

Exploring barriers to hospital delivery in Sub-Saharan Africa: a review of the literature

ORIGINAL RESEARCH

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ABSTRACT

Background: The maternal mortality ratio (MMR) in sub-Saharan Africa is more than 60 times that in the UK. Both the Millennium Development Goals and the Sustainable Development Goals set out by the United Nations include a focus on reducing worldwide MMR. One way in which to achieve this is to encourage mothers in the developing world to deliver their babies in healthcare facilities. This review aims to identify the barriers to hospital delivery in sub-Saharan Africa.

Methods: Two databases were searched for relevant studies published within the last five years. All articles included in the review were critically appraised using CASP checklists and the STROBE statement to assess for bias. Barriers to hospital delivery were identified in each study and organised into categories according to the three delays model.

Results: Thirteen barriers to facility delivery were identified. Fear of maltreatment by healthcare staff, perceived low quality of care, distance and lack of transport to facilities, and cost of delivery were identified as the barriers for which there was the highest level of evidence.

Discussion: Successful interventions to tackle lack of transport and cost of delivery have been identified. It appears more difficult to find a solution to the barriers created by societal norms, however, as it would be culturally insensitive to impose Western beliefs on those with different traditional and religious views. This review provides suggestions for future research and potential interventions to reduce maternal mortality in sub-Saharan Africa.

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BACKGROUND

Every day there are approximately 830 preventable deaths of women relating to pregnancy worldwide, with more than half of these occurring in sub-Saharan Africa. (1) The most common causes of death include haemorrhage, sepsis, hypertensive disorders, pulmonary embolism, unsafe abortion and delivery complications. (2) Maternal death has huge societal impact in low- and middle-income countries due to the economic roles of women. (3, 4) Children of mothers who die have increased rates of mortality, (4-6) poverty, (3, 4, 7) psychological problems, (8) early pregnancy, (9) malnutrition (7, 9) and poor educational attainment. (4, 7-9)

The United Nations Millennium Development Goals (MDGs) are eight goals that were set in 2000 to be achieved by 2015. (10) MDG5 aimed to improve maternal health by reducing the worldwide maternal mortality ratio (MMR) by 75%. (10) MMR is measured in maternal deaths per 100,000 live births. Significant progress has been made, with worldwide MMR decreasing by 37% between 2000 and 2015. (11) However, geographical inequalities still exist: in 2015, the MMR in sub-Saharan Africa was estimated at 546, compared to just nine in the UK. (11)

In 2015, the United Nations (UN) adopted the Development Agenda “*Transforming our World*”, containing 17 Sustainable Development Goals (SDGs) for review in 2030. (12) SDG3 aims to improve health at all ages, again focusing on reducing worldwide MMR. (12)

Skilled attendance at delivery was recognised as a key factor in the reduction of maternal mortality by the Safe Motherhood Initiative in 1987. (13) As part of progress towards achieving MDG5 and SDG3, interventions have been introduced to encourage mothers in the developing world to deliver in healthcare facilities. (10, 12) However, rates of facility delivery in this setting remain low. (14) This review will explore the barriers towards facility delivery in sub-Saharan Africa.

Maternal mortality is an important global health issue that UK medical students should be aware of. An appreciation of the barriers towards facility delivery in developing countries is essential in understanding why maternal healthcare inequalities exist globally and to identify successful interventions to improve maternal mortality in these countries in the future. This review is of particular interest to students with an interest in global health, international obstetrics or those undertaking a medical elective in sub-Saharan Africa.

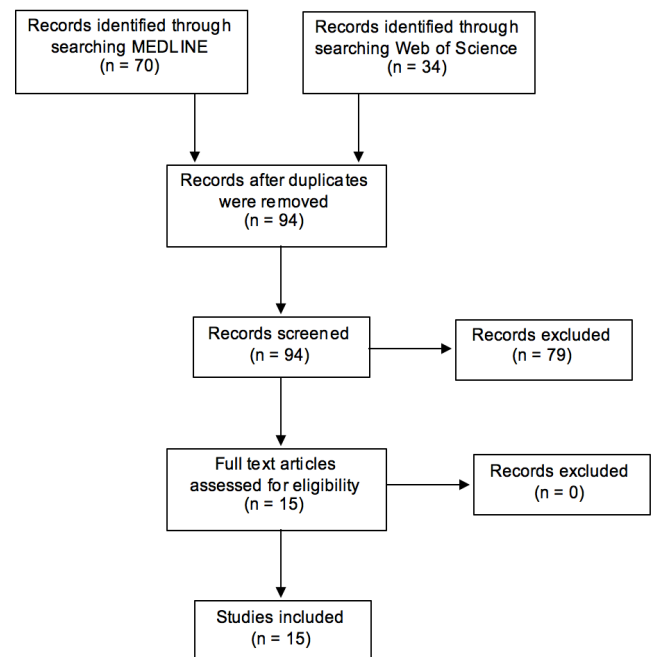
METHODS

A comprehensive literature search was conducted using two databases: MEDLINE and Web of Science. MEDLINE was chosen for its wide range of medical literature whilst Web of Science was

chosen to reflect a multi-disciplinary approach. Three key themes of the research question were identified: hospital delivery, barrier, and sub-Saharan Africa. Variations of these themes were used to conduct the searches. Search filters included English language and ‘published since 2012’. The literature search was limited to papers published between 1st January 2012 and 17th February 2017 (the date on which the searches were conducted) in order to ensure that all of the identified barriers were relevant to the present day.

104 papers were identified in total, ten of which were duplicates. The titles and abstracts of the remaining 94 papers were read and papers were excluded from the review if they did not specifically focus on barriers to hospital birth in sub-Saharan Africa. 15 papers remained at the end of this process, all of which were included in the review. Articles were reviewed by one researcher (R Best).

Figure 1 - PRISMA flow diagram



The resulting articles were critically appraised in order to assess risk of bias and quality of evidence. The Critical Appraisal Skills Programme (CASP) Qualitative Research checklist (15) was used to critically appraise the qualitative studies; CASP Systematic Review checklist (16) was used for the systematic reviews; and the STROBE Statement Cross-Sectional Study checklist (17) was used to assess the cross-sectional studies.

The proposed barriers to hospital delivery were identified in each paper and collated into a spreadsheet. These barriers were then organised into three categories according to the three delays model proposed by Thaddeus and Maine in 1994. This model identifies three points at which delays prevent mothers from delivering at hospital: 1) delays in decisions to seek care; 2) delays to arrival at a healthcare facility; and 3) delays in care provision. (18) Considering the barriers to facility delivery using this framework allows interventions to be targeted to these three stages in seeking and receiving care.

The barriers are discussed below with consideration of the scientific rigour of the papers in which they were identified. Ethical approval was not required for this literature review.

RESULTS

Summary of studies

Twelve studies explored barriers to hospital delivery in individual communities within sub-Saharan Africa, (19–30) whilst three focused on wider populations. (31–33) A systematic review by Brighton et al. explored perceptions across sub-Saharan Africa, (31) whilst Tey and Lai and Bohren et al. reviewed barriers in low- and middle-income countries. (32, 33)

Seven studies focused on women who were pregnant or who had recently delivered; (19, 20, 23–25, 28, 32) two focused on women of childbearing age regardless of gravidity; (26, 30) two explored healthcare workers' perceptions of barriers; (21, 22) and the remainder looked more broadly at populations, including healthcare workers, pregnant women and communities. (27, 29, 31, 33)

Critical appraisal

Six of the studies were deemed to be of high quality, with low risk of bias and high confidence in the findings. (21, 24, 26, 28, 30, 33) Five studies were assessed as being of moderate quality, (19, 22, 23, 25, 32) whilst the remaining four were deemed to have low confidence in the study findings. (20, 27, 29, 31) Full details of the critical appraisal findings for each study are given in Table 2.

Barriers identified

Thirteen barriers to facility delivery were identified: community influence, cost of treatment, cultural beliefs, fear of HIV testing, lack of autonomy and confidentiality, lack of knowledge, lack of a support person, lack of transport, perceived low quality of care, fear of maltreatment, medicalisation of childbirth, precipitous labour, and poor facility equipment. These barriers are further discussed in terms of the three delays model below. (18)

Delays in decisions to seek care

Community influence

Five papers identified family or community influence as a barrier to facility delivery due to the pregnant woman's lack of autonomy within her community. (21, 30–33) In the settings described, the decision to receive hospital care is made either by the woman's husband or community elders, (21, 30–33) particularly when there are costs associated with delivery. (31)

Cultural beliefs

Four papers identified women's cultural beliefs as a barrier. (21, 28, 31, 33) Bohren et al. highlight the belief that complications of childbirth, particularly eclamptic seizures, are spiritual in nature rather than physical and therefore could not be treated by healthcare professionals. (33) Similarly, Brighton et al. describe the belief that complications during pregnancy are caused by women's bad behaviour and the only curative treatment is the confession of sins. (31) In Tigray, Ethiopia, women value traditional practices during childbirth such as rituals to summon the support of Saint Mary, which are infeasible to replicate in a healthcare setting. (21)

Fear of HIV testing

Two studies found fear of HIV testing to be a barrier to facility delivery in pregnant women. (26, 33) Bohren et al. highlight how women in low- and middle-income countries fear the discrimination associated with a positive HIV test result. (33) Mason et al. noted a similar fear in Kenyan women, with many participants not wishing to know their own result as well as being fearful of others discovering that they tested positive. (26)

Lack of autonomy and confidentiality

O'Donnell et al. identified lack of autonomy as a major barrier to facility delivery in Malawi, with women reporting that they often did not understand why a treatment had been given in hospital and had not been asked for consent for procedures. (29) Also in Malawi, Kumbani et al. found lack of confidentiality to be a reason to avoid delivering at a facility. (25)

Lack of knowledge

Echoka et al. describe women's lack of knowledge about pregnancy as a barrier to seeking a facility delivery in the Malindi district of Kenya. Many women stated that they thought the pregnancy complications they were experiencing were part of a normal labour and delivery and therefore did not know to seek help. (20) This

barrier was also identified by women in Coast Province, Kenya (27) and healthcare workers in Rwanda. (22)

Lack of support person

Crissman et al. identified lack of a support person as a barrier to hospital delivery in rural Ghana, (19) as the presence of a birth partner is a prerequisite for healthcare worker delivery in this area.

Low quality of care

Six papers identified a perception of poor-quality care at facilities as a barrier to hospital delivery. (24-26, 28, 32, 33) In the study by Bohren et al., women reported healthcare workers to be undertrained, incompetent and inexperienced. (33) Other perceptions of low quality care included lack of pain relief and unavailability of delivery attendants; (24) long waiting times for antenatal care appointments; (25, 26) and unprofessional attitudes from staff. (26)

Maltreatment

The most commonly identified barrier in this review was women's fear of maltreatment by hospital staff, with more than two thirds of the reviewed papers highlighting this issue. (19, 23-29, 31, 33) Maltreatment experienced by women included neglect, (23, 24, 27, 29, 33) verbal, (19, 23-29, 31, 33) physical (23, 27, 33) and sexual (23) abuse. Bohren et al. describe pregnant women being slapped, hit and forcefully restrained by medical staff. (33) Brighton et al. highlight how women are not allowed to express pain or make noise during labour. (31)

Medicalisation of childbirth

One theme identified by five papers was the perception of childbirth as a natural process that should not require medical treatment. (20-22, 30, 32) Echoka et al. discuss the fact that despite high levels of birth preparedness, mothers in Kenya choose to deliver at home because they do not associate pregnancy with ill-health. (20) Similarly, Gebrehiwot et al. found that women living in rural Ethiopia are reluctant to visit hospital for delivery unless they perceive themselves to be sick. (21) This finding is reflected in studies in Rwanda (22) and Nigeria (30) as well as in Tey and Lai's quantitative study in sub-Saharan African and South Asia. (32)

Poor facility equipment

Poor-quality facility equipment was identified as a barrier by Gebrehiwot et al. in Ethiopia. (21) In this study, healthcare workers describe an absence of infection prevention equipment such as masks and goggles as well as shortage of clean water and electricity, which acts as a barrier to women seeking healthcare at the facilities. (21)

Delays in arrival at facility

Distance and lack of transport

Nine studies identified distance or lack of transport to a healthcare provider as a barrier to facility delivery. (19, 20, 27, 28, 30-33) More specific barriers within this theme included high cost of transportation, (19, 27, 33) limited availability of transportation, (19, 27, 28, 32, 33) inability to travel at night, (19, 33) poor roads (19, 20, 27, 33) and distance to facility. (28, 30-32)

Precipitous labour

Three studies described precipitous labour as a barrier to facility delivery, whereby women had intended on attending the hospital to give birth but were unable to make it to the hospital in time. (19, 25, 28)

Delays after reaching hospital

Cost of delivery

Cost of facility delivery was identified as a barrier in eight studies. (19, 22, 26-28, 30, 32, 33) In many settings, patients are denied medical treatment unless they pay for the service beforehand, (33-35) limiting the number of hospital deliveries even when mothers are able to reach the facility in time. Even in countries where there is no fee for delivery, studies describe the 'hidden costs' of childbirth, which include transportation, (27, 33) registration, (26) laboratory tests (26) and items such as sheets and antiseptics that women are expected to bring with them to hospital. (19)

DISCUSSION

Thirteen barriers to facility delivery were identified by this review. An important link that can be made between several of these barriers is societal norms. Cultural beliefs, community influence, maltreatment in hospital facilities and childbirth as a natural process are barriers that result from what is perceived as normal in sub-Saharan African communities. It can therefore be difficult to implement effective interventions to tackle these barriers, as it would be culturally insensitive to try to impose Western beliefs on

those with different traditional and religious views.

Barriers that may be tackled more readily are cost of delivery and lack of transport to facilities. Free and heavily subsidised obstetric care programmes have already been introduced in many countries in sub-Saharan Africa, which have been shown to increase the number of facility deliveries and reduce maternal mortality. (34, 36–38) Similarly, a free emergency transport service implemented in central India, which is also a developing country with a high maternal mortality ratio, has been found to increase the number of hospital deliveries. (39)

Interestingly, Mason et al. identified HIV testing as both a barrier and facilitator to hospital delivery, as some women recognised the value of being tested and appreciated the free service whilst others feared the stigma of a positive result. (26) A suggested intervention here might be to highlight the importance of a woman's right to choose whether or not she receives the test, though this does raise potential ethical issues surrounding unknown vertical transmission of HIV.

The three most commonly identified barriers to facility delivery were fear of maltreatment by healthcare staff; (19, 23–29, 31, 33) distance and lack of transport to facilities; (19–21, 25, 27, 28, 30, 32, 33) and cost of delivery. (19, 22, 26–28, 30, 32, 33) Each of these barriers were identified by four papers that were assessed to be of high quality as well as a number of papers that were assessed to be of moderate or low quality. Perceived poor quality of care was another barrier identified by four high quality studies, (24–26, 28, 32, 33) though it was identified as a barrier in fewer total papers than the other three common barriers.

On the other hand, three barriers to hospital delivery were only identified by papers that were assessed to be of moderate or low quality: lack of a support person; (19) lack of knowledge; (20, 22, 27) and lack of autonomy and confidentiality. (25, 29) The evidence for these barriers is therefore weaker than the evidence for the other barriers identified.

Strengths of this review include the recent nature of all of the articles included. This suggests that all of the barriers identified are current issues, as it is recognised that barriers to hospital delivery may change over time. The included studies also represent the views of healthcare workers and communities as well as pregnant women themselves. Finally, validated scoring systems have been used to critically appraise the literature.

Limitations of the review include the relatively small sample size and the fact that several of the included studies were assessed as having low confidence in the quality of evidence. The qualitative study by Mwangome et al (27) in particular was found to be poorly conducted with reference to the CASP criteria. Another limitation is that different scoring systems were used to critically appraise the papers, due to differences in study design, and each paper was only

appraised by one researcher (R Best).

This review has identified the main barriers to hospital delivery in sub-Saharan Africa, which enables organisations such as the World Health Organisation and the United Nations to target their interventions towards the relevant barriers in order to improve maternal mortality.

CONCLUSION

The barriers identified by the most papers with the highest quality evidence in this review were fear of maltreatment by healthcare staff; perceived low quality of care at facilities; distance and lack of transport; and cost of delivery. Successful interventions to tackle lack of transport and cost of delivery have been identified, though it appears more difficult to find a solution to the barriers created by societal norms.

Future research should focus on the implementation of effective interventions to target transport and cost as well as investigating the reasons behind maltreatment of pregnant women by hospital staff. Investment should also be made in hospitals where there is lack of equipment and utilities such as running water and electricity in order to improve standards and encourage women to deliver in hospital.

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APPENDIX






| Table 1: Summary of studies | | | | |
|--------------------------------|--|---|---|---|
| Paper | Study Design | Setting and Population | Barriers Identified | Intervention(s) Identified |
| Bohren et al 2014 (33) | Systematic review of qualitative studies using thematic analysis | Women, partners and healthcare professionals in 17 low- and middle-income countries worldwide | Traditional and family influences Distance to facility Cost of delivery Low perceived quality of care Fear of discrimination | Reduction of abuse and disrespect of women during childbirth |
| Brighton et al 2013 (31) | Systematic review of qualitative studies using thematic analysis | Men, women and communities in sub-Saharan Africa | Abuse from healthcare staff Inability to express pain during childbirth Cultural beliefs about pathophysiology of childbirth Community influence | Promotion of behavioural change amongst healthcare workers Incorporation of traditional birth attendants into the hospital setting |

Table 1: Summary of studies (Continued)

| Paper | Study Design | Setting and Population | Barriers Identified | Intervention(s) Identified |
|----------------------------------|---|---|--|---|
| Crissman et al 2013 (19) | Qualitative study using semi-structured interviews and grounded theory analysis | 85 pregnant women attending an antenatal clinic in Akwatia, Ghana | Maltreatment by midwives Cost of delivery Lack of a support person Difficulties in transportation Precipitous labour | Reduction or removal of delivery fees Introduction of tractor / bicycle / donkey ambulances Introduction of a "red card" transport system |
| Echoka et al 2014 (20) | Qualitative study using in-depth interviews and thematic analysis | 30 women in Malindi District, Kenya who had experienced near-death obstetric complications | Lack of transportation Lack of knowledge of dangers Childbirth viewed as natural | Development of better roads and access to emergency transport |
| Gebrehiwot et al 2014 (21) | Qualitative study using in-depth interviews and thematic analysis | 4 midwives and 12 health extension workers in Tigray, Ethiopia | Delivery is a natural event Cultural traditions and rituals Inaccessible transport Unmet community expectation Shortage of water and electricity | Humanisation of the delivery process |
| Hagey et al 2014 (22) | Qualitative study using semi-structured interviews and content analysis | 17 healthcare professionals working in Kigali, Rwanda | Lack of knowledge Experience of previous births Lack of support from partners Cost of delivery Antenatal care cultural beliefs | Improvement of maternal education Introduction of HIV testing as an incentive Improved tracking of antenatal visits |
| Kujawski et al 2015 (23) | Quantitative study using structured questionnaires and multivariate logistic regression | 1388 women who delivered at hospital in the Tanga region, Tanzania | Abuse from healthcare professionals | Reduction of abuse and disrespect of women during childbirth |
| Kumbani et al 2012 (24) | Qualitative study using in-depth interviews and thematic analysis | 14 women who had delivered in Chiradzulu District Hospital in the Chiradzulu district, Malawi | Poor communication Poor attitudes from staff Discrimination from staff Delays in care | Improved antenatal information Improved maternal education on danger signs Improved attitudes of healthcare workers |
| Kumbani et al 2013 (25) | Qualitative study using in-depth interviews and thematic analysis | 12 women who had delivered at home in the Chiradzulu district, Malawi | Abuse from healthcare workers Delays in antenatal care Difficulty getting to facility Precipitous labour No guarantee of confidentiality | Improved maternal education Improved staffing levels |

| Table 1: Summary of studies (Continued) | | | | |
|---|--|--|--|--|
| Paper | Study Design | Setting and Population | Barriers Identified | Intervention(s) Identified |
| Mwangome et al 2012 (27) | Qualitative study using structured interviews, focus groups and thematic analysis | 90 hospital staff and general public and 26 mothers who delivered outside of hospital in Coast Province, Kenya | Cost of care Lack of transport Poor patient-staff relationship Lack of knowledge | Improved links between the hospital and community Development of individual birth plans Improved staff training Development of introductory visits for expectant mothers to healthcare facilities |
| Nakua et al 2015 (28) | Quantitative cross-sectional study analysed with weighted multivariate logistic regression | 400 mothers aged between 15 and 49 with a child less than 12 months old in Amansie West District, Ghana | Insults from healthcare workers Unavailability of transport Lack of birth preparedness Lack of knowledge Lack of partner involvement | Improved staff training Improved maternal education about the benefits of hospital delivery Introduction of an incentive |
| O'Donnell et al 2014 (29) | Qualitative study using in-depth interviews, focus groups and thematic analysis | 33 postnatal mothers aged between 16 and 36 who had delivered in the last 7 days, and 10 healthcare providers in Mangochi district, Malawi | Lack of autonomy Strained relationships and poor communication with staff | Improved communication between mothers and healthcare providers |
| Tey and Lai 2013 (32) | Quantitative cross-sectional study analysed with logistic regression | Currently married women aged 15-49 who had given birth within 5 years of the survey in Bangladesh, India, Pakistan, Kenya, Nigeria or Tanzania | Preference for traditional birth Lack of transport Cost of delivery Objection from partner Lack of trust in facility | Improved maternal education on the risks of childbirth and the benefits of institutional delivery |
| Yar'Zever and Said 2013 (30) | Quantitative cross-sectional study analysed with Chi-square tests | 1,000 married women aged between 14 and 49 from the Hausa clan, Nigeria | Husband's refusal Lack of illness Distance to healthcare facility Lack of money | Improved education of husbands / partners Improved antenatal care |

| Table 2: Critical appraisal of studies | | | |
|--|-------------------------------------|---|--|
| Paper | Critical Appraisal Tool | Confidence in Evidence | Comments |
| Bohren et al 2014 | CASP systematic review checklist |  High confidence | <p>Comprehensive literature search.</p> <p>Clear assessment of the quality of included studies.</p> <p>Results of all included studies clearly displayed and combination of results appropriate.</p> <p>Overall findings clearly and appropriately expressed and applicable to the population studied. All important outcomes considered.</p> |
| Brighton et al 2013 | CASP systematic review checklist |  Low confidence | <p>It is not clear whether grey literature and non-English language literature was searched or whether key experts in the field were contacted as part of the search strategy.</p> <p>There is no evidence of critical appraisal of the included literature.</p> <p>Results of individual studies have not been clearly displayed and it is therefore unclear whether combination of results is appropriate.</p> <p>Overall results are clearly and appropriately expressed and are relevant to the study population. All important outcomes have been considered.</p> |
| Crissman et al 2013 | CASP qualitative research checklist |  Moderate confidence | <p>Limited justification for methods used or recruitment method, though convenience sampling is appropriate.</p> <p>Reasons stated for participant refusal.</p> <p>Detailed description of data collection methods, data form and data saturation with limited justification for methods used.</p> <p>Reflexivity explored in terms of translation but not in formulation of research questions, sample recruitment or data analysis.</p> <p>Ethics not considered and no mention of ethical approval.</p> <p>Comprehensive description of data analysis methods with clear themes.</p> <p>Findings clearly stated and research deemed valuable.</p> |
| Echoka et al 2014 | CASP qualitative research checklist |  Low confidence | <p>No justification of research design and limited discussion of recruitment process.</p> <p>Clear description of data collection method and data form. Limited justification of data collection methods and data saturation not discussed.</p> <p>Reflexivity not discussed.</p> <p>Ethical approval granted but limited exploration of potential ethical issues. Limited description of data analysis methods.</p> <p>Findings are clearly stated according to the three delays model, and relate back to the original research question. Research deemed valuable.</p> |
| Gebrehiwot et al 2014 | CASP qualitative research checklist |  High confidence | <p>Limited justification of research design.</p> <p>Appropriate recruitment strategy with justification of methods.</p> <p>Appropriate and well explored data collection methods with justification for setting. No discussion of data saturation.</p> <p>Reflexivity adequately explored.</p> <p>Ethical approval granted but limited exploration of potential ethical issues. Detailed description of data analysis methods.</p> <p>Overall findings are clearly stated. Research deemed valuable.</p> |

| Table 2: Critical appraisal of studies (Continued) | | | |
|--|--|---|--|
| Paper | Critical Appraisal Tool | Confidence in Evidence | Comments |
| Hagey et al 2014 | CASP qualitative research checklist |  Moderate confidence | <p>No justification of research design.</p> <p>Appropriate recruitment strategy and data collection method, though neither justified. Clear explanation of data collection method and data form. No discussion of data saturation.</p> <p>Reflexivity discussed in terms of data collection.</p> <p>Ethical approval granted but limited exploration of potential ethical issues. Limited discussion of data analysis methodology.</p> <p>Clear statement of findings. Research deemed valuable.</p> |
| Kujawski et al 2015 | STROBE statement cross-sectional study checklist |  Moderate confidence | <p>Clear scientific basis, rationale and aims.</p> <p>Comprehensive description of study design, setting, participants, variables and measures.</p> <p>No mention of potential biases or sample size calculations. Brief description of statistical methods.</p> <p>Data provided on study participant demographics and results reported clearly using odds ratios and confidence intervals.</p> <p>Key results presented clearly. Limitations discussed but no mention of generalizability of results.</p> |
| Kumbani et al 2012 | CASP qualitative research checklist |  High confidence | <p>Limited justification of research design.</p> <p>Clear explanation of recruitment method with justification.</p> <p>Clear explanation of data collection methods, data form, setting and saturation.</p> <p>Comprehensive exploration of reflexivity.</p> <p>Ethical approval obtained but limited exploration of potential ethical issues. Some explanation of data analysis methodology.</p> <p>Clear statement of overall findings. Research deemed valuable.</p> |
| Kumbani et al 2013 | CASP qualitative research checklist |  Moderate confidence | <p>Some justification of research design.</p> <p>Detailed explanation and justification of recruitment strategy.</p> <p>Clear explanation of data collection methodology, data form and data saturation without justification.</p> <p>Limited consideration of reflexivity.</p> <p>Ethical approval obtained but limited exploration of potential ethical issues.</p> <p>Some exploration of data analysis methods. Unclear how themes were derived from data.</p> <p>Clear overall statement of findings. Research deemed valuable.</p> |
| Mason et al 2015 | CASP qualitative research checklist |  High confidence | <p>Good justification of research design. Recruitment strategy appropriate and justified.</p> <p>Detailed description of data collection methods, data form and setting.</p> <p>No discussion of data saturation.</p> <p>Limited consideration of reflexivity.</p> <p>Ethical approval obtained but no exploration of potential ethical issues.</p> <p>Comprehensive description of data analysis methodology.</p> <p>Clear statement of findings. Research deemed valuable.</p> |





| Table 2: Critical appraisal of studies (Continued) | | | |
|--|--|---|---|
| Paper | Critical Appraisal Tool | Confidence in Evidence | Comments |
| Mwangome et al 2012 | CASP qualitative research checklist |  Low confidence | Limited justification of research design. Unclear recruitment strategy due to involvement with another study. Data collection setting and data saturation not described. No consideration of reflexivity. Ethical approval obtained but no exploration of potential ethical issues. Some description of data analysis methods. Statement of findings could be clearer. Research deemed valuable. |
| Nakua et al 2015 | STROBE statement cross-sectional study checklist |  High confidence | Clear scientific basis, rationale and aims. Comprehensive description of setting, participant recruitment, study design and sample size calculation. No mention of potential biases. Comprehensive description of statistical methods. Data provided on study participant demographics and results reported clearly using appropriate statistics as well as graphs and charts. Key results presented clearly and comprehensive discussion of limitations. No discussion of generalizability of results. |
| O'Donnell et al 2014 | CASP qualitative research checklist |  Low confidence | Limited justification of research design. Description of purposive sampling of facilities but limited description of recruitment strategy within clusters. Clear description of methods of data collection and data form but no mention of data saturation. Limited exploration of reflexivity. Ethical approval obtained but no exploration of potential ethical issues. Poor description of analysis methods. Clear statement of findings and suggestions for future research. |
| Tey and Lai 2013 | STROBE statement cross-sectional study checklist |  Moderate confidence | Clear scientific basis, rationale and stated objective. Brief description of participants and setting. Comprehensive description of variables and measures. No mention of potential biases or sample size calculations. Comprehensive description of statistical methods. Data provided on study participant demographics and results reported clearly using odds ratios, percentages and confidence intervals. Key results presented clearly. No discussion of limitations or generalizability of results. |

Table 2: Critical appraisal of studies (Continued)

| Paper | Critical Appraisal Tool | Confidence in Evidence | Comments |
|----------------------------|--|------------------------|---|
| Yar'zever and Said 2013 | STROBE statement cross-sectional study checklist | High confidence | <p>Clear scientific basis, rationale and stated objectives, including comprehensive use of a theoretical framework.</p> <p>Comprehensive description of participants, setting, study design, sample size calculations, variables and measures.</p> <p>No mention of potential biases.</p> <p>Limited description of statistical methods.</p> <p>Data provided on study participant demographics and results reported clearly using frequency tables.</p> <p>Key results presented clearly.</p> <p>Consideration of limitations and future areas for research.</p> |

Table 3: Summary of identified barriers. Green = high confidence; yellow = moderate confidence; red = low confidence

| Barrier | Papers identifying barrier |
|----------------------------------|--|
| Delays in decisions to seek care | <p>Community influence</p> <ul style="list-style-type: none"> Bohren et al, 2014 Gebrehiwot et al, 2014 Tey and Lai, 2013 Yar'zever and Said, 2013 Brighton et al, 2013 |
| | <p>Cultural beliefs</p> <ul style="list-style-type: none"> Bohren et al, 2014 Gebrehiwot et al, 2014 Brighton et al, 2013 Nakua et al, 2015 |
| | <p>Fear of HIV testing</p> <ul style="list-style-type: none"> Mason et al, 2015 Bohren et al, 2014 |
| | <p>Lack of autonomy and confidentiality</p> <ul style="list-style-type: none"> Kumbani et al, 2013 O'Donnell et al, 2014 |
| | <p>Lack of knowledge</p> <ul style="list-style-type: none"> Echoka et al, 2014 Hagey et al, 2014 Mwangome et al, 2012 |
| | <p>Lack of support person</p> <ul style="list-style-type: none"> Crissman et al, 2013 |
| | <p>Low quality of care</p> <ul style="list-style-type: none"> Bohren et al, 2014 Kumbani et al, 2013 Kumbani et al, 2012 Mason et al, 2015 Tey and Lai, 2013 Nakua et al, 2015 |

| Table 3: Summary of identified barriers. Green = high confidence; yellow = moderate confidence; red = low confidence (Continued) | | |
|--|--------------------------------|---|
| Barrier | Papers identifying barrier | |
| Delays in decisions to seek care | Maltreatment | <ul style="list-style-type: none"> ■ Bohren et al, 2014 ■ Crissman et al, 2013 ■ Kujawski et al, 2015 ■ Kumbani et al, 2013 ■ Kumbani et al, 2012 ■ Mason et al, 2015 ■ Mwangome et al, 2012 ■ Nakua et al, 2015 ■ O'Donnell et al, 2014 ■ Brighton et al, 2013 |
| | Medicalisation of childbirth | <ul style="list-style-type: none"> ■ Echoka et al, 2014 ■ Gebrehiwot et al, 2014 ■ Hagey et al, 2014 ■ Tey and Lai, 2013 ■ Yar'zever and Said, 2013 |
| | Poor facility equipment | <ul style="list-style-type: none"> ■ Gebrehiwot et al, 2014 |
| Delays in arrival at facility | Distance and lack of transport | <ul style="list-style-type: none"> ■ Bohren et al, 2014 ■ Crissman et al, 2013 ■ Echoka et al, 2014 ■ Gebrehiwot et al, 2014 ■ Kumbani et al, 2013 ■ Mwangome et al, 2012 ■ Tey and Lai, 2013 ■ Yar'zever and Said, 2013 ■ Nakua et al, 2015 |
| | Precipitous labour | <ul style="list-style-type: none"> ■ Crissman et al, 2013 ■ Kumbani et al, 2013 ■ Nakua et al, 2015 |
| Delays after reaching hospital | Cost of delivery | <ul style="list-style-type: none"> ■ Bohren et al, 2014 ■ Crissman et al, 2013 ■ Hagey et al, 2014 ■ Mason et al, 2015 ■ Mwangome et al, 2012 ■ Tey and Lai, 2013 ■ Yar'zever and Said, 2013 ■ Nakua et al, 2015 |

| Table 4: Details of literature searches | | | | |
|---|-------------|---|--|-------------------|
| Database | Search Date | Search Type | Search Strategy | Papers Identified |
| MEDLINE via Ovid | 17/02/2017 | Advanced – some terms mapped to subject heading with an exploded search (identified in search strategy with 'Exp.'). All search terms limited to English language and timeframe '2012 – current'. | [barrier OR limit* OR "limiting factor"] AND ["hospital birth" OR "attended delivery" OR "hospital delivery" OR Obstetrics (Exp.) OR "obstetric care"] AND [Africa South of the Sahara (Exp.) OR "sub-Saharan Africa"] | 70 |
| Web of Science | 17/02/2017 | Basic, searching in 'Topic', excluding items published before January 2012. | barrier AND hospital delivery AND Africa | 34 |



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