RESEARCH

Bottlenecks in the implementation of essential screening tests in antenatal care: Syphilis, HIV, and anemia testing in rural Tanzania and Uganda

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ABSTRACT

Objective: To identify and compare implementation bottlenecks for effective coverage of screening for syphilis, HIV, and anemia in antenatal care in rural Tanzania and Uganda; and explore the underlying determinants and perceived solutions to overcome these bottlenecks. *Methods:* In this multiple case study, we analyzed data collected as part of the Expanded Quality Management Using Information Power (EQUIP) project between November 2011 and April 2014. Indicators from household interviews (n = 4415 mothers) and health facility surveys (n = 122) were linked to estimate coverage in stages of implementation between which bottlenecks can be identified. Key informant interviews (n = 15) were conducted to explore underlying determinants and analyzed using a framework approach. *Results:* Large differences in implementation were found within and between countries. Availability and effective coverage was significantly lower for all tests in Uganda compared with Tanzania. Syphilis screening had the lowest availability and effective coverage in both countries. The main implementation bottleneck was poor availability of tests and equipment. Key informant interviews validated these findings and perceived solutions included the need for improved procurement at the central level. *Conclusion:* Our findings reinforce essential screening as a missed opportunity, caused by a lack of integration of funding and support for comprehensive antenatal care programs.

1. Background

Screening for syphilis, HIV, and anemia is an essential element of antenatal care (ANC) and its importance remains uncontested [1,2]. Almost two-thirds of adverse outcomes in newborns could be prevented through effective screening followed by treatment and/or prophylaxis for mothers infected with syphilis and/or HIV, respectively [3,4]. Anemia is a frequent indirect cause of maternal mortality [5]. Despite the emphasis on screening in the focused ANC strategy launched by WHO in the early 2000s, coverage of screening for syphilis, HIV, and anemia remains low in many settings [6].

In Tanzania and Uganda, both countries with a high maternal and newborn mortality, screening for adverse conditions in pregnancy has long been included in national policies [7]. Before the arrival of rapid point-of-care tests for syphilis in 2005, storage and the time needed to perform the rapid plasma regain test constituted major barriers to implementation [8]. Since 2010, rapid point-of-care tests for syphilis have been available in both Tanzania and Uganda [9]. Testing for HIV during pregnancy became an integral part of ANC for prevention of mother-to-child transmission (PMTCT) in the early 2000s and is

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routinely available in most facilities offering ANC. In contrast, screening for anemia is largely restricted to facilities with laboratory services [10].

In both countries, maternal health policies aim to provide user-friendly integrated services, whilst achieving results and providing value for money [11]. Comparing the coverage of screening tests represents an opportunity to monitor the implementation of such policies [12]. However, studies on integrated care have primarily examined single aspects such as the acceptability of offering several tests during the same visit [13] or of dual testing [14]. Such studies evaluate the feasibility of integration at the point of service delivery but not the effectiveness of integrated services within a health system [15].

Herein, the implementation bottlenecks for effective coverage of syphilis, HIV, and anemia screening in rural Tanzania and Uganda are identified and compared utilizing a novel approach linking data from households and health facilities to estimate population coverage in stages of implementation and key informant interviews to explore underlying determinants and potential solutions to the identified bottlenecks.

2. Methods

2.1. Study design and setting

This multiple case study [16] was nested within the Expanded Quality management Using Information Power (EQUIP) project, a district-wide collaborative quality improvement intervention for maternal and newborn care implemented between 2011 and 2014 in rural south-eastern Tanzania (Tandahimba district) and eastern Uganda (Mayuge district) [17,18]. One of the many areas of improvement focused on increasing consistent syphilis screening during ANC.

The study regions have high maternal and newborn mortality, with 6% and 8% of adult women being HIV positive in Tanzania and Uganda,

respectively [19,20]. Population-based syphilis prevalence in adult women is 2% in Uganda, whereas sentinel surveys in pregnant women show a syphilis prevalence of 4% in Tanzania [19,20].

2.2. Data collection

As part of EQUIP, surveys of households and health facilities were implemented to generate data for quality improvement and project evaluation [18]. These surveys were also conducted in adjacent non-intervention districts (Newala, Tanzania; and Namayingo, Uganda).

The household survey was a continuous cluster sample survey implemented between November 2011 and April 2014 where, each month, 10 household clusters were selected with a probability proportional to the population size of each district. Within each cluster, 30 households were sampled using simple random sampling. Interviews were held with all resident women of reproductive age (13−49 years; n = 27 957), applying a special module for those with a recent live birth; mean age was 30 years (interquartile range 30−39) and 63% were married. Questions included utilization of health services during pregnancy and delivery, type of care received, and perceptions of quality. During analysis, participants were limited to women with a live birth in the 12 months prior to the survey (n = 4415).

The health facility survey was a census of all 122 health facilities, repeated six times at four-month intervals during the study period. A checklist was used to assess facility readiness in terms of availability of drugs and equipment and interviews were conducted with the in-charge regarding the provision of routine care [18].

Fifteen purposively sampled key informants were interviewed in February 2014 in Tandahimba, Tanzania, and in November 2014 in Mayuge, Uganda. Three key informants at the district level were interviewed in each country. At the health facility level, six interviews
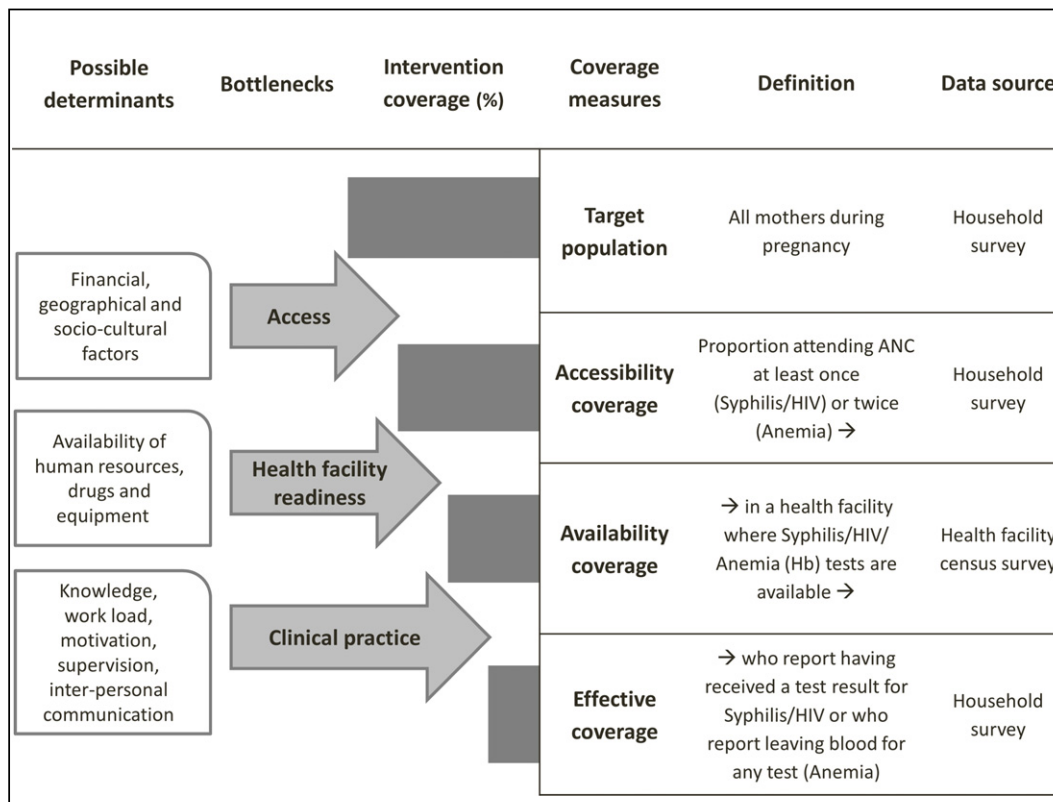

Possible determinants	Bottlenecks	Intervention coverage (%)	Coverage measures	Definition	Data source
			Target population	All mothers during pregnancy	Household survey
Financial, geographical and socio-cultural factors	Access		Accessibility coverage	Proportion attending ANC at least once (Syphilis/HIV) or twice (Anemia) →	Household survey
Availability of human resources, drugs and equipment	Health facility readiness		Availability coverage	→ in a health facility where Syphilis/HIV/ Anemia (Hb) tests are available →	Health facility census survey
Knowledge, work load, motivation, supervision, inter-personal communication	Clinical practice		Effective coverage	→ who report having received a test result for Syphilis/HIV or who report leaving blood for any test (Anemia)	Household survey

Fig. 1. Implementation pathway for essential screening tests during intenatal care (ANC). Adapted from Baker et al. [22]. Coverage measures with their definitions are outlined. Arrows in the definition column represent the conditionality of the stages in the pathway. Attritions in coverage, the bottlenecks causing these, and their possible determinants are illustrated.