

Rheumatic Heart Disease and Maternal Health

Background: Rheumatic fever and rheumatic heart disease

Group A streptococcal infection can cause rheumatic fever (RF) progressing to rheumatic heart disease (RHD) in children and young people. RHD causes damage to the heart valves, which leads to progressive heart failure, disability, and premature death.¹ During pregnancy, the circulatory system undergoes profound change, causing signs and symptoms that are identical to those of heart failure. Women with heart valves already damaged by RHD are at an increased risk of complications and mortality during pregnancy and delivery. Joint obstetric-cardiac care has the potential to ensure survival for pregnant mothers and their children.²



Background: Maternal Mortality and RHD

Between 1990 and 2015, there were over 10 million maternal deaths, almost all among women residing in low- and middle-income countries (LMICs).² In these regions, one in five maternal deaths result from indirect causes, most commonly exacerbation of pre-existing medical conditions like heart disease.³ RHD is a leading cause of indirect maternal death, whereby the acquired heart valve lesions limit the ability of the heart to handle the substantial increase in cardiac output and blood volume during pregnancy.^{4,5} The diagnosis of RHD is often made for the first time when symptoms arise in response to these haemodynamic changes.^{4,6} Unfortunately, breathlessness, fatigue and swelling, and heart murmurs are signs and symptoms of heart failure, and these are easily mistaken for normal signs and symptoms of late pregnancy, therefore placing women at risk of cardiovascular collapse and even death. RHD patients who have received metallic valve replacement surgery rely on anticoagulant medication to prevent blood clots from forming and blocking the metallic valve. However, warfarin anticoagulation is associated with poor pregnancy outcomes including miscarriage and developmental abnormalities among surviving infants, as well as placing women at great risk for haemorrhage during delivery.^{7,8}

A South African study identified several key avoidable factors that contributed to maternal death in women with RHD. These included patient delay in seeking help, lack of expertise by medical staff managing the case, delay in referral to the appropriate level of care, and the delay in appropriate action.⁵ Unfortunately, such preventable factors contribute to the high maternal mortality rates seen across many LMICs.

The contribution of RHD to maternal mortality in developing countries

National and local research confirms the tragic toll of RHD on pregnant women. In February 2018 results of a large multi-center register study of women with heart disease in pregnancy were published. The study demonstrated that 50% of pregnant women with mitral stenosis from RHD developed heart failure. Many women with less severe valve disease also developed heart failure. Two percent of women in the study died during or after pregnancy though others required intensive health care which is not readily available in lower-resource settings.⁹ This register study reflects the experiences of women reported at the country level:

- In Senegal, 36% of pregnant women with RHD admitted to a tertiary cardiac department died during pregnancy, at an average age of 29 years.³
- In South Africa 41% of indirect obstetric deaths are associated with heart disease, overwhelmingly from RHD.³
- In Brazil, 33% of women who died of heart disease during pregnancy had RHD.³

RHD: Global efforts targeting maternal health and RHD

The United Nations Sustainable Development Goals commits to end preventable maternal, newborn and child deaths by 2030 – by association this includes RHD. The UN Maternal Mortality Estimation Inter-Agency Group (MMEIG) data projections suggest that current efforts to address maternal mortality need to be scaled up in order to achieve the Sustainable Development Goals aim of less than 70 maternal deaths per 100 000 livebirths globally by 2030.¹⁰ More specifically, the World Heart Federation and World Health Organization has set out to reduce premature mortality from RHD by 25% by the year 2025¹¹, and the first high-level global policy is set to be adopted at the 2018 World Health Assembly. Soon, national and international decision makers will need to prioritise RHD and its eradication in endemic settings.

In 2005, the first All Africa Workshop on Rheumatic Fever and Rheumatic Heart Disease assembled to create The Awareness, Surveillance, Advocacy and Prevention (ASAP) programme in response to the alarming number of deaths due to RHD in the region.¹² One of the key outcomes of fully implementing the ASAP approach is a reduction in maternal deaths from heart disease. Almost ten years later, low use of reproductive health services among women with RHD, lack of RHD surveillance, unreliable supply of quality benzathine penicillin G, scarce cardiac surgery facilities, lack of national RHD prevention programs, and absence of multi-sectoral RHD initiatives have been barriers to eradication of RHD in the region.¹³

What can be done?

RHD Action offers technical support to researchers, clinicians and policy makers addressing RHD in all settings. Further information is available at rhaction.org

References

1. Carapetis, J. R. *et al.* Acute rheumatic fever and rheumatic heart disease. *Nat. Rev.* **2**, 15084 (2016).
2. Sliwa, K. *et al.* Spectrum of cardiac disease in maternity in a low-resource cohort in South Africa. 1–8 (2014). doi:10.1136/heartjnl-2014-306199
3. Say, L. *et al.* Global causes of maternal death: A WHO systematic analysis. *Lancet Glob. Heal.* **2**, 323–333 (2014).
4. Nanna, M. & Stergiopoulos, K. Pregnancy Complicated by Valvular Heart Disease: An Update. *J Am Hear. Assoc.* **3**, 1–19 (2014).
5. Soma-pillay, P., Seabe, J. & Sliwa, K. The importance of cardiovascular pathology contributing to maternal death : Confidential Enquiry into Maternal Deaths in South Africa , 2011 – 2013. *Cardiovasc. J. Afr.* **27**, 60–65 (2016).
6. Roos-Hesselink, J. W. *et al.* Outcome of pregnancy in patients with structural or ischaemic heart disease: results of a registry of the European Society of Cardiology. *Eur. Heart J.* **34**, 657–665 (2013).
7. Nanda, S., Nelson-Piercy, C. & Mackillop, L. Cardiac disease in pregnancy. *Clin. Med.* **12**, 553–560 (2012).
8. Chan, W., Anand, S. & JS, G. Anticoagulation of pregnant women with mechanical heart valves: A systematic review of the literature. *Arch. Intern. Med.* **160**, 191–196 (2000).
9. Van Hagen MI, Thorne AS, Taha RN, et al. Pregnancy Outcomes in Women With Rheumatic Mitral Valve Disease: Results From the Registry of Pregnancy and Cardiac Disease. *Circulation* 2018; **137**(8): 806–16.
10. Alkema, L. *et al.* Global , regional , and national levels and trends in maternal mortality between 1990 and 2015 , with scenario-based projections to 2030 :a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet* **387**, 462–474 (2016).
11. Remenyi, B., Carapetis, J., Wyber, R., Taubert, K. & Mayosi, B. M. Position statement of the World Heart Federation on the prevention and control of rheumatic heart disease. *Nat. Rev. Cardiol.* **10**, 284–292 (2013).
12. Robertson, K. A., Volmink, J. A. & Mayosi, B. M. Towards a uniform plan for the control of rheumatic fever and rheumatic heart disease in Africa – the Awareness. *South African Med. J.* **96**, 241–245 (2006).
13. Watkins, D. *et al.* Cardiovascular Topics Seven key actions to eradicate rheumatic heart disease in Africa :the Addis Ababa communiqué. 1–5 (2016). doi:10.5830/CVJA-2015-090