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Can a mobile application deliver appropriate, acceptable and usable personalised nutrition advice to UK adults

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Personalised nutrition (PN) has the potential to promote greater adherence to a healthy lifestyle but this has been costly and labour-intensive to develop and deliver. Advances in computer technology and artificial intelligence (AI) offer the opportunity to construct and deliver PN advice automatically and remotely. The EU-funded PROTEIN project⁽¹⁾ aimed to develop a mobile application that delivers tailored and responsive nutrition and physical activity advice to adults across the EU. Here we report on the appropriateness of the PN advice delivered and the perceived usability of the mobile application within the UK project cohort.

Eighty participants were recruited from the general public (i) adults with a poor-quality diet (PQD, n 29; defined as ≤ 3 daily portions of fruit and vegetables), (ii) adults with iron deficiency anaemia (IDA, n 11; Hb < 120 mg/L) and (iii) adults who were overweight (OW, n 40; BMI 25–30 kg/m²). Baseline anthropometric, physical activity and general health data was collected and inputted into the PROTEIN dashboard along with their dietary preferences and individual goals, triggering the generation of an individualised 7-day nutrition and activity plan (NAP)⁽²⁾, which participants were encouraged to follow. App interaction rate was assessed according to the number of meal confirmations users made and their ratings of the meals, snacks and activities provided by the NAP generator. NAPs regenerated on a weekly basis dependent on the users' app engagement. After 4 weeks of use, participants completed two online usability questionnaires and reported their current weight. This study received a favourable ethical opinion from the Health Research Authority (ID: 294871). Data were checked for normality (SPSS v28) and are presented as mean [SD]; significance was set at $p < 0.05$.

Mean age and BMI were 44.7 [16.1] years and 27.7 [5.5] kg/m² respectively. The NAP recommendations were all within the macro-/micronutrient reference ranges devised to underpin the meal recommender system², suggesting they were appropriate, yet over 90% of users did not confirm that they had consumed or skipped a meal, highlighting low user interaction and acceptability. OW group users completing the intervention (n 32), reported an average of -1.1 ± 1.4 kg weight loss (ns). Questionnaire responses (all users) suggested that the app increased their motivation ($n = 41$) and ability ($n = 35$) to eat a healthy diet but the overall usability score was low (47.2%). Most negative responses related to the system complexity rather than the guidance provided or the app appearance.

Overall, the PROTEIN app could accurately define appropriate meal plans and motivate users to improve their lifestyle, in line with previous pilots⁽³⁾. However, future versions of the mobile app should focus on developing a more user-friendly system to increase interaction

References

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