Abstract

Developing the Nutrition Score — a Nutrient Profiling Model for a Weight Loss Mobile App

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Various nutrient profile models (NPM) are used for food package labelling, such as Traffic Lights, Health Star Rating, Nutri-Score [1]. However, these existing NPMs do not suit the context of mobile applications (app), where food is logged exclusively as consumed, not as sold. The inadequacy of existing NPMs for app use highlights a gap in accurately assessing the nutritional quality of foods as per real time consumption. This limitation underscores the need for developing a new model that takes into account highly variable portion sizes to ensure app users receive accurate nutritional feedback.

To fill this gap, the World Health Organization's (WHO) Nutrient Profiling guidelines [2] were applied to develop a Nutrition Score (NS) within a weight loss (WL) coaching app as a NPM. The aim of this work is to study quantitative characteristics of the NS and its reception by the app users.

The eight-step procedure outlined in the 2010 WHO recommendations for developing NPMs [2] was followed to define the NS. 1) Purpose: To develop a system for providing non-judgmental feedback on digital food logs, accounting for portions; 2) To use an existing or develop a new model: Develop a new model specifically for in-app food feedback; 3) Scope of and exemptions to the model: For foods as they're consumed; 4) Food categories: foods and drinks; 5) Nutrients included: Energy, protein, fibre, total sugar, saturated and unsaturated fats, sodium, calcium, vitamin C, alcohol; 6) Reference amount: Absolute values per given portion, "per 1000 kcal" and "per 100 g"; 7) Thresholds and/or scores: both; 8) Numbers for thresholds: European Reference Intakes[3,4] and FDA daily values(5) for primary thresholds (secondary are decided pragmatically).

To evaluate the NS, food logs recorded by eligible app users (18–70 years, 45–250 kg, 150–250 cm, meals recorded for at least 15 days in August 2024) were selected. Each log was scored (Optimal, Good, Fair or Low) and given a list of nutrient claims using the NS algorithm. From this we assessed the distribution of scores. Users acceptability of the NS was measured by calculating an average of 1–5 star ratings received.

During August 2024, 213,525 app users logged 5,593,617 meals each accompanied by a NS. Among those, 52,541 users logged meals for at least 15 days during August 2024: 3,650,833 meals in total. Median share (IQR) of Optimal, Good, Fair and Low meal scores was 14.5 (7.8–22.8)%, 48.7 (39.3–57.4)%, 19.2 (10.8–28.6)% and 2.6 (0.0–6.0)%. From 116,822 star ratings, the average rating was 4.5/5, and 67.3% of ratings scored 5/5.

WHO Nutrient Profiling was effectively used to develop a NS for an app, reflecting nutritional quality and receiving positive user acceptability. Further research is required to assess its association with WL and improvement in dietary adequacy.

References

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