

Review



Effect of systems approach intervention on adherence to antenatal and postnatal appointments: a systematic review

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Effect of systems approach intervention on adherence to antenatal and postnatal appointments: a systematic review

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Abstract

Maternal and child health is one of the most significant aspects of service delivery pillar. With every country focusing on the achievement of sustainable development goal number three (SDG 3), provision and utilization of maternal and child health services continue to attract global attention. Many countries make significant investments to provide these services at no cost to expectant mothers. However, maternal and child health services have not obtained optimal utilization for

various reasons. Improving adherence to antenatal care (ANC) is an integral strategy to reduce under-five mortality and to improve maternal and child health. In sub-Saharan Africa, women often initiate antenatal care visit in their first trimester, but do not follow through to the recommended four ANC visits. Failure to attend ANC visits increases fetal, maternal, and neonatal mortality. Therefore, there is need for comprehensive systems to attain SDG 3 by 2030. A systematic approach intervention that cuts across health system has been proven to increase adherence. Interventions such as patient reminders and public relation initiatives such as information sharing, effective communication and education among health workers could prove effective in this course. The aim of this review is to examine the impact of systematic approach intervention on adherence to ANC appointments. The methodology included PRISMA guidelines for systematic reviews. Google Scholar and PubMed databases were searched using the terms such as systems approach intervention, adherence to appointments, missed appointments, ANC visit attendance, Postnatal Care (PNC) visit attendance, ANC adherence, and PNC adherence. Biases were assessed based on geographical area and publication dates. The result of the review showed that all the studies included reported a positive effect of systems approach intervention in increasing appointment adherence, with an average of 42% appointment adherence and 35% reduction in missed appointments in antenatal and postnatal clinics across all the studies. Conclusively, systems approach intervention increases adherence to appointments in antenatal and postnatal clinics. Multiple interventions also produce better outcomes.

Introduction

Maternal and child health is one of the most significant aspects of service delivery pillar. Provision and utilization of maternal and child health services have continued to gain global attention, whereby individual country seeks to improve the attainment of SDG-3 as set by the

United Nations. Several countries have subsidized the services to expectant mothers who are the end users. Yet, maternal and child health. Many countries make significant investments to provide these services at no cost. However, maternal and child health services have not obtained optimal utilization for various reasons. Literature shows that expectant mother tends to miss appointments despite these services being free in many countries. Many studies have been done in the past to improve maternal and child health with various interventions. Majority of these studies focus on monetary incentives and community-based interventions, most of which are not sustainable. The studies record improved coverage in the short term, but this dwindles drastically because the interventions cannot be sustained. Even though community-based interventions such as home visits, locating expectant mothers and linking them with facilities to receive services are effective, they are not sustainable in the long run. Therefore, there is need for a systems approach intervention that integrates health systems factors including people, processes, and technology through multiple, effective, and sustainable interventions that improves factors associated with utilization of maternal and child health services. Improving adherence to antenatal care (ANC) is an integral strategy to reduce under-five mortality and to improve maternal and child health. Although, the literature shows that in sub-Saharan Africa, expectant mothers would often present themselves for antenatal care (ANC) during their first trimester, yet they often failed to complete the full recommended four ANC visits. Non-compliance with prescribed number of ANC visits increases the risk of fetal, maternal, and/or neonatal mortalities. To address this challenge there is need for more comprehensive systems approach in sub-Saharan Africa to meet the 2030 goal. This review therefore seeks to examine the effects of systems intervention on expectant mothers' compliance to ANC appointments.

Despite the continuous efforts across the world to improve maternal and child health in sub-Saharan

Africa, neonatal and maternal mortality remain higher compared to the developed nations [1]. There are many disparities and health inequities affecting women in sub-Saharan Africa. For example, women in low-income nations are exposed to more maternal death risk factors with 1 in 160 women dying in childbirth compared to 1 in 3700 in high-income nations [1]. Only about 52% of expectant mothers in developing countries attain the four minimum ANC visits recommended by the World Health Organization. Postnatal care (PNC) is also essential in limiting maternal and neonatal deaths because most fatalities take place within the first week after birth [2]. In addition, in Africa, out of the two-thirds of women with hospital deliveries, only about 13% received proper PNC within two days. Immunization plays an integral role in saving infant lives. However, in 2008, about 1.5 million children below the age of five died from diseases that are preventable by vaccines [2]. Also, about one in five children did not receive all required immunization in 2012 globally. Therefore, ANC and PNC visits are significant in improving maternal and child health [3]. However, many women still miss their appointments which limit the possibility of achieving SDG 3.

Expectant mothers are needed to comply more with ANC to positively impact on attainment of SDG-3 by 2030. Even though these services are often free, literature shows that women miss these appointments. In attempts to establish why women miss their ANC appointments, studies have shown the significance of strengthening health system factors and patient factors through patient reminders to promote appointment adherence [3]. While many studies associate missed appointments to patient forgetfulness, health system factors play an integral role in this, and many studies have suggested strengthening organization of maternal and child health services as well as human resources for health. Appointment adherence can be improved by initiating a systems approach intervention that integrates people, processes and technology [3]. Such logistical issues may range from bad road network and cost of transportation,

to limited power supply that prevents regular charging of mobile phones and poor telecommunication network especially in rural areas. Reminding women about their ANC appointments, and implementing public relations initiatives have been cited as effective system interventions because they cut across health system factors and patient factors [2]. The simplest means to remind patients is through phone call and electronic notifications, while public relation initiatives can be done through information, education and communication with the human resources for health [4]. Mobile phones have changed the way people communicate and can act as remote reminders to prompt change in behavior [4]. Effective communication and education among human resources for health have also been noted to improve the way health workers treat patients seeking services. Merely greeting patients, cleaning common areas, and starting operations in time can improve relationship between health workers and patients, prompting adherence to appointments [5]. In addition, patient reminders and public relations initiatives increase appointment adherence in ANC clinics [5]. This paper reviews recent evidence available in literature on means of increasing ANC appointment compliance.

Objective: to review the effect of a systems approach intervention in increasing adherence to appointments in antenatal and postnatal clinics. *Review question:* what is the effect of a systems approach intervention in increasing adherence to appointments in antenatal and postnatal clinics? In order to achieve the objective and answer the review question, the studies were categorized in terms of their outcome measure and reviewed for relevance based on the inclusion criteria.

Methods

The systematic review was done according to the guidelines of PRISMA for systematic reviews as shown in Figure 1.

Data sources and search strategy: a broad search of literature was done using PubMed database and Google Scholar with the selected terms. Search terms were identified to assess the effect of a systems approach intervention in increasing adherence to ANC and PNC appointments. A review of titles and abstracts was conducted to ascertain the relevance of the selected articles for the systematic review. The keywords used included systems approach intervention, adherence to appointments, missed appointments, ANC visit attendance, PNC visit attendance, ANC adherence, and PNC adherence. The search for the articles was done between January 10, 2020 to January 20, 2020. Even though the geographical limitation was not considered, the selected studies were limited by dates of publication as indicated in the inclusion criteria below.

Inclusion and exclusion criteria: selected studies were subjected to the following criteria: peer-reviewed and published between January 2010 and January 2020, focused on adherence and non-adherence to ANC or PNC, implemented a systems approach intervention, had a randomized controlled trial, clinical trial or quasi experimental research design, and published in English language. Exclusion criteria included historical control designs and studies that did not involve ANC or PNC appointment adherence to avoid possible bias due to the distinct nature of maternal and child health services. Population age of study participants was not considered for inclusion or exclusion.

Study selection and data extraction: the inclusion criteria described above was applied, and the titles and abstracts of the selected studies screened for inclusion. Extraction of data was done from all the selected studies including but not limited to the nature of intervention, sample description, technology used, and intervention period, frequency of intervention, statistical significance, and outcome measures. Geographical locations and study designs were also abstracted. Screening of titles and abstracts of the selected studies were done, followed by examination of full texts to fulfill the inclusion criteria.

Classification of data and outcome: descriptive statistics of the selected studies was conducted, and interpretations done based on the outcome measures. The assessed outcome measures were adherence to ANC and PNC appointments, and missed appointments in ANC and PNC clinics. In addition, the review examined whether study variables such as quality of the study and geographical area affected the study findings, the effectiveness of systems approach intervention, and whether the number of interventions affected the outcome. A summary measure was determined by the difference in risk between those who adhered to their ANC or PNC appointments compared to those who missed their appointments. The intervention group was also compared with the control group. The findings of all the selected studies based on the intervention was combined and compared against the control groups in all the studies. The percentages of outcome measures (adherence to appointments) was extracted from all the intervention groups. The intervention groups that included multiple interventions were also used as unit of analysis. For example, some studies used a combination of interventions (for both patients and health workers) while others used single intervention (for either patients or health workers) and compared against control groups.

Current status of knowledge

The review process and the mechanism of literature search is illustrated in Figure 1. 106 articles were listed in the original search and another 15 from the bibliography of the articles. A total of 10 articles were found eligible after duplicates were excluded and abstracts and full texts screened for admissibility in the inclusion criteria. The studies included were characterized by year of publication, author, sample size, region, intervention, and outcome measure. These characteristics have been illustrated in Table 1. All the included studies were randomized control trials (RCTs). 7 (70%) of all the studies included in the review used increased adherence to appointments

as the measure of outcome and 3 (30%) measured missed appointment rate. 7 (70%) of studies included used at least two interventions and 3 (30%) used a single intervention to achieve the predetermined outcome measure. The total number of participants in all the included studies that received interventions were 10874 and 7153 were used as control [1,3,5-10]. The studies compared adherence to appointments or missed appointment rate of the intervention group and the control group.

Even though systems approach interventions including patient reminders and public relations initiatives were used in 7 (70%) of the included studies, 3 (30%) only used patient reminders as an intervention. All the studies, 3 (30%), that used only patient reminders applied either short message system reminders and phone call reminders or both. The review determined that the nature and the frequency of all the interventions were customized based on the appointments. All studies that used patient reminders sent at least two reminders prior to the appointment. Other studies that utilized public relations initiatives consistently engaged health workers in communications and follow-ups on better ways to serve patients. Many studies did not, however, mention when the reminders were sent or how the health workers were engaged. 7 (70%) of the studies sent reminders at least twice prior to the appointment day. 7 (70%) studies that used multiple interventions reported up to 42% increase in appointment adherence, while 3 (30%) that used a single intervention recorded nearly up to 30% increase in adherence to appointments. Studies that measured missed appointments recorded similar reduction in missed appointments by an average of 35%. A typical public relations initiative reminded health workers to start operations in time, foster friendly attitude, observe cleanliness, and communicate with patients, and educate patients on the significance of attending the appointments. Patient reminder interventions reminded the patients of the appointment date and relevance of attending appointments.

Across all the studies, systems approach interventions were noted to increase appointment adherence by 42% on average and reduced missed appointments by approximately 35% in ANC and PNC clinics. There was a significant difference in outcome between studies that used multiple interventions and those that used single intervention as indicated above. Even though studies that used one reminder method and those that used multiple reminder methods reported relatively similar results, those that combined text notification and phone call reminders recorded slightly better outcomes. All the studies noted that lack of adherence to appointments and missing appointments increases neonatal and under five mortality rates and worsens maternal and child health. Wastage and inefficiency in the use of health resources were also cited across all the studies as implications of missing appointments. In addition, all the studies recommended further investigation on the patient reminders and the possible ethical implications. 7 (70%) of the studies suggested that health workers should consistently educate mothers on the relevance of ANC and PNC visits. Also 5 (50%) of studies found organization of maternal and child health services and medical facility factors responsible for the increasing missed appointments. These studies recommended sustainable interventions that would strengthen health systems and incorporate patients in order to achieve the World Health Organization's recommendation of at least four ANC visits. All the studies included recommended a systems approach and sustainable intervention that integrates all the health system factors for better outcomes.

Many sub-Saharan African countries did not meet Millennium Development Goals on reducing child mortality and improving maternal health [6]. The current status has prompted the world to champion their efforts towards meeting Sustainable Development Goal on improving well-being and health through increasing access to maternal and child health services. These goals can be achieved in sub-Saharan African countries if

effective and sustainable interventions are implemented. Esamai [6] suggested that where maternal and child health services are accessible, many women still fail to seek those services, leading to high missed appointments in ANC and PNC clinics. This systematic review has established that a systems approach intervention increases appointment adherence and reduces missed appointments. This conclusion is supported by Bradley and colleagues [7] that, by scaling up health systems intervention, the uptake of maternal and child health services would be improved. The need for adequate investment in health systems in Africa is also supported in that African countries lack sufficient human resources, health infrastructure, equipment and supplies necessary to provide essential maternal and child health services. A systems approach intervention is also required in the health infrastructure to support delivery of maternal and child health services. The review also established that human resource factors contribute to the missed appointments. This is similar to findings from [8] that documented the existence of a significant relationship between the density of health workers and maternal and child health and survival.

The review has established that systems approach interventions such as patient reminders and public relations initiatives increases appointment adherence and reduces missed appointment rates in ANC and PNC clinics. This finding had earlier been supported by [9], citing that reminding patients about their appointments is likely to make them remember and adhere to the appointment. Also, multiple interventions provide better outcomes. Where health workers communicate with the patients, observe facility cleanliness, extend operation hours, and foster good attitude, adherence to ANC and PNC appointments is likely to be high. This is justified by the review as it established that multiple interventions increased adherence to appointments by 42%. This review also established that even if a single intervention is implemented, missed appointments are likely to reduce by an average of 30%. In all the studies that

were included in this review, systems approach intervention is preferred and has a better outcome compared to a single intervention. Even though the cost of the implementation of systems approach interventions are relatively high, they are sustainable and are likely to facilitate the achievement of SDG 3. This illustration is similar to the findings of [10] that reported the need for sustainable multiple interventions to accomplish SDG 3. Therefore, it is essential to achieve optimal adherence to ANC and PNC appointments to reduce neonatal deaths, under five mortality, and improve maternal health. This review has established that this can be achieved through implementing systems approach interventions which are sustainable, and integrates people, processes and technology.

Strengths and limitations: this systematic review considered different outcome measures, all of which improve maternal and child health. It has demonstrated that a systems approach intervention increases appointment adherence. However, the review could be limited by the types of interventions investigated as it focused solely on patient reminders and human resource engagement and education for better service provision. The review also used a narrative method to synthesize data, limiting the capacity to suggest a preferred intervention. There was also a possible bias in the interpretation because of the varying methods used by the included studies. Given that only peer-reviewed studies published in English were included, certain findings may have been restricted.

Future research directions: even though the review has established the significance of systems approach intervention in increasing appointment adherence and reducing missed appointment rates, it has not ascertained how to sustain such interventions. The review has also not suggested various interventions besides patient reminders and public relations initiatives. Therefore, the systematic review recommends further investigation on sustainable systems approach interventions to increase appointment adherence.

Conclusion

Systems approach intervention increases appointment adherence in ANC and PNC clinics. Interventions such as patient reminders and public relations initiative like information, communication and education influence behavior change and increases ANC and PNC coverage. Multiple interventions provide better outcomes, including reduced neonatal deaths, under-five mortality, and improves maternal and child health. Therefore, systems approach intervention facilitates the achievement of sustainable development goal number three.

What is known about this topic

- *Increased appointment adherence in antenatal and postnatal clinics promotes maternal and child health.*

What this study adds

- *Systems approach interventions increase adherence to appointments in antenatal and postnatal clinics;*
- *Using multiple sustainable interventions increases antenatal and postnatal coverage.*

Competing interests

The author declare no competing interests.

Authors' contributions

Mr. Shadrack Ochieng Opon: research, review and manuscript development. The author have read and agreed to the final manuscript.

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Table and figure

Table 1: characteristics of included studies

Figure 1: procedure of sampling studies

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Table 1: characteristics of included studies

| Study | Sample Size | Intervention | Region | Outcome Measure |
|------------------------|-------------|------------------|--------------------------|---|
| Haji et al. (2019) | 1116 | Patient Reminder | Kenya | Missed Appointment |
| Lund et al. (2014) | 2550 | Patient Reminder | Zanzibar | Adherence to Antenatal care appointments |
| Mbuagbaw et al. (2015) | Not Stated | Systems Approach | Not Stated | Adherence to Antenatal care appointments |
| Lund et al. (2012) | 2550 | Systems Approach | Zanzibar | Adherence to postnatal care appointments |
| Bangure et al. (2015) | 304 | Patient Reminder | Zimbabwe | Missed Appointment |
| Pell et al. (2013) | Not Stated | Systems Approach | Ghana, Kenya, and Malawi | Adherence to Antenatal care appointments |
| Jacobs et al. (2018) | 1652 | Systems Approach | Zambia | Adherence to Antenatal care and postnatal care appointments |
| Esamai et al. (2017) | 1800 | Systems Approach | Kenya | Adherence to postnatal care appointments |
| Bradley et al. (2012) | 20 | Systems Approach | Ethiopia | Adherence to postnatal care appointments |
| Gupta et al. (2014) | 8035 | Systems Approach | Tanzania | Adherence to Antenatal care appointments |

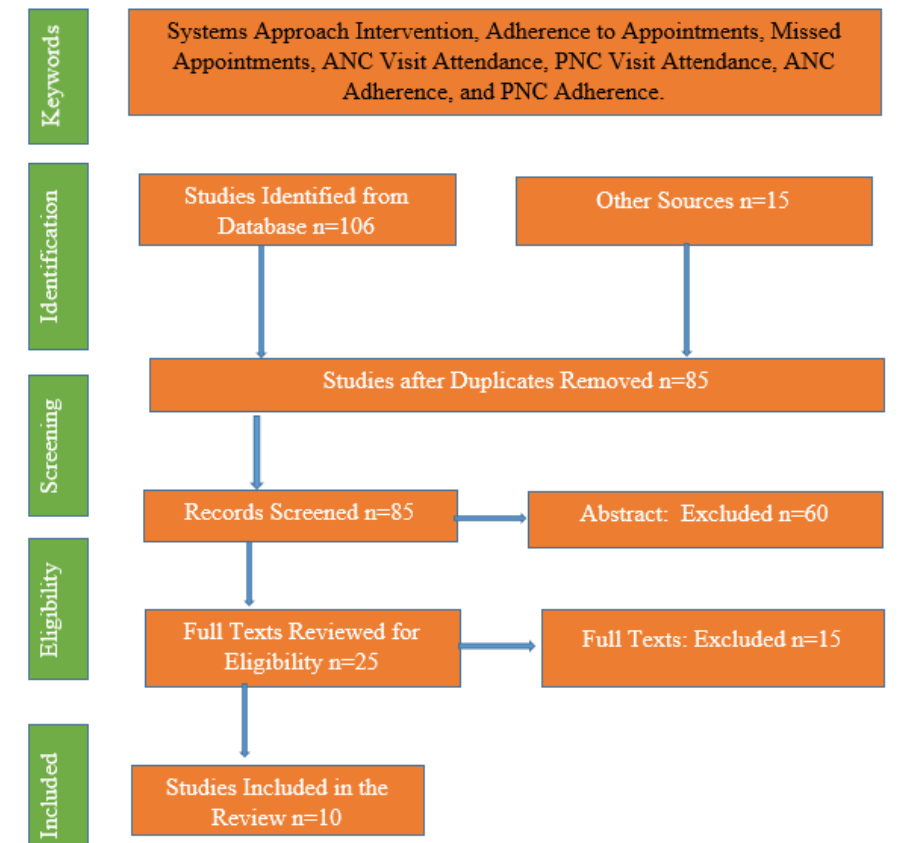


Figure 1: procedure of sampling studies