# Essays on Online Healthcare Platforms
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## Abstract

Online healthcare platforms have increased in popularity over the years. These platforms offer a safe mode of physician-patient and patient-patient interaction. One type of online platform matches patients with physicians, for example, platforms like RateMDs (USA and Canada), Vitals (USA), Good Doctor Online (China), and Practo (India). These portals, referred to as Physician Review Websites (PRWs), have gained traction over the years. The other platform type involves patient-to-patient interaction and are generally called Online Health Communities (OHCs). OHCs are online social networks where people can share health experiences and learn how to self-manage healthcare issues by seeking and providing social support. These platforms have some shortcomings which bear examination. PRWs, for example, have not achieved widespread adoption in developing countries compared to the larger population despite the increase in the utilization of online platforms across domains. The addition of relevant information on PRWs may ameliorate such issues. Similarly, OHCs, while known to contribute positively to health outcomes, face issues related to the dissemination of information, particularly in the case of patients with mental health issues. Interventions on OHCs may benefit such patients by creating a safe space for patients to share sensitive mental health issues. Our work examines these issues in terms of information availability, adequacy, dissemination, and impact on the health outcomes of patients. While extant research has examined such platforms in the IS literature, rigorous examination of the issues related to PRWs and OHCs, as mentioned above, contributes to the stream of literature on online healthcare platforms. We conduct three studies which investigate the issues mentioned above.

The first study involves examining the information needs of patients on PRWs. PRWs help users select physicians by providing structured and unstructured data on physicians and patients' experiences with physicians. However, studies indicate that prospective patients do not have access to all the relevant information needed to procure healthcare services, like physician consultation. In the case of teleconsultation services, for example, the patients are almost entirely dependent on the information available on the PRWs, which indicates that access to relevant and high-quality information is essential. The study aims to address the gaps in understanding (1) what information is available on PRWs and what information patients seek for the selection of physicians and (2) how PRWs can address the information gap. The adequacy of the available information on PRWs is investigated through a survey instrument, topic modelling and experimental verification. The survey results, combined with the topics generated through modelling, show that twelve out of twenty-five topics are either unavailable or partially available, indicating an information gap. The impact of adding relevant information to PRWs is verified through an experimental study. We find that adding the right information improves information adequacy. The chances of physician profiles with more relevant, high-quality information being selected for appointments increase. The results will help PRWs and hospitals decide how to restructure information on their websites and devise strategies to nudge patients to write reviews highlighting the desired information.

The second study examines the information signals patients use in the physician selection process. Information signals may be present on PRWs in the form of linguistic (text-based or profile-based) and visual (profile picture-based) features. Parsing signals from both physician and patient inputs to determine the important ones is paramount for selecting the physicians best suited to the patients. Previous research states that information from a diverse set of patients can provide credible information regarding physician quality. We thus

operationalize signals by examining linguistic and visual signals on PRWs through machine learning and deep learning techniques and find their corresponding impact on physician selection through a quasi-longitudinal regression model. We find that patients focus more on visual cues in the form of eye contact and linguistic cues in the form of negative emotional content in reviews along with the overall sentiment score, while other signals, like smiling faces or positive emotional content in reviews, do not show a significant effect. Physician ratings moderate the role of the negative emotional content of the text reviews, showing that negative emotions affect physician selection more in the case of physicians with high ratings. Ratings moderate the overall sentiment score similarly, which is experimentally validated with three measures. Our work contributes to the literature by studying joint information signals and their impact on physician selection. The findings regarding the proportions of negative emotional content show that the role of emotions in the healthcare domain is not identical to that of e-commerce domains, one reason being the high information asymmetry on such platforms. The results can help PRWs to modify their mechanisms for ranking or listing physicians on the platforms by accounting for the combined effect of visual and linguistic signals.

The third study examines the role of the communication style of content creators on YouTube on the social support sought or received by mental health patients. People with mental illnesses experience significant psychological vulnerability during interactions with healthcare providers, which may lead to patients avoiding counselling sessions. OHCs like YouTube offer an alternative way for these patients to learn about mental health and illnesses. Interventions on these platforms can benefit individuals who may be otherwise unwilling to seek formal healthcare services. The process by which these users seek and interact with medical information online is a complex activity with a high cognitive load. In the context of

mental health, it is thus crucial that the language is accessible to the patient and increases attention and participation. The appropriateness of communication context is studied through the formal-informal dimension of communication. The study is conducted using well-known deep learning and causal inference methods. We find that an informal communication style used by the content creator leads to a rise in emotional support, as well as a drop in informational and experiential support sought or received by commenters on the platform. The results would help the content creator in developing guidelines on content creation which can lead to better health outcomes. Mental health patients on the platform would find more accessible language in videos helpful, leading to more engagement in the form of social support on these platforms.