

An mHealth intervention for the dietary management of hemodialysis patients

Citation for published version (APA):

Fakih El Khoury, C. (2020). *An mHealth intervention for the dietary management of hemodialysis patients*. Ridderprint BV. <https://doi.org/10.26481/dis.20200701cf>

Document status and date:

Published: 01/01/2020

DOI:

[10.26481/dis.20200701cf](https://doi.org/10.26481/dis.20200701cf)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

VALORIZATION

VALORIZATION

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

1. Kaplan, B. and P.F. Brennan, Consumer informatics supporting patients as co-producers of quality. *Journal of the American Medical Informatics Association*, 2001. 8(4): p. 309-316.
2. Birnbaum, F., et al., Patient engagement and the design of digital health. *Academic emergency medicine: official journal of the Society for Academic Emergency Medicine*, 2015. 22(6): p. 754.
3. Azar, K.M., et al., Mobile applications for weight management: theory-based content analysis. *American journal of preventive medicine*, 2013. 45(5): p. 583-589.
4. Pagoto, S., et al., Evidence-based strategies in weight-loss mobile apps. *American journal of preventive medicine*, 2013. 45(5): p. 576-582.
5. Chen, J., J.E. Cade, and M. Allman-Farinelli, The most popular smartphone apps for weight loss: a quality assessment. *JMIR mHealth and uHealth*, 2015. 3(4): p. e104.

6. Baker, T.B., D.H. Gustafson, and D. Shah, How can research keep up with eHealth? Ten strategies for increasing the timeliness and usefulness of eHealth research. *Journal of medical Internet research*, 2014. 16(2): p. e36.
7. Robinson, T.N., et al., An evidence-based approach to interactive health communication: A challenge to medicine in the information age. *Jama*, 1998. 280(14): p. 1264-1269.
8. Rusnak, S. and P. Charney, Position of the Academy of Nutrition and Dietetics: Nutrition Informatics. *Journal of the Academy of Nutrition and Dietetics*, 2019. 119(8): p. 1375-1382.
9. Worsfold, L., B.L. Grant, and G.C. Barnhill, The essential practice competencies for the Commission on Dietetic Registration's credentialed nutrition and dietetics practitioners. *Journal of the Academy of Nutrition and Dietetics*, 2015. 115(6): p. 978-984.
10. Lacey, K. and E. Pritchett, Nutrition care process and model: ADA adopts road map to quality care and outcomes management. *Journal of the Academy of Nutrition and Dietetics*, 2003. 103(8): p. 1061-1072.
11. Rizk, R., et al., Cost-effectiveness of dedicated dietitians for hyperphosphatemia management among hemodialysis patients in Lebanon: results from the Nutrition Education for Management of Osteodystrophy trial. *Journal of medical economics*, 2017. 20(10): p. 1024-1038.
12. Byham-Gray, L. and K. Wiesen, *A clinical guide to nutrition care in kidney disease*. 2004: American Dietetic Association.
13. Phillips, W., Clinical nutrition staffing benchmarks for acute care hospitals. *Journal of the Academy of Nutrition and Dietetics*, 2015. 115(7): p. 1054-1056.
14. Crutzen, R., G.-J. Ygram Peters, and C. Mondschein, Why and how we should care about the General Data Protection Regulation. *Psychology & health*, 2019. 34(11): p. 1347-1357.
15. Martínez-Pérez, B., I. De La Torre-Díez, and M. López-Coronado, Privacy and security in mobile health apps: a review and recommendations. *Journal of medical systems*, 2015. 39(1): p. 181.
16. de Santé, H.A., Good practice guidelines on health apps and smart devices (mobile health or mhealth). 2016, URL: [https://www. has-sante. fr/portail/upload/docs/application/pdf/2017-03 ...](https://www.has-sante.fr/portail/upload/docs/application/pdf/2017-03...)
17. Stoyanov, S.R., et al., Mobile app rating scale: a new tool for assessing the quality of health mobile apps. *JMIR mHealth and uHealth*, 2015. 3(1): p. e27.