

Predicting Pregnancy Complications in Low Resource Contexts [†]

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Abstract: The United Nations listed maternal mortality as a major problem especially in developing countries. Predictive models that predict pregnancy complications have been suggested as an intervention to reduce maternal mortality but at the moment, many are not used in clinical practice. This study proposes a service-dominant perspective as an alternative use of predictive models to create value for maternal healthcare. I anticipate that through the use of the service innovation framework and social capital theory, I can study how health practitioners and pregnant women can be empowered with skills and knowledge to predict pregnancy complications and trigger collaborative value creation.

Keywords: service-dominant logic; maternal healthcare; predictive models; pregnancy complications

1. Introduction

In 2015, about 830 women died every day from pregnancy or childbirth-related complications, with 99% reported from developing countries [1]. Despite improvement activities, the United Nations' fifth Millennium Development Goal (MDG 5) of a 75% reduction in the maternal mortality ratio (MMR; number of maternal deaths per 100,000 livebirths) has not been met. Worldwide, the number only dropped by 43% [1]. The slow progress in developing countries is explained by limited access to healthcare and shortage of medically trained maternal and child healthcare professionals [2].

Furthermore, specialized professionals are devoted to urban areas and in rural areas, where most of the population resides, access to high quality healthcare is very limited [3,4]. In order to achieve the MDG5 goals and extend maternal healthcare to rural areas, many countries have implemented a task shifting strategy [5]. In a task shifting strategy, less trained and qualified community healthcare workers organized in village health teams (VHTs) [6] become the first point of contact for pregnant women. It is perceived that VHTs need predictive models to predict pregnancy complications and to identify women with the highest risk of adverse maternal outcomes [7]. However, rural level healthcare workers experience major problems to predict pregnancy complications [8] and cannot use predictive models because they are too complex and require computer support [7,9]. The problem with too complex models seems to be a general one [10] and there is little evidence of their impact and usefulness in practice [10,11].

The way VHTs are supposed to predict pregnancy complications reflects a traditional healthcare system, designed for highly qualified healthcare professionals and with limited focus on patient involvement. The patients cooperate by accepting information provided by the doctors without questioning it (i.e., passive compliance), which can lead to a low quality of life [12]. Increasingly, systems are transformed to more actively involve patients in the co-creation of healthcare service experiences [12]. The transformation reflects a vital shift in perspective from a

goods-dominant logic perspective, with healthcare management based on outdated managerial science practices [13], to a service-dominant (S-D) logic in which service providers and customers are co-creating value [14].

To improve healthcare management and services, at the individual, organization or system level, patients and healthcare workers need to co-create value [12]. Such a patient's activation approach [13] requires interactional resources including knowledge, technology and institutions [15]. However, there are few studies on IT processes and structures that are needed to actively embrace patient participation in the improvement of healthcare services at the organizational or system level [16].

This research proposes a study that investigates the role of IT in value co-creation for predictions of pregnancy complications in low resource contexts.

Research Questions

The overall research question is: "How can IT support value co-creation in predicting of pregnancy complications in low resource contexts?" Specific research questions are:

1. Which factors enable value co-creation in predicting pregnancy complications in low resource settings?
2. In what ways can IT facilitate value co-creation in predicting pregnancy complications in low resource contexts?
3. In what ways can IT be designed to enable value co-creation in predicting pregnancy complications in low resource contexts?

2. Literature

Value co-creation in service-dominant (S-D) lens is defined as "the processes and activities that underlie resource integration and incorporate different actor roles in the service ecosystem" [17].

The task shifting strategy presents challenges of inadequate access to quality maternal healthcare services in the rural communities. The quality of healthcare is not only achieved through service delivery but also through improved healthcare outcomes or the value obtained from the healthcare service delivery process [12]. Improved healthcare outcomes require innovative ways of healthcare service provision. Michie et al. [18] indicates that treatment plans and related health care activities do not only include interactions with health professionals but rather extends to the individual lifestyle and beliefs. Evidence has shown that involvement of the patients in their treatment creates value as they actively seek and share information with health professionals, friends, family, support groups and colleagues to redesign their treatment programs [12] and prevent diseases through proper diet and exercises [19].

Models and frameworks have been developed to improve healthcare outcomes in low-resource settings. Mburu [20] developed a conceptual model for designing and deploying mHealth solutions for low-resource settings and tested it in maternal healthcare. The model was aimed at narrowing the gap between design of mHealth solutions and the use context. However, the model is inclined to processes between the healthcare provider and the patient and limits patients-patients or patients-family relationships. This limits research that focuses on other processes that support prevention and management of complications in rural settings with limited healthcare professionals. In this situation, the model is suitable for use in the traditional healthcare system that makes the healthcare provider at the center of healthcare and hence leads to limited quality of healthcare outcomes or reduced value.

Higa and Davidson [21] developed a model that uses the S-D logic perspective for value co-creation in rural under-resourced settings. The model focuses of three actors including the patients, family or friends and healthcare providers who integrate resources to co-create value which is in this case, improving chronic disease health outcomes. The resources considered in the model include social capital in form of social support from family and friends, eHealth resources to facilitate service delivery and eHealth resources that enhance patient engagement in health behavioral changes. The model assumes that the resources are readily available and that the actors are

willing and available to exchange services despite acknowledging that the different actors are situated in both formal and informal institutions that may limit their interactions. Higa and Davidson suggest further research on the contributions on different actors and how limitations faced by actors to access and integrate services.

The models and frameworks indicate the need to consider a social-technical approach when designing IT solutions that lead to improved health outcomes.

3. Method

I will use qualitative research methods because they aim at understanding the emic perspective of the people through the meanings they attach to their experiences rather than focusing on facts [22]. Study contexts for my study include Uganda and Sweden. For the study in Sweden, I will conduct in-depth interviews with the midwives and the obstetricians in Gothenburg. An in-depth interview is a conversation between a researcher and the participants and provides detailed insights into the research process [22]. For the study in Uganda, I will use the ethnographic research approach in which, I intend to follow up the VHTs as they interact with the pregnant women and the midwives. The ethnographic research approach is selected because it provides IS researchers with insights into the human, social and cultural aspects of IS information development and application [23]. Ethnographic research will enable me to see “what people are doing as well as what they say they are doing” [24] through participant observation [25].

Regarding data analysis, I will analyze my data using the thematic analysis method and findings will be compared with concepts from the service innovation framework and the social capital theory. Thematic analysis is defined by Braun and Clarke [26] as a method used to “identify, analyze and report patterns within the data”. They indicate that thematic analysis uses a similar set of coding procedures that are used by researchers who conduct grounded theory ‘lite’. I select thematic analysis approach because it is flexible [26] therefore I can use both inductive and deductive strategies to data analysis [22].

4. Theoretical Framework

I intend to use the social capital theory [27] and service innovation framework [17] to design requirements for the use of IT to support value-co-creation in predicting pregnancy complications. Applying the service innovation framework from the S-D logic in my research enables me to understand the service ecosystem, the service platform and the value co-created by different actors in the ecosystem [17]. In addition, I will adopt Bourdieu’s theory of habitus and forms of capital specifically social capital in my research. Bourdieu’s social capital theory helps to understand the social structures and patterns of behavior that encode certain cultural understanding and hence can lead to inequity [27]. Deeper understanding of the resources in the ecosystem including “social support from families and ehealth resources to facilitate service delivery, and eHealth resources that enhance patient engagement in health behavioral changes” [21] and how they can be integrated or shared by the different actors requires using the social capital theory.

Conflicts of Interest: The authors declare no conflict of interest.

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