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Health economic evaluation for evidence-informed decisions in low-resource settings

The case of Antenatal care policy in Rwanda

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Abstract

Introduction The general aim of this thesis is to contribute to the use of health economic evidence for informed health care decisions in low-resource settings, using antenatal care (ANC) policy in Rwanda as a case study. Despite impressive and sustained progress over the last 15 years, Rwanda's maternal mortality ratio is still among the highest in the world. Persistent gaps in health care during pregnancy make ANC a good candidate among interventions that can, if improved, contribute to better health and well-being of mothers and newborns in Rwanda.

Methods Data used in this thesis were gathered from primary and secondary data collections. The primary data sources included a cross-sectional household survey (N=922) and a health facility survey (N=6) conducted in Kigali city and the Northern Province, as well as expert elicitation with Rwandan specialists (N=8). Health-related quality of life (HRQoL) for women during the first-year post-partum was measured using the EQ-5D-3L instrument. The association between HRQoL and adequacy of ANC utilization and socioeconomic and demographic predictors was tested through bivariate and linear regression analyses (Paper I). The costs of current ANC practices in Rwanda for both the health sector and households were estimated through analysis of primary data (Paper II). Incremental cost associated with the implementation of the 2016 World Health Organization (WHO) ANC recommendations compared to current practice in Rwanda was estimated through simulation of attendance and adaptation of the unit cost estimates (Paper III). Incremental health outcomes of the 2016 WHO ANC recommendations were estimated as life-years saved from perinatal and maternal mortality reduction obtained from the expert elicitation (Paper III). Lastly, a systematic review of the evidence base for the cost and cost-effectiveness of routine ultrasound during pregnancy was conducted (Paper IV). The review included 606 studies published between January 1999 and April 2018 and retrieved from PubMed, Scopus, and the Cochrane database.

Results Sixty one percent of women had not adequately attended ANC according to the Rwandan guidelines during their last pregnancy; either attending late or fewer than four times. Adequate utilization of ANC was significantly associated with better HRQoL after delivery measured using EQ-VAS, as were good social support and household wealth. The most prevalent health problems were anxiety or depression and pain or discomfort. The first ANC visit accounted for about half the societal cost of ANC, which was \$44 per woman (2015 USD) in public/faith-based facilities and \$160 in the surveyed private facility. Implementing the 2016 WHO recommendations in Rwanda would have an incremental national annual cost between \$5.8 million and \$11 million across different attendance scenarios. The estimated reduction in perinatal mortality would be between 22.5% and 55%, while maternal mortality reduction would range from 7% to 52.5%. Out of six combinations of attendance and health outcome scenarios, four were below the GDP-based cost-effectiveness threshold. Out of the 606 studies on cost and cost-effectiveness of ultrasound during pregnancy retrieved from the databases, only nine reached the data extraction stage. Routine ultrasound screening was reported to be a cost-effective intervention for screening pregnant women for cervical length, for vasa previa, and congenital heart disease, and cost-saving when used for screening for fetal malformations.

Conclusions The use of health economic evidence in decision making for low-income countries should be promoted. It is currently among the least used types of evidence, yet there is a huge potential of gaining many QALYs given persistent and avoidable morbidity and mortality. In this thesis, ANC policy in Rwanda was used as a case to contribute to evidence informed decision-making using health economic evaluation methods. Low-income countries, particularly those that still have a high burden of maternal and perinatal mortality should consider implementing the 2016 WHO ANC recommendations.

Keywords Antenatal, maternal, cost, cost-effectiveness, ultrasound, EQ-5D-3L, Low-income countries

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