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Magnitude and determinant of Continuum of care in maternal health services and its impact on maternal and infant health outcome: Review of Literature

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Abstract

Introduction: Worldwide, annually millions of women, newborn and children died from preventable causes that could manage by easily and affordable interventions. However, more than 60 million pregnant women were delivered at home without the help of skilled provider. Thus, assuring continuity of care has become a key program strategy for improving the health of mothers and newborns. But, evidence was rare on level and determinants of continuum of care in maternal health services and how continuity of maternal health service is effectiveness on reduction of maternal and infant mortality particularly in developing countries. Therefore, this review gave some clue on these scarce evidences.

Methodology: The searching strategies were done by searching published studies only in the form of English language. Our searching engines were: PubMed, Google Scholar, Cochrane and Medline. Bibliographies of eligible paper were manually identified from relevant citations. Then after, the identified articles were evaluated based on the stated

objectives and review full articles that fulfill inclusion criteria.

Result: The review result reveals that the magnitude of continuum of care in maternal health service was low. Such that in South Asia (25%), Sub-Saharan African (14%), Cambodia (60%) and Ghana (8%) of women were received full range of key component of maternal health services. Hence, the determinant factors that hinder the completion of continuum of care were categorized as individual factors, socio-economic factors, family factors and community factors. Some of those factors were the richest women [AOR= 14.2; 95%CI: 6.97 - 28.83]; urban resident [AOR=0.42; 95%CI: 0.27 - 0.65]; greater autonomy [AOR=1.45; 95%CI: 1.21 - 1.71]; women in the highest household wealth index [AOR=2.7; 95%CI: 1.8 – 3.9], higher household wealth index [AOR=1.9; 95%CI: 1.4 – 2.7], middle household wealth index[AOR=1.4; 95%CI: 1 – 1.9] and lower household wealth index [AOR=1.4; 95%CI: 1 – 1.8]. Completion of continuum of care was clinically and statistically significant on reduction of maternal, infant, neonatal and perinatal mortality. The interventions that linked antenatal care, skilled birth attendance, and postnatal care had significantly reduced neonatal mortality [RR=0.84; 95% CI: 0.75 - 0.94]; perinatal mortality [RR=0.81; 95% CI: 0.74 - 0.90] and maternal mortality [RR = 0.52; 0.38 – 0.71]. Moreover, linked the three stages of the space dimension (community–family care, outpatient–outreach care, and clinical care) had a significant reduction in neonatal mortality (RR= 0.88; 95% CI: 0.79 - 0.97) and perinatal mortality (RR = 0.78; 95%CI: 0.66 - 0.92) but there was no significant reduction in maternal mortality (RR=0.94; 95%CI: 0.49 - 1.83).

Conclusion: As a conclusion completion of continuum of care was low and different determinant factors were indentified that hinders the completion rate. Continuity of maternal health service was a key strategy for reduction of maternal, infant, neonatal and perinatal mortality in developing countries. Thus, eliminating those hindering factors and expansion of continuum of care in maternal health program is strongly recommended for developing countries.

1. Introduction

Worldwide, annually millions of women, newborn and children died from preventable causes that could manage by easily and affordable interventions. Those interventions could save their lives but it could not available for the most target group as they need. Different scholar literature reveals that annually more than 60 million pregnant women were delivered at home without the help of skilled provider. As a result of these, around 530,000 women die from pregnant related complication among them 68,000 of maternal death attributed by unsafe abortion. In addition, 4 million of babies were died within the first month of life and more than 3 million of birth encountered as stillbirth whereas around 10 million of death occurs on children whose age less than five. Furthermore, 99% of maternal, newborn and children deaths occur in developing country particularly in low and middle income countries(1).

The burden of maternal and infant deaths falls disproportionately in low and middle income countries. However, improving access to and uptake of maternal and infant

care service could improve maternal and infant health outcomes by preventing maternal and infant mortality and morbidity Hence, continuum of care in maternal health could meet these challenges and improve the health and survival of women, newborn and children world(2).

Maternal health services are an important program in reduction of maternal and infant morbidity and mortality. Different studies show that the uptake of maternal health services in developing countries has significant consequences for both the safe transition of the mother through pregnancy and child birth, and the survival and health of the child during early infancy. Even if antenatal care alone cannot prevent all pregnant related complication. Even though the information provided by the antenatal service provider on danger signs, diet, and planning for delivery, along with testing for anaemia, malaria and high blood pressure are important for the successful management of pregnancies and the subsequent wellbeing of the child(3).

Despite success in extending the accessibility of maternal health care, low income countries needs continuous effort to reduce maternal and neonatal mortality. Increasing continuum of care through an integrated service-delivery system involving both public and private sectors could be a solution to improve maternal and infant health outcome(4). However, at the beginning of 1970 the term continuum of care was applied in order to facilitate the integration of the research and practice for provision of continuum of care for elderly people. After a certain period of time, the use of continuum of care become wide and wide which is almost commonly refers to individual patient care and case management. Then, it is used for the promotion of appropriately linking different component of the services in order to protect the patients from lost to follow-up on the services(5). Thus, it is defined as is the time has come for these health interventions for newborn babies and maternal health outcome to be integrated into maternal and child health programs. This approach promotes care for mothers and children from pregnancy to delivery, the immediately after delivery or during postnatal period and childhood. In another direction, continuum of care is a service that required to link households to hospitals by improving home based practices, mobilizing families to seek the care they need, and increasing access to and quality of care at health facilities(6).

According to World Health Organization Report 2005; continuum of care had two meaning: the first meaning is the care is offered as a continuum throughout the lifecycle beginning from adolescent, pregnancy, childbirth and childhood periods whereas the second meaning reveals that the care has been provided in a continuum that spans the home, the community, the health center and the hospital(7). For more clarification, it is stated diagrammatically as follow(8). Furthermore, CDC/Care International in 2011 state that continuum of care is a care that providing for the right person, at the right time and in the right place(9). Hence, it is a core principle and strategy of maternal health service programs(7).

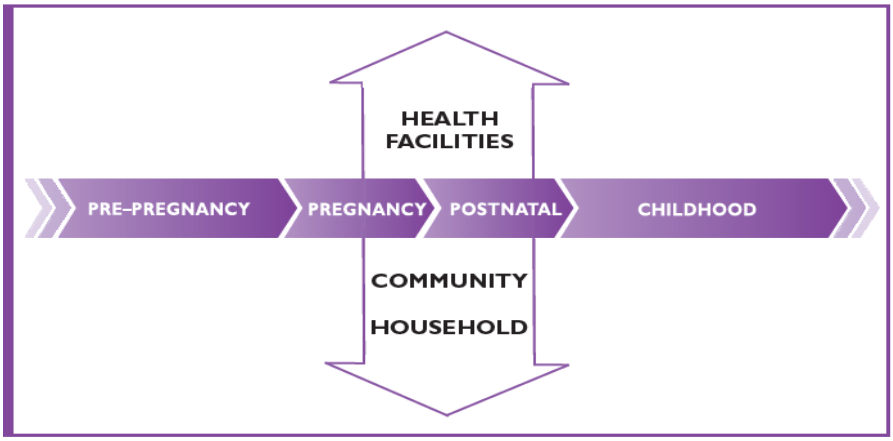


Figure 1: Time and Space dimension of Continuum of Care in maternal health services

In addition, continuum of care in maternal health services is a continuity of care that provided at individual care level (continuity of individual care), integrating service provider with community, integrating different services at community level throughout the life cycle (continuity of community care) and population based services provisions (continuity of population based care) in order to promote maternal, newborn and infant health status by protecting them from any mortality and morbidity(10). Assuring continuity of care has become a key program strategy for improving the health of mothers and newborns. Successful and effectiveness of service delivery offers continuum of care relies on understanding where the gaps in seeking care along the continuum and what factors contribute to these gaps is very essential(4). But, for this literature review we apply a narrowed scope of continuum of care, focusing on women during the period from pregnancy to childbirth and after delivery and also level of maternal health services provision or place dimension from at home level to the health facility. Therefore, the aim of this review is to assess level of completing and determinant factors on continuum of care in maternal health services and its contribution to maternal and infant health outcome.

2. Methodology

We aimed to explore the level of completion and determinants of continuum of care in maternal health services and it impacts on maternal and infant health outcomes, in the context of developing countries. The searching strategies were done by searching published studies only in the form of English language. Our searching engines were: PubMed, Google Scholar, Cochrane and Medline. We searched with the terms "*continuum of care*", "*continuum*", and "*continuity*", "*continuum of care in maternal health services*" and "*maternal health*". These searches identified different relevance articles which were referred to integrated care for health of mothers, neonates, and children and its contribution on maternal and infant health outcome. Furthermore, bibliographies of eligible paper were manually identified from relevant citations that our searches missed. Then after, the identified articles were evaluated based on the stated objectives. Those articles that meet the aim of review were included in the review but not fulfill the aim were excluded.

3. Result of Literature Review

3.1. Magnitude of continuum of care in maternal health services

A continuum of care approach for maternal health is being championed as a means to ensure women receive essential services during pregnancy, delivery and the postpartum period. Evidence in 12 African countries indicate that consistently low uptake of at least two levels of maternal health care services in the path of continuum of care. Thus, the path relationships in the continuum of care in maternal health care service: from 'adequate antenatal care' to 'adequate delivery care' (0.32) and from 'adequate delivery care' to 'adequate postnatal care' (0.78) which were positively associated and statistically significant at $p < 0.001$(11).

In South Asia 25% of women received continuum of care in maternal health services (all key three components of services) where as in Sub-Saharan Africa 14% of women were received all services. But, 16% and 12% of pregnant women were not receiving continuum of care in South Asia and Sub-Saharan Africa respectively. Furthermore, the most popular combinations of services in continuum of care were receiving only one ANC visit and no other services and receiving all services except four or more ANC visits. Delivered by skilled birth attendant without any ANC visit was uncommon: less than 5% in South Asia and less than 1% in sub-Saharan Africa. Likewise, PNC was uncommon unless it was combined delivered by skilled birth attendant and at least one ANC visit(12).

In South Asia and Sub-Saharan Africa, the proportion of women who had followed the pathway in continuum of care from one service to the next services is still low. The overall for the two countries is 84% of women had at least one ANC visit but among them 38% of pregnant women received at least 4th or more ANC visit (55% of reduction or discontinuation of the services). Among women who initiate the 1st ANC visit, only 28% of women were received 4th ANC visit and delivered by skilled birth attendant but the proportion of women who dropped out between the 4th ANC visit and skilled birth attendant (SBA) was the smallest across the continuum (25% decrease from the 4th ANC visit to SBA services and 67% reduction from 1st ANC visit). Similarly, 17% of women were received all services up to PNC (a 40% drop out rate from SBA, 55% drop out rate from 4th ANC visit and 80% drop out rate from 1st ANC visit). However, the comparisons between the pathways for Asia and Sub-Saharan Africa indicate that 87% of women in South Asia had at least one ANC visit compared to 78% of women in Sub-Sahara had at least 1st ANC visit while 25% of women Asia were received all elements of the continuum of care compared to 14% of women in Sub-Sahara were received all key element of continuum of care in maternal health services(12).

In Cambodia, the study reveals that there is high level ANC coverage: 90% of women had received at least 1st ANC visits but 60% of pregnant women were complete 4th or more visit which WHO recommend visit. However, among those women 74% of women were attended by skilled health professionals. Among ANC attendants: 57% pregnant women were gave their birth at the health facility. Whereas, 71% of women were received PNC services particularly check up for their health within two days regardless of where they delivered. Thus, regarding continuum of care indicate that 90% of pregnant women were received 1st ANC visits, of which 71% of pregnant women were received skilled delivery

services (19% of women were dropped) and 60% of women were received PNC services (11% of women were dropped in the continuity from skilled delivery to postnatal care services). Hence, 60% of women had received the full range of maternal health service (complete continuum of care) (4) (13).

Furthermore, Demographic and Health Survey (DHS) of Cambodia reveals that 11% of pregnant women who received both ANC service and received skilled delivery services but not received postnatal care; 8% were attend PNC service but not skilled delivery and 13% of pregnant women were not attended both skilled delivery and postnatal care services. There was a regional variation in the continuum of care in this study area: the proportion of pregnant women who received key maternal health services is ranging from 14% to 96% among Cambodia 19 provinces(4).

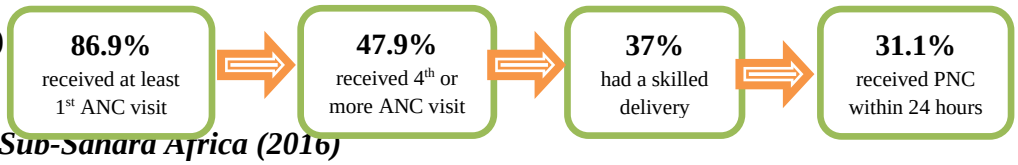
In Ghana, 8% of pregnant women had completed continuum of care. Even though, 86.1% of pregnant women were received 4th ANC visit and fell to 75.6% for skilled birth attendant/health facility delivery; then it drastically fell to 25.4% for PNC within 48 hours. Completion rate of continuum of care: A proportion of women who attained 4th ANC visit and had SBA/health facility delivery but lacked PNCs was 60.0% whereas women who attained 4th ANC4+ and received at least one visit of PNC service but had not delivered by skill birth attendant was 16.0%. Among the Ghana district: the continuity of care in Navrongo was 14% whereas in Dodowa was 7%(14).

In Pakistan study indicates the trend of composite measure of completion rate of continuum of care in maternal health services was increased from 15% to 27% over time from 2006 to 2012(15).

Study in Tanzania reveals that more than 90% of all pregnant women attend at least 1st antenatal care and 62% of pregnant women were visit 4th or more ANC visits but of them less than five in ten (<50%) of pregnant women received skilled delivery care at available health facilities(16). Similarly, in Ethiopia 66.3% of pregnant women did not use ANC services at first trimester and 22.3% had received ANC services less than 4 visits(17). Thus, overall summery of continuum of care was summarized as follow:

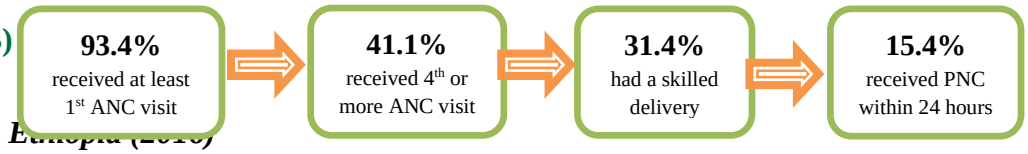
In South Asia (2016)

(A)



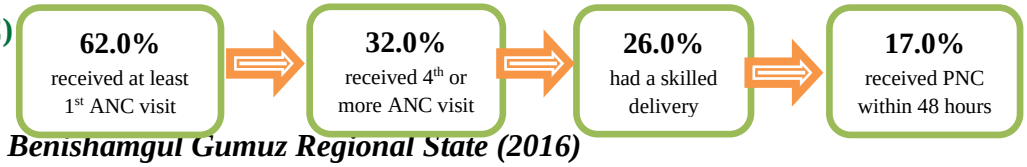
In Sub-Sanara Africa (2016)

(B)

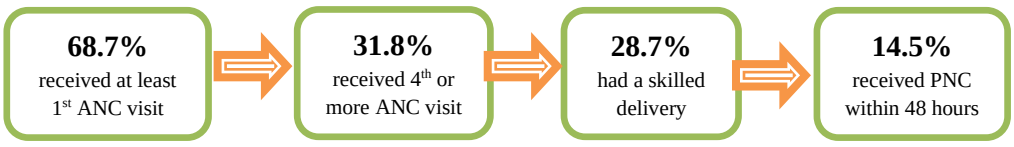


In Ethiopia (2016)

(C)



In Benishamgul Gumuz Regional State (2016)



3.2. Determinant factors on continuum of care in maternal health service

In 12 Africa countries reveals that different factors influence completion of continuum of care such that the path relationships from "*individual and family characteristics*" contribution to "adequate antenatal care" (−0.004) and to "adequate delivery care" (−0.03) were negatively statistically significant whereas from "*community characteristics*" contribution to "*adequate antenatal care*" (0.08) and "*adequate postnatal care*" (0.07) were statistically significant with positive relationship but negative relationship with "*adequate delivery care*" (−0.05). Furthermore, "*socioeconomic status*" had positive relationship for continuum of care in maternal health care services constructed with three key components: with the highest estimate encountered in its relationship with "*adequate antenatal care*" (0.36) and the lowest estimate observed being in the relationship with "*adequate postnatal care*" (0.02) whereas the "*child's characteristics*" had a positive relationship with '*adequate postnatal care*' (0.02)(11).

In South Asia and Sub-Saharan Africa study identified that the factors that hinder continuity of maternal health service: women in the richest wealth quintile had a significantly greater odds of receiving all of the elements of the continuum versus none [AOR= 14.2; 95%CI: 6.97 - 28.83; p<0.001]; being urban resident women [AOR=0.42; 95%CI: 0.27, 0.65; p<0.001]; pregnant women who had greater autonomy or having great decision making power [AOR=1.45; 95%CI: 1.21, 1.71; p<0.05] and more educated were more likely received all full package of continuum of care than women who had no autonomy and no educated respectively(12).

Cambodia Demographic and Health Survey (CDHS) point out that the socio-demographic and obstetric characteristic were affect the completion of continuity of maternal health services: older women were less likely to receive all three component of maternal health services than younger women [for women whose age is 35 and above (48%) compared with women whose age between 20 – 35 years (62%) and women age below 20 years (64%)]; educational status of women had positive impact on completion of continuum of care [women whose educational status is higher education (95.8%), secondary school (80.2%), primary school (57%) and no education 35.9%)] and also the resident of women had an association with continuity of maternal health services [for urban (86.9%) whereas for rural (54.5%)]. Similarly, high birth order is less likely to complete the continuum of care in maternal health services [women whose birth is four or more (42.2%), three (56.6%), two (65%) and one (70.6%)]. Furthermore, economic status of the household had positive correlation with completion of continuity of maternal health services [highest wealth quintile (89.4%); high wealth quintile (72.6%); middle wealth quintile (59.4%), low wealth quintile (49.4%) and lowest wealth quintile (38.6%)]. Women who had an exposure to mass media is more likely complete continuum of care than women who had no exposure to mass media (66.5% versus 48.7%)(4).

The study identified the predictors of being goes through the pathway of maternal health services uptake. Among the different factors identified for completing the three component of maternal health services (ANC, Skilled delivery and PNC services):

women exist in the highest household wealth index [AOR=2.7; 95%CI: 1.8 – 3.9], higher household wealth index [AOR=1.9; 95%CI: 1.4 – 2.7], middle household wealth index[AOR=1.4; 95%CI: 1 – 1.9] and lower household wealth index [AOR=1.4; 95%CI: 1 – 1.8]; women who were taken their urine sample [AOR=1.6; 95%CI: 1.3 – 1.9]; women who were gave their birth at the health facility [AOR=6.4; 95%CI: 5.2 – 7.9] were more likely complete continuity of maternal health services. So, in this model *rho* is 0.35, indicates that 35% of the total variation in the use of the three key component of maternal health services are accounted by between province variations i.e. more than one-third of the total variation in use of postnatal care among women who received both antenatal care and skilled birth attendance(4).

In Ghana, the study reveals that geographical location had significant influence on completion of maternal health services: women in Kintampo district [AOR=0.36; 95% CI: 0.15 – 0.89] and in Dodowa [AOR=0.52; 95% CI: 0.31 – 0.73] compared with Navrongo. The rate completion of continuity of maternal health services is vary region by region due to different determinants factors were exist in those regions. The determinant factors identified among three districts: ethnicity, marital status, timing of pregnancy, and beliefs about childhood illnesses were associated with completion of continuum care in Navrongo. In Kintampo, type of transport used to go to place of delivery [AOR=4.77; 95% CI: 1.39 – 16.43] and a woman's marital status being married [AOR=0.79; 95% CI: 0.34 – 1.88] whereas in Dodowa, type of transport to go to delivery place [AOR=2.93; 95% CI: 1.04 – 8.25] were a statistical and clinically significantly associated with completion of continuum of care. Furthermore, women in Kintampo district and Dodowa district were significantly higher risk for discontinuing care at pregnancy and delivery compared to women in Navrongo district: women in Kintampo district four times higher risk of discontinuing care at pregnancy [RR=4.28; 95%CI: 1.39 – 13.15] and 16 times increased risk of discontinuity of care at delivery [RR=15.89; 95%CI: 5.36 – 47.07] whereas women in Dodowa district had a higher risk of discontinuity of care at delivery [RR=7.63; 95%CI 2.40 – 22.20](14).

In spite of geographical factors, there are various individual factors that affect completion of continuum of care: women partner had tertiary education [AOR=2.77; 95% CL: 1.17 – 6.55]; Christian women [AOR=2.44; 95% CI: 1.12 – 12.28] compared with traditional followers; women who believed some childhood sicknesses cannot be treated [AOR=0.4; 95% CI: 0.23 – 0.61] ; women who had unwanted pregnancy [AOR=1.75; 95% CI: 1.11 – 2.76] and also women who had availability of transportation/car service/use a car to the health facility [AOR=2.05; 95%CI: 1.16 – 3.61](14).

In Pakistan, continuum of care in maternal health services was associated with health care decision making (54.0%), exposure to mass media (91.2%), and having not a big problem in case of distance (76.1%) and transport arrangement to access health facility for medical care (72.9%)(15). Similarly, the factors that provoke discontinuity of maternal health services were identified. Geographical location is one of the predicting factors: pregnant women from Punjab received more care at all levels as compared to any other province in both waves such that 44 and 30.8% women received complete continuum of care from Punjab, followed by 38 and 29.2% from Sindh province in waves 2 and 3 respectively. Similarly, women education is

other predictor factor for continuum of care: uneducated women (31.6%) received complete continuum of care in wave 2, whereas women with higher education (31.4%) availed continuum of care in wave 3. Similarly, the odds of 4th ANC visit was high for the respondents with highly educated husbands [AOR=1.53; 95%CI: 1.21-1.93] and [AOR=1.23; 95%CI: 1.01 - 1.49] from waves 2 and 3 respectively. Furthermore, a high odds ratio was found for the association between achievement of 4th or more ANC visits and SBA were women who had a high educational status [AOR=4.62; 95%CI: 3.35-6.36] and [AOR=3.48; 95%CI: 2.73- 4.44] in both waves. And also women whose husbands received higher education [AOR=1.56, 95%CI: 1.20 - 2.03] and [AOR=1.43; 95%CI: 1.16 - 1.77] during waves 2 and 3 respectively(15).

Moreover, women who have only 1–2 children [AOR=1.42; 95%CI: 1.09 - 1.85] and [AOR=1.99; 95%CI: 1.59 - 2.48] had a higher likelihood of continued care at delivery (ANC^{4+} and SBA) than any other category during wave 2 and 3 respectively(15). The economic status of respondents showed that the richest respondents had more chances to avail ANC^{4+} than any other category of economic status within both waves women who were belong to the richest wealth quintile household [AOR=7.57; 95%CI: 5.21 - 10.99] and [AOR=6.79; 95%CI: 4.95 - 9.31] had a higher likelihood of continued care at delivery (ANC4+ and SBA) than any other category during wave 2 and 3 respectively(15).

Furthermore, completion of continuum of care among women who gave birth at the age of 30 years age or above were insignificant for the second wave of PDHS [AOR=1.64; 95%CI: 0.98 - 2.72] but significant for the third wave [AOR=1.74; 95%CI: 1.19 - 2.56]. Women with higher educational status [AOR=3.44; 95%CI: 2.48 - 4.77 and [AOR=3.73; 95%CI: 2.92 - 4.76], having 1–2 children [AOR=1.49; 95%CI: 1.11 - 1.99] and [AOR=1.91; 95%CI: 1.51 - 2.39] and belonging to the richest quintile [AOR=7.38; 95%CI: 4.83 - 11.27] and [AOR=5.37; 95%CI: 3.85 - 7.49] were more likely to achieve complete CoC from wave 2 and 3 accordingly. Moreover, the odds of respondents autonomy to healthcare decision making [AOR=1.19; 95%CI: 1.04 - 1.36] and their exposure to the mass media [AOR=1.48; 95%CI: 1.21 - 1.81] was also found higher to achieve complete CoC in PDHS 2012/13(15).

Similarly other evidences reveals that factors that associated with discontinuity of maternal health services at the three stages of service provision (pregnancy, delivery, and postpartum) were marital status, women partner education, household wealth quintiles and women belief on childhood illness. Such that being single marital status the risk of discontinuity at pregnancy [RR=2.95; 95%CI: 1.29 – 6.74] and also at delivery [RR=3.41; 95%CI: 1.32 – 8.83]; women whose partner education attended tertiary education were had lower risk of discontinuity of care at pregnancy [RR=0.13; 95% CI: 0.03 – 0.57] and delivery [RR=0.24; 95% CI 0.07 – 0.84]. Women who believed that some childhood sicknesses cannot be treated were three times more likely to discontinue care at ANC [RR=3.25; 95%CI: 1.80 – 5.88] and at delivery [RR=2.66; 95%CI: 1.51 – 4.68]. Despite individual level factors, household level factors were also influence completion of continuum of care: women who were exist in the household socio-economic status categorized under the low socioeconomic status were higher risk of discontinuity of care at both ANC and delivery services(14).

Study conducted in three rural Ugandan districts reveals that pregnant women who started their 1st ANC in their first trimester were at least three times more likely to attend 4th or more ANC visit compared to those who did not start 1st ANC in their first trimester(18). Moreover, women who belonged to the poorest (first) wealth quintile were 62% less likely to attend at least 4th ANC visit compared to those who belonged to the least poor (fifth) wealth quintile. Beside, women who were saving for maternal health were two times more likely to deliver at health facility compared to those who did not save for maternal health[AOR=2.11; 95%CI: 1.39 – 3.21]. Women who attended at least 4th ANC visits were 42% more likely to deliver at the health facility compared to those who did not attend at least 4th ANC visits[AOR=1.42; 95%CI: 1.17 – 1.74]. Women with parity of at least four were 27% less likely to deliver at a health facility compared to those with parity below four(18).

3.3. Impacts of continuum of care on maternal and infant health outcomes

3.3.1. Impact of continuity of maternal health services on neonatal health outcome

Birth outcomes have improved dramatically worldwide in the past 40 years. Yet, there is still a large gap between the outcomes in developing and developed countries. It reviews that low birth weight, prematurity, and birth defects; current knowledge and practices of a healthy pregnancy, identifies cost-effective opportunities for improving birth outcomes and supporting families with an infant handicapped by birth problems and then recommend priority research, capacity building, and institutional and global efforts to reduce adverse birth outcomes in developing countries was mandatory action. Birth outcome depend on maternal health care services delivered in the health system. Thus, continuity of maternal health services strategies and programs are essential in order to reduce the mortality and morbidity associated with adverse birth outcome(19).

Maternal death is a big challenge in developing countries including Ethiopia. Beyond maternal death; her death is the leading factors to neonatal and infant death such that 4 million neonatal deaths and 3.2 million stillbirths every years contributed by maternal deaths(20). Despite of these, maternal health services interventions during pregnant, child birth and after delivery in continuous manner have an effect on the multiple outcomes for the mother and baby as well as having long term individual and societal potential. Evidence reveals in 46 countries of Africa estimate that the major causes of newborn deaths which could be prevented by provision of essential maternal health services package that is the coverage of essential maternal health services were reached at 90% of women and newborn who need the services that can reduce all newborn deaths by 37 - 67% which accounts as 430,000 - 800,000 neonatal deaths in the Africa(9). According to meta – analysis and systematic review results, the interventions that linked antenatal care, skilled birth attendance, and postnatal care had significantly reduced neonatal mortality [RR=0.84; 95% CI: 0.75 - 0.94] and perinatal mortality [RR=0.81; 95% CI: 0.74 - 0.90] (8).

However, other evidences reveal that women who receive the linkage between ANC and SBA (using both services in continues way) did not lead to any significant reductions in neonatal mortality [RR=0.68: 95% CI: 0.41 - 1.1] but there was a significant reductions in perinatal mortality [RR=0.51; 95% CI 0.38 to 0.68]

whereas the linkage between SBA and PNC service intervention did not significantly reduce perinatal mortality [RR=0.91; 95% CI: 0.75 - 1.11]. Moreover, linkage of ANC and PNC service would have a significant reduction in neonatal mortality [RR=0.81; 95% CI 0.67 - 1.00] and perinatal mortality (RR=0.74; 95% CI: 0.65 - 0.84). The interventions employing a linkage of antenatal care and postnatal care significantly reduced a composite of the three mortality types (RR=0.79; 95% CI: 0.69 - 0.91). In addition, linked the three stages of the time dimension (antenatal care, skilled birth attendance, and postnatal care) and the three stages of the space dimension (community–family care, outpatient–outreach care, and clinical care) had a significant reduction in neonatal mortality (RR= 0.88; 95% CI: 0.79 - 0.97) and perinatal mortality (RR = 0.78; 95%CI: 0.66 - 0.92) but there was no significant reduction in maternal mortality (RR=0.94; 95%CI: 0.49 - 1.83)(8).

Time dimension of continuum of care could reduce neonatal mortality evidenced by continuity of care at ANC 7 – 14% additional reduction in NMR; continuity of care at childbirth 19 – 34% additional reduction NMR and continuity of care at PNC 10 – 27% additional reduction NMR regardless of place dimension continuum of care in maternal health services. Similarly, place of dimension of continuum of care reveals that effective implementation of continuity of care at family/community level intervention could avert 14 – 32% of neonatal mortality rate; outpatient/outreach level intervention also avert 7 – 14% of neonatal mortality rate and at clinical care intervention could reduce 26 – 51% of neonatal mortality rate regardless of time dimension of continuum of care. Hence, to a the greatest reduction in deaths and improvement in health, all of these packages must reach women and children in continuation manner at the appropriate level and time period(21).other study reveals that adequate utilization of antenatal, delivery and postnatal health services reduced the likelihood of neonatal mortality[OR = 0.25; 95%CI: 0.13 – 0.46] (22). Therefore, different literatures evidence that completion of continuum of care in maternal health services result a statistical significant reduction of neonatal mortality (23-33).

3.3.2. Impact of continuity of maternal health services on maternal health outcome

A meta-analysis result reveals that the intervention that linked ANC, SBA and PNC services had not have a significant decrease in maternal mortality [RR=0.75; 95% CI: 0.46 - 1.22](8).

Study in UK identified the risk factor for the occurrence of maternal death. The finding indicated that women who had a pre-existing medical condition had more than eight times higher risk for maternal deaths compared with women who had no any medical problems [AOR=8.65; 95% CI: 6.29–11.90] and also more than three times higher risk of suffering maternal death among women who had anaemia during their current pregnancy [AOR=3.58; 95%CI: 1.14–11.21]. Similarly, pregnant women who had not received antenatal care services or inadequate use of ANC services [AOR=46.85; 95% CI: 19.61–111.94] and women who had previous pregnancy problems [AOR=1.85; 95% CI: 1.33–2.57] were statistical significantly associated with higher odds of maternal death. In addition, women who were being unemployed was two times more likely suffered with death compared with employed women [AOR=1.81; 95% CI: 1.08–3.04). The odds of maternal death increased linearly by 6% per year increase in maternal age after adjusting for the other risk factors for maternal death(34).

Based on this review technique; twelve studies were included for the analysis, of them three studies indicating that intervention packages resulted a statistical significant reduction on maternal mortality (23, 25, 35) whereas eight studies were not statistical significant reduction on maternal mortality (27-32, 36, 37). But, with your surprising one study reveals that intervention packages had been significantly increases maternal mortality(38).

Conclusion

In developing countries, completion of continuum of care in maternal health service is low. Hence, there are many determinant factors that associated with discontinuity of maternal health services at the three stages of service provision (pregnancy, delivery, and postpartum). Those factors were individual factors, socio-economic factors, family factors and community factors. Some of those factors were the richest wealth index, urban resident, decision making power/greater autonomy, women in the highest household wealth index, higher household wealth index, middle household wealth index, and lower household wealth index, women partner education and women belief on childhood illness. Completion of continuum of care in maternal health service was clinically and statistically significant on reduction of maternal, infant, neonatal and perinatal mortality.

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