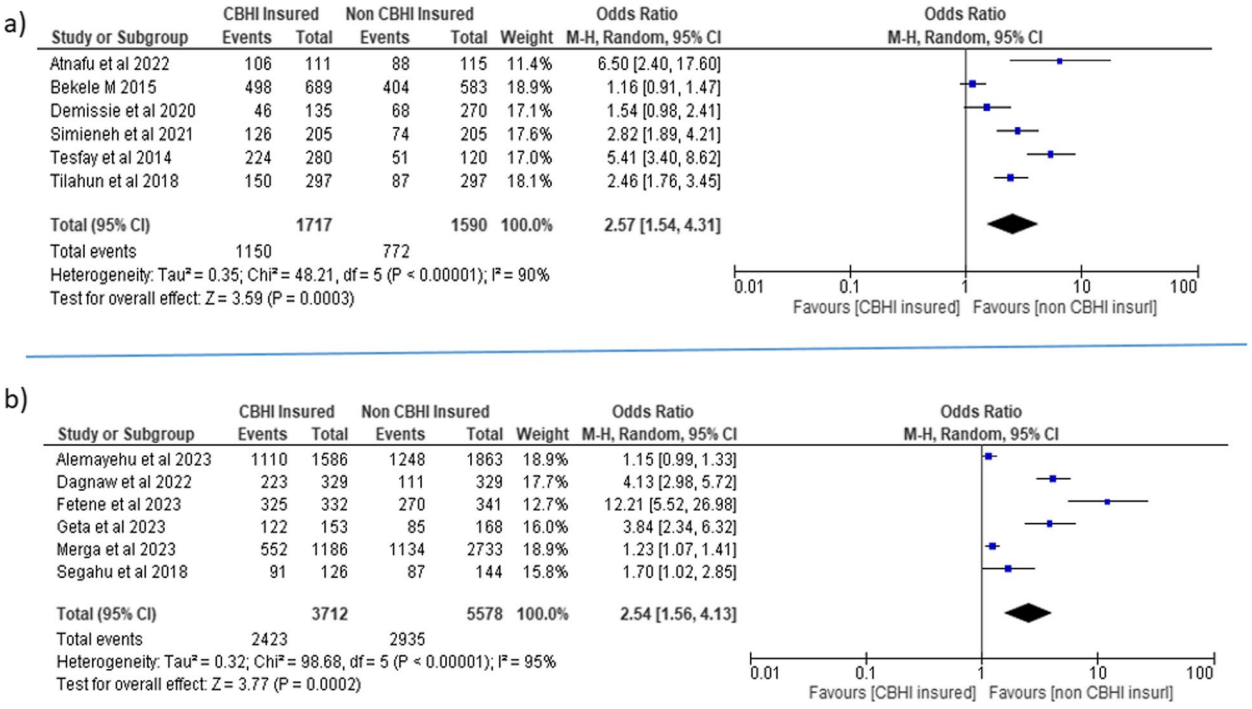

Fig. 10 Odds Ratio estimates for studies conducted before 2017 (**a**) and after 2017 (**b**), Ethiopia, 2024

people with insurance schemes were associated with increased consumption of health care services [31]. The reasons behind increased utilization among CBHI members could be: (I) reduced financial barriers: CBHI alleviates the financial burden of healthcare, a major deterrent for many Ethiopians. Reduced out-of-pocket expenses incentivize seeking care, particularly for preventive and routine checkups, potentially leading to early detection and management of chronic illnesses. (II) CBHI often strengthens service delivery infrastructure, particularly in rural areas, enhancing accessibility and convenience for members. This reduces travel time and costs, making healthcare more readily available. (III) CBHI programs often include health education and awareness campaigns, empowering members to understand the importance of regular checkups, preventive measures, and early intervention. This can motivate individuals to proactively seek care. (IV) CBHI fosters community ownership and participation in healthcare management. This can build trust in the healthcare system and encourage individuals to utilize available services [11, 32, 33].

Healthcare utilization is a key performance indicator for measuring universal health coverage [4]. In lower and middle income countries, however, catastrophic health expenditure is the major bottleneck to achieve the expected level of health coverage and healthcare utilization, particularly for noninsured people [34]. One alternative to covering poor people in the informal sector is to involve them into CBHI. Its core idea is that the poor must be protected, particularly those who are unable to withstand the burden of payments for medical expenditure. Hence, health insurance is aimed to reduce the barriers to poor people to receive affordable treatment [35]. In Ethiopia, CBHI schemes is believed to fulfill the government's long term goal of improving healthcare by mobilizing domestic resources, improving access to healthcare services, and increasing the quality of services provided [36]. The increased and improved cash flow has had a positive effect on the availability of drugs and other supplies, which in turn has improved the quality of health services the facilities provide [37]. As a result, the annual outpatient visits per capita among CBHI member households was higher (2.09) than the annual outpatient visits per capita of the general population (1.77). Treatment seeking during illness was higher among CBHI member households (70%) relative to households from non-CBHI districts (58%) [38].

The finding from our review will have the following implications: (I) Implication for improved health outcomes: Increased healthcare utilization can lead to earlier diagnosis and treatment of diseases, potentially improving individual and population health outcomes. This holds true for both preventable and chronic conditions. (II) Implication in reducing inequality: CBHI can contribute to reducing healthcare disparities by enabling vulnerable populations, previously unable to afford care, to access essential services. This promotes equity and improves overall population health. II) Implication for sustainable healthcare financing: Increased service utilization can generate additional revenue for healthcare

systems, contributing to financial sustainability and potentially allowing for further service expansion and quality improvement.

Limitation of the study

Since, studies included are cross sectional surveys, there might be methodological limitations to arrive at cause effect relationships. Moreover, statistically significant heterogeneities were observed among individual studies. Even though, we applied statistical techniques to manage such statistical problems, we couldn't control all effects.

Conclusion

Community based health insurance has significantly increased healthcare services utilization among insured people as compared to non - insured people in Ethiopia. It yields almost three folds increase in health services utilization as compared with non CBHI users. This will help to achieve the long run plan on the universal health coverage and health for all approach. Hence, addressing challenges of CBHI enrollment and improving community engagement into this system will be helpful.

Abbreviations

JBI	Jonna Briggs Institute
CBHI	Community based health insurance
PRISMA	Preferred Reporting Items for Systematic Review and Meta-Analysis

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-024-11617-5.

Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

FDB contributed in the conception, FDB, MA, YT, AE, SDK, NK, MMM, EBE, KA and LA study contributed in the design, execution, acquisition of data, analysis and interpretation of the result, drafting, reviewing articles; approval of the version for publication agreed to share accountability for all aspects of the work.

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Availability of data and materials

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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