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**Implementation of an electronic clinical decision support system for maternal care in rural primary health care facilities in Ghana and Tanzania: Assessment of its adoption and usability**

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Each year, the world loses about 300,000 women and millions of children under the age of five years due to pregnancy and childbirth-related complications. Over 95% of these deaths occur in developing countries mostly in sub-Saharan Africa (SSA). Despite several interventions to curb the menace, more efforts are required to succeed. As part of these efforts, the QUALity of MATernal and prenatal care (QUALMAT) project assessed the role of an electronic clinical decision support system (eCDSS) and of performance-based incentives in bridging the knowledge gap and know-do gap through improved performance and motivation of health workers in maternal care. The main objective of this thesis was to assess adoption and usability of the eCDSS in resource-constrained SSA settings. A longitudinal study was conducted in 12 intervention and 12 control rural primary health care facilities (PHC) in Ghana and Tanzania between August 2011 and December 2013 employing mixed methods in both intervention and control sites to assess adoption and usability of the eCDSS. Tools and techniques deployed were structured questionnaires, focus group discussions, interviews, observations, and an analysis of

computer log files. The study subjects included all health workers participating in prenatal and maternal care.

Overall, 108 health workers from the 24 rural PHC facilities participated in the study during the baseline while 56 from 12 facilities and 118 from 24 facilities participated during the midterm and final surveys, respectively. Only 31 (28.7%), 51 (91.1%), and 69 (58.5%) health workers had previous training on computers as reported during the baseline, midterm, and final surveys, respectively. There were 45 (43.3%) participants who rated themselves as computer illiterates during the baseline survey, 2 (3.6%) during midterm, and 34 (38.8%) during the final survey. The computer knowledge levels were associated to age, district, years of work experience, and previous computer experience of a health worker. Younger health workers and those from the intervention districts were more computer literate. Generally, the majority of the respondents (over 90%) throughout the study demonstrated very positive attitudes towards electronic health (eHealth) systems and especially the eCDSS. The health workers expected the system to simplify their work and support decision making during patient encounters. No single variable consistently influenced the health workers' attitudes towards eHealth throughout the study; however, sex, age, previous computer experience, and district of the respondents were associated with their attitudes in different study phases.

The eCDSS was successfully implemented in the intervention sites, the health workers continuously used the system to support maternal care over the period of two years. In Tanzania, 71% of all 3,798 ANC clients were managed using the eCDSS as compared to 59% of the registered 24,204 clients in Ghana ($p<0.01$). The respective figures for deliveries were 1,185/1,427 (83%) in Tanzania and 1,435/2,144 (67%) clients in Ghana ($p<0.01$). Over 95% perceived the system as useful, easy to use, and user-friendly.

Provision of adequate computer training and support, positive attitudes among the care providers were the most frequently cited facilitators for the success while unreliable electricity, perceived increase in workload, using only one laptop per PHC facility, and lack of computer skills were perceived to hinder a successful adoption of the system.

The findings indicate that it is feasible to introduce an eCDSS system to rural PHC facilities and keep it running over prolonged periods of time. The health workers had positive attitudes towards eHealth despite limited prior computer experience. They adopted the eCDSS system and perceived it as a useful and user-friendly tool to support patient care. Individual users, tasks, technology, and organizational factors acting as facilitators for and barriers to a successful adoption and usability of the eCDSS were identified.