



Maternal Care Interventions to Improve Maternal Mortality Ratio (MMR)

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Abstract

Daily, approximately, 800 women die from causes of pregnancy and during birth of child. These causes are totally preventable. Developing countries contribute for 99% of maternal deaths. The World is committed to decrease the Maternal Mortality Ratio to below 70 deaths per 100,000 live births, by the year 2030. This is target no. 3 of Sustainable Development Goal (SDGs) set by United Nations. The study was conducted with the objectives to see whether the evidence based maternal health care interventions around the globe reduce the MMR and other pregnancy related outcomes and to identify gaps in hierarchy of evidence available. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analysis) guidelines were used to do the review. The papers published in English language during last 25 years are searched using various search engines and electronic databases. The results of the study were validated by considering statistical toll of using the Odds ratio and 95% confidence intervals. Out of 1322 articles, 28 papers in English language qualified for study. There were 3 systematic reviews, 2 Randomized Controlled Trials (RCTs) and 23 Non-randomized Controlled trials. The different maternal care interventions categories were availability of skilled birth attendants in 12 studies (48%), available and operational Emergency Obstetrics Services (EmOC) health care interventions in 17 studies (68%) and timely referral of patients and transport availability in need in 14 studies (56%), respectively. The study revealed positive impact of the maternal health care interventions on the pregnancy outcomes, MMR, case fatality rate, increased institutional deliveries and cesarean section rate. The systematic review suggests strongly that MMR can be reduced by proper managing and implementing 'integrated' evidence based maternal health care interventions.

Keywords: Maternal Mortality Ratio, Skilled Birth Attendants, Referral, Emergency Obstetrics Services (EmOC)

INTRODUCTION

Every day around the world, about 830 pregnant women succumb to death due to pregnancy or complications of the child birth. This high mortality rate is unacceptable. 289,000 pregnant women deaths were reported in year 2013 due to pregnancy and complications of delivery. However, most of these maternal deaths were preventable in nature and reported from low-resource settings countries. A worldwide goal to improve maternal health is being approved by International Community. This was one

of the eight Millennium Development Goals (MDGs) adopted in 2000. There is a commitment made to reduce the maternal mortality ratio by three quarters between 1990 and 2015 (1). Presently the Sustainable Development Goal (SDGs), Goal 3, Good health and Well Being, has replaced the target of MDGs, to reduce the MMR below 70 per 100,000, by 2030. Maternal deaths have been reduced by 45% at global level since 1990. Many Sub-Saharan African countries with high MMR are

also able to reduce their MMR by 50%, since 1990(2). The countries of Asia and North Africa have also achieved a greater reduction in MMR. However, the global maternal mortality ratio, between 1990 and 2013, reduced by only 2.6% per year. This achievement is not at par with an annual decline rate of 5.5%, set to attain MDG5. (3). The progress of decline of maternal mortality ratio in developing countries is not easy to assess correctly and remains a challenge due to non-availability of data of high quality in countries experiencing a very high maternal mortality ratio.

The areas of the world where high MMR is observed also indicate about health inequities due to health care services accessibility. This reflects a major gap between rich and poor countries health equity because 99% of the maternal deaths happen in developing and underdeveloped countries. Approximately fifty percent of preventable maternal deaths occur in African sub saharan countries while rest thirty three percent of maternal deaths occur in South Asia.

Maternal mortality ratio disparity is being observed in 2013, when a rate of 230 per 100 000 live births was noted in developing countries in comparison to 16 per 100 000 live births in developed countries. Huge health disparities are noticeable as well between different countries as few countries showed a very high maternal mortality ratios of more than 1000 per 100 000 live births. A small number of countries also show large disparities within their own geographical areas between pregnant women having high and low socioeconomic status and in between those living in urban and rural areas respectively.

The adolescent females below 15 years of age in particular face a greater risk of death during pregnancy and delivery. The sudden development of complications during normal pregnancy and delivery are the most important causes of death among this group in developing countries (4).

The etiologies for high maternal mortality ratio include bleeding or hemorrhages (38%), sepsis (11%), abortions (9%), hypertensive disorders (5%) and obstructed labor (5%) (5,6), all of which are preventable. Still Often high risk pregnancies are being delivered at home in rural areas which are attended by untrained/unskilled birth attendants, in such cases sudden development of complications during delivery increase the high possibility of maternal deaths.

The rural population faces with poor transportation accessibility. It is quite difficult for them to get the emergency healthcare in need of an urgency. In developing countries the 24x7 hrs Emergency Obstetric Care (EmOC) facilities are not available in all geographical areas. Mostly there is no effective referral transport system, neonates care facilities with adequate proper referral support at primary care level. Other healthcare accessibility constraints are poor physical infrastructure, lack of availability of skilled birth attendants/ANMs/ specialists doctors, shortages of essential drugs and non-functional equipment. These adverse factors put the pregnant women in danger to get Emergency Obstetrics Care (EmOC) services to save life. The quality of maternal health care services depend on three essentials services (a) a trained birth attendant at delivery, (b) access to Emergency Obstetrics Services (EmOC) facility to deal with complications and (c) an adequate effective referral system to ensure complicated pregnancies get EmOC services in time (6). The other socio-economic barriers to access the health care include costs, poverty, female illiteracy, lack of health education etc. Lack of women's empowerment to seek maternal healthcare is a big gender barrier. These social problems considerably delay in accessing, seeking, reaching and getting the healthcare services in healthcare settings (6). Thus it appears to be a strong case that maternal mortality ratio can be decreased by increasing the accessibility to available Emergency Obstetrics Care (EmOC) services and referring of complicated cases in time to avoid delays.

The study was conducted with objectives to see whether the evidence based maternal health care interventions in different healthcare settings all over the globe able to reduce the MMR in developing countries and to identify gaps in hierarchy of evidence.

Materials and Methodology:

Search strategy was carried out by developing the search terms and finding articles by using different search engines.

1. **Search terms:** "Maternal Mortality" AND reduction OR interventions OR (randomized AND controlled AND trials AND (Randomized Controlled Trial) . The terms, "maternal death", "maternal mortality" , "maternal mortality ratio", "emergency

obstetric care”, “skilled birth attendant”, “referral”, “interventions”, “evidence-based”, are used with AND or OR searched engines . These terms are also used as free terms in other search engines.

2. **Search engine:** PRISMA guide lines was used as a search strategy. The various searched engines are the EBM(evidence based medicine), EMBASE, MEDLINE, Pub Med and Cochrane CENTRAL Register, database, google scholar, TRIP, DARE, NLH,CRD (NHS), Wiley online ,Summary search, AHRQ,electronic databases. The relevant studies between 1st January 1992 and 31st December 2016, for a period of twenty five years, was taken into account. The selected articles were reviewed further to assess , if “maternal death”, “maternal mortality” , “maternal mortality ratio”, “emergency obstetric care”, “skilled birth attendant”, “referral”, “ maternal interventions”, are used with Boolean “AND” or” OR” in all searched engines. The filters were used to exclude study types not eligible. Papers published in English were included.The last search was made on December 31st 2016.

Inclusion criteria

1. All studies evaluating any of the maternal health care interventions including skilled birth attendant’s availability, EmOC facility and timely referral.
2. All studies carried out as systematic reviews , randomized controlled trials and non-randomized trials .Though RCTs are the best method to assess the interventions impact , but it is also desirable to review the evidences from quasi-experimental trials because maternal mortality depends on many factors which are multidimensional in nature.
3. All studies with Maternal mortality ratio as an primary outcome. However, indirect outcomes of MMR such as Cesarean Section rates ,Case fatality rate , and institutional deliveries/births numbers were also considered.
4. The time period for literature review for last 25 years was taken due to scientific knowledge advancement in last few decades.
5. The World Bank (The World Bank. Country Classifications.2008) criteria was used to classify developing countries. A per capita income of less than \$975 was taken for low income and the per capita income between

\$976 - \$3,855 per capita was taken for lower middle income countries.

Exclusion criteria

The editorials, letters to editors, observational, descriptive or cross-sectional or studies, case reports etc. were excluded. The articles including specific diseases condition in pregnancy and its outcomes were also excluded.

Quality of paper assessment

The full text of abstracts and title of papers were viewed to remove duplicate articles. The abstracts of inclusion criteria were downloaded for further assessment. The information were extracted to find out whether articles meet the eligibility criteria to include in study. A critical appraisal checklist was used to validate the article internally. The Randomized and Non-randomized controlled trials studies were assessed to find out biases selection bias, selective outcome reporting, incomplete outcome data, focused question, confounding factors etc. using bias criteria. In Non randomized controlled trials with or without control groups and Randomized controlled trials , high risks and low risks of bias were assessed.

Data Management

A predesigned eligibility form was used to assess whether to include or exclude a particular full text paper. A form was designed to retrieve the relevant data from included eligible papers. This form was having eight columns to gather data from papers included (i) title, name of authors, publication year (ii) the characteristics of the study i.e country, type of study, sample size and setting (iii) type of maternal health care interventions, (iv) observation and results of interventions outcomes (v) Critical comments , if any. The outcomes indicators measured were trends of Maternal mortality ratio , EmOC indicators i.e. case fatality rate (CFR), proportion of births in EmOC facilities, and the caesarean section rate (CSR) before and after implementation of the intervention. MMR was acceptable as a key indicator which is used to evaluate the impacts of maternal health care interventions though MMR trends may be confounded by a range of factors. The derived data were computed for odds ratio with 95% confidence intervals for the indicators measured in the papers. Meta-analysis, an optional part of systematic review,

was not attempted due to wide variations of maternal healthcare interventions used, time intervals and indicators used to measure outcomes of interventions.

Results:

1322 papers electronically retrieved. Out of these 36 free articles in English language were screened for inclusion criteria. 28 papers qualified for literature review, measuring outcomes of maternal health care interventions. MMR, cesarean section rate, case fatality rate and institutional deliveries were measured as outcomes. 3 systematic reviews, 2 Randomized Controlled Trials (RCTs) and 23 non randomized controlled trials with and without controls were found. 5 non randomized trials with control and 18 studies without controls were included. Various maternal healthcare interventions revealed community level interventions, intranatal care by skilled birth attendants in 12 studies (48%), EmOC type of maternal care interventions in 17 studies (68%) referral improvement and transport availability interventions in 14 studies (56%), respectively. However, healthcare interventions seem to overlap in all studies.

Quality of study designs used to collect the data were found to be satisfactory. This was due to good study designs to give low risks of bias. Non-randomized controlled trials without control groups were found to be suffering from greater number of bias. The sample size, study designs and control groups was taken into consideration to assess bias in studies.

The most direct measurable outcome of the result of interventions related to maternal health was MMR. However, other outcomes of these interventions were also noticed in the studies. These outcomes were % of institutional deliveries increment following interventions, rates of cesarean section and case fatality rates.

Of the all 28 interventional studies, 2 (1.6%) were randomized controlled trials, 5 (18%) non-randomized trial with controls and the remaining were non-randomized trials without controls respectively. There was considerable overlapping of maternal health care interventions in all studies. The maternal healthcare interventions implemented in various studies included community participation, life saving skills for communities and birth

attendants at household level, training of birth attendants to improve intranatal care quality, availability of skilled birth attendant with linking to the formal healthcare system; availability and accessibility of EmOC services; improving the available infrastructure, availability of essential equipment in working condition, drug supplies and strengthening existing referral system. (Table 3)

These interventions were developed after needs assessment surveys and reviews of the project areas. Needs assessment surveys helped to assess the magnitude of the problem, etiologies for maternal deaths. Such type of studies helped to develop more specific and focused maternal care interventions in the areas of concern followed by proper implementation.

Though the maternal health is affected by many social and economic determinants the interventions seem to be overlapped in almost all studies in all countries. These interventions can be categorized according to the levels of prevention: primary level interventions aimed at preventing pregnancy, secondary level of prevention to avoid obstetric complications and tertiary level prevention i.e. preventing death after development of complications.

The most common interventions found integrated in 53% - 65% (15-18 studies) were training of birth attendants to provide good Emergency Obstetrics Care, availability of and motivation of healthcare workers, renovating maternal health care facility, improving adequate supply of emergency and essential drugs, consumables and equipment to deal effectively the complications of the pregnancy. Information, education and communication (IEC) program at the community level were found in 20 (32%) of the programs. IEC activities were related to the danger signals arising during pregnancy, about preparation for complications of delivery and awareness to avoid delays in getting the medical aid to deal effectively the complications. The maternal care interventions were able to achieve the objective by increased institutional based deliveries, by knowing when to go to institution for help and improved awareness of the danger signals of the pregnancy. The interventions in studies conducted in China, Gambia and Honduras linked the unskilled birth attendants to the quality care of health care services to get the improved the maternal health

outcomes. The training focused on the significance of and practice of clean child birth and immediate referral of complicated delivery to the EmOC obstetric services to avoid delays in getting emergency care. The studies reflected that training of trained birth attendants (TBA) reflected a positive effect on maternal health outcomes where the TBA services are being utilized by the community. However, positive maternal health outcomes were related to only when these interventions backed up by fully functional referral systems supported by good professional collaboration within the existing systems.

The maternal healthcare interventions in Africa were of small in nature mainly applied to a state/district healthcare settings providing healthcare to adjacent small communities. Though, the studies from China, Bangladesh, Nepal, Honduras and Bolivia reported reduction in MMR throughout country, however, the interventions aimed at special and specific geographic areas having high maternal mortality ratio. This was with a special emphasis to the most remote difficult rural geography.

A range of indicators assessed the impact of the maternal health care interventions. Various indicators were used by different studies to determine the outcomes of the interventions which depend upon healthcare intervention applied. The outcome indicators of interventions were MMR in (67%) and EmOC indicators in (52%) of studies, respectively. The other indicators used were increase in institutional deliveries at EmOC facility, cesarean section rates, % of high risk pregnant women referred for timely emergency services. Various other outcomes indicators of interventions were time period on an average, from start of complications to start of treatment, number of patients referrals, services of specialists utilized, blood transfusion, knowledge and attitude about obstetric care among community and females. A singleton RCT study from Pakistan also used EmOC indicator in addition to maternal mortality ratio. A statistically significant decline in maternal mortality ratio was observed in both RCTs included. In non-randomized controlled trials a significant decline was observed in 3 of non-randomized trials with controls.

Maternal mortality ratio noticed to be decreased from 933/100,000 live births to 186/100,000 live births (OR = 0.20, 95% CI = 0.09 - 0.44), a sharp

decline by 80%, reported by Tanzania regional hospital study.

Similarly 6 (21.42%) of studies showed statistically significant reduction in case fatality rate (CFR). The required needs for EmOC health care facility was used as an outcome indicator in 6 studies. A mean increase of 120% (range- 20% to 334%) after 5 years period, was also reported. The health care policy to improve the EmOC facility with subsequent improving the healthcare quality also resulted in a sharp increase of institutional deliveries by 70% in five interventional studies. These lacked community-based packages after 6 years of gestational period of implementation which policies corrected.

There were three main factors which played a significant role in maternal health care interventions proper implementation. These were related to leadership skills, managerial skills, issues of adequate resources and community utilization. Lack of political commitment led to insufficient budgeting, improper use of available resources, and defective policies for maternal care, poor technical and allocative efficiency of resources. Political and social instabilities in few countries like Angola and Sierra Leone, were reported leading to poor implementation of interventions. However, the countries with strong political commitment like China, Egypt, Honduras, Bangladesh and Bolivia reflect a greater success in proper implementation of the interventions.

Eight studies (28.57%) reported lack of resources responsible for poor implementation of the maternal care interventions. Limited budget was a major constraint for poor implementation of the maternal care interventions. This resulted in lack of timely supply of essential drugs, equipment and skilled manpower resources as well as poor referral. It was also found that more than 70% of maternal interventions were supported by the donors of international origin.

In four (14.28%) studies, different community low social and economic status, cultural and nutritional factors were found responsible for poor implementation of maternal care interventions. The poverty also adversely affected utilization of obstetric care services in Nigeria, Sierra Leone where no enabling policies exists for population below poverty line.

Discussion:

Not much studies in from of systematic reviews, meta-analysis and RCTs are available which showed reduction of MMR by different maternal health interventions. This is gap in knowledge. Most of the studies found are non-randomized controlled trials that too without controls. This indicates an urgent need to develop and implement uniform maternal health care interventions based on good scientific evidences particularly in low resource setting countries.

The best ever 'gold standard' scientific evidence is provided by randomized trial (RCT) . This is the most objective method of removing bias through statistically refined methodologies to compare the study and control group in a n appropaite scientific way. RCTs designs are equated with experimental designs for this reason. However, this is slow, costly and results produced are often difficult to apply in "real life situations". This drawback removal is possible by increasing computer capacity to analyse observational studies with multiple variables.

Policy Decisions and Leadership/Management Issue -- Political commitment to implement the evidence based maternal care interventions requires technical support in form of good scientific studies to support administarative approvals. The policy decision makers need excellent proof to stand by a evidence based decision to implement the interventions in low resource settings.

Since review study reflects mostly mainly non randomized controlled studies without controls it lacks good evidence to convince the policy decision makers , health care leaders to generate political will to support the maternal healthcare interventions. The reason is that it is a crude method due to non-randomization; therefore, the degree of comparability is low and every probability to obtain high spurious results. Extrastatistical criteria becomes critical for judging the validity of casual relationship between a risk factor/ exposure and maternal health problems. Therefore, the maternal outcomes of nonrandomized studies were too diverse to arrive at concrete conclusions. There may be a lot of probability of spurious associations as well.

The review study also found that maternal health care interventions were not integrated during

implementation phases.

A small number of studies evaluated only community level intervention. It is a well-known fact that maternal health is multidimensional in nature and depends on many socioeconomic determinants which rationalize the need for integrating different meatrnl care interventions to improve it.

A good aspect of study was that maximum number of interventions were developed after needs assessments surveys to correctly assess the situationa analysis of the maternal health problems, the various etiologies for high maternal mortality and morbidity. These interventions, however, needed to be validated by preventive RCTs to assess the outcomes of the interventions.

These needs assessment surveys helped to design more specific focused interventions for implementation. The same are used for monitoring and evaluation of the outcomes.

A very strong favorable impact on maternal health outcomes was observed when the interventions between traditional birth attendants with secondary and tertiary health care systems established in studies in countries like Gambia, Honduras and China (8,9,11,19,21,22).

Of course, these interventions were successful when backed up by functional referral systems and EmOC facility. The most common maternal intervenions integrated were strengthening the healthcare settings EmOC infrastructure , making the resources available in form of essential drugs availability, equipments and consumables to provide care in case of emergency, good quality training for EmOC training. These integrated interventions were found in 68 % of the studies (10, 12, 13, 14, and 19).

Similarly 56% of studies integrated the improved referrals and transport avaialabilty systems interventions to avoid delays in seeking the emergency care in need. (7,9,10,20,26,27,28,31).

A positive and favorable impact is reported on MMR outcome in most of the interventional studies but other outcomes measures like % of increased institutional deliveries , caesarean section rates also displayed an upwards trends.48% of studies had the community level Information education communication (IEC) interventions activities.

These IEC activities were additional to interventions found as most implemented many interventions in an integrated manner. (17,23,24,29,30,31).

Most of non-randomized trials studies with or without controls integrated many maternal care interventions but RCT for individual and independent maternal healthcare intervention was not found during review. This strongly support the concept that different maternal health care interventions covering the determinants of maternal health issue need to be integrated. Then they can implemented to lower the MMR favourably. This is because of the fact that maternal health depends on various social and cultural factors and multidimensional in nature. However, maternal healthcare interventions effectiveness requires the attention to address. Similar findings on maternal health care interventions are being reported by other review studies (32, 33, and 34). Thus it can be safely interpreted that the local socioeconomic determinants of the maternal health should be taken into account for integration of the different healthcare interventions to be effective to produce favourable outcomes.

Most of the interventions programs focused on how to improve upon the accessibility and utilization of maternal care services by community with additional component of quality of healthcare. A higher maternal mortality reduction was observed where a well-established referral functional healthcare system existed. It also have improved access to skilled birth attendants who are well trained and equipped with logistics to deal with emergencies timely and good referral system to deal effectively with delivery and danger signals of pregnancy leading to complications. This is crucial because most of the maternal deaths takes place during the delivery as life-threatening complications develop suddenly without any danger alerts beforehand. Therefore, such emergency case urgently, immediately requires adequate and appropriate medical aid to save the life. (35)

The study strongly support that leadership, political will and management is of highly significance prerequisites for proper implementation of the maternal care interventions to get the desired outcomes of reduced MMR.

The review study also concludes that single maternal health care intervention is not effective in reducing

MMR. Different evidence based maternal care interventions need to be integrated to effectively reducing the MMR in developing countries to achieve Sustainable Development Goals related to maternal health.

Limitations of the study

The validity of the results may be adversely affected by selective positive reporting and publishing the studies with selective outcome. It may not be convincing to the policy makers. The articles searched in English only might have missed few studies. Limiting the study to health sector interventions might have also missed some studies.

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**Diagram 1. PRISMA flow chart of the process of identifying and including articles for the Literature review—
Maternal evidence based Interventions ,screening and selection process**

Identifying

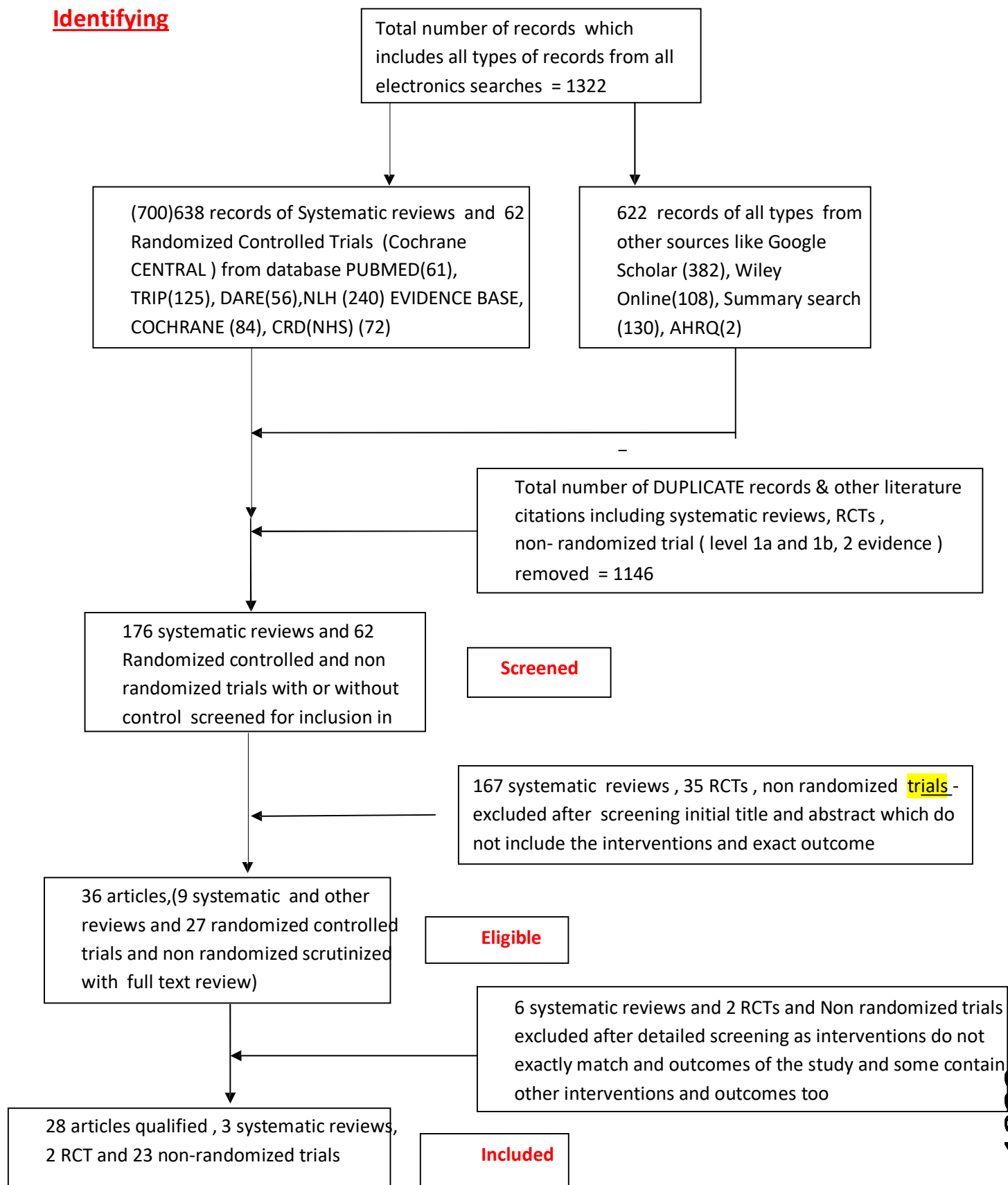


Table No1 -List of Countries included

China	Pakistan	Bangladesh	India
Nepal	Gambia	Jamaica	Egypt
Bolivia	Peru	Angola	Tanzania
Honduras	Latin America	Senegal	Sierra Leone

Table No 2- Maternal Interventions and its impact on Maternal Deaths

Country & Type of Study	Maternal Interventions*	Time period	Maternal deaths/live births		Odds Ratio (95% CI)
			Intervention	Control	
Non-randomized trials with control groups			After intervention	Before intervention	
Angola [8]	Community based interventions –Type 3, Hospital based interventions Type 5	4	55/18,755	66/5,363	0.24 (0.16 - 0.34)
Gambia [9]	Hospital Based Interventions Type 8 and Type 14	3	1/769	5/714	0.43 (0.02 - 1.55)
Bangladesh [10]	Community based interventions –Type 3, Hospital based interventions Type 5	3	6/4,424	20/5,206	0.35 (0.66 - 0.89)
Gambia [11]	Community based interventions –Type 3, Hospital based interventions Type 5, 7 and 8	7	11/405 to 13/1,236	4/267 to 7/727	0.36 (0.20 - 0.64)

Non-randomized trials without control groups			After intervention	Before intervention	
Bolivia [7]	Hospital Based Interventions Type 6, 8 and 10	11	230/10 ⁵	390/10 ⁵	0.59

China [7]	Community based interventions –Type 1, 3, Hospital based interventions Type 4, 8 and 10	16	61/10 ⁵	100/10 ⁵	0.61
Egypt [12]	Community based interventions –Type 1, Hospital based interventions Type 5, 8 and 10	7	585/696,428	772/443,678	0.48 (0.43 - 0.54)
Senegal [13]	Hospital Based interventions Type 4, 7 and 14	3	27/6,622	50/6,017	0.49 (0.30 - 0.80)
Pakistan [14,15]	Community based interventions –Type 3, Hospital based interventions Type 8, 10, 12, 14 and 15	5	34/52,982	48/55,454	0.74 (0.48 - 1.15)
Tanzania [16]	Hospital based interventions Type 4,5,6 and 7	5	8/4,296	28/3,000	0.20 (0.09 - 0.44)

China [19]	Community based interventions –Type 1, 3, Hospital based interventions Type 5,8 and 10	3	114/10 ⁵	456/10 ⁵	0.25
Peru [20]	Community based interventions –Type 1, Hospital based interventions Type	4	2/3,119	9/3,002	0.21 (0.05 - 0.99)

	5,6,8 and 14				
Honduras [22]	Community based interventions –Type 1,3, Hospital based interventions Type 5,8 and 13.	7	108/10 ⁵	182/10 ⁵	0.59
Nigeria [23]	Hospital Based interventions Type 4,5,6 and 7	6	7/1208	47/2999	0.37 (0.17 - 0.81)
Nigeria [24]	Community based interventions –Type 1,2, Hospital based interventions Type 5,6 and 7	6	7/815	44/861	0.16 (0.07 - 0.36)
India [25]	Hospital Based Interventions Type 5 to 10	14	90/10 ⁵	380/10 ⁵	0.24

Nepal [26]	Community based interventions –Type 1,2 , Hospital based interventions Type 4,7,and 10.	10	281/10 ⁵	539/10 ⁵	0.52
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Table No 3 -Maternal Health Care Interventions in different studies

Maternal Health Care Interventions	
Type	Community Based Interventions
1.	Community based IEC (Information, Education and Communication) Activities : Focus: awareness of danger signs of pregnancy complications and birth preparedness and importance of health facility delivery services
2	Establishing community based funds for obstetric complications for transport programs :
3	Training and linking traditional birth attendants to the health system: Focus: Clean delivery and shorten delays for complications of pregnancy and childbirth.
Type	Hospital/Facility Based Interventions
4	Establishing blood policies and blood banks
5	Training on EmOC , placement and motivation of health care providers
6	Upgrading existing health facility infrastructure and equipment for obstetric care
7	Improving drugs supply , consumables and equipment availability for obstetric care
8	Strengthening referral system & transport of patients
9	Construction of new health facilities for EmOC services

10	Enabling policies and political commitment to increase health facility utilization and accessibility of essential obstetric care services
11	Establishment of revolving funds at the EmOC health facility
12	Establishing family planning services
13	Establishing maternity waiting homes
14	Establishing mobile maternal health services, outreach / supportive supervision programs
15	Improving antenatal care