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Investigating the resistance to telemedicine in Ethiopia

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ABSTRACT

Background: Telemedicine has great potential to improve health care in Africa as well as other developing areas, especially when medical expertise is urgently needed in emergency situations. Yet resistance from healthcare professionals could prevent telemedicine's social value from being materialized.

Objective: This article intends to understand why healthcare providers resist using telemedicine from a threat-control perspective.

Method: A survey on 107 healthcare professionals in Ethiopia was conducted.

Conclusions: The resistance to telemedicine is determined by perceived threat and perceived controllability, which in turn are influenced by reduced autonomy, anxiety, and costs. Government support weakens the effect of perceived threat but strengthens the effect of perceived controllability on telemedicine resistance.

1. Introduction

The fast-spreading epidemic Ebola in western Africa countries has drawn the world's attention. Given the shortage of medical specialists in these countries, telemedicine could have played an important role in curbing the rampage of Ebola. Telemedicine refers to the use of telecommunication and information technologies to deliver health care services over distance. By eliminating geographical separation between health providers and recipients, telemedicine can improve access to medical services that are often difficult to provide in remote rural regions like Sub-Saharan Africa (SSA). SSA is a vast rural region that has poor healthcare conditions and is short of medical personnel and facilities. The three countries with the most widespread Ebola (Guinea, Liberia, and Sierra Leone) are in this SSA region.

Health conditions in the SSA have always been alarming. According to the World Health Organization (WHO), about 28.1 million HIV/AIDS carriers, or more than 70% of the worldwide HIV/AIDS population, are in the SSA [1]. As a matter of fact, the SSA carries 25% of the global burden of disease; yet, it only possesses 1.3% of the world's health workforce [2]. The doctor-to-population ratios in SSA countries range from 1:5000 to 1:30,000, which is significantly lower than the average ratio of 1:1400 in other developing countries and 1:300 in

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developed countries [1]. The shortage of health care professionals combined with the rampage of diseases together lead to huge health disparities between the SSA and the rest of the world. Telemedicine is a highly promising technology that could be utilized to reduce the SSA health disparities and improve medical conditions of the underserved SSA communities. Its role will be particularly salient in epidemic disaster situations like Ebola, which limits the ability of specialists to work on site.

Prior research finds that telemedicine is able to increase care accessibility, improve care quality, reduce costs, and enhance patient and provider satisfaction, and telemedicine has been routinely used in some parts of the world [3–5]. However, telemedicine's benefits cannot be fully realized because many health care systems are still unable to employ telemedicine as a regular approach to delivering medical services [6]. Telemedicine pilot projects often suffer from economic sustainability issues after the initial seed funding is depleted [7]. Besides economic and technological impediments, a frequently cited challenge to the survival of telemedicine is that complex human and social factors hinder the diffusion of telemedicine services [6]. Given that telemedicine represents a novel service model that differs from the familiar traditional face-to-face approach, it is not uncommon for health care professionals and patients to find the idea difficult to embrace. The medical literature suggests that health care professionals have negative attitudes toward telemedicine for several reasons: fear of handling computers, anxiety that telemedicine will reduce their job security, apprehension that the return on investment for telemedicine is low, and concern that the physician–patient communications will be ineffective [8]. Physicians are also concerned that the implementation of telemedicine technologies may alter current work practices, challenge physician referral methods, or interrupt their workflow [9]. These negative perceptions and concerns tend to produce an impression that telemedicine is threatening rather than beneficial, which leads to a resistance to telemedicine adoption. Therefore, understanding why health care professionals resist telemedicine will enhance appropriate and meaningful use of telemedicine systems in Africa.

User resistance has consistently been identified as a major obstacle to the success of system implementations [10,11]. In fact, it is reported to be the number one challenge to the implementation of large-scale systems, and is widespread in the early stages of system implementation [12]. User resistance is particularly serious in healthcare settings in which healthcare professionals are characterized by high professional autonomy and a low propensity for being persuaded by people outside their profession [13–15]. Both qualitative and quantitative studies suggest that physician resistance is one of the top barriers to implementing clinical information systems [16].

Telemedicine, as an innovative approach to delivering care enabled by IT, is new to healthcare professionals in SSA countries and will likely encounter resistance. Given that telemedicine could provide great social value to Africans, it is important to understand why healthcare professionals tend to resist the use of telemedicine. However, prior research on telemedicine use is predominantly focused on physician adoption of telemedicine [17–20], and existing knowledge about healthcare professionals' resistance to telemedicine is scant. There is a lack of theory-driven quantitative research that delineates which antecedents lead to resistance and in what way. This research attempts to fill this gap in the literature. Our objective is to understand why Sub-African healthcare professionals resist the use of telemedicine. Based on technology threat avoidance theory (TTAT) [21], we propose that perceived threat and perceived controllability are two salient perceptions determining resistance and identify a set of antecedents that influence these two perceptions.

2. Theoretical foundation

As shown in Fig. 1, we draw on technology threat avoidance theory (TTAT) to develop a research model that explains health care providers' resistance to telemedicine [21,22].[1] We suggest that users' resistance to telemedicine is primarily determined by two cognitive appraisals: the resistance increases when the users perceive telemedicine to be a threat and decreases when they believe that telemedicine usage is controllable. Based on an extensive literature review, we propose that perceived threat arises from three major cognitive sources: reduced autonomy, anxiety, and cost, and anxiety and cost also reduce perceived controllability. In addition, given that any individual is inevitably surrounded by some social contexts, we posit that users' cognitive perceptions and appraisals are influenced by contextual factors. Specifically, government support plays a pivotal role in alleviating telemedicine resistance by having a negative effect on reduced autonomy, anxiety, and cost, as well as by moderating the effects of perceived threat and perceived controllability on resistance. We explain in detail the theoretical rationale behind the research model as follows.

TTAT, rooted in coping theory from social psychology, posits that IT is a two-sided sword that could bring both benefits and losses to individuals. Resistance is a type of coping behavior that arises from individuals' cognitive evaluation of the situation [21]. Specifically, when an innovative IT such as telemedicine is introduced, a stressful situation is created for the users because they need to make efforts to adapt to this new technology. To cope with the stress, users go through two processes: cognitive appraisal and coping. During cognitive appraisal, they determine whether and how telemedicine impacts their well-being [23]. This process can be further divided into primary appraisal, which decides what may be at stake, and secondary appraisal, which determines what can be done to prevent or reduce harm or improve benefits.

In the context of telemedicine, primary appraisal gives rise to perceived threat, defined as the extent to which users believe that telemedicine negatively influences their personal benefits despite its value in improving care delivery. Secondary appraisal, on the other hand, leads to perceived

[1] Rogers' diffusion of innovation model is widely applied to explain the positive behavior of technologyadoption/acceptance. However, this study is focused on resistance, which is a type of negative behavior. Therefore, Rogers' model cannot be readily applied in this context. Resistance is a typical form of coping. That is why we chose TTAT that is based on coping theory instead of Rogers' model.