Towards to a Human-Food Interaction Framework in the Context of Chronic Disease Management

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Abstract

We proposed a human-food interaction framework (HFICDM) to guide design studies to improve experiences of patients with chronic conditions. The framework was developed based on a field study that examined anticoagulation treatment. This model can support digital food initiatives and empowerment of patients.

Author Keywords

Theory; design; digital food; empowerment of patients

ACM Classification Keywords

H.1.2. User/Machine Systems: Human Factors

Introduction

It is known that there is a multidimensional relationship between food and health. Moreover, the challenges of individuals with a chronic condition regarding food consumption has also been demonstrated in field studies. However, conceptual frameworks are missing to describe relationships between important variables and guide design efforts. Frameworks can inform and support digital food initiatives and empowerment of patients.

HFICDM Framework

We proposed a human-food interaction framework in the context of chronic disease management. We called it HFICDM. This model highlights three building blocks (personal characteristics, requirements of the chronic condition, and food-related experience), which interact within the social context. This model also highlights misfits among these building blocks. Social context can increase or decrease the magnitude of the misfit. Identification of these misfits can guide design efforts to ensure these three components fit properly.
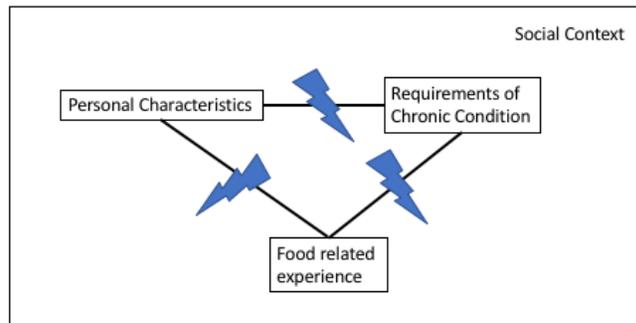

Figure 1: Proposed human-food interaction framework in the context of chronic disease management: HFICDM Framework

A Case: Anticoagulation Treatment

Anticoagulation management requires steady vitamin K consumption and monitoring of alcohol consumption. We collected data from 39 patients from a pharmacist-led anticoagulation clinic. Data was collected through interviews and tablet computer-based journaling. Qualitative data analysis revealed that personal characteristics and requirements of the chronic condition affected food-related experience. The impact is moderated by social context. Personal characteristics include daily routines, food preferences, and experience with the condition. Social context includes family (and its effects on daily routines), support, encouragement, and expectations/assumptions of friends and relatives. Reported food-related experiences reflect lack of social engagement, frustration, and cognitive overload. Reported misfits include preconceptions of the social environments due to alcohol control and work demands that may not allow for following a diet required by the therapy plan.

Discussion

Models, frameworks, and theories can provide a great value to the human-food interaction discipline. They provide well-validated pathways to link observed phenomena with foundational knowledge, thus enhancing efficiency and generalizability. Design-oriented frameworks such as HFICDM can also inform design studies that aim to improve quality of life by ensuring that personal characteristics, requirements of chronic conditions, and food-related experience fit properly and are supported by social context. Well-designed digital food technologies (e.g., diet trackers, food-sharing apps, and "smart" kitchenware) can support that structure and enhance patient empowerment. Studying the misfits among these three dimensions can inform the design of these technologies. These misfits can also be used to explain the factors that affect adherence. The proposed framework should be validated through further field studies and in other disease contexts. Development of HFI frameworks for specific contexts (e.g., health care, education) can create a corpus that will lead to grand HFI theories.