Design and Development of a Food Composition Database for Use in an AI-based Mobile Phone App Prototype to Track Diets among Adolescents in Sri Lanka

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Rationale/Objectives

- Adolescents are at high risk for health inequities due to their unfavorable dietary practices (Ruiz et al., 2019).
- In order to develop healthy eating practices and better food choices, more approachable ways are required to collect dietary data from adolescents.
- Although there are several traditional methods for dietary assessment, those are time-consuming, are not reliable and have complex protocols.
- As mobile phones and devises are widely used by adolescents of varied demographics, they can be used to influence dietary patterns and collect dietary data from adolescents.
- The aim of this study was to develop a food composition database to calculate the food groups and nutrient intakes of the users.
- Hence, development of a mobile phone app prototype to collect dietary data using artificial intelligence (AI)-based image recognition of food, provide feedback, and motivate adolescents in Sri Lanka to make healthier food choices is in progress.

Method

Identification of priority food list

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Compilation of nutrient composition values for individual raw and processed food items

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Recipe calculation - Estimate nutrient composition of multi-ingredient foods

Raw ingredient weights → **Preparation of the recipe** → **Final weight of the cooked food**

Calculation of weights of the raw ingredients present in 100g of cooked food ← **Foodbase 2000 (Institute of Brain Chemistry, UK) software analysis**

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Final nutrient composition of the recipe

Table 1 - Nutrient composition of commonly consumed Sri Lankan foods

Food item	Energy (Kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Fibre (g)	Starch (g)	Total sugar (g)	Calcium (mg)	Magnesium (mg)	Sodium (mg)	Potassium (mg)
BEANS, CURRY, W/COCONUT MILK	131	2.9	10.9	5.7	2.8	1.7	3	50	25.5	483	225
BEANS, TEMPERED	118	2.4	10.1	4.5	3.5	1.6	2.6	63	32.4	883	333
BEEF, CURRY, W/O COCONUT MILK	109	13.3	4.7	3.5	0.8	1	0.5	38	32	874	327
BEEF, STIR FRIED	680	38.5	58.4	0	0	0	0	10	53.7	3043	750
BEET ROOT, TEMPERED	80	1.3	7	3.2	0.1	0.9	1.9	14	17.6	427	147
BEETROOT, CURRY, W/COCONUT MILK	185	3.7	15	9.4	0.7	3.1	5.5	32	37.1	742	304
BENGAL GRAM DHAL (VATANA), CURRY, W/COCONUT MILK	186	7.7	10.3	16.6	0.6	12.6	1.7	28	42.5	547	321
BITTER GOURD, DEEP FRIED, SALAD	228	3.8	19	11.2	4.7	1	2.4	81	46.5	2709	628
BITTERGOURD, TEMPERED	187	3	16.1	8.1	3.8	0.4	1.6	70	33.9	977	442
BRINJAL, CURRY, W/COCONUT MILK	83	2.1	6.2	5.1	0.4	1.8	1.7	26	24.1	601	232
BRINJAL, MOJU	514	4.3	49.8	12.9	0	2.6	7.3	37	45	815	484
CABBAGE LEAVES, MALLUM	58	5.9	1.6	5.3	4.6	2.8	0.5	267	77.1	1144	474
CABBAGE LEAVES, TEMPERED	101	4	7.7	4.1	3.1	1.8	0.6	182	52	629	326
CANNED FISH, ADDED WITH ONION, TEMPERED	210	10.3	16.3	6	1	1.2	2.2	44	32.5	620	280
CANNED FISH, CURRY, W/COCONUT MILK, TEMPERED	235	10.4	19	6	0.8	1.5	2.5	44	32.7	552	252
CAPSICUM, TEMPERED	142	4	12.4	4	0.7	0.4	1.6	29	22	930	220
CARROT, CURRY, W/COCONUT MILK	141	2.9	11.1	7.9	0.7	2.1	4.1	45	24.2	811	274
CARROT, SALAD, W/SCRAPED COCONUT, RAW	118	3.3	9.1	6	0	1	3.9	29	24.9	619	266
CARROT, SALAD, W/TOMATO	35	2.2	0.5	5.7	0	1.4	3	32	21.8	1088	260
CASHEW, CURRY, W/COCONUT MILK	476	13.2	39.1	19.1	0.7	13.4	3.4	37	198.2	457	433

Results

- Excel spread sheet of food database was developed for about 160 individual and multi-ingredient foods.

Implications

- Generated nutrient composition data will be fed into the backend of the mobile phone app
- Validated mobile app will provide feedback and motivate users to make healthier food choices.

References

Ruiz LD, Zuelch ML, Dimitratos SM, Scherr RE. Adolescent Obesity: Diet Quality, Psychosocial Health, and Cardiometabolic Risk Factors. Nutrients. 2019 Dec 23;12(1):43. doi: 10.3390/nu12010043. PMID: 31877943; PMCID: PMC7020092.