The Impact of Multimodal Health Education on Health Awareness Among the Mobile Population: An Eye-Tracking Experiment Based on Information About Ground-Glass Nodules in the Lungs

Division: Health Communication

Introduction

Following China's Seventh National Population Census, the mobile population surged to 376 million in 2020, representing 26.62% of the entire population (National Bureau of Statistics, 2021). This demographic shift is not just a socio-economic phenomenon but also poses significant public health challenges, particularly concerning health disparities among the mobile workforce. This group, often in precarious employment, faces notable health declines between ages 31 to 40 (Fan, 2019), underscoring the need for specific health interventions. Despite improvements in national health literacy, there remains a notable gap for those with lower educational levels, largely comprising the mobile population. This disparity is critical for managing chronic and infectious diseases, highlighting the importance of boosting health literacy among the less educated. This study leverages the insight that cognitive ability significantly affects health literacy (Serper et al., 2014) and aims to evaluate the impact of multimodal health communication strategies (text, visuals, and videos) on improving health awareness and outcomes. Focusing on lung cancer prevention and the detection of ground-glass opacity (GGO) nodules, the research targets Beijing's mobile workforce. It explores how health communication tailored to their media consumption habits can enhance health literacy and encourage proactive health behaviors in one of China's most vulnerable groups.

This research draws on Media Richness Theory, suggesting that the effectiveness of information delivery varies across different media based on their ability to convey nuanced information and prompt feedback (Trevino et al, 1987). It proposes hypotheses on media suitability for conveying straightforward knowledge (H1a) versus ambiguous health knowledge (H1b). Additionally, leveraging Cognitive Load Theory (Sweller, 1988), it examines how cognitive processing influences learning, leading to a hypothesis (H2) that richer media improve transmission of less relevant health information. The study seeks to explore why richer media aid memory retention of complex information (RQ), integrating insights from seminal works in media and cognitive research.

Methodology

In a 2020 study focused on Beijing's migrant workers, 85 participants aged 35 and above, with normal vision and no prior knowledge of GGOs, were divided into three groups to explore the effects of different information formats on their understanding of GGOs. This study was conducted through an eye-tracking experiment. The groups received information through text, charts, or videos without subtitles, presented via eye-tracking software. Health education content, developed with input from Beijing Cancer Hospital clinicians, included the definition, progression, and management of GGOs. A questionnaire with seven multiple-choice questions assessed the participants' knowledge and memory of GGOs, distinguishing between questions aimed at reducing uncertainty and those addressing ambiguity. This structure aimed to evaluate the cognitive impact of varying presentation methods on health literacy.

Results and Contributions

This study elucidates the symbiotic relationship between persuasion and behavioral change theories, leveraging the stages-of-change model by Prochaska et al. (1992) which identifies five critical phases of behavioral transformation: precontemplation, contemplation, preparation, action, and maintenance. It highlights the non-linear, often spiral nature of progression through these stages, with a particular focus on the pivotal role of media in health communication to foster awareness in the precontemplation stage. Furthermore, the research integrates cognitive load theory to explore how audiovisual media facilitate information retention and processing, contrasting with traditional print media. Findings suggest that media richness significantly enhances the dissemination of uncertainty-reducing information without markedly affecting ambiguity resolution. Key to media effectiveness is 'self-referencing', enabling audiences to connect new information with personal experiences and needs. However, for complex health information distant from an individual's life, high-richness media can reduce cognitive load and improve learning efficiency and memory accuracy by engaging peripheral routes of persuasion. This approach underscores the strategic use of media modality in health communication, particularly for information that imposes a high intrinsic cognitive load on the audience (Slater, 1999; Shen, Sheer, & Li, 2015).

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