

## THE ROLE OF THE WORLD HEALTH ORGANISATION AND RELATED FUNDS ON MATERNAL AND CHILD HEALTH IN NIGERIA

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### Abstract

Maternal and child health is extremely important because it serves as the fundamental metric of a successful society or nation. This is because every successful conception of a child ensures that there is hope for a better world because each child has the potential to make a positive difference. The demands of mothers' health must be appropriately met since they have a significant impact on how birth will turn out and, thus, on the continuation of life. The purpose of this study is to provide light on the roles played over time by the World Health Organization, United Nations Children's Fund, and United Nations Population Fund in influencing maternal and child health in Nigeria.

Using a well-established guide on performing systematic reviews and meta-analyses for medical research as well as PRISMA reporting criteria, systematic review was used to effectively search for data related to the steps taken by these multilateral organizations. After carefully evaluating all the publications acquired and ensuring that they met the inclusion and exclusion criteria, respectively, an electronic search was conducted on Google Scholar and PubMed, yielding 49 studies for systematic review. According to the research's design, the multilateral organizations engaged in the program, the measures taken by those organizations, the country, the target group whether it is for maternal or child health and the state or area in Nigeria where the study was conducted, the data were retrieved. The general quality of the included studies was not astounding this due to the fair rating most of the study received, the availability of the roles in form of intervention or programmes executed by the multilateral organizations involved in this study were very limited upon searching electronically implying that much qualitative and dedicated research on this theme needs to be adequately carried out.

This study demonstrates that the three organizations have had a significant impact on Nigeria over the years. However, the World Health Organization has contributed the most to maternal and child health, as evidenced by the targeted programs it has carried out in Nigeria over the years. One significant result of this program was the complete eradication of poliomyelitis in Nigeria.

**Keywords:** WHO, child health, Nigeria

### INTRODUCTION

Maternal mortality continues to be an issue affecting women in developing countries. In 2017, maternal mortality ratio which denotes the number of maternal deaths per 100,000 livebirths experienced a significant positive change for the

better by being dropped by about 38% worldwide but in this worldwide reduction 94% of all maternal deaths occur in low- and middle-income countries, this key fact was presented by World Health Organization. Also, approximately 810 women in 2017 died from preventable causes related to pregnancy and childbirth, among them includes

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young adolescents between the ages of 10-14 and they face high risk of death and complications experienced during and after childbirth.<sup>1</sup>

Reports suggested by fragile state index postulates that countries termed into fragile states regarding poor health outcomes experienced which can be classified into very high alert or high alert contained fifteen countries (South Sudan, Somalia, Central African Republic, Yemen, Syria, Sudan, the Democratic Republic of the Congo, Chad, Afghanistan, Iraq, Haiti, Guinea, Zimbabwe, Nigeria and Ethiopia), and these 15 countries had maternal mortality ratios in 2017 ranging from 31 (Syria) to 1150 (South Sudan)". The significant discrepancy in socio-economic status leading to a huge gap between the rich and poor causing the under privileged to face problems regarding to the use of health facilities this becomes even worse for pregnant women.<sup>2</sup>

The development of a child is crucial to every nation. This is because the continued growth of such nation is assured by successive generations to continue and preserve legacy. However, neonatal and under 5 mortalities have constantly been a health challenge, especially in sub-Saharan Africa. Most deaths in newborn babies in their first 28 days or in the first month occur as a consequence of infections and birth defects.<sup>3</sup> Nigeria is a vast country in west Africa estimated to be over 200 million, it is known to be populous with a reputable economy though it is still a developing country. There is quite a high concentration of teenage pregnancy and maternal deaths but health interventions by various multilateral organizations occasionally intervene to improve the health status.<sup>4</sup> The health monitoring of mothers and their children is very significant to be adequately studied as there is a great link between the overall growth of every country in relation to the number of successful births, maternal and child health can somewhat be thought as an indicator as there exist an indivisible association between both health outcomes are often used as a basic key parameter or health indicator for every country.<sup>5</sup>

## METHODS

This systematic review was carried out in accordance with the established guide and method-

ological recommendations employed in systematic reviews for medical research.<sup>6</sup> And the preferred reporting items for systematic reviews for meta-analyses by Muka<sup>7</sup> was utilized. As part of undertaking this systematic review adequate steps were taken and the core research question guiding this review was: what issues was prevalent in all mothers and they are under the ages of 5 in Nigeria and how has world health organization, united nations population fund and united nations children fund taken measures to mitigate this problem. A measure in relation to this systematic review was defined as any form of program, intervention or strategy initiated by the multilateral organizations involved in this study. The measure employed by these multilateral organizations should be aimed at achieving better health status or outcomes, ensuring that every mother and child meets their full potential through experiencing a long and healthy life.

## SEARCH STRATEGY AND SEARCH STRING

The search strategy and search string used in this review followed an initial search which was conducted in a database ensuring that relevant keywords and index terms for publications that were connected to the review subject were adequately prioritized. Following this we made a comprehensive search of PubMed and Google scholar from the month of inception to February 2022 making sure that relevant publications were included. The following phrases and search string including MeSH (Medical subject headings) terms, were used for doing research in PubMed: ("maternal health"[MeSH Terms] OR "mother s health"[All Fields]" OR "mother health"[All Fields]) AND ("child health"[MeSH Terms] OR "newborn health"[All Fields] OR "infant Health"[All Fields]) AND ("nigeria"[MeSH Terms] OR "nigeria"[All Fields] OR "nigeria s"[All Fields] AND ("world health organization"[MeSH Terms] OR "world health organization"[All Fields]) AND ("united nations population fund"[MeSH Terms] OR "united nations population fund"[All Fields]) AND ("united nations children's fund"[MeSH Terms] OR "united nations children's fund"[All Fields]). The search phrases and search string used for Google scholar includes Maternal health, mother health, child health, newborn health, world health organization, united nations population fund, united nations children's fund and Nige-

ria. "Maternal health," "child health," "world health organization," "united nations population fund," "united nations children's fund," and "Nigeria."

#### SELECTION OF SOURCES OF EVIDENCE AND ELIGIBILITY CRITERIA

As part of assuring a qualitative study, inclusion and exclusion criteria were established and fully taken into consideration, during the study and this was achieved by examining the full text to determine their eligibility prioritizing the inclusion and exclusion criteria. Studies that were fit to be included were as follows; Studies in English, studies whose findings gave a detailed description of the measures employed by the multilateral organizations under study, studies carried out in Nigeria, studies carried out in sub-Saharan Africa of which Nigeria was included and multi-country studies in which Nigeria took part in them, observational studies such as prospective cohort, case-control and cross-sectional studies, journals, articles and randomized control trials while also integrating a holistic approach of ensuring that the roles undertaken by World Health Organisation and other related funds which may come in form of measures, interventions or programmes were adequately taken into consideration and were reported appropriately while also paying keen attention to the efficacy of such measures through the outcome of programmes undertaken by World Health Organisation and other related funds. Studies that were excluded from the studies are as follows; Studies that were not English, studies that showed no association to measures undertaken by World Health Organisation and other related funds involved in the study, multi-country studies that did not include Nigeria and sub-Saharan studies that excluded Nigeria, Abstracts, posters, conferences, proceedings, meta-analyses, pre-prints, systematic reviews, study protocols, reports, and case-series this is to ensure that vivid information are gotten for this research as it will would be a baseline for other prospective research to track the roles of World Health Organisation and other related funds to maternal and child health in Nigeria.

#### DATA EXTRACTION AND ANALYSIS

We collected data from the studies that met the inclusion criteria for analysis using Microsoft Excel,

and adequately arranged them into categories in regard to factors such as study design, state (region), target group, sample size, multilateral organization involved (world health organization, united nations population fund and international children's fund) and outcome of studies.

#### QUALITY ASSESSMENT OF INCLUDED STUDIES

The quality of the included studies was assessed using methods for evaluating research quality developed by the National Heart, Lung, and Blood Institute<sup>10</sup> (NHLBI) for observational cohort and cross-sectional investigations. Responses were required to a total of fourteen questions, which were arranged as follows, to assess the importance of the findings: The research question, the study population, the groups drawn from that population, and the standard eligibility requirements rationale of sample size, Evaluation of exposure came before evaluation of result. a long enough period of time to observe the result, varying degrees of the urge to be exposed, Measurements of exposure and assessments of that exposure, recurrent assessments of that exposure, assessments of the results, and outcome raters, statistical analysis, follow-up frequency, and The studies that were taken into consideration for inclusion were all cross-sectional, the exposure was not assessed prior to the outcomes, the studies were evaluated at a single point in time and, as a result, did not have any follow-ups, and none of the studies reported outcomes in a manner that would have allowed the assessors to be blind to the studies' findings. Three categories appeared after the quality was rated on a scale of 12 points: exceptional (10–12 points), fair (6–9 points), and awful (1-5 points). No matter how the NHLBI rated the study, it was all considered in the analysis. Following the NHLBI's recommendations, fourteen questions were evaluated for randomized controlled studies. They include: If such a study was clearly referred to as a randomized clinical trial, or RCT, was the application of randomly generated assignments appropriate to such a study, was such a treatment concealed in such a way that the results could not be predicted, was the exposed population and the researcher blinded to the treatment group, were the outcome assessors blinded to the participants group assignment, were there existing similarities among participant

groups that could affect the outcomes. Was there any claim made by the researcher that the sample size was too large to detect a difference in the actual outcome between groups, where the results predicted before the analysis were the study's original protocol followed, the measures used to assess the outcomes were consistent across all the participants.

**DATA SYNTHESIS**

Due to the significant degree of heterogeneity in both the methodology and the equipment used for data collection, a meta-analysis was not feasible. Given that the studies involved ranged from cross sectional studies, randomized controlled trials, before and after study, multi country studies, articles, and journals.

**RESULTS**

After removing duplicates, the electronic search yielded 404 publications that made up the systematic literature. Selection was made after care-

fully reviewing all the topics, abstracts, and research. 49 papers were included in the systematic review out of the 117 full texts that were accessed in total (see [Figure 1](#)).

As a result, [Supplementary Table \(1\)](#) briefly outlines the classification of the included studies into key components by grouping them into the study designs, target group, whether it was focused on maternal or child health, state (county) in Nigeria where the study was taken, country where the study was undertaken, multilateral organizations involved in each included study, measures undertaken by the multilateral organizations, outcome of each study, and quality of the studies. It also asserts that the main measures that all the multilateral organizations of concern in this study primarily concentrated on vaccination coverage, antenatal care, actualization of better outcome in successive labor encountered in pregnant mothers and reducing maternal and child mortality. As compared to maternal health needs, there was a high frequency of coordinated activities and actions to satisfy children's health needs.

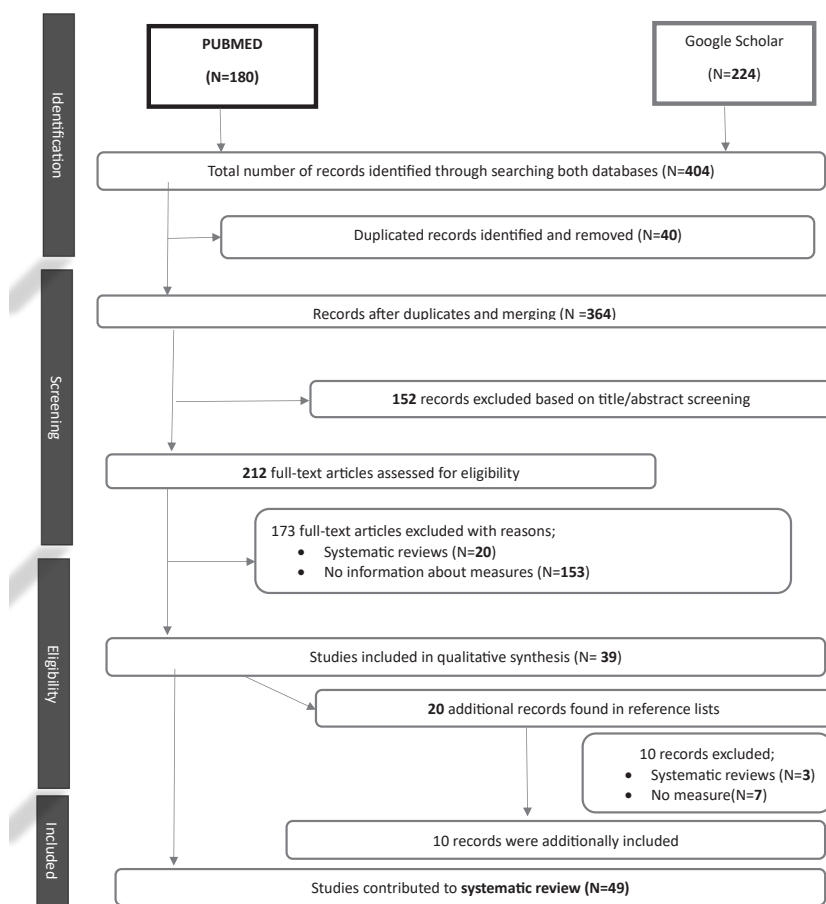


Figure 1. PRISMA flowchart

Figure 2 below displays the rating of the included studies, excluding journals and articles, demonstrating the study's overall methodological rigor after performing a quality evaluation on each one. As it can be observed from the illustration, most

studies on mother and child health have been mediocre, suggesting that researchers in these fields should work harder to conduct more thorough, high-quality studies to enhance the body of knowledge on this issue since it is pertinent.

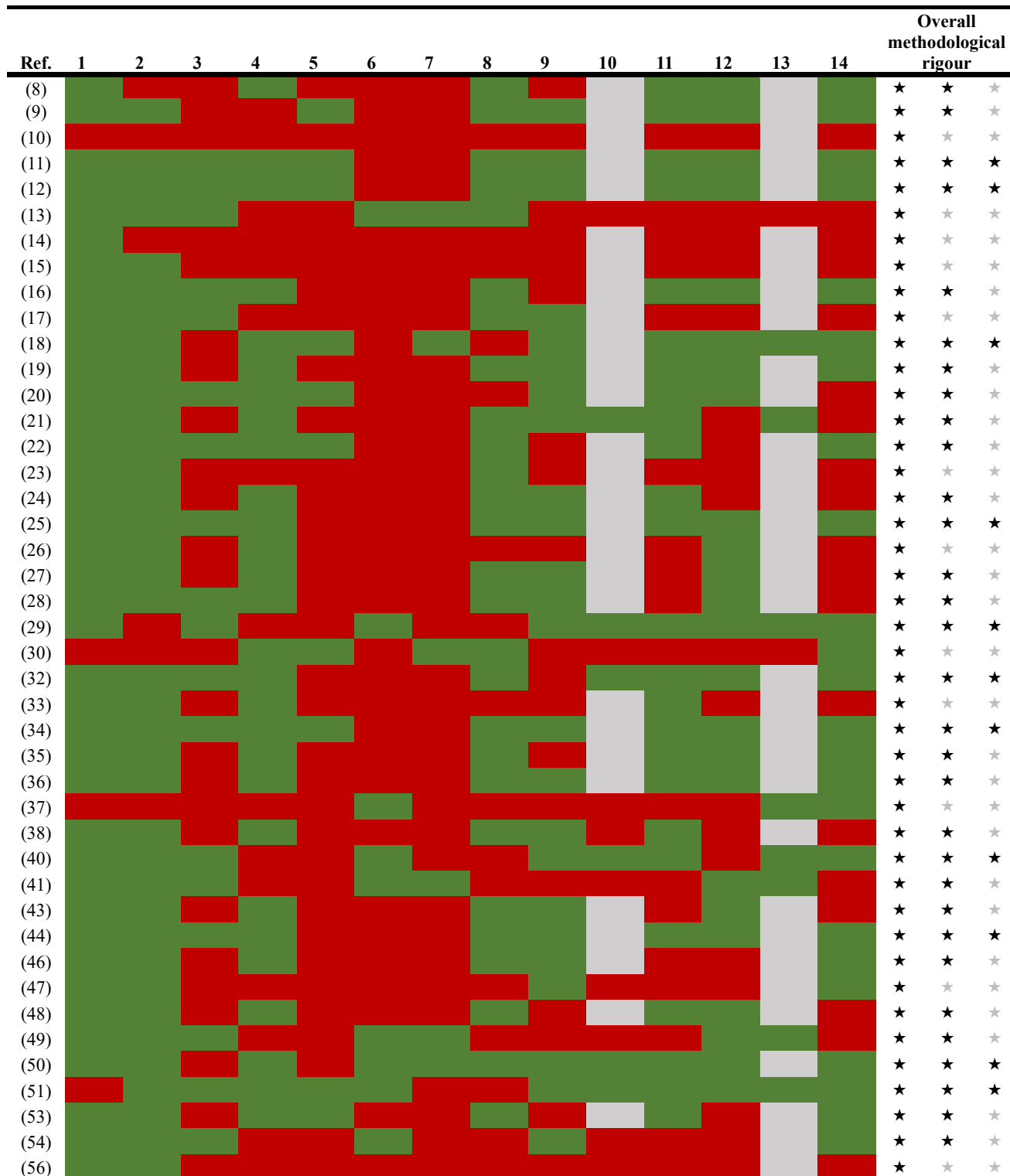


Figure 2. Rating of the included studies  
 Green colour= Good; Grey colour= Neutral; Red colour= Poor;  
 One star= Poor overall rating; Two star= Fair overall rating; Three star= Good overall rating

## DISCUSSION

After carefully examining the 49 studies that matched the inclusion criteria and were included. It is crucial to note that the systematic review that was conducted exposes key elements that are pertinent to this study. It follows a pattern which tries to further explain the influence that the World Health Organization, United Nations Children's Fund, and United Nations Population Fund have had throughout time on maternal and child health in Nigeria.

### PECULIAR RECURRING MATERNAL AND CHILD HEALTH CHALLENGE TRENDS IN NIGERIA

According to the research that were chosen, Nigeria's inadequate healthcare facilities are to blame for most health problems, namely the poor health outcomes that mothers and their children endure. Most pregnant women perceive antenatal care as merely a protocol in place in all hospitals and not a crucial necessity to enable them to have a good state of health as well as their unborn children, according to studies, and this behavior pattern has repeatedly been shown to be a causal factor also leading to poor health outcomes. While the South, East, and West of Nigeria have a significant understanding of the necessity for regular prenatal care, the rates of visits are not noteworthy, especially in the rural settings of the nation. This has over time led to inadequate antenatal visits, which is characteristic in the North of Nigeria.

Pregnant women frequently have complications linked to obstetric care and labor difficulties because of these insufficient prenatal care appointments. According to studies, there have been numerous instances of maltreatment of expectant mothers who are on the verge of giving birth by healthcare professionals. Since there are no specific laws or regulations that offer exclusive treatment for expectant mothers and their children, this has made the problems with maternal and child health in Nigeria even worse. Nigeria is presently among the polio-free nations in the world. This is due in large part to the fact that immunization against measles and polio was seen to be a constant activity widespread across all areas of Nigeria.

## MEASURES UNDERTAKEN BY WHO UNFPA AND UNICEF

The World Health Organization has been the highest contributing multilateral organization to mother and child health over the years, according to [Supplementary Table \(2\)](#), which shows the overall features of the included studies. The United Nations Population Fund, United Nations Children's Fund, and World Health Organization have worked together, but much-needed concentrated efforts still need to be made to maintain appropriate health for mothers and their children. This review demonstrates that all three multilateral organizations made many interventions. Yet certain programs stood out because of their persistence and commitment, such as the BOLD initiative (Better outcomes in labor difficulties) and the WHO-specified objective of 80% vaccine coverage. The BOLD project, which was implemented by all three multilateral organizations, proved to be beneficial because it aims to improve the standard of healthcare provided to expectant mothers during the height of childbearing. As a result, this project can be deemed successful because there has been a marked decline in maternal mortality, particularly among expectant mothers who are pregnant at the time of delivery. On the other hand, the WHO specified target of 80% vaccination coverage is seen to be its most committed effort to date. To meet this goal in Nigeria, the WHO has worked closely with UNFPA and UNICEF. Other noteworthy actions taken by these international organizations include RACE (Rapid Access Expansion Programme), which aims to eliminate malaria, diarrhea, and pneumonia among children aged 2 to 59 months, COMPASS (Community Participation for Action in Social Sector), which encourages the use of healthcare and education in various Nigerian communities, INSPIRE (Implementation and enforcement of laws, Norms and Values, Safe environments, Parent and caregiver support, income and economic strengthening, Response and support services, Education and life skills) aimed at ending violence against children, MDG 4 goal (Millennium development goal 4) aimed at reducing child mortality, WHO recommendation on antenatal care for pregnant women which is aimed at encouraging routine checks by pregnant women before conception to achieve a successful delivery, WHO recommendation for the option B plus of mothers with HIV aimed at eliminating mother to

child transmission of HIV and a more recent intervention employed by UNFPA with other non-governmental organizations in Nigeria to examine the effects of Covid 19 on health facilities in Nigeria. A very important item to highlight is the Bill and Melinda Gates Foundation's sponsorship of several interventions (programs) carried out by these international organizations.

### DECISION MAKERS PERSPECTIVE

Decision makers which principally constitute of the various levels of the government in Nigeria such as the federal, state, local and other governmental agencies are key players to ensuring adequate measures which are imbibed by various multilateral organisations to maternal and child health concerns in the country are successively incorporated. However, there is a shortfall in the level of commitment by the government of Nigeria to achieving the utmost goal of World Health Organisation been the most significant contributor to the wellbeing of mothers and children as interventions and programmes undertaken by these multilateral organisations are not adequately follow up by the government which has occasionally led to poor health outcomes resulting to morbidity experienced in pregnant women and children between the ages of 0-3, and in most severe cases mortality.

Therefore, it is very important for decision makers to work effectively and collaboratively to facilitate the programmes, intervention or measures employed by multilateral organisations as it assures excellent health outcomes and above all increases the longevity of human lives.

### LIMITATIONS

In Nigeria, research has lagged in its focus on maternal and child health concerns throughout

time. As a result, only 49 studies out of a total of 364 studies were included in the analysis after duplicates and merging were considered.

### RECOMMENDATIONS

This study demonstrates that significant work must be done to improve maternal and child health in Nigeria, especially through interventions or programs that would lessen the problems unique to mothers and their offspring. There also needs to be more qualitative study specifically focused on children ages 0-5, as there isn't much evidence available in Nigeria about significant health outcomes or follow-up at this age. Although the WHO's commitment to maternal and child health is very praiseworthy, close cooperation with other multilateral organizations and government agencies in Nigeria can help to further ease the issues that mothers and children face. The WHO's antenatal care recommendation has been shown to be effective, but there is still much that can be done to change pregnant women's behavior because so many of them disregard the value of routine antenatal checks, which can occasionally cause labor problems and even death for both mother and child. Over the years, the UNFPA and UNICEF have also been seen to play significant roles in enhancing the standard of maternal and child health, but they could still implement more strategic programs to help improve the health of women and children, especially pregnant women, to ensure that they have easy labors and deliveries, which in turn leads to the creation of a successful population. Most importantly, Nigerian non-governmental organizations ought to follow the Bill and Melinda Gates foundation's lead and collaborate with these multilateral organizations in order to produce good and high-quality health outcomes in all areas of health, not only mother and child health.

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Supplementary Table (1) below denotes the classification of the included studies into key component

| Ref. | Study Design           | Target Group              | Country   | Sample Size | MLO Involved       | Measures undertaken by MLOs   | Outcome of studies   | Quality of study |
|------|------------------------|---------------------------|---|-------------|--------------------|---|--|------------------|
| (8)  | Cross-sectional study  | Maternal Health           | Nigeria   | 204         | WHO                | Screening tool employed to measure common mental disorders  | High prevalence of maternal common mental disorders in north-western Nigeria.  | Fair             |
| (9)  | Cross-sectional study  | Maternal and Child health | Nigeria   | 307         | UNFPA              | Intervention implemented by UNFPA in collaboration with other non-governmental organizations in Nigeria which were WHARC, EVA, and PPFN. This project was carried out during the pandemic to see the effect of Covid-19 on primary health care facilities | Large proportions of primary health centers in 30 local government areas of the 10 states involved in this study provided essential reproductive maternal, child, and adolescent health services which limited the provision of primary protective equipment during the lockdown | Fair             |
| (10) | Before and After Study | Maternal and Child health | Nigeria, Bangladesh, Côte d'Ivoire, Ethiopia, Ghana, India, Malawi, Uganda, and United Republic of Tanzania | 2607        | WHO, UNICEF, UNFPA | An established network for improving the quality of maternal and child health care between WHO, UNICEF and UNFPA  | Poor care practices have persistently led to the cause of mortality to mothers and their newborns this occurs more in sub-Saharan Africa   | Poor             |
| (11) | Cross-sectional        | Child health              | Nigeria   | 750         | WHO, UNICEF        | WHO specified target of 80% vaccination coverage  | Routine immunization was below the WHO target  | Good             |
| (12) | Cross-sectional        | Maternal and Child Health | Nigeria   | 440         | WHO                | WHO 2007 reference charts to determine the BMI of children  | High prevalence of obesity in Lagos state (South-west) Nigeria   | Good             |
| (13) | Cross-sectional        | Maternal and Child health | Nigeria   |             | WHO, UNICEF        | Support strategy by WHO, UNICEF, and USAID to Nigeria   | Inequalities in access to child health have declined over the period 1990-2008 while socio-economic inequalities   | Poor             |

|      |                 |                           |   |         |                    |  |   |  |      |
|------|-----------------|---------------------------|---|---------|--------------------|--|---|--|------|
| (14) | Cross-sectional | Maternal health           | Nigeria   | 323     | WHO, UNICEF, UNFPA | Intervention to assess pre-eclampsia and eclampsia   | Health care seeking practice by pregnant women is low thereby leading to high occurrence of pre-eclampsia and eclampsia     | in access to maternal health has increased | Poor |
| (15) | Cross-sectional | Child health              | Nigeria   | 29      | WHO, UNICEF        | Global polio eradication initiative programme  | High impact has been felt through this initiative on polio eradication  |  | Poor |
| (16) | Cross-sectional | Maternal health           | Nigeria, Sierra Leone, Kenya, Bangladesh, India | 500 000 | WHO, UNFPA, UNICEF | A project funded by Department of International Development United Kingdom (DFID UK) and UNICEF to Emergency Obstetric Care      | Emergency Obstetric Care is significantly below target in Nigeria   |  | Fair |
| (17) | Cross-sectional | Child health              | Nigeria   | 449     | WHO                | WHO specified target of 80% vaccination coverage   | High incidence of measles occurred due to poor immunization   |  | Poor |
| (18) | Cross-sectional | Child health              | Nigeria   | 300     | WHO                | The Department of Maternal, Newborn, Child, and Adolescent Health intervention in synergy with Bill and Melinda Gates foundation | High Treatment of possible serious bacterial infection of young infants   |  | Good |
| (19) | Cross-sectional | Maternal health           | Nigeria   | 360     | WHO, UNFPA, UNICEF | Combined intervention strategy to reduce maternal mortality  | High rate of maternal mortality occurred in Ogun (Southwest) due to poor health education                                   |  | Fair |
| (20) | Cross-sectional | Maternal and child health | Nigeria   | 630     | WHO, UNICEF        | High burden impact of malaria approach adopted by WHO and micro-mass planning on long-lasting insecticide nets by UNICEF and WHO | There are high rural-urban disparities in care seeking practices among mothers to their children under ages of five         |  | Fair |
| (21) | Cross-sectional | Maternal and Child health | Nigeria, Ghana, Guinea, Myanmar                 | 2672    | WHO                | Multi-country intervention employed by WHO to examine how women are treated during childbirth                                    | Setting played a significant role to labour companionship as mistreatments was majorly encountered in low resource settings |  | Fair |
| (22) | Cross-sectional | Maternal and Child health | Nigeria   | 1241    | WHO                | Study undertaken was based on the universal health coverage by WHO target goal   | COVID 19 negatively greatly impacted reproductive, maternal, newborn and child health in Nigeria                            |  | Fair |

| of 2030 in line with the impact of COVID 19 on the target |                                     |                           |                                 |                    |   |  |
|---|-------------------------------------|---------------------------|---------------------------------|--------------------|---|--|
| (23)  | Prospective cohort                  | Maternal health           | Nigeria, Ethiopia               | WHO, UNFPA         | Implemented survey on maternal death surveillance and response by WHO and UNFPA   | This is a survey which was targeted to reduce the mortality rate in mothers among 62 countries involved in the study<br>Poor                     |
| (24)  | Cross-sectional                     | Maternal and Child health | Low-middle income countries     | WHO                | 5000<br>Comprehensive recommendations on routine antenatal care for pregnant released by WHO  | Majority of women in need of antenatal care had little visits to medical care facilities leading to poor health outcomes<br>Fair                 |
| (25)  | Cross-sectional                     | Maternal and Child health | Nigeria, Ghana, Guinea, Myanmar | WHO, UNFPA, UNICEF | 2672<br>Funding by Department of reproductive health and research WHO, UNFPA, ICF and United states agency for international development to research how women are treated during facility-based childbirth | Mistreatment was seen in high proportion among the country involved in the study<br>Good   |
| (26)  | Prospective cohort                  | Maternal and Child health | Nigeria Uganda                  | WHO                | Project carried out by WHO named better outcomes in labour difficulty (BOLD) which address quality of facility-based childbirth care in low resource settings   | Notable reduction of maternal morbidity and mortality has been seen to occur in Nigeria over the years because of the project<br>Poor            |
| (27)  | Cross-sectional                     | Maternal and Child Health | Nigeria Uganda                  | WHO                | 132<br>Combined intervention employed by WHO, UNFPA, and ICF to improve the quality of care during childbirth   | Much needs to be done to improve the quality of care during childbirth as much reported complications have been seen to occur previously<br>Fair |
| (28)  | Article                             | Maternal health           | Nigeria, Zambia, India          | WHO                | Research funding initiated to curb maternal syphilis associated with adverse pregnancy outcomes in Nigeria, Zambia, and India   | Unsolved high burden of maternal syphilis is associated with adverse pregnancy outcomes<br>Fair  |
| (29)  | Cluster randomized controlled trial | Maternal and Child health | Nigeria                         | WHO                | 6391<br>Intervention by WHO to improve male knowledge and attitudes about maternal and child health in Nigeria  | Universal home visits showed to improve male spouses' knowledge about maternal and child health<br>Good  |

|      |                                   |                           |                                    |       |                    |  |   |      |
|------|-----------------------------------|---------------------------|------------------------------------|-------|--------------------|--|---|------|
| (30) | Randomized controlled trial study | Child health              | Nigeria                            | 308   | WHO, UNICEF        | WHO recommendation of guidelines in pneumonia care and management of child illness, WHO/ICF collaboration organizing a training programme called 'Caring for the sick child in the community'                                  | Pneumonia has been a lingering issue in Nigeria however, it is explicit to note that the randomized controlled trial employed for this study accrues that more study needs to be done to contain the prevalence of pneumonia in Nigeria   | Poor |
| (31) | Article                           | Maternal and Child health | Nigeria, Ethiopia, Kenya, Tanzania |       | WHO, UNICEF, UNFPA | Synergy between all the multilateral organization to generate estimate of aids/contribution disbursed to Nigeria, Ethiopia, Kenya, and Tanzania on reproductive, maternal, newborn and child health                            | USA and UK were the largest bilateral donors in 2017, Global fund and Gavi were the largest multilateral donors and the proportion received for reproductive, maternal, newborn and child health increased with Nigeria receiving the highest aid in 2017 followed by Ethiopia, Kenya, and Tanzania |      |
| (32) | Cross-sectional study             | Maternal and Child health | Nigeria                            | 376   | WHO                | WHO recommendation on recognized danger signs and health seeking behaviours of mothers and caregivers  | Knowledge of mothers on key WHO danger signs associated with their newborns was significantly poor as only few numbers of them recounted fever as only the only known danger  | Good |
| (33) | Cross-sectional                   | Maternal and Child health | Nigeria                            | 142   | UNICEF, WHO        | WHO recommendation for the option B plus of mothers with HIV of lifelong antiretroviral therapy (ART) after delivery, collaboration of WHO/ICF/USAIDS in the global elimination of mother to child transmission of HIV (eMTCT) | Many mothers preferred the previous recommendation of WHO option B allowing ART until one week after cessation of breastfeeding for women not needing ART for their own health  | Fair |
| (34) | Cross-sectional                   | Child health              | Nigeria                            | 433   | WHO                | WHO 2030 target for eliminating transmitted helminth infections  | There is poor coverage of periodic deworming in pre-school age children   | Good |
| (35) | Cross-sectional                   | Maternal and Child health | Nigeria                            | 21785 | WHO                | WHO guidelines on the timeliness of antenatal care (ANC)   | Many numbers of mothers in Nigeria had at least on ANC contact during their recent pregnancies  | Fair |

|      |                          |                           |   |       |                    |   |  |      |
|------|--------------------------|---------------------------|---|-------|--------------------|---|--|------|
| (36) | Cross-sectional          | Maternal and Child health | Nigeria   | 21785 | WHO                | WHO recommended standards on ANC contacts in Nigeria  | The East, West and South of Nigeria had much ANC contacts while the North has the poorest ANC contact                              | Fair |
| (37) | prospective cohort study | Maternal and Child health | Nigeria, Malawi, Zimbabwe                           | 5107  | WHO                | INSPIRE project by WHO focusing to improve the retention in care among mothers living with HIV  | Diverse perceptions aroused as to the definitions of retention in prevention of mother to child transmission of HIV                | Poor |
| (38) | Cross-sectional          | Maternal health           | Nigeria   | 2710  | WHO                | Community Participation for Action in the Social Sector Project (COMPASS) developed in Nigeria following WHO guidelines on community intervention | There was less improvement as to overall maternal and childcare as compared to the health facility in 2009                         | Fair |
| (39) | Article                  | Maternal and Child health | Low- and middle-income countries (Nigeria included) |       | WHO                | WHO guidelines on Ending preventable maternal mortality   | Maternal and child death continues to be a lingering issue in low- and middle-income countries further actions are highly required |      |
| (40) | Prospective Cohort study | Child health              | Nigeria   | 6017  | WHO                | WHO oxygen guidelines   | Pulse oximetry should be used to routinely access Hypoxaemia in children   | Good |
| (41) | Prospective Cohort study | Child health              | Nigeria   | 2975  | WHO                | WHO specified target of 80% vaccination coverage  | Large coverage of oral polio vaccine and third pentavalent immunization was observed   | Fair |
| (42) | Article                  | Child health              | Nigeria, Zimbabwe                                   |       | WHO, UNFPA, UNICEF | WHO global recommendations of intrapartum care  | Much needed research needs to be done on improving labour care and its outcomes  |      |
| (43) | Retrospective Study      | Maternal and child health | Ethiopia, Malawi, Nigeria                           | 38948 | UNFPA              | UNFPA population monitoring strategy  | There was high usage of contraceptives among unmarried people as opposed to married people   | Fair |
| (44) | Cross-sectional study    | Maternal and Child health | Ghana, Guinea, Myanmar, Nigeria                     | 2672  | WHO                | WHO project on how women are treated during facility-based childbirth   | Verbal abuse appears to be the most common mistreatment followed by lack of supportive care  | Good |

|      |                             |                                  |   |                    |   |  |      |
|------|-----------------------------|----------------------------------|---|--------------------|---|--|------|
| (45) | Article                     | Maternal and Child health        | Low- and Middle-income countries            | WHO                | WHO report for universal health coverage  | Much action is required to meet the WHO universal health coverage  |      |
| (46) | Cross-sectional             | Child health                     | Nigeria                                     | WHO, UNICEF        | Collaboration between WHO and ICF in meeting MDG 4 target which is reducing childhood deaths globally | There is a significant reduction from the year 2003-2013 in under five mortality rates                   | Fair |
| (47) | Cross-sectional             | Maternal health                  | Nigeria                                     | WHO                | WHO committed action to achieve MDG 4 target  | Health facility basically affects the provision of free maternal care                                    | Poor |
| (48) | Cross-sectional             | Maternal health and Child health | Nigeria                                     | UNFPA, UNICEF, WHO | WHO "Better outcomes in labour" project (BOLD) and collaboration with UNFPA and UNICEF                | More attention to the emotional needs to expectant mothers in health facilities needs to be increased    | Fair |
| (49) | Cross-sectional             | Maternal health                  | Nigeria                                     | WHO                | WHO recommendation on ANC for pregnant women  | More research and intervention need to be done specially in antenatal care in low resource settings      | Fair |
| (50) | prospective cohort study    | Maternal and Child health        | Nigeria, Uganda                             | UNFPA, UNICEF, WHO | WHO BOLD project and collaboration with UNFPA AND UNICEF  | More findings to improve labour via improved cervical dilation needs to be done                          | Good |
| (51) | randomized controlled trial | Maternal and Child health        | Bangladesh, India, Kenya, Nigeria, Pakistan | WHO                | Funding by WHO and Bill and Melinda Gates foundation  | Use of dexamethasone led to less risk to still birth or neonatal death                                   | Good |
| (52) | Journal                     | Maternal and Child health        | Nigeria                                     | WHO                | Collaboration of WHO with civil society organizations in Nigeria                                      | In Nigeria there are few laws that support reproductive, maternal, neonatal, child and adolescent health |      |
| (53) | Cross-sectional             | Maternal and Child health        | Nigeria                                     | WHO                | WHO guidelines on preventing maternal mortality   | Many adolescent mothers arouse from the north which impacted negatively on maternal and child health     | Fair |

|      |                 |                           |                                    |      |                    |   |  |      |
|------|-----------------|---------------------------|------------------------------------|------|--------------------|---|--|------|
| (54) | Cross-sectional | Child health              | Malawi, Mozambique, Niger, Nigeria | 6200 | WHO                | WHO Rapid access expansion (RACE) programme                                 | Integrated community case management could help decrease child mortality to areas with low health facilities | Fair |
| (55) | Journal         | Maternal and Child health | Nigeria                            |      | WHO                | WHO programme to monitor health systems                                     | Much needs to be done to achieve positive health outcomes to every mother and her child                      |      |
| (56) | Cross-sectional | maternal and child health | Nigeria                            | 40   | WHO, UNICEF, UNFPA | Collaboration of various multilateral organization including USAID and UNDP | There are not enough policies favouring the quality of maternal and child health in Nigeria                  | Poor |

MLO= Multinational Organization; ANC= Antenatal Care; BOLD= Better outcomes in labour difficulty; COMPASS; Community Participation for Action in the Social Sector Project; INSPIRE; Implementation and enforcement of laws, norms and values, safe environments, parents and caregiver support, income and economic strengthening, response and support services, education, and live skill; RACE; Rapid access expansion programme; UNDP; United nations development programme; USAID; United states agency for international development



Supplementary Table 2: Overall features of the included studies

| Features                  | Percentage of studies<br>n=49 (%) | References   |
|---------------------------|-----------------------------------|--|
| <b>Study design</b>       |                                   |  |
| CSS                       | 31 (63%)                          | (8),(9),(11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(24),(25),(27),(32),(33),(34),(35),(36),(38),(44),(46),(47),(48),(49),(53),(54),(56) |
| RCT                       | 3 (6.12%)                         | (29),(30),(51)   |
| B/A study                 | 1 (2%)                            | (10)   |
| Article                   | 5 (10%)                           | (28),(31),(39),(42),(45)   |
| Cohort                    | 7 (14%)                           | (23),(26),(37),(40),(41),(43),(50)   |
| Journal                   | 2 (4%)                            | (52),(55)  |
| <b>Target group</b>       |                                   |  |
| Maternal health           | 9 (18%)                           | (8),(14),(16),(19),(23),(28),(38),(47),(49)  |
| Child health              | 11 (22%)                          | (11),(15),(17),(18),(30),(34),(40),(41),(42),(46),(54)   |
| Maternal and Child health | 29 (59%)                          | (9),(10),(12),(13),(20),(21),(22),(24),(25),(26),(27),(29),(31),(32),(33),(35),(36),(37),(39),(43),(44),(45),(48),(50),(51),(52),(53),(55),(56)          |
| <b>Organizations</b>      |                                   |  |
| WHO                       | 29 (59%)                          | (8),(12),(17),(18),(21),(22),(24),(26),(27),(28),(29),(32),(34),(35),(36),(37),(38),(39),(40)  |
| UNICEF                    | 0                                 | (41),(44),(45),(47),(49),(51),(52),(53),(54),(55)  |
| UNFPA                     | 2 (4%)                            | (9),(43)   |
| Two organizations         | 8 (16%)                           | (11),(13),(15),(20),(23),(30),(33),(46)  |
| All three organizations   | 10 (20%)                          | (10),(14),(16),(19),(25),(31),(42),(48),(50),(56)  |

| <b>Location</b> |          |
|-----------------|----------|
| North Central   | 3 (6%)   |
| North East      | 2 (4%)   |
| North West      | 2 (4%)   |
| South West      | 7 (14%)  |
| South East      | 4 (8%)   |
| South South     | 1 (2%)   |
| More than one   | 13 (27%) |
| Multi-country   | 17 (35%) |

(30),(33),(56)  
 (29),(53)  
 (8),(20)  
 (11),(12),(14),(18),(19),(22),(40)  
 (32),(34),(47),(55)  
 (17)  
 (9),(13),(15),(16),(27),(35),(36),(38),(41),(46),(48),(49)  
 (10),(16),(21),(23),(24),(25),(26),(28),(31),(37),(39),(42),(43),(44),(45),(50),(51)

CSS= Cross sectional study; RCT= Randomized controlled trial; B/A study= Before and After study; WHO= World Health Organization, UNICEF= United Nations Children’s Fund; UNFPA= United Nations International Children Emergency Fund; Two organizations= Studies in which only two multilateral organizations collaborated; All three organizations= Studies in which all three multilateral organizations collaborated; More than one; Studies undertaken in more than geographical region of Nigeria; Multi-country= Studies involving multiple countries in which Nigeria was part of such a study