**Additional file 4: Characteristics of included studies**

| **Reference no.** | **Title of the study with First Author and Publication year** | **Study type** | **Study setting** | **Objective** | **Sample size** | **Quality** |
| --- | --- | --- | --- | --- | --- | --- |
| 12 | “Neither we are satisfied nor they”-users and provider’s perspective. *Battachcharya, S. 2015* | Qualitative-  In-depth interviews | Secondary care facilities in Uttar Pradesh, India. | To assess recently delivered women’s and care providers’ perceptions of care to understand the common challenges affecting provision of quality maternity care in public health facilities in India. | 40 | High |
| 42 | Effectiveness and Efficiency of Aama Surakshya Karyakram in terms of Barriers in Accessing Maternal Health Services in Nepal. *Bhusal, C.L. 2011* | Mixed method  Cross sectional and explorative | Five districts in Nepal | To find out the effectiveness and efficiency of Aama Surakshya Karyakram to address barrier in accessing maternal health services in Nepal. | 47 | Medium |
| 53 | What prevents midwifery quality care in Bangladesh? *Bogren, M. 2018* | Qualitative  Focus group discussions | Public nursing institutes/colleges in Bangladesh. | To describe midwifery students’ perceptions on midwives’ realities in Bangladesh based on their own experiences. | 67 | High |
| 63 | Health facility and skilled birth deliveries among poor women with Jamkesmas health insurance in Indonesia: *Brooks, M.I. 2017* | Mixed method-2ry analysis and In-depth interviews | Indonesia | To evaluate the association of health facility and skilled birth deliveries among poor women with and without Jamkesmas and explore perceived barriers to health insurance member-ship and maternal health service utilization. | 45,607  + 51 | High |
| 13 | Preferences for infant delivery site among pregnant women and new mothers in Northern Karnataka, India. *Bruse, S.G. 2015* | Qualitative  -In-depth interviews | Three districts in Northern Karnataka | To explore the factors influencing preference for home, public or private hospital delivery among rural pregnant and new mothers in three northern districts of Karnataka state, India | 110 | High |
| 14 | Does the Janani Suraksha Yojana cash transfer programme to promote facility births in India ensure skilled birth attendance? Chaturvedi, S. 2015 | Qualitative -Non-participant observations and interviews | Healthcare facilities in Madhya Pradesh, India | To examine the quality of intra-partum care provided in facilities under the JSY programme to study whether it ensures skilled attendance at birth. | 18 + 10 | High |
| 15 | Pregnancy-Related Health Information-Seeking Behaviors Among Rural Pregnant Women in India: *Das, A. 2014* | Qualitative Focus group discussions | Health centres in rural Delhi, India | To assess information-seeking behaviors and barriers to information seeking among pregnant women. | 27 | High |
| 64 | Healthcare providers’ perception of the referral system in maternal care facilities in Aceh, Indonesia: *Diba, F. 2019* | Cross sectional | Private and public health facilities in three districts in Aceh province | To investigate the barriers perceived by staff in the referral systems in maternal healthcare facilities across Aceh province in Indonesia. | 32 facilities | Medium |
| 71 | “If we miss this chance, it’s futile later on”– late antenatal booking and its determinants in Bhutan. *Dorji, T. 2019* | Mixed-method Cross-sectional study and in-depth interviews | Maternity Wards of the three tertiary care hospitals in Bhutan | To assess the magnitude and determinants of late ANC in order to guide interventions to achieve early ANC in the lower middle-income setting of Bhutan | 868 women +  14 IDI | High |
| 65 | Newborn care in Indonesia, Lao People’s Democratic Republic and the Philippines: a comprehensive needs assessment. *Duysburgh, E. 2014* | Qualitative | Indonesia, Lao PDR and the Philippines | To conduct a comprehensive, equity-focussed newborn care assessment and to explore options to improve newborn survival in Indonesia, Lao People’s Democratic Republic (PDR) and the Philippines |  | Medium |
| 16 | Categorizing and assessing comprehensive drivers of provider behavior for optimizing quality of health care. *Engl, E. 2019* | Qualitative  In-depth interviews and a game technique | Public health facilities in Uttar Pradesh, India. | To introduce a process for systematically structuring and refining the types of potential drivers and barriers driving key healthcare staff behaviors and a set of qualitative methods to investigate these drivers and barriers among healthcare staff. | 35 IDI  46 | High |
| 43 | Incentivizing universal safe delivery in Nepal: 10 years of experience. *Ensor, T. 2017* | Secondary analysis of DHS data | Nepal | To examine the impact of innovative financing initiatives on access to safe delivery services |  | High |
| 54 | Policy opportunities and limitations of evidence-based planning for immunization: *Grundy, J. 2016* | Field trial | Bangladesh | To tackle the inequities in access to the national immunization programme in Bangladesh with related to geographic location and social factors | Not found | Medium |
| 17 | Impact of a Multi-Strategy Community Intervention to Reduce Maternal and Child  Health Inequalities in India.  *Gupta M. 2017* | Qualitative Focus group discussions and In-depth interviews | Ambala and Mewat districts in Haryana, India | To explore the perceptions and beliefs of stakeholders about extent of implementation and effectiveness of National Rural Health Mission 's health sector plans in improving MCH status and reducing inequalities. | 33 + 42 | High |
| 18 | Barriers and prospects of India’s conditional cash transfer program to promote institutional delivery care. *Gupta, A. 2018* | Qualitative  In depth interviews | Three Indian states.  Jharkhand, Madhya Pradesh and Uttar Pradesh | To understand community health workers’ and program officials’ perceptions regarding barriers to and prospects for the uptake of facilities offered under the JSY. | 50 |  |
| 55 | Challenges and opportunities of integration of community based Management of Acute Malnutrition into the government health system in Bangladesh. *Ireen S. 2018* | Qualitative -document review, key informant interviews and direct observation | Bangladesh | To assess the preparedness of the health system to implement community based management of acute malnutrition in Bangladesh. | 38 | High |
| 56 | Perceptions of health care providers and patients on quality of care in maternal and neonatal health in fourteen Bangladesh government healthcare facilities. *Islam F. 2015* | Mixed-method  Focus group discussions and In-depth interviews | District and sub-district hospitals in Thakurgaon and Jamalpur in Bangladesh | To explore the perception of healthcare providers about the quality of and to investigate patient satisfaction with the maternal and neonatal health care received from district and sub-district hospitals. | 168+  14 FGD | High |
| 57 | The impact of Gonoshasthaya Kendra's Micro Health Insurance  plan on antenatal care among poor women in rural Bangladesh. *Islam M.T. 2012* | Cross sectional survey | Six upsila from three districts in Bangladesh | To assess the impact of Micro  Health Insurance administered by Gonoshasthaya Kendra (one of the largest health-related NGOs) on ANC utilization by poor women in rural Bangladesh. | 592 | High |
| 19 | The emergence of maternal health as a political priority in Madhya Pradesh, India: *Jat, T.R. 2013* | Qualitative Interviews and document  review | India  Madhya Pradesh, India | To explore why and how maternal health became a political priority at sub-national level in the state of Madhya Pradesh in India. | 20 | High |
| 20 | Socio-cultural and service delivery dimensions of maternal mortality in rural central India. *Jat, T.R. 2015* | Qualitative -Social autopsies | The Khargone district in Madhya Pradesh state, India. | To explore socio-cultural and service delivery related dimensions of maternal deaths in rural central India using a human rights lens. | 22 | High |
| 21 | Assessment of facility readiness and provider preparedness for dealing with postpartum haemorrhage and pre-eclampsia/eclampsia in public and private health facilities of northern Karnataka, India. *Jayanna, K. 2014* | Cross-sectional | eight districts of northern Karnataka state South India | To assess the facility readiness and  Provider preparedness related to screening and management of the two most common obstetric emergencies, PPH and pre-eclampsia/eclampsia, at both the PHC level and at higher facilities. | 131 + 148 facilities | Medium |
| 72 | Recognising the challenges of providing care for Thai pregnant adolescents: Healthcare professionals’ views. *Jittitaworn, W. 2019* | Qualitative  Semi-structured interviews | Three teenage pregnancy clinics in Thailand | To understand the experiences of healthcare professionals in caring for pregnant adolescent women in Thailand. | 21 | High |
| 44 | Universal institutional delivery among mothers in a remote mountain district of Nepal: what are the challenges? *Joshi, D. 2016* | Cross sectional | Eight of the 24 VDCs in Mugu District of western Nepal. | To assess the proportion of mothers who delivered in health facilities and among mothers who delivered at home, to understand their reasons for doing so and among mothers who delivered in health facilities, to understand their challenges. | 458 | High |
| 58 | Trends in equity in use of maternal health services in urban and rural Bangladesh. *Kamal , N. 2016* | Secondary analysis of survey data | Bangladesh | To addresses whether the urban–rural and rich-poor gaps in use of selected maternal healthcare indicators have narrowed or widened over the last decade in Bangladesh |  | Medium |
| 22 | What does quality of care mean for maternal health providers from two vulnerable states of India? Case study of Bihar and Jharkhand. *Karvande, S. 2016* | Qualitative  - In-depth interviews | Two districts each from Bihar and Jharkhand states in India | To explore quality components related to practices, health system challenges and quality enablers from providers’ perspectives with a focus on maternal health studied through a pilot research conducted in 2012–2013 in two states of India—Bihar and Jharkhand. | 49 | Medium |
| 23 | Family planning training needs of auxiliary nurse midwives in Jharkhand, India . *Karvande, S. 2018* | Qualitative Observation, interviews and reviews | Jharkhand state, India | a systematic assessment of the training needs of ANMs in Jharkhand | 67+ | High |
| 24 | Readiness of public health facilities to provide quality maternal and newborn care across the state of Bihar, India. *Kaur, J. 2019* | Cross-sectional study | of 190 primary health centres and 36 district hospitals in Bihar, India | To assess the readiness of facilities to provide quality maternal and neonatal care. | 226 | Medium |
| 45 | Barriers to utilization of childbirth services of a rural birthing center in Nepal: *Khatri, R.B. 2017* | Qualitative - In-depth interviews & Focus group discussions | Village Development Committees in Rukum district of the mid-western region, Nepal. | To explore the barriers and provide pragmatic recommendations for better service delivery and use of rural birthing centers. | 26 +  23 | High |
| 69 | Key factors deterring women’s engagement with skilled birth attendants in three districts of Timor-Leste. *King, R. 2019* | Qualitative descriptive study | Three districts in Timor-Leste | To describe the barriers to women’s access to maternity services in three districts of Timor-Leste. | 17 +  30 | High |
| 66 | Can cash transfers improve determinants of maternal mortality?  Evidence from the household and community programs in Indonesia. *Kusuma D. 2016* | Cross sectional 2ry data analysis | Indonesia | To provide evidence on the effects of household cash transfers and community cash transfers on determinants of maternal mortality. | 26000 households | Medium |
| 46 | Illness recognition, decision-making, and care-seeking for maternal and newborn complications: *Lama, T.P. 2017* | Qualitative  -Narratives | Sarlahi District, Nepal | To characterize the process and factors influencing recognition of complications, the decision-making process, and care-seeking behavior among families and communities who experienced a maternal complication, death, neonatal illness, or death in a rural setting of Nepal. | 32 events | Medium |
| 47 | Assessment of facility and health worker readiness to provide quality antenatal, intra-partum and postpartum care in rural Southern Nepal. *Lama, T.P. 2020* | Cross-sectional | Birthing centres and the District hospital in the rural southern Nepal district of Sarlahi. | To assess the facility readiness and health worker knowledge required to provide quality maternal and newborn care. | 24 facilities | Medium |
| 59 | Does healthcare voucher provision improve utilisation in the continuum of maternal care for poor pregnant women? *Mahmood, S.S. 2019* | Cross-sectional surveys | Chattogram and Sylhet divisions of  Bangladesh | To reports the effect of maternal health voucher scheme initiated to reduce financial, geographical and institutional barriers to access for the poorest on the use of continuum of maternal care. | 2400 | Medium |
| 25 | Nurse and physician reflections on the application of a quality standards training program to reduce maternal mortality. *Maloney, S. I. 2018* | Qualitative  Focus group discussions | Twenty-two government hospitals across Kerala in India | To evaluate provider perspectives on the implementation of material taught during an evidence-based medical education session aimed at reducing common causes of maternal death in government hospitals in India. | 131 | High |
| 48 | Care seeking for children with fever/cough or diarrhoea in Nepal:  equity trends over the last 15 years. *Målqvist, M. 2017* | Cross sectional 2ry data analysis | Nepal | To analyse time trends in the prevalence of fever/ cough and diarrhoea in Nepal and applies an equity lens in order to identify disadvantaged groups. | 23178 | High |
| 26 | Barriers and facilitators to the provision of optimal obstetric and neonatal emergency care and to the implementation of simulation-enhanced mentorship in primary care facilities in Bihar, India. *Morgan, M.C. 2018* | Qualitative  Semi-structured interviews | 320 primary health clinics across the state of Bihar, India | To explore barriers and facilitators to optimal care provision and to implementation of simulation-enhanced mentorship in primary health clinics in Bihar. | 20 | High |
| 67 | The Effect of Health Insurance on Institutional Delivery in Indonesia. *Muckhlisa, M.N. 2018* | Cross sectional 2ry data analysis | 33 provinces in Indonesia | To analyze effect of health insurance on institutional delivery in Indonesia. | 39,942 | High |
| 49 | Perceptions of users and providers on barriers to utilizing skilled birth care in mid- and far-western Nepal. *Onta, S. 2014* | Qualitative  Focus group discussions | Three districts in Nepal -. Dailekh, Bajhang, and Kanchanpur | To explore the perceptions of service users and providers regarding barriers to skilled birth care. | 24 FGD | High |
| 27 | The perceptions, health-seeking behaviors and access of Scheduled Caste women to maternal health services in Bihar, India. *Patel, T, 2018* | Qualitative  In-depth interviews | Purnia district, Bihar | To examine the factors contributing to low use of maternal health services by investigating the perceptions, health-seeking behaviours and access of SC women to maternal healthcare services in Bihar, India. | 18 | Medium |
| 50 | Health system barriers influencing perinatal survival in mountain villages of Nepal: implications for future policies and practices. *Paudel, M. 2018* | Qualitative  In-depth interviews | Two villages in Mugu district, Nepal | To examine the health care contexts shaping perinatal survival in remote mountain villages of Nepal. | 62 | Medium |
| 68 | Barriers to utilization of postnatal care at village level in Klaten district, central Java Province, Indonesia. *Probandari, A. 2017* | Qualitative  In-depth interviews | Klaten district, Central Java Province, Indonesia | To explore barriers to utilization of postnatal care at the village level in Klaten district, Central Java Province, Indonesia. | 19 | High |
| 60 | ‘Sometimes they fail to keep their faith in us’: community health worker perceptions of structural barriers to quality of care and community utilization of services in Bangladesh. *Puett, C. 2015* | Qualitative  Focus group discussions | Southern Bangladesh | To explore Community health workers ‘perceptions of barriers to quality of care among two groups of workers implementing community case management of acute respiratory infection, diarrhoea and severe acute malnutrition in southern Bangladesh. | 83 | Medium |
| 51 | Delivering postpartum family planning services in Nepal: are providers supportive? *Puri, M.C. 2018* | Qualitative  In-depth interviews | Six tertiary level public hospitals in Nepal | To explore the perspectives of different types of providers on PPFP including PPIUD, their confidence in providing PPFP services, and their willingness to share their knowledge and skills with colleagues after receiving PPFP and PPIUD training. | 14 | Medium |
| 28 | Public health interventions, barriers, and opportunities for improving maternal nutrition in India. *Ramakrishnan, U. 2012* | Qualitative  In-depth interviews | Uttar Pradesh and Tamil Nadu in India | To evaluate the implementation of maternal nutrition programs in India. | 46 +  35 | Medium |
| 29 | Contracting in specialists for emergency obstetric care-, does it work in rural India? *Randiv, B. 2012* | Mix method  Cross sectional survey and interviews. | Public health facilities in three districts in Maharashtra state of India. | Aim to explore provision, practice, performance, barriers to execution and views about contracting in specialists for emergency obstetric care in rural India. | 44 +  42 | Medium |
| 30 | Is quality of care during childbirth consistent from admission to discharge? *Saxena, M. 2018* | Qualitative  Non-participant observations | Nine public health facilities in two rural districts of Uttar Pradesh, India | To understand women’s experiences of childbirth and identify quality gaps in the process of maternity care | 23 | High |
| 52 | Barriers and facilitators to institutional delivery in rural areas of Chitwan district, Nepal: *Shah, R. 2018* | Qualitative | Chitwan district, Nepal | To explore socio-cultural and health service-related barriers to and facilitators of institutional delivery | 12 +50 | Medium |
| 31 | Quality of Health Management Information  System for Maternal & Child Health Care in Haryana State, India. *Sharma, A. 2016* | Cross-sectional survey | 209 Sub-Centre areas across  all 21 districts of Haryana state , India | To assess the extent of completeness and quality of HMIS in Haryana state of India. | 4807 | Medium |
| 32 | Can India’s primary care facilities deliver? A cross-sectional assessment of the Indian public health system’s capacity for basic delivery and newborn services *. Sharma, J. 2018* | Cross-sectional Survey | Community health centres and primary health centres across 30 states and union territories in India. | To assess input and process capacity for basic delivery and newborn care in the Indian public health system and to describe differences in facility capacity between rural and urban areas and across states. | 8536 + 4810 | High |
| 33 | Maternal health care access among migrant women labourers in the selected brick kilns of district Faridabad, Haryana: *Siddaiaha, A. 2018* | Mixed method Focus group discussions | Faridabad district of Haryana in North India | To assess maternal health care utilization among women labourers working in brick kilns situated in an area of Haryana, North India. | 500 | High |
| 34 | State-wide program to promote institutional  delivery in Gujarat, India: who participates  and the degree of financial subsidy  provided by the Chiranjeevi Yojana  Program. *Sidney K. 2018* | Cross-sectional survey | Sabarkantha, Dahod, and Surendranagar, three districts of Gujarat , India | To elicit socio-demographic characteristics, out-of-pocket expenditures, and Chiranjeevi Yojana program details. Chiranjeevi Yojana is a large public-private partnership program in Gujarat, India, under which the state pays private sector obstetricians to provide childbirth services to poor and tribal women. | 901 | High |
| 61 | Availability of emergency obstetric care among public and private health facilities in rural Northwest Bangladesh. *Sikder, S.S. 2015* | Cross sectional survey | Gaibandha and Rangpur Districts in Rangpur Division in Bangladesh | To explore the availability and readiness for emergency obstetric care provision among commonly visited health facilities (public and private) for pregnancy-related health care in two districts of rural northwest Bangladesh. | 14 health facilities | Medium |
| 35 | Management and referral for high-risk conditions and complications during the antenatal period: knowledge, practice and attitude survey of providers in rural public healthcare in two states of India. *Singh, S. 2019* | Cross sectional | Peripheral health centres in two Indian states, Himachal Pradesh Andhra Pradesh | To assess rural providers’ perspectives on management and referrals of antenatal women with high obstetric risk, or with complications. | 147 | Medium |
| 36 | Newborn care practices and home-based postnatal newborn care programme – Mewat, Haryana, India, 2013. *Sinha, L.N. 2014* | Cross-sectional survey | Mewat district in the south of Haryana, India | To study newborn care practices among mothers in Mewat, Haryana, having a high neo natal mortality rate and to determine risk factors for unsafe practices and describe the knowledge and skills of Accredited Social Health Activists during home visits. | 320 | Medium |
| 62 | Out-of-pocket expenditure for seeking health care for sick children younger than 5 years of age in Bangladesh: findings from cross-sectional surveys, 2009 and 2012. *Tahsina, T. 2017* | Cross-sectional surveys | Five rural districts in Bangladesh | To estimate and identify determinants of OPE in seeking health care for sick under-five children. | 7362  6896 | High |
| 37 | How equitable is the uptake of conditional cash transfers for maternity care in India?  *Thongkong, N. 2017* | 2ry data analysis | Five districts in Jharkhand and Odisha state, India. | To measure and explain socioeconomic inequality in the receipt of JSY benefits. | 3,682 | High |
| 38 | Logistical, cultural, and structural barriers to immediate neonatal care and neonatal resuscitation in Bihar, India*. Vail, B. 2018* | Qualitative Semi-structured interviews | Rural primary health centres in Bihar, India. | To understand barriers to evidence based practices in neonatal clinical care in Bihar | 18 | M Medium |
| 39 | Utilization of maternal health care services and their determinants in Karnataka State, India. *Vidler, M. 2015* | Qualitative Focus group discussions and individual interviews | Two rural Districts (Belgaum and Bagalkot) of Karnataka State, India | To describe the patterns and determinants of routine and emergency maternal health care utilization in rural Karnataka State, India. | 335+  12 | Medium |
| 73 | Barriers, Facilitators and Priorities for Implementation of WHO Maternal and Perinatal Health Guidelines in Four Lower income Countries: *Vogel, J.P. 201* | Mixed-method  Surveys, Focus group discussions | Myanmar (Uganda, Tanzania and Ethiopia are also in settings). | To identify barriers and facilitators to implementation of WHO maternal heath recommendations in four lower-income countries and to identifying implementation strategies to address these barriers. |  | High |
| 40 | Has Chiranjeevi Yojana changed the geographic availability of free comprehensive emergency obstetric care services in Gujarat, India? *Vora, K.S. 2015* | Cross sectional analysis | Three rural  districts of Gujarat, India | To examine the effectiveness of Chiranjeevi Yojana (public private partnership  Program) in improving availability of EmOC services in three districts of Gujarat. | 2763 | Medium |
| 70 | The decision to seek care antenatal and during labour and birth –Who and what influences this in Timor-Leste? *Wallace, H.J. 2018* | Qualitative Focus group discussions and interviews | Four municipalities of Timor-Leste (Viqueque, Baucau, Ermera and Dili municipalities) | To identify what influences people’s decisions to seek antenatal care and care during labour and birth and to provide emic/local insights to help midwives and maternal health providers tailor care and resources appropriately, thus improving maternal health. | 80 +  17 | Medium |
| 41 | Facilitators and barriers to participation of private sector health facilities in government-led schemes for maternity services in India: *Yadev, V. 2017* | Qualitative  In-depth interviews | Jharkhand and Uttar Pradesh, India. | To explore the perception of various stakeholders on expectations, benefits, barriers and facilitators to private sector participation in government-led schemes—specifically Janani Suraksha Yojana (JSY)—for maternity service delivery. | 31 | Medium |