VALORIZATION
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The use of eHealth has become a reality that practitioners can benefit from; technologies are continually evolving, and they have become an integral part of societies.

The present thesis explored the effectiveness of dietary apps on nutritional outcomes in chronic diseases as well as the development and pilot evaluation of an Arabic dietary self-monitoring and educational app for hemodialysis patients. The app developed (KELA.AE) is to our knowledge the first of its kind in the Arab region. The valorization of the thesis may be directed to clinicians, app developers, policymakers, and researchers to provide optimal nutrition care to patients while incorporating the use of mobile technologies. This thesis could also be considered a roadmap for researchers and app developers regarding person-centered, evidence, and theory-based approaches that could be used for the development of dietary apps for the management of chronic diseases.

**Collaboration between developers and stakeholders**

The involvement of all stakeholders is essential for the development of tools that succeed in patient care. Historically, patients have rarely been actively involved in the development of healthcare tools. The process involved healthcare practitioners, developers, and scientists rather than patients themselves. However, patients are interested in personalized, interactive tools to self-manage their conditions; they want customized, targeted, tailored information to satisfy their needs.[1]. Patient engagement has been linked to better health outcomes, yet there have been reports of low usage because existing tools generally fail to cater to patients’ needs[2]. Technologies will only succeed if patients are ready, motivated, willing, capable of using them and find them easy to use.

Additionally, commercial dietary mobile applications available through app stores are not always grounded in theories and evidence, and they often lack accuracy in the information provided and do not go through extensive evaluations [3-5]. Whereas, applications based on formative research are more likely to be grounded in theories and therapeutic evidence, yet they may not be well disseminated, nor do they benefit from updates from the rapidly evolving technologies[6]. Thus, there is a need to disseminate interventions that have undergone trials showing effectiveness and to provide them as open access to the public. Dissemination should be made for research, particularly in open access journals, to share results. App dissemination, on the other hand, should also be performed and potentially be in collaboration with the industry.
If dietitians, and healthcare practitioners, in general, do not take the lead by contributing to mHealth developments, the rapid technological advances may be disruptive or possibly even cause harm to patient management[7, 8]. The latter may allow for the dissemination and usage of mHealth solutions that are not grounded in theories and therapeutic evidence, which in turn may have a negative impact on health outcomes.

We propose a close collaboration between app developers, dietitians, and patients as means to approach such challenges with an overarching tactic that allows patients to benefit from the theories and evidence produced by the scientific community but also from the technological advances and entrepreneurial engines made by the private sector. We perceive that for this idea to take shape, dietitians and other healthcare practitioners should take the lead by approaching this continuously evolving sector and therefore contribute to the development, dissemination, and evaluation of dietary applications or other future technologies that may arise. Dietitians and healthcare practitioners, in general, should also act as a liaison to ensure patient involvement in the development process so that solutions are adequately catered to patient needs. To accomplish the latter, dietitians must obtain and continuously update their knowledge and skills in the area of nutrition informatics.

The Commission on Dietetic Registration of the Academy of Nutrition and Dietetics in the United States has taken the lead by incorporating informatics related competencies that dietitians may choose to fulfill as part of the continuing education required to maintain their credentialing. The Commission on Dietetic Registration, however, has not made these learning outcomes mandatory; we suggest that the informatics sphere is made compulsory for the renewal of dietitians’ credentials[9]. We also suggest that countries that require continuing education for the maintenance of credentialing should incorporate a minimum number of continuing education units in the area of nutrition informatics. This would provide dietitians with knowledge and skills to be more involved in the incorporation of advancing technologies into practice.

INTEGRATION OF MHEALTH COMPONENTS INTO THE NUTRITION CARE PROCESS (NCP)

The nutrition care process (NCP) is a framework proposed by the Academy of Nutrition and Dietetics in the United States and adopted by many countries across the world that provides a stepwise approach for the delivery of quality nutrition care. The nutrition care process (NCP) model also includes a graphical illustration that includes environmental factors that may impact the practice in dietetics. The current model lists the patient at the center surrounded by healthcare, social, economic systems, and practice settings as environmental factors that influence nutrition care practices [10].
We propose that during the next update of the NCP, an additional factor entitled “technological developments” is considered for addition to the outer ring of environmental factors in the model to keep the model in line with modern developments. The process may involve an update of the evidence on the role of technological developments on the practice along with a Delphi study aimed at defining the role of technological progress on dietetic practice as well as selecting where exactly they fit in the model.

Additionally, the steps included in the NCP comprise nutrition assessment, diagnosis, intervention, monitoring, and evaluation. Standardized terminology is proposed by the (NCP) pertinent to each step. The current domains for each step lack explicit incorporation for eHealth tools applied to assessment, diagnosis, interventions, or monitoring and evaluation. We also propose that the terminology should be inclusive of eHealth across all domains of the NCP. Currently, nutrition standardized terminology is incorporated into patients’ electronic health records (EHR). However, the terminology itself still lacks to reflect interventions using tools such as mobile apps, web-based platforms, teleconsultations, or other components of eHealth that may contribute to the steps of the nutrition care process.

**APP GOVERNANCE CONSIDERATIONS**

Intensive nutrition interventions are clinically and cost-effective in the management of hemodialysis patients, and particularly in the management of hyperphosphatemia [11]. However, this requires a dietitian to patient ratio along with enough time dedicated to each patient [12]. This is a challenge that most healthcare systems face, especially in the dietetics field, where clinical nutrition staffing benchmarks are not yet well established [13]. Dietary apps can offer support to dietitians and patients/clients equally as they may act as educational, self-monitoring, or communication tools. The aim would be to enhance the dietitian and patient relationship by providing tools that render the communication more efficient.

New apps are being continuously developed and made accessible to the public; these apps often contain target guidelines, educational materials, and require the input of personal health information. Given their potential contribution to patients’ treatment plans, special attention should be given to their content and to the management of data that users input into the app.

Different countries have regulations mandating data protection and data processing; such laws also cover matters related to users consenting to share their personal data [14, 15]. However, app content, reliability, and correctness in line with current practice guidelines are not regulated. Placing rigid regulations may hinder technological development, yet not including any overarching view of the scope of these apps may put users at risk.
mHealth apps should be assessed and validated before being made available to the public, and thus app evaluation should be more thoroughly explored. In France, the Haute Autorite de Sante developed good practice guidelines for manufactures and evaluators for apps that are not subject to regulatory approvals (such as apps with medical purposes)[16]. Tools evaluating apps such as the MARS (Mobile App Rating Scale) have also been developed, validated, and extensively used in the literature for app evaluation [17]. At the international level, however, there is no consensual approach to the assessment of mobile apps that are not classified as medical devices.

An international task force guiding the evaluation and dissemination of apps could be a future direction for policymakers and researchers. The task force would create a universal app evaluation tool that is adapted from validated tools. It may include international healthcare practitioners, app developers, patients, but also stakeholders from commercial apps. It would also aim at creating a voluntary “label” similar to a food label. The label would be available to app stores, and it should include easy to understand criteria with a rating of the app. The task force would also create guidelines for the development of an app label that includes reliability of content (compliance to evidence practice guidelines), data privacy and management, developer qualifications, among other criteria. Such labels would serve as a guiding tool for dietitians, healthcare practitioners, and patients equally.

References


