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Guidelines for maternal and neonatal "point of care": Needs of and attitudes towards a computerized clinical decision support system in rural Burkina Faso

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ABSTRACT

Background: In 2010, 245,000 women died due to pregnancy-related causes in sub-Saharan Africa and southern Asia. Our study is nested into the QUALMAT project and seeks to improve the quality of maternal care services through the introduction of a computerized clinical decision support system (CDSS) to help healthcare workers in rural areas. Healthcare information technology applications in low-income countries may improve healthcare provision but recent studies demonstrate unintended consequences with underuse or resistance to CDSS and that the fit between the system and the clinical needs does present challenges.

Aims: To explore and describe perceived needs and attitudes among healthcare workers to access WHO guidelines using CDSS in maternal and neonatal care in rural Burkina Faso.

Methods: Data were collected with semi-structured interviews in two rural districts in Burkina Faso with 45 informants. Descriptive statistics were used for the analysis of the quantitative part of the interview corresponding to informants' background. Qualitative data were analyzed using manifest content analysis.

Results: Four main findings emerged: (a) an appreciable willingness among healthcare workers for and a great interest to adapt and use modern technologies like computers to learn

Abbreviations: ANC, antenatal care; CDSS, clinical decision support system; CIE, Comité Institutionnel d'Ethique; CRSN, Centre de Recherche en Santé de Nouna; IT, information technology; MDG, Millennium Development Goal; PMTCT, prevention mother to child transmission; PNC, postnatal care; QUALMAT, quality of prenatal and maternal care (EU-funded project); TAM, technology acceptance model or theory acceptance model of technology.

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more in the workplace, (b) a positive attitude to easy access of guidelines and implementation of decision-support using computers in the workplace, (c) a fear that the CDSS would require more working time and lead to double-work, and (d) that the CDSS is complicated and requires substantial computer training and extensive instructions to fully implement.
Conclusions: The findings can be divided into aspects of motivators and barriers in relation to how the CDSS is perceived and to be used. These aspects are closely connected to each other as the motivating aspects can easily be turned into barriers if not taken care of properly in the final design, during implementation and maintenance of the CDSS at point of care.
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1. Background

Maternal mortality varies widely between rich and poor countries. As many as 287,000 women died due to pregnancy-related causes worldwide in 2010 of which 245,000 deaths were in low-income countries. This equals a death risk of 1 in 25 women during delivery in the poorest countries [1]. Millennium Development Goal 5 (MDG 5) aiming for improving maternal health was adopted in the late 1990s but is the one that has failed to show any major improvement in recent years [2]. The priority is to increase the proportion of deliveries with skilled attendance, this being a key indicator for measuring a progress of MDG 5 [1,2]. However the medical care in many healthcare settings in low-income countries is of poor quality and the performance of health workers is suboptimal since there is a gap between knowledge and clinical practice [2,3]. Innovative methods and tools to improve skills and performance of rural maternal healthcare workers are needed to decrease the risks of death for the mothers and their newborns [2–5].

One strategy to assist health workers in rural settings in poor countries to more skilled and informed decisions is to provide access to easy-to-use guidelines and information with Information Communication and Technology (ICT) tools at the point of care [5–8]. Among ICT tools, computerized clinical decision support systems (CDSSs) are one of most interest combining action-oriented algorithms and interactivity to help and fulfil the needs of the healthcare providers [5,9–11]. Patient characteristics and results of clinical assessments by the provider are matched to a computerized clinical knowledge base and recommendations are then presented to the clinician for a decision [5,10,11]. The benefits include immediate and targeted delivery of necessary knowledge or evidence required to make informed decisions at the point of care [4,5,11,12].

The QUALMAT (Quality of Maternal and Neonatal Care) project addresses the potential needs of CDSS used in rural care settings in three African countries (Burkina Faso, Ghana and Tanzania) [5]. The system has four parts: (i) the user interface, (ii) the xml data base, (iii) algorithms to screen entered clinical values in the xml database and (iv) a section with training and information documents using WHO guidelines for maternal and neonatal care [4,5]. The idea is that needed knowledge is available at "point-of-care" in a pedagogic manner on a laptop in each resource-strained health facility supplied with electricity using rechargeable batteries connected to solar panels [5]. The CDSS system was developed in English for use in Ghana and later translated into French for Burkina Faso and into Kiswahili for use in Tanzania [5].

The benefits, implementation challenges and impact of CDSS have, however, received no or limited attention in resource-strained healthcare settings in Africa [4,5,8,13] even though mobile phones have appreciably improved connections, procedures for referrals and distance consultation patterns in rural healthcare in Africa [6]. All studies reveal challenges including power failure, poor knowledge in using computers, shortcomings in adapting the CDSS according to needs and linking it to other health information systems thereby impeding the desired benefits of these services [10,14,15]. Recent studies of unintended consequences with underuse, or resistance to apply CDSS, show that these observations are explained by the poor fit between the system and clinical needs [16]. The better understanding we have regarding facilitators, barriers and issues of non-acceptance, the better we can minimize unexpected adoption behaviour and thereby benefit most from the use of CDSS in rural healthcare settings [16]. In particular, it is important to understand how a CDSS has to be adapted to the local context [14].

The aim of this study was to explore and describe perceived needs and attitudes among healthcare workers to access WHO guidelines using CDSS in maternal and neonatal care [5] in rural Burkina Faso. The study was carried out in maternal healthcare units in two rural districts in north-western Burkina Faso [5]. They are challenged by lack of trained well-paid staff, poor resources, are simple facilities with erratic access to electricity making it mandatory to understand how a CDSS can be contextualized and strengthen performance of staff [5,14,17].

2. Methods

2.1. Study design and setting

To understand the perceived needs and attitudes to access WHO guidelines through the use of CDSS in maternal and neonatal rural healthcare in Burkina Faso, we used a qualitative approach with semi-structured interviews. A qualitative approach is a fruitful way to explore people's needs, experiences, attitudes, thoughts and perceptions of different phenomena [18].

This study on understanding the value and complexities of CDSS in rural maternal care is part of a comprehensive implementation research project called "*Quality of prenatal and maternal care: Bridging the know-do gap* (www.qualmat.net)"

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