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COMMUNITY-BASED MANAGEMENT OF PREECLAMPSIA IN RISK FACTOR IDENTIFICATION, DETECTION, AND EMERGENCY TREATMENT: A SCOPING REVIEW

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Abstract

Preeclampsia accounts for 10-14% of maternal deaths globally and the prevention is faced with the difficulty of identifying risk factors, as well as the limitations of emergency management. This study aims to investigate the literature on community-based management in the identification of risk factors, detection, and emergency management of preeclampsia. This study was conducted using the Arksey & O'Malley framework, while the data were sourced from 621 articles obtained through PubMed, Cochrane, Ebsco, Wiley online library, ProQuest, and Science Direct with 14 articles included in the analysis. Inclusion criteria include articles with experimental design, case-control, cohort, cross-sectional, qualitative study, and mixed-method studies, on the identification of risk factors, detection, and management of emergency preeclampsia in the community. Meanwhile, exclusion criteria include non-English articles, reviews, commentaries, and protocols. The article review was carried out by 2 reviewers, extracted according to the data map, and presented in a narrative. The implementation of community-based management of preeclampsia through sharing tasks between cadres and midwives shows an increase in knowledge and skills in detecting preeclampsia and its danger signs as well as the recommendation of $MgSO_4$ during an emergency before starting a referral. Contacts between pregnant women and community providers > 8 times led to a reduction in maternal and child mortality. Community-based management of preeclampsia has great potential but requires regular training and refreshment as well as government support to strengthen the health service system in the prevention of preeclampsia.

Keywords : Community, Detection, Emergency, Preeclampsia

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INTRODUCTION

Maternal and child mortality is still a priority issue for low-middle countries. One of the World Health Organization (WHO) agendas in the Sustainability Development Goals (SDGs) sets a target

of reducing maternal mortality to less than 70 by 2030 (Abraha et al., 2019). However, this target is still far from being achieved. Most maternal deaths occur due to complications during pregnancy and childbirth that can actually be prevented with good handling and treatment before, during, and after the delivery process. However, the lack of expert staff and resources causes the referral system not to function properly, so emergency cases are not handled. As many as 75% of pregnancy complications are caused by bleeding, preeclampsia, infection, complications during childbirth, and unsafe abortion (WHO, 2019).

Preeclampsia is a syndrome characterized by increased blood pressure and proteinuria with or without pathological edema that occurs after 20 weeks of gestation which can develop into dysfunction of various organ systems (Fox et al., 2019; Meazaw et al., 2020). Preeclampsia is the second leading cause of maternal death with a prevalence of 10% after postpartum hemorrhage (Black, E, Robert, n.d.). The World Health Organization (WHO) estimates that more than 14% of maternal deaths globally are caused by hypertensive disorders of pregnancy, and >95% occur in low- and middle-income countries (Ekawati et al., 2020; P von Dadelszen et al., 2007). Risk assessment is an important step before diagnosing preeclampsia (Bartsch et al., 2016; Belay & Wudad, 2019). Mild to moderate preeclampsia often does not cause symptoms but can develop into serious complications for the mother and fetus (R A Salam et al., 2015). This condition is very well managed at the tertiary and specialist levels. Emergency preeclampsia management protocols using MgSO4 can be easily obtained so that mothers with preeclampsia will not develop more serious complications. However, at the community level, preeclampsia often ends in complications and is too late in treatment (Bellad et al., 2020). Challenges such as the absence of clear guidelines in determining risk and referral standards, the inability to detect and treat the condition in an emergency, distance, and high costs overall increase maternal mortality rates (Amosse et al., 2021; Raghavan et al., 2016). In addition, in low-middle countries, emergency assistance with MgSO4 cannot be given immediately due to limited supplies and limited resources. The availability of effective interventions in various health facilities does not guarantee a decrease in maternal mortality because 50% of cases of eclampsia seizures occur before the mother can reach a health facility (Thobbi & Amwar, 2017).

Community-based preeclampsia management emphasizes collaboration with village cadres and midwives as competent human resources to reach wider services at the community level. This can increase access to services and strengthen the health system (Kirk, 2020; Shobo et al., 2020). Cadres are trained to recognize high-risk pregnancy factors and monitor the health of pregnant women by reporting complaints experienced during pregnancy. The Scoping Review aims to identify and explain community-based management of preeclampsia in identifying risk factors, detection, and emergency management.

MATERIALS AND METHODS

The Scoping Review method refers to the Arksey & O'Malley framework with stages 1) identifying study questions, 2) identifying relevant studies, 3) selecting studies, 4) mapping data, 5) compiling, concluding, and reporting data (Arksey & O'Malley, 2005; Peters et al., 2015).

Data Sources And Data Retrieval Strategies

The data were sourced from studies conducted between 2000 and 2020. In 2002, a maternal program was launched to achieve the Sustainable Development Goals (Meazaw et al., 2020). The 621 articles included 9 electronic literature articles from PubMed, Cochrane 2, Science Direct 249, Willey online library 51, springer 103, ProQuest 106, and Ebsco 101. The keywords used were MESH and/or Text Word terminology. The article identification process began with the appropriate keywords, and then a filtering process was carried out by removing inappropriate articles based on titles, duplications, and abstracts. From the articles collected, namely 67 per title, there were 5 duplications. After reviewing the abstract, 25 were left behind, with 6 of them being reviews, comments, and protocols. Eligibility criteria were carried out by screening from the full text and 19 articles were obtained. A total of 5 did not meet the established criteria, leaving only 14 to be identified and presented in the Scoping Review.

Table 1: Search Strategy

Category	*Parameter*
Population	*Pregnancy[MesH] OR Pregnant women[MeSH]*
Intervention	*(Guideline*[tw] OR management[tw]) AND community[tw]*
	"Risk Factor"[MeSH] OR (Detection[tw] OR "early Diagnosis"[MeSH])*
	AND emergencies[MeSH] OR emergencies[tw] OR emergency[tw] AND
Outcome	*Pre-Eclampsia[MeSH] OR Preeclapmsia[tw]*

Data Selection

The inclusion criteria were articles that used quantitative studies such as trial design, case-control, cohort, cross-sectional, qualitative studies, and mixed methods. The population was pregnant women with predetermined interventions, namely community-based management or guidelines, and the result is the detection or increased risk and emergency of preeclampsia. Meanwhile, the exclusion criteria included articles that were not in English and those in the form of reviews, comments, and protocols.

Creating Data Maps/Extracting Data

Two independent reviewers assessed the results based on predetermined inclusion criteria,

including filtering titles, abstracts, and full text. A third reviewer is taken when there is a dispute between the 2 individuals. Data extraction was arranged in a map table containing the author's name, year of publication, type of study, intervention explaining the mechanism implemented, and results including detection and treatment, as well as univariate outcomes such as percentage, multivariate odds ratio, and relative risk.

Compilation, Conclusion, And Report

Data synthesis was done by compiling the extracted data in a narrative summary table based on a data map. Data were extracted manually, and the report was prepared as a narrative using the thematic pattern of community-based management of preeclampsia, the detection/increased risk, and the emergency of preeclampsia and its treatment.

Ethical Approval

This study has received approval from the Research Ethics Committee, Faculty of Medicine, Universitas Sebelas Maret 57/UN27.06.11/KEP/EC/2022. The application for informed consent, part of ethical eligibility, has undergone a review process from the ethics committee.

RESULT AND DISCUSSION

Result

Article Characteristics

The analysis consisted of 14 articles, namely 4 qualitative, 3 cross-sectional, 1 retrospective, 3 Mixed Methods, and 3 RCT studies. The locations described in the article are India 4 studies, Nigeria 2, Pakistan 3, Mozambieq 2, Bangladesh 1, Madagascar 1, and DRC 1 study. The scope of management discussion or guidelines for handling Preeclampsia includes 5 national guidelines, 2 feasibility study articles, 6 community-based management, and 1 report on the implementation.

Table 1: Data map of Author, country, type of study, intervention, risk and emergency of Preeclampsia, study results

Author, Year, Country	Study design	Intervention/comparison	Results
J.O. Sotunsa, 2016, Nigeria (Sotunsa et al., 2016)	Qualitative studies	Qualitative studies Part of the *CLIP RCT*	CHW's knowledge of emergency detection and treatment is adequate, namely by measuring blood pressure, the presence of symptoms of headache, oedema, and lack of sleep, but is not confident in giving MgSO4 when an emergency occurs.
Umesh Charanthimath, 2018, India (Charanthimath	Qualitative studies	NRHM in India implements the policy of administering MgSO4 by ANM and ASHA in	ANM has the ability to measure blood pressure. Community representatives support ANM can provide MgSO4 and referral efforts

Author, Year, Country	Study design	Intervention/comparison	Results
et al., 2018)		preeclampsia emergencies.	
Dalau Mukadi Nkamba, 2020, Kinshasa, *Democratik Republik of Congo* (Nkamba et al., 2020)	*Cross sectional*	National DRC policy guidelines on the use of MgSO4 by PHC and hospitals. Comparison is secondary and tertiary health services.	The guidline can mention the risk of prim parous preeclampsia, multiple pregnancies, previous history of preeclampsia, autoimmune diseases, family history of preeclampsia, diabetes, chronic hypertension, and history of chronic kidney failure. Overall, health workers were able to diagnose severe preeclampsia 91.4% but only 43.9% gave MgSO4
Mruntunjaya B.Bellad, 2020, India (Bellad et al., 2020)	*Cluster Randomized Controlled trial*	Clustered implementations of CLIP with comparisons accept regular implementations. CHW training in measuring blood pressure, proteinuria, PIERS, and antenatal contact for application to pregnant women. Trained nurses/midwives are allowed to provide Methyldopa and MgSO4 therapy.	Detection of preeclampsia with POM indicated that the emergency is identified when the miniPIERS score is > 25%, severe preeclampsia. Immediate referral < 4 hours. There was no difference in the main outcome (female morbidity and mortality) OR (95%CI) 0.92 (0.74.1.15), women with CLIP contacts≥ 8 times had less neonatal mortality OR 0.19 (0.1, 0.35)
Helena Boene, 2016, Mozambieq (Boene et al., 2016)	*Mixed-Method*	CLIP program preparation. Secondary data in the form of training, reports, and guides as a database of knowledge and skill s of CHW against preeclampsia.	Detection of preeclampsia includes blood pressure, proteinuria, headache, oedema, vaginal bleeding, no foetal movement, lower abdominal pain, fever, convulsions, and weight loss. Among the 93% of CHW who recognize pregnancy complications, only 41% can describe at least 1 danger sign, in the case of preeclampsia, CHW directly referred, 90% CHW could not measure blood pressure, and proteinuria, 14% dared to give methyldopa and 5% injections to pregnant women.
Esperanca Sevene, 2020, Mozambieq (Sevene et al., 2020)	*Cluster Randomized Controlled trial*	CHW was provided with 15 days of training in triage, transportation, and medication, and training in blood pressure measurement techniques, using the CLIP device (PIERS), and basic communication	Diagnosis of preeclampsia with POM indicated the need of recommendations for referral and anti-hypertensive measures. There was a 20% reduction in the general impact on maternal, foetal, and new-born mortality. Maternal, foetal, and new-born mortality rates aOR are 1.31. 95%CI 0.70-2.48. In

Author, Year, Country	Study design	Intervention/comparison	Results
		techniques and antenatal contact by CHW.	the intervention group, mothers who had contacts > 8 times had a smaller impact on maternal morbidity, aOR 0.79 (95% CI 0.63.0.99; p=0.041
Sana Sheikh, 2016, Pakistan (Sheikh et al., 2016)	*Mixed-Method Study*	The feasibility test of the implementation of CLIP by CHW and facility-based services (doctors) by providing interventions both in screening and triage of pregnant women for the risk of preeclampsia and administering oral antihypertensive and MgSO4	The provider correctly mentions the signs and symptoms, complications of preeclampsia include antepartum bleeding, prematurity, brain haemorrhage, decreased foetal movement, stunted foetal growth, and refers to a tertiary health facility. MgSO4 is not recommended in primary and secondary health facilities
Anna Williams, 2019, Bangladesh (Williams et al., 2019)	*Retrospective record review*	Analysis of the preeclampsia situation after the CLIP program. Competency-based training was adopted from the central program for the regency for 2 days. Monitoring and evaluation are carried out every month at the selected facility	After the intervention, all facilities had MgSO4, guidelines for preeclampsia/eclampsia screening, 65% of mothers received 1 ANC, and 18% > 3 times. Blood pressure and proteinuria examinations were performed in 90% of ANC visits, 283 women were identified as preeclampsia/eclampsia, and 53% were given MgSO4. 94% of Women with eclampsia were referred to CEmONC facilities.
Olukolade George Shobo, 2020, Nigeria (Shobo et al., 2020)	*Mixed-Method*	VHW was given training in measuring blood pressure for 2 weeks and then implemented for pregnant women with an intervention duration of 6 months. The first visit started in the first 4 months and the second visit from the second month to the last intervention.	There is a decrease of the prevalence of pregnancy from 1.5% (95% CI, 1.3-1.7) at the first visit to 0.8% (95%, 0.6-1) at the second visit. VHW can measure the blood pressure of pregnant women using a semi-automatic device,
Umesh Ramadurg, 2016, India (Ramadurg et al., 2016)	Qualitative Studies	Existing national program interventions in India.	Most do not understand the causes of preeclampsia. Many think that the cause of preeclampsia is stress, seizures, and fear. CHW knows that MgSO4 is for handling emergencies, but no one provides MgSO4 in handling
Rehana A. Salam, 2016, Pakistan (Rehana A. Salam et al.,	Exploratory qualitative studies	The national program applies community-based treatment of preeclampsia. LHW was allowed to diagnose the	72% of LHW recognize the danger signs of preeclampsia, 9% have a blood pressure measuring device, 4% have a proteinuria meter, and 34% can measure blood pressure,

Author, Year, Country	Study design	Intervention/comparison	Results
2016)		danger signs of preeclampsia and gave MgSO4.	complications are referred.
Rahat N, Qureshi, 2020, Pakistan (Qureshi et al., 2020)	*Cluster RCT*	The intervention package includes meetings with community leaders, antenatal contacts, and home visits by cadres for screening with miniPIERS and mHealth application and monitoring	Stratification of preeclampsia using POM, while action by giving Methyldopa and referring. There was no significant difference between maternal mortality in the intervention and control cluster aOR 1.08(0.69, 1.71:0.77) and morbidity aOR 1.12(0.57,2.16:0.77). The number of visits affects the impact. Visits 4-7 times (p=0.015), >8 times p< 0.01
Ania Salem, 2018, Madagaskar (Salem et al., 2018)	*Cross-sectional*	PANDA's health program contains a guide to the danger signs of pregnancy compared to no similar program.	Approximately 99.2% of pregnant women carried out ANC, 70.8% received information on danger signs at the beginning of the ANC meeting and 60.8% were carried out by cadres. 55.4% of the red flag actions referred to the hospital.
Krishnamurthy, 2014, Karnataka India (Jayanna et al., 2014)	*Cross-sectional*	National guideline program that already exists in primary care compared to secondary and private services.	Approximately 78.5% (95% CI 74.6-82.1) of providers correctly diagnosed severe preeclampsia, and only 46% (95%CI 41.8-50.9) recommended MgSO4, other treatments were given intravenous fluids, antihypertensives, anticonvulsants, oxygen and referrals

NRHM: The National Rural Health Mission; CHW: Community Health Worker; VHW: Village Health Worker; ANM: Auxiliary Nurse midwives; ASHA: Accredited Social Health Activist

Community-Based Management Of Preeclampsia

Preeclampsia management in the form of 5 national guidelines from India and Pakistan shows that 2 of them are ongoing interventions through PHC at the community level while secondary/tertiary/private services are the comparator (Jayanna et al., 2014; Nkamba et al., 2020). Meanwhile, the remaining 3 are feasibility studies for preparing community-based interventions (Charanthimath et al., 2018; Ramadurg et al., 2016; Rehana A. Salam et al., 2016). All of these articles allow providers and CHW/VHW to recognize the danger signs of preeclampsia and recommend MgSO4. Community-based management begins with assessing knowledge and skills in diagnosing and treating Preeclampsia through interviews and FGDs (Boene et al., 2016; Sheikh et al., 2016; Sotunsa et al., 2016). The training is carried out for 2-15 days with a curriculum on how to measure blood pressure, recognize risk factors, and detect preeclampsia through miniPIERS or POM, communication techniques, administration of MgSO4 in handling emergencies, and antenatal contact

by CHW according to WHO recommendations (Bellad et al., 2020; Qureshi et al., 2020; Sevene et al., 2020; Shobo et al., 2020) with monitoring every 1 month.

Detection/Diagnosis/Risk Factors, Emergency Preeclampsia And Its Management

A total of 5 articles on national guidelines from India and Pakistan explained that 72%-78.5% of cadres recognized the danger signs of preeclampsia (Jayanna et al., 2014; Rehana A. Salam et al., 2016) but only 34% were able to measure blood pressure and 9% had measuring devices (Rehana A. Salam et al., 2016). Although most cadres have good knowledge about the diagnosis and danger signs, only 2 out of 5 articles (40%) achieved recommendations for MgSO4 administration ranging from 43.9%-46% [(23.33)] while 3 out of 5 articles (60%) do not give MgSO4 and recommend referral (Charanthimath et al., 2018; Ramadurg et al., 2016; Rehana A. Salam et al., 2016).

Two community-based management feasibility studies conducted in Pakistan and Mozambique showed that 90% of health providers could measure blood pressure, but only 41% recognized the danger signs of preeclampsia. Moreover, there was a lack of knowledge in explaining the causes of preeclampsia, and only 14% gave Methyldopa (Boene et al., 2016), while only doctors recommended MgSO4 (Sheikh et al., 2016).

Six articles on the implementation of community-based preeclampsia management programs from India, Madagascar, Nigeria, and Pakistan reported that 99.2% of pregnant women underwent ANC, 70.8% received information about the danger signs of pregnancy since the first meeting, and cadres provided 60.8% of the information (Salem et al., 2018). Furthermore, 99.9% of cadres were able to measure blood pressure, 98.4% measured proteinuria, and 96.8% recommended Methyldopa to treat emergencies (Qureshi et al., 2020; Shobo et al., 2020). Although there was no significant difference in the impact of maternal mortality as demonstrated by aOR 1.31, 95%CI 0.70-2.48 (Sevene et al., 2020), OR (95%*CI*) 0.92 (0.74,1.15) (Bellad et al., 2020), *aOR* 1.08 (0.69, 1.71: 0.77) (Qureshi et al., 2020) but all articles mentioned that contact with cadres or health workers $\geq$ 8 times will reduce the risk of mortality, as well as maternal and child morbidity (Bellad et al., 2020; Qureshi et al., 2020; Sevene et al., 2020).

Field reports on the implementation of community-based management showed that before the program, only 3 women detected preeclampsia and 2 with eclampsia. After the program was implemented, 283 were detected with preeclampsia/eclampsia, 90% of pregnant women received blood pressure and proteinuria checks during ANC, 53% recommended MgSO4, 94% of eclamptic women were referred to obstetric emergency services, 80% delivered vaginally leading to 97% live birth (Williams et al., 2019).

Discussion

Preeclampsia detection can be done through blood pressure measurement or simple urine protein examination that can be done at the community level. Cadres can monitor pregnant women whose diastolic examination results reach > 80 mmHg or urine protein examination results are +1. Pregnant women who have experienced preeclampsia before, have a family history and have chronic diseases such as kidney failure and diabetes mellitus are also risk factors for preeclampsia. Detection of preeclampsia emergencies is characterized by systolic blood pressure > 160 mmHg or diastolic > 110 mmHg, pregnant women experience visual disturbances, severe abdominal pain, nausea, and vomiting, and the fetus does not move (Chawla et al., 2020). Emergency management of preeclampsia in the community is prioritized on screening accuracy so that pregnant women do not experience delays in being referred to secondary or tertiary health services. The development of preeclampsia can be prevented if detected early. However, at the community level, the lack of uniformity in screening, diagnosis, and treatment guidelines is a major problem in preeclampsia policy (Gudu & Sripad, 2020). MgSO4 administration may be effective in preventing preeclampsia emergencies, but in low-middle countries, it is constrained by inadequate supplies, resources, transportation, and security (Toledo-jaldin et al., 2020). Low-dose aspirin administration is an alternative at the first level of health services to prevent the development of preeclampsia for pregnant women at risk (Atallah et al., 2017). The development of pregnancy complications due to preeclampsia at the community level is related to delays in triage, namely late identification of who to help, delays in referral, delays in obtaining transportation to health services, and ineffective treatment (Payne et al., 2014). The biggest cause of morbidity and mortality related to preeclampsia is caused by poorly trained cadres who cannot detect and are late in triaging. Community-based healthcare management is a breakthrough offered to low-middle countries (Adepoju et al., 2021). Community-based management of preeclampsia uses an approach to empowering cadres in the community. The task-sharing method between midwives and cadres is used to reach a wider area. Cadres are trained to measure blood pressure, and urine protein, read interpretation of results, motivate the implementation of ANC, and make referrals for the effectiveness of screening programs in the community (RHIhub, 2021) The miniPIERS (Preeclampsia Integrated Estimate of Risk) is a guideline set at the community level to predict adverse preeclampsia. Likewise, PIERS on the Move (POM) utilizes mHealth to facilitate cadres in carrying out detection. However, at the community level, standardization of guidelines is still difficult to implement due to differences in provider understanding (Payne et al., 2014). CHWs play an important role in this program because they are resources that have unique characteristics with similarities in ethnicity, language, culture, socioeconomic status, and life experiences with patients, making it easier for them to blend in with the wider community (Alwy Al-beity et al., 2020; Ndwiga et al., 2018). They also bridge the

limitations of facilities and health professionals in providing quality health services (Macuácua et al., 2019). Geographically, the presence of cadres is beneficial, especially in dealing with remote areas or those that are geographically difficult to reach (Charanthimath et al., 2018). Cadres can conduct home visits to pregnant women and record the results of monitoring the health of pregnant women to be reported to midwives (Nishimwe & Mchunu, 2022). In low-middle countries with low literacy rates, cadres are needed to accompany mothers and provide education to prevent high-risk pregnancies and motivate pregnant women to comply with Antenatal care (Tavananezhad et al., 2022). ANC and PNC are maternal morbidity factors where the number of ANC visits reduces the negative impact on mothers(Tura et al., 2020; Widyaningsih et al., 2017). Distance, cost, and socio-culture are obstacles to the effectiveness and efficiency of ANC and PNC; therefore, community-based management of preeclampsia provides solutions through contact or home visits by trained cadres under the supervision of midwives or nurses (Peter von Dadelszen et al., 2020). At the community level, visits by community health cadres (CHWs) are carried out every 4 weeks or <28 weeks of pregnancy, 2 weeks or 28-35 weeks of pregnancy, weekly> 36 weeks, <24 hours after delivery, on the day of delivery, and 3, 7, 14 weeks postpartum (Qureshi et al., 2020). Community-based management of preeclampsia prioritizes training of community health cadres in conducting screening, utilizing blood pressure measurement technology that can be done at home, primary and clinical services, and emergency management (Peter von Dadelszen et al., 2020). Reporting the development of pregnant women's health, consultation, and coordination with providers can be done using social media such as WhatsApp. Midwives, as the main providers of pregnant women in villages, must continuously improve their knowledge and skills about high-risk pregnancy screening to be transferred to cadres as a task-sharing with midwives

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Although community-based preeclampsia management is a prospective program, this program has obstacles, including the need for funds to pay cadres and the unclear career path of cadres which may hinder the retention of cadre duties (Munguambe et al., 2016). The benefits of this study are that it describes the implementation of community-based preeclampsia management, both in existing primary program services and trials in the community and field studies after the program is implemented, to obtain comprehensive community-based preeclampsia management results. Meanwhile, the weakness is that it does not specifically explain the management of secondary and tertiary preeclampsia, so that it cannot describe the gap in management standards.

CONCLUSION

Community-based management of Preeclampsia is effective in identifying risk factors, detecting or diagnosing danger signs, and managing emergencies. Through the collaboration of cadres and midwives as supervisors, they provide solutions to the limitations of human resources in a wider

range of services, the inaccessibility of health facilities due to distance and cost, and the accuracy of action when complications occur. Refresher training and training needs to be conducted periodically to maintain the quality of detection and treatment capabilities and government policies to support strengthening the community-based health service system.

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Declaration of Interest Statement

The authors declare that they have no conflict of interests.

REFERENCES

Abraha, T. H., Gebrezgiabher, B. B., Aregawi, B. G., Belay, D. S., Tikue, L. T., & Reda, E. B. (2019). Factors associated with compliance with the recommended frequency of postnatal care services in four rural districts of Tigray region, north Ethiopia. *Korean Journal of Family Medicine*, *40*(5), 329–334. https://doi.org/10.4082/kjfm.18.0023

Adepoju, A. A., Vidler, M., Akadri, A. A., Jaiyesimi, E., Nwankpa, C. C., Odubena, O. O., Sharma, S., Li, L., Tu, D., Drebit, S., Payne, B., Akeju, D. O., Bhutta, Z., Magee, L. A., Nathan, H. L., Shennan, A. H., Sotunsa, J., Adetoro, O. O., von Dadelszen, P., … Soyinka, O. (2021). The ability and safety of community-based health workers to safely initiate lifesaving therapies for pre-eclampsia in Ogun State, Nigeria: An analysis of 260 community treatments with MgSO4 and/or methyldopa. *Pregnancy Hypertension*, *25*(May), 179–184. https://doi.org/10.1016/j.preghy.2021.05.005

Alwy Al-beity, F., Pembe, A. B., Kwezi, H. A., Massawe, S. N., Hanson, C., & Baker, U. (2020). "We do what we can do to save a woman" health workers' perceptions of health facility readiness for management of postpartum haemorrhage. *Global Health Action*, *13*(1), 1–12. https://doi.org/10.1080/16549716.2019.1707403

Amosse, F., Boene, H., Kinshella, M. L. W., Drebit, S., Sharma, S., Tatendamakanga, P., Valá, A., Magee, L. A., Dadelszen, P. Von, Vidler, M., Sevene, E., & Munguambe, K. (2021). Implementation of a community transport strategy to reduce delays in seeking obstetric care in rural Mozambique. *Global Health Science and Practice*, *16*, S122–S136. https://doi.org/10.9745/GHSP-D-20-00511

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology: Theory and Practice*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Atallah, A., Lecarpentier, E., Goffinet, F., Doret-Dion, M., & ... (2017). Aspirin for prevention of preeclampsia. In *Drugs*. Springer. https://doi.org/10.1007/s40265-017-0823-0

Bartsch, E., Medcalf, K. E., Park, A. L., Ray, J. G., Al-Rubaie, Z. T. A., Askie, L. M., Berger, H., Blake, J., Graves, L., Kingdom, J. C., Lebovic, G., Lord, S. J., Maguire, J. L., Mamdani, M. M., Meloche, J., Urquia, M. L., & Van Wagner, V. (2016). Clinical risk factors for pre-eclampsia determined in early pregnancy: Systematic review and meta-analysis of large cohort studies. *The BMJ*, *353*. https://doi.org/10.1136/bmj.i1753

Belay, A. S., & Wudad, T. (2019). Prevalence and associated factors of pre-eclampsia among pregnant women attending anti-natal care at Mettu Karl referal hospital, Ethiopia: cross-sectional study. *Clinical Hypertension*, *25*(1), 1–8. https://doi.org/10.1186/s40885-019-0120-1

Bellad, M. B., Goudar, S. S., Mallapur, A. A., Sharma, S., Bone, J., Charantimath, U. S., Katageri, G. M., Ramadurg, U. Y., Mark Ansermino, J., Derman, R. J., Dunsmuir, D. T., Honnungar, N.

V., Karadiguddi, C., Kavi, A. J., Kodkany, B. S., Lee, T., Li, J., Nathan, H. L., Payne, B. A., … von Dadelszen, P. (2020). Community level interventions for pre-eclampsia (CLIP) in India: A cluster randomised controlled trial. *Pregnancy Hypertension*, *21*(April), 166–175. https://doi.org/10.1016/j.preghy.2020.05.008

Black, E, Robert, 2016. (n.d.). *Reproductive, Maternal, Newborn, and Child Health*. https://www.ncbi.nlm.nih.gov/books/NBK361907/pdf/Bookshelf_NBK361907.pdf

Boene, H., Vidler, M., Augusto, O., Sidat, M., Macete, E., Menéndez, C., Sawchuck, D., Qureshi, R., von Dadelszen, P., Munguambe, K., & Sevene, E. (2016). Community health worker knowledge and management of pre-eclampsia in southern Mozambique. *Reproductive Health*, *13*(Suppl 2), 105. https://doi.org/10.1186/s12978-016-0220-2

Charanthimath, U., Vidler, M., Katageri, G., Ramadurg, U., Karadiguddi, C., Kavi, A., Joshi, A., Mungarwadi, G., Bannale, S., Rakaraddi, S., Sawchuck, D., Qureshi, R., Sharma, S., Payne, B. A., Von Dadelszen, P., Derman, R., Magee, L. A., Goudar, S., Mallapur, A., … Revankar, A. (2018). The feasibility of task-sharing the identification, emergency treatment, and referral for women with pre-eclampsia by community health workers in India. *Reproductive Health*, *15*(Suppl 1). https://doi.org/10.1186/s12978-018-0532-5

Chawla, R., Nasa, P., Chawla, R., & ... (2020). 20 Severe Preeclampsia. *ICU Protocols: A Step …*. https://books.google.com/books?hl=en&lr=&id=6VHaDwAAQBAJ&oi=fnd&pg=PA205&dq=%22preeclampsia%22+%22guideline%22&ots=h2KavmSHJ7&sig=Rgak6hVlCpe1pw-nrU_QJp0Q-7Y

Ekawati, F. M., Emilia, O., Brennecke, S., Gunn, J., Licqurish, S., & Lau, P. (2020). Opportunities for improving hypertensive disorders of pregnancy (HDP) management in primary care settings: A review of international published guidelines in the context of pregnancy care in Indonesia. *Pregnancy Hypertension*, *19*(January), 195–204. https://doi.org/10.1016/j.preghy.2020.01.012

Fox, R., Kitt, J., Leeson, P., Aye, C. Y. L., & Lewandowski, A. J. (2019). Preeclampsia: Risk Factors, Diagnosis, Management, and the Cardiovascular Impact on the Offspring. *Journal of Clinical Medicine*, *8*(10), 1625. https://doi.org/10.3390/jcm8101625

Gudu, W., & Sripad, P. (2020). BARRIERS TO THE DETECTION, MANAGEMENT and PREVENTION OF PREECLAMPSIA/ECLAMPSIA IN ETHIOPIA: FORMATIVE REVIEW. *Ethiopian Journal of Reproductive Health*, *12*(4), 1–12. http://ww.ejrh.org/index.php/ejrh/article/view/406

Jayanna, K., Mony, P., Ramesh, B. M., Thomas, A., Gaikwad, A., Mohan, H. L., Blanchard, J. F., Moses, S., & Avery, L. (2014). 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: A cross-sectional study. *BMC Pregnancy and Childbirth*, *14*(1). https://doi.org/10.1186/1471-2393-14-304

Kirk, K. (2020). *High Impact Practices—Task sharing for hypertensive disorders in pregnancy: Improving early detection and management of hypertensive disorders in pregnancy*.

Macuácua, S., Catalão, R., Sharma, S., Valá, A., Vidler, M., MacEte, E., Sidat, M., Munguambe, K., Von Dadelszen, P., & Sevene, E. (2019). Policy review on the management of pre-eclampsia and eclampsia by community health workers in Mozambique. *Human Resources for Health*, *17*(1), 1–9. https://doi.org/10.1186/s12960-019-0353-9

Meazaw, M. W., Chojenta, C., Muluneh, M. D., & Loxton, D. (2020). Systematic and meta-analysis of factors associated with preeclampsia and eclampsia in sub-Saharan Africa. In *PloS one*. journals.plos.org. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0237600

Munguambe, K., Boene, H., Vidler, M., Bique, C., Sawchuck, D., Firoz, T., Makanga, P. T., Qureshi, R., Macete, E., Menéndez, C., Von Dadelszen, P., & Sevene, E. (2016). Barriers and facilitators to health care seeking behaviours in pregnancy in rural communities of southern Mozambique. *Reproductive Health*, *13*(1). https://doi.org/10.1186/s12978-016-0141-0

Ndwiga, C., Sripad, P., & Warren, C. (2018). Addressing barriers to quality of underutilized commodities and services for prevention and management of pre-eclampsia and eclampsia in Kenya. *Reproductive Health*.

Nishimwe, C., & Mchunu, G. G. (2022). Exploring health provider's knowledge on the home-based

maternal and neonatal health care package in Rwanda. *BMC Pregnancy and Childbirth*, *22*(1), 1–12. https://doi.org/10.1186/s12884-022-04435-2

Nkamba, D. M., Vangu, R., Elongi, M., Magee, L. A., Wembodinga, G., Bernard, P., Ditekemena, J., & Robert, A. (2020). Health facility readiness and provider knowledge as correlates of adequate diagnosis and management of pre-eclampsia in Kinshasa, Democratic Republic of Congo. *BMC Health Services Research*, *20*(1), 1–14. https://doi.org/10.1186/s12913-020-05795-1

Payne, B. A., Hutcheon, J. A., Ansermino, J. M., Hall, D. R., Bhutta, Z. A., Bhutta, S. Z., Biryabarema, C., Grobman, W. A., Groen, H., Haniff, F., Li, J., Magee, L. A., Merialdi, M., Nakimuli, A., Qu, Z., Sikandar, R., Sass, N., Sawchuck, D., Steyn, D. W., … Donnay, F. (2014). A Risk Prediction Model for the Assessment and Triage of Women with Hypertensive Disorders of Pregnancy in Low-Resourced Settings: The miniPIERS (Pre-eclampsia Integrated Estimate of RiSk) Multi-country Prospective Cohort Study. *PLoS Medicine*, *11*(1). https://doi.org/10.1371/journal.pmed.1001589

Peters, M. D. J., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *International Journal of Evidence-Based Healthcare*, *13*(3), 141–146. https://doi.org/10.1097/XEB.0000000000000050

Qureshi, R. N., Sheikh, S., Hoodbhoy, Z., Sharma, S., Vidler, M., Payne, B. A., Ahmed, I., Mark Ansermino, J., Bone, J., Dunsmuir, D. T., Lee, T., Li, J., Nathan, H. L., Shennan, A. H., Singer, J., Tu, D. K., Wong, H., Magee, L. A., von Dadelszen, P., & Bhutta, Z. A. (2020). Community-level interventions for pre-eclampsia (CLIP) in Pakistan: A cluster randomised controlled trial. *Pregnancy Hypertension*, *22*(May), 109–118. https://doi.org/10.1016/j.preghy.2020.07.011

Raghavan, S., Geller, S., Miller, S., Goudar, S. S., Anger, H., Yadavannavar, M. C., Dabash, R., Bidri, S. R., Gudadinni, M. R., Udgiri, R., Koch, A. R., Bellad, M. B., & Winikoff, B. (2016). Misoprostol for primary versus secondary prevention of postpartum haemorrhage: A cluster-randomised non-inferiority community trial. *BJOG: An International Journal of Obstetrics and Gynaecology*, *123*(1), 120–127. https://doi.org/10.1111/1471-0528.13540

Ramadurg, U., Vidler, M., Charanthimath, U., Katageri, G., Bellad, M., Mallapur, A., Goudar, S., Bannale, S., Karadiguddi, C., Sawchuck, D., Qureshi, R., Von Dadelszen, P., & Derman, R. (2016). Community health worker knowledge and management of pre-eclampsia in rural Karnataka State, India. *Reproductive Health*, *13*(Suppl 2), 141–148. https://doi.org/10.1186/s12978-016-0219-8

RHIhub. (2021). *Health Promotion*. https://www.ruralhealthinfo.org/toolkits/health-promotion/2/strategies

Salam, R A, Das, J. K., Ali, A., Bhaumik, S., & ... (2015). Diagnosis and management of preeclampsia in community settings in low and middle-income countries. In *Journal of family …*. ncbi.nlm.nih.gov. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4776599/

Salam, Rehana A., Qureshi, R. N., Sheikh, S., Khowaja, A. R., Sawchuck, D., Vidler, M., Von Dadelszen, P., Zaidi, S., Bhutta, Z., Sultana, Z., Anwer, D., Beth, P., Olabisi, A., Marianne, C., Dada, O. A., Sharla, D., Tabassum, F., Shivaprasad, G., Chirag, K., … Magee, L. A. (2016). Potential for task-sharing to Lady Health Workers for identification and emergency management of pre-eclampsia at community level in Pakistan. *Reproductive Health*, *13*(Suppl 2). https://doi.org/10.1186/s12978-016-0214-0

Salem, A., Lacour, O., Scaringella, S., Herinianasolo, J., Benski, A. C., Stancanelli, G., Vassilakos, P., Petignat, P., & Schmidt, N. C. (2018). Cross-sectional survey of knowledge of obstetric danger signs among women in rural Madagascar. *BMC Pregnancy and Childbirth*, *18*(1), 1–9. https://doi.org/10.1186/s12884-018-1664-x

Sevene, E., Sharma, S., Munguambe, K., Sacoor, C., Vala, A., Macuacua, S., Boene, H., Mark Ansermino, J., Augusto, O., Bique, C., Bone, J., Dunsmuir, D. T., Lee, T., Li, J., Macete, E., Singer, J., Wong, H., Nathan, H. L., Payne, B. A., … von Dadelszen, P. (2020). Community-level interventions for pre-eclampsia (CLIP) in Mozambique: A cluster randomised controlled trial. *Pregnancy Hypertension*, *21*(April), 96–105. https://doi.org/10.1016/j.preghy.2020.05.006

Sheikh, S., Qureshi, R. N., Khowaja, A. R., Salam, R., Vidler, M., Sawchuck, D., Von Dadelszen, P., Zaidi, S., & Bhutta, Z. (2016). Health care provider knowledge and routine management of pre-eclampsia in Pakistan. *Reproductive Health*, *13*(Suppl 2), 107–113. https://doi.org/10.1186/s12978-016-0215-z

Shobo, O. G., Okoro, A., Okolo, M., Longtoe, P., Omale, I., Ofiemu, E., & Anyanti, J. (2020). Implementing a community-level intervention to control hypertensive disorders in pregnancy using village health workers: lessons learned. *Implementation Science Communications*, *1*(1), 1–15. https://doi.org/10.1186/s43058-020-00076-8

Sotunsa, J. O., Vidler, M., Akeju, D. O., Osiberu, M. O., Orenuga, E. O., Oladapo, O. T., Qureshi, R., Sawchuck, D., Adetoro, O. O., Von Dadelszen, P., & Dada, O. A. (2016). Community health workers' knowledge and practice in relation to pre-eclampsia in Ogun State, Nigeria: an essential bridge to maternal survival. *Reproductive Health*, *13*(Suppl 2), 133–139. https://doi.org/10.1186/s12978-016-0218-9

Tavananezhad, N., Bolbanabad, A. M., Ghelichkhani, F., Effati-Daryani, F., & Mirghafourvand, M. (2022). The relationship between health literacy and empowerment in pregnant women: a cross-sectional study. *BMC Pregnancy and Childbirth*, *22*(1), 1–9. https://doi.org/10.1186/s12884-022-04686-z

Thobbi, V. A., & Amwar, A. (2017). A study of maternal morbidity and mortality due to preeclampsia and eclampsia. In *Al Ameen J Med Sci*. ajms.alameenmedical.org. http://ajms.alameenmedical.org/ArticlePDFs/6 AJMS V10.N3.2017 p 174-179.pdf

Toledo-jaldin, L., Bull, S., Contag, S., Escudero, C., Heath, A., Roberts, J. M., Scandlyn, J., Julian, C. G., & Moore, L. G. (2020). *low-resource settings : an example from Bolivia*. 139–144. https://doi.org/10.1016/j.preghy.2019.03.008.Critical

Tura, A. K., Scherjon, S., Stekelenburg, J., Van Roosmalen, J., Van Den Akker, T., & Zwart, J. (2020). Severe hypertensive disorders of pregnancy in Eastern Ethiopia: Comparing the original WHO and adapted sub-saharan african maternal near-miss criteria. *International Journal of Women's Health*, *12*, 255–263. https://doi.org/10.2147/IJWH.S240355

von Dadelszen, P, Menzies, J., Gilgoff, S., Xie, F., & ... (2007). Evidence-based management for preeclampsia. In *Front …*. pdfs.semanticscholar.org. https://pdfs.semanticscholar.org/6e71/8747e3984ee5246fb6836425490bb5d96d0c.pdf

von Dadelszen, Peter, Bhutta, Z. A., Sharma, S., Bone, J., Singer, J., Wong, H., Bellad, M. B., Goudar, S. S., Lee, T., Li, J., Mallapur, A. A., Munguambe, K., Payne, B. A., Qureshi, R. N., Sacoor, C., Sevene, E., Vidler, M., Magee, L. A., Macete, E., … Sotunsa, J. O. (2020). The Community-Level Interventions for Pre-eclampsia (CLIP) cluster randomised trials in Mozambique, Pakistan, and India: an individual participant-level meta-analysis. *The Lancet*, *396*(10250), 553–563. https://doi.org/10.1016/S0140-6736(20)31128-4

WHO. (2019). *Maternal Mortality*. https://www.who.int/news-room/fact-sheets/detail/maternal-mortality

Widyaningsih, V., Khotijah, & Balgis. (2017). Expanding the scope beyond mortality: burden and missed opportunities in maternal morbidity in Indonesia. *Global Health Action*, *10*(1), 1–9. https://doi.org/10.1080/16549716.2017.1339534

Williams, A., Khan, M. A., Moniruzzaman, M., & ... (2019). Management of preeclampsia, severe preeclampsia, and eclampsia at primary care facilities in Bangladesh. *... Health: Science and …*. https://www.ghspjournal.org/content/7/3/457.short