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Impact of an electronic clinical decision support system on workflow in antenatal care in sub-Saharan primary healthcare facilities

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Health information technology (health IT) and especially the use of electronic clinical decision support systems (eCDSS) has promising potential to improve quality of care and promote patient safety. Despite this promise, the initial implementation of eCDSS comes with unfavorable workflow challenges such as misalignment between the established workflow and the new system. This often results in unintended consequences, such as introducing new work or increasing the existing workload on staff. Depending on how it impacts on workflow, it may even produce different results in different settings.

When the QUALMAT eCDSS, an intervention package designed to support healthcare providers improving the quality of antenatal care (ANC) and delivery in rural primary health centers in Ghana and Tanzania, was introduced, we analyzed the workflow in the targeted settings before and during the long-term use of the eCDSS.

The objectives of the study was to investigate impact of the QUALMAT eCDSS on the clinical workflow of healthcare providers involved in ANC activities; we specifically aimed to describe the workflow of healthcare providers before and after eCDSS implementation in the ANC clinics. The duration of task categories, the order of major tasks categories, and the documentation of information on ANC cards was assessed. In each country, six health centers in one district were designated as intervention sites. In another adjoining district, where no QUALMAT interventions were implemented, six other health centers served as control sites. Direct observation and a time-motion study design were employed to assess the ANC process using structured data sheets with predefined task categories. The duration and order in which task categories were performed were observed and relevant medical information on ANC cards was extracted, reviewed, and analyzed. The QUALMAT eCDSS did not increase the

duration of time spent on ANC activities at the study intervention sites in Ghana and Tanzania as compared to the controls sites and positively influenced history taking at the sites in Ghana, with significantly more history taking after the eCDSS implementation. The order of performing task categories was positively influenced with more pregnant women having prior history taking before subsequent examination. The QUALMAT eCDSS positively influenced the workflow in the ANC clinics without increasing the work load. After the eCDSS implementation, the documentation practices in the two interventions sites showed varied evidence of change in completeness of ANC card entries, with significant increase in completeness in sites in Ghana, but no effect in Tanzania.

In conclusion using the QUALMAT eCDSS did not increase the time spent for ANC processes in these rural African settings. It however influenced the ANC workflow processes by changing the order in which history taking was performed, significantly increasing the frequency of history taking. The QUALMAT eCDSS has potential to stream line workflow by influencing the order of performing other tasks in a manner, beneficial to the pregnant women, without negatively influencing documentation practices on ANC cards. Thus, the QUALMAT eCDSS has the potential to improve the quality of ANC care provided.