Progress in Nutrition 2023; Vol. 25, N. 1: e2023013 DOI: 10.23751/pn.v25i1.12660

Original article

Designing and validation of an instrument for the assessment of dietary habits, physical activity, sun exposure and sleeping patterns among community-based Saudi adults

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Abstract. *Background and aim:* Prevalence of diet-related diseases has risen rapidly. Changes in certain life-style factors (dietary habits, physical activity, sun exposure and sleeping patterns) are the key to understanding these diseases. Most of previous research studies investigated these factors separately and hence any inter-relationships that may exist among these factors is not much clear due to lack of a comprehensive instrument that determine these factors at a time in a collective manner. Therefore, the aim of this study was to design and validate an instrument that assess these life-style factors in a comprehensive way. *Methods:* The design and validation of the instrument were carried out in four distinct phases: a) literature review and existing instruments; b) design of the instrument c) sample selection of experts (N = 14); and d) quantitative (Likert-type scale from 1 to 5) and qualitative assessment of degree of relevance of each of the 36 items included in the instrument. Aiken's V coefficient was used to determine content validity. Likewise, internal consistency was calculated using Cronbach's α coefficient. *Results:* The final questionnaire had 4 parts to cover data on dietary habits, physical activity, sun exposure and sleeping patterns. The questionnaire was also greatly improved by the qualitative comments of the experts, which were incorporated. For most of the items, the results showed demanding levels of validity (V ≥ 0.76), internal consistency (α= 0.915), and inter-rater, and intra-rater reliability. *Conclusion:* Therefore, it is a valid and reliable instrument that makes possible a complete assessment of dietary intake, physical activity, sun exposure and sleeping patterns in adult Saudi population.

Key words: content validity, dietary habits, physical activity, sun exposure, sleeping patterns

Introduction

Many public health recommendations and clinical guidelines emphasize the importance of healthy lifestyles. Components of a healthy lifestyle include all those activities that directly or indirectly affect the human life in positive ways. Nutrition is an important component of a healthy lifestyle. Epidemiologic studies demonstrate that following a healthy lifestyle has substantial health benefits (1,2). Research studies have found that a healthy lifestyle is significantly correlated with health maintenance and disease prevention (3-6).

Individuals greatly differ in their lifestyle behaviors (3). Lifestyle can be defined as a person or group's way of living, such as specific behaviors or habits. The World Health Organization's guidelines suggest that a healthy lifestyle can reduce the risk of preventable health problems and improve one's quality of life (4). A healthy lifestyle entails conscious efforts on part of the individual to effectively protect one's health and

the health of others (5). Healthcare professionals advise patients about the importance of a healthy lifestyle and its role in disease prevention and recovery. Moreover, various health-related articles have also posited that a healthy lifestyle plays a crucial role in averting the development of lifestyle diseases (6-9).

Dietitians and nutritionists can effectively advise patients about the importance of a healthy lifestyle, either individually or as a part of a health professional team. Most patients believe that it is necessary for them to have a therapeutic relationship with dietitians and nutritionists and to speak to them about a healthy lifestyle. Moreover, they consider dietitians and nutritionists to be their role models since they promote the health and wellbeing of their patients through nutrition prescription (7). Patients also believe that dietitians and nutritionists should advise them about various personal health-related behaviors. Therefore, dietitians and nutritionists require a broad array of knowledge and skills that extend beyond traditional notions of diet therapy. In order to ensure that diet therapy yields effective outcomes, first-line interventions must not only adopt the traditional approaches (e.g., nutrition prescription) but should also promote a healthy lifestyle (8). Individual physical activity levels, outdoor time, sleeping habits and other related factors which comprise of the patient's nutritional status and other healthy behaviors, should be assessed during the first and follow-up visits. However, healthy lifestyle related factors have not been assessed primarily due to the following reasons: lack of time, limited knowledge and expertise, traditional beliefs about the dietitians and nutritionists' role (i.e., that assessing health-related factors is not a dietitians and nutritionist's responsibility), and patients' lack of interest in changing their unhealthy lifestyles (9). Additionally, whereas dietitians and nutritionists in the community rely heavily on their tacit and professional subject-matter knowledge, they often ironically believe that these skills do not pertain to dietary therapy (10).

There is sufficient evidence to show that healthy lifestyle changes are needed to prevent prevailing diseases like obesity and diabetes, for example, or improve functional limitations. However, previous assessment tools have primarily dealt with only limited aspects of a healthy lifestyle, such as nutrition, exercise, and mindfulness (9-12). There is lack of a lifestyle tool that includes information about a broad aspect of healthy lifestyle choices that could be completed in a relatively short period of time. The purpose of a screening tool is to guide and provide effective lifestyle advice based on the result of a healthy lifestyle in a timely manner. Most of the studies found in the literature have focused on the health and lifestyle behaviors in Europe and North America. Very limited information exists in the literature about the health and health behaviors of adults in the Kingdom of Saudi Arabia or other Arab countries. Historically, research on the nutritional status has centered on undernutrition in disadvantaged sections of the population. Studies from the Saudi Arabia have assessed food consumption patterns (11-20), but have not included the development of monitoring and assessment tools for lifestyle behavior modifications into their research model. Therefore, the purpose of this study was to develop a valid and reliable screening tool to measure healthy lifestyle among adults.

Methods

Research Design

This study employed a methodological design to develop the Healthy Lifestyle Screening Tool (HLST) to evaluate Healthy Lifestyle among young adults. The validity and reliability of the HLST were established in accordance with DeVellis' guidelines (2016) (12) for tool development. In order to generate items for the questionnaire, a review of the literature and a qualitative study were conducted to form the concept of a healthy lifestyle for adults Saudis.

A. Review of the literature: A purposeful electronic search was carried out using 'PubMed' search engine and the 'Science Direct' portal. Articles with keywords including healthy lifestyle, adults, dietary habits, food frequency, sleeping habits, sun exposure, physical activity were retrieved in order to develop the concept and to generate items for the questionnaire.

B. Qualitative study: Semi-structured interviews were conducted to elucidate determinants of healthy

life style among adults as perceived by experts and adult people. In doing so, experts (academicians, dietitians, and nutrition researchers) and adult students (3 each male and female) aged 20 – 40 shared and discussed their experiences on strategies to maintain and improve overall lifestyle for good health among adult Saudis. Purposive sampling with maximum variance (age, marital status, education, socio-economic backgrounds and living conditions) was used to choose adult participants living in different parts of the Riyadh city, Saudi Arabia.

Item pool Generation

A total of 82 items were generated from the literature review. Of these, most (71) items were derived from the literature review, while the remaining items were derived from interviews with experts and adult individuals. These items were divided among five themes health condition and satisfaction with body image, dietary habits, physical activity, sun exposure and sleeping pattern. The items were preceded by 15 demographic and case coding questions including age, gender, occupation, educational level, place of residence of the subject.

Formation of an expert panel

For selection of a panel of Saudi experts for content validity, the inclusion criteria set by the research team were: i) to have a master/PhD in nutrition sciences; ii) to have a university degree majoring in nutrition/dietetics; iii) to have a license as a dietitian; iv) to have at least 5 years' experience; and v) to have publications in clinical nutrition, nutrition, public health etc. Candidates who met at least 80% of the inclusion criteria were classified as experts. This procedure was used in previous studies e.g. Ibáñez et al., 2019 (13). Initially, collaboration was requested from 32 experts, who had to fulfil at least 4 of the 5 (80%) of the inclusion criteria but finally, a panel of 14 Saudi experts who provided the information was selected. None of the experts received any gratuity for their participation, as their contributions were totally voluntary.

Quantitative Analysis

After revising the 82 questionnaire items as well as the 15 demographic and case coding questions in both in text and technical format, they were uploaded in an electronic form using the Microsoft forms hosted by the King Saud University (KSU). Due to the limited capacity of questions allowed by the Microsoft forms and a long nature of some questions related to the food frequency, the electronic questionnaire was divided into three parts as shown in table 1. At the end of each of the first and second part, there was a link to access to the next part.

Each member of the expert panel was asked to give a score to each of the 82 questionnaire items ranging from 1 to 5 (1 – highly irrelevant, 2 – moderately irrelevant, 3 – neutral, 4 – moderately relevant, and 5 – highly relevant). Their ratings were used to examine three content validity indices including Lawshe's content validity ratio (CVR), Aiken's V coefficient and Penfield's interval scores.

Statistical Analyses

The formula for computation of CVR is presented as follow (14).

CVR=the number of specialists who have checked option 4 and 5 – (the total number of specialists/2)/ the total number of specialists/2.

Aiken's V coefficient (Aiken, 1985) (15) was also used. This coefficient makes it possible to quantify the relevance of an item according to the opinion of a group of experts. Its value oscillates between 0 and 1, with the latter figure showing perfect agreement among the experts with regard to the contents evaluated. The score obtained with the calculation of this coefficient established which items should be eliminated, modified or acceptance. The algebraic equation modified by Penfield and Giacobbi (2004) (16) was used to calculate Aiken's V coefficient.

$(V=X^{-}–l/k)$--(1)

In this equation, X is the mean of the scores of the judges in the sample, l is the lowest possible rating, and k is the range of possible values of the Likert scale used minus 1.

The free Visual Basic 6.0 program (17) was used to obtain three factors: i) the range of evaluations (maximal evaluation-minimal evaluation); ii) Aiken's V coefficient; and iii) the confidence intervals of 90%, 95% and 99%, using the score method of Penfield and Giacobbi (2004) (25).

Once Aiken's V coefficient was calculated, it was necessary to establish the criteria for the elimination, modification or acceptance of the items. The exact critical value for the acceptance of Aiken's V was calculated using the initial formula proposed by Aiken (Aiken, 1985) (24), applying the central limit theorem for large samples (m > 25). The number of experts was 14 (n), the number of items 75 (m), with a response scale of 5–1 = 4 (c) and applying a 95% or 99% confidence level (z).

V=z/0.23mn(c – 1)(c+1)––––––––√+0.5V=z0.23 mn(c – 1)(c+1)+0.5 ……(2)

A confidence level of 95% was considered to obtain the exact critical value for accepting the items, resulting in a value of 0.77. Similarly, to obtain the cut-off point for the modification of the items a confidence level of 99% was considered, resulting in a value of 0.88. So that, all the items with lower values with a 95% confidence level (V < 0.77) were eliminated, the items with values between 95% and 99% (V = 0.77 and 0.88) were modified, and lastly the items with a confidence level of 99% (V > 0.88) were considered optimal (Table 2).

Results

The objective of content validity was to determine the degree to which the questionnaire was able to measure the intended concept under evaluation (ϑ). After identifying the five themes of a healthy lifestyle based on the existing literature, the primary item pool was generated with 82 items which were repeatedly revised and reduced to 75. These items were broadly classified into five themes, namely, health condition and satisfaction with body image, dietary habits, physical activity, sun exposure and sleeping pattern as shown in table 1.

As a result of item pooling and categorization, we developed a questionnaire (Healthy Lifestyle Screening Tool: the short for Saudi HeLiST-for adult Saudis; as shown in ARABIC in Annex 1). The initial questionnaire was developed in Arabic where the content validity was performed. The questionnaire was in an electronic form in three parts which was proceeded by 15 demographic and case coding questions including age, gender, occupation, educational level, place of residence of the subject. The other 75 items were distributed among five themes; health condition and satisfaction with body image (3 items), dietary habits (53 items), physical activity (4 items), sun exposure (9 items) and finally sleeping pattern (6 items).

Given that there were 14 experts (N = 14), the cut-off value of CVR in this study was estimated at 0.15 (at p = 0.05). As indicated in Table 1, all of the questionnaire items in the five themes were higher than the cut-off value.

Table 2 presents the obtained results after the calculation of Aiken's V coefficient and its confidence intervals of 95% and 99% of the items that make up the validation instrument. The values obtained suggest excellent content validity. It was not necessary to eliminate any item, as they presented values equal to or above 0.77 in the aspects of pertinence. In general, a confidence level of 95% was considered to obtain the exact critical value for accepting the items, resulting in a value of 0.77. Similarly, to obtain the cut-off point for the modification of the items a confidence level of 99% was considered, resulting in a value of 0.88. So that, all the items with lower values with a 95% confidence level (V < 0.77) were eliminated, the items with values between 95% and 99% (V = 0.77 and 0.88) were modified, and lastly the items with a confidence level of 99% (V > 0.88) were considered optimal.

Table 3 presents some of the qualitative evaluations issued by the experts and the action taken to improve the tool, as an example. The values obtained for the internal consistency of the validation instrument using the calculation of Cronbach's αcoefficient are shown in Table 4. When considering the reliability of new instruments, values of over 0.90 are considered excellent (18).

Table 1. Content validity through Lawshe's CVR

Questionnaire					CVR
Part #	**Q#**	**Q code**	**Questions**	**Theme**	
	1	P1-16	Are you satisfied with your body shape/size?	Health condition and satisfaction with body image	0.571
	2	P1-17	Do you have any health problems?		0.571
	3	P1-18	If you have any health problem, please mention it.		0.714
	4	P1-19	How many meals do you usually eat during the day? (don't count snacks)	Dietary habits	0.571
	5	P1-20	In which of your main meals do you usually eat the largest amount of carbohydrates?		0.857
	6	P1-21	In which of your main meals do you usually eat the largest amount of protein?		0.714
	7	P1-22	In which of your main meals do you usually eat the largest amount of lipids?		0.714
	8	P1-23	Do you eat breakfast regularly?		0.571
	9	P1-24	Do you sleep after eating a main meal (2 hours or less apart)?		0.571
	10	P1-25	If you sleep after eating a main meal (2 hours or less apart), mention the meal and its eating time.		0.429
	11	P1-26	Does your desire to eat certain foods wake you up or cause insomnia?		0.429
	12	P1-27	If your desire to eat certain foods wake you up or cause insomnia, mention these foods.		0.429
One	13	P1-28	Do you eat snacks?		0.714
	14	P1-29	If you eat snacks, how many snacks do you eat during the day?		0.714
	15	P1-30	If you eat snacks, list all snacks you usually consume?		0.571
	16	P1-31	Do you follow a specific diet?		0.714
	17	P1-32	If you follow a specific diet, what is the reason?		0.429
	18	P1-33	If you follow a specific diet, mention for how long you have been following it?		0.571
	19	P1-34	If you follow a specific diet, write the reason.		0.714
	20	P1-35	Frequency consumption of milk and milk products		0.571
	21	P1-36	Frequency consumption of milk and milk products (cont.)		0.286
	22	P1-37	Frequency consumption of Fruits		0.714
	23	P1-38	Frequency consumption of Fruits (cont.)		0.571
	24	P1-39	Frequency consumption of vegetables		0.714
	25	P1-40	Frequency consumption of vegetables (cont.)		0.143
	26	P2-5	Frequency consumption of meat, poultry, fish, and eggs		0.429
	27	P2-6	Frequency consumption of meat, poultry, fish, and eggs (cont.)		0.429
Two	28	P2-7	Frequency consumption of mixed dishes		0.429
	29	P2-8	Frequency consumption of mixed dishes (cont.)		0.429
	30	P2-9	Frequency consumption of Sandwiches and snacks		0.571

Table 1. Content validity through Lawshe's CVR

Questionnaire					CVR
Part #	**Q#**	**Q code**	**Questions**	**Theme**	
Two	31	P2-10	Frequency consumption of Sandwiches and snacks (cont.)	Dietary habits	0.429
	32	P2-11	Frequency consumption of baked goods, sweets, and starches		0.571
	33	P2-12	Frequency consumption of juices and drinks		0.429
	34	P2-13	Frequency consumption of juices and drinks (cont.)		0.286
	35	P2-14	what is the average number of water glasses/cups (250 ml), do you usually drink daily?		0.714
	36	P2-15	What is the temperature of the water you prefer to drink?		0.571
	37	P2-16	Do you think that the amount of water you drink daily is enough to maintain your health and prevent kidney stones?		0.571
	38	P2-17	How do you usually drink water? One big sip or shot, 2,3, or 4 sips		0.571
	39	P2-18	In what position do you usually drink water? Sitting on a chair, Sitting on knees, Standing or Walking		0.857
	40	P2-19	When do you usually drink water? When I start to feel thirsty/ When I feel very thirsty/Continuously regardless if I feel thirsty or not.		0.714
	41	P2-20	Frequency of water consumption during the following conditions; immediately before eating, while eating, immediately after eating, before sleeping, after waking up, before showering		0.571
	42	P2-21	Frequency consumption of desserts		0.571
	43	P2-22	Frequency consumption of desserts (cont.)		0.714
Three	44	P3-5	Frequency consumption of nuts and seeds		0.857
	45	P3-6	Do you use artificial sweeteners?		0.857
	46	P3-7	If you are using an artificial sweetener, please mention its name.		0.571
	47	P3-8	Do you use nutritional supplements such as vitamins or proteins?		0.714
	48	P3-9	In case of using nutritional supplements, please mention their type.		0.857
	49	P3-10	Do you add butter, ghee, margarine (vegetable butter) or oils on bread?		0.857
	50	P3-11	In the case of adding butter, margarine (vegetable butter), ghee or oils on bread, how many teaspoonful do you add daily?		0.714
	51	P3-12	Do you add sugar to tea, coffee, corn flakes or something else?		0.714
	52	P3-13	If you add sugar, mention its type (white, brown, ..etc.).		0.714
	53	P3-14	In case of adding sugar: how many teaspoonful do you add daily?		0.857
	54	P3-15	Frequency consumption of fats and oils		0.714
	55	P3-16	Is salt added during cooking of your foods?		0.571
	56	P3-17	Do you add salt to foods before eating?		0.571

Table 1. Content validity through Lawshe's CVR

Questionnaire					CVR
Part #	**Q#**	**Q code**	**Questions**	**Theme**	
Three	57	P3-18	How often do you do the following activities for at least 30 minutes at a time? Light sport such as walking, housework/ Moderate sport such as brisk walking, swimming, cycling or farm work/ Vigorous sport such as running, playing ball, or strenuous work.	Physical activity	0.857
	58	P3-19	Are you satisfied with the level of your physical activity?		0.714
	59	P3-20	Do you exercise due to a specific health problem?		0.714
	60	P3-21	Do you exercise two hours or less after eating a main meal?		0.571
	61	P3-22	Do you expose yourself to the sunlight?	Sun Exposure	0.571
	62	P3-23	Is there a benefit from exposure to sunlight?		0.571
	63	P3-24	What is the benefit of exposure to sunlight?		0.429
	64	P3-25	How long have you been exposed to the sun during the past week (on average)?		0.286
	65	P3-26	What time do you usually expose yourself to the sunlight?		0.714
	66	P3-27	Do you expose your body directly to the sunlight (without barriers even window glass)?		0.571
	67	P3-28	Do you apply a specific cream or Lotion on the skin before exposing yourself to the sunlight?		0.286
	68	P3-29	How do you expose yourself to sunlight? Fully dressed (including veil for females), fully dressed with uncovered body parts e.g. face, hands, feet, part of arms or legs, wearing sportswear that exposes most of the leg and arm.		0.714
	69	P3-30	Are you satisfied with your level of exposure to sunlight?		0.714
	70	P3-31	How many hours on average do you sleep at night?	Sleeping pattern	0.571
	71	P3-32	What is the time period do you usually spend during your sleep?		0.714
	72	P3-33	What is the average time (in minutes) do you usually spend from going to bed till falling asleep?		0.571
	73	P3-34	Do you take a nap?		0.429
	74	P3-35	If you take a nap, how long is the average of your nap?		0.571
	75	P3-36	If you take a nap, what is the time period do you usually take the nap?		0.571

Table 2. Indexes of content validity (Aiken's V) and CI of 95% and 99% in the aspects of pertinence of the newly developed tool

Questionnaire				Rating Frequency					Aiken's V	95% CI		99% CI	
Part #	Q#	Q code	Theme	1	2	3	4	5		Lower Limit	Higher Limit	Lower Limit	Higher Limit
One	1	P1-16	Health condition and satisfaction with body image	0	0	3	7	4	0.768	0.738	0.808	0.747	0.828
	2	P1-17		0	2	1	3	8	0.804	0.774	0.844	0.783	0.864
	3	P1-18		0	0	2	4	8	0.857	0.827	0.897	0.836	0.917
	4	P1-19	Dietary habits	0	1	2	4	7	0.804	0.774	0.844	0.783	0.864
	5	P1-20		0	1	0	6	7	0.839	0.809	0.879	0.818	0.899
	6	P1-21		0	1	1	6	6	0.804	0.774	0.844	0.783	0.864
	7	P1-22		0	1	1	8	4	0.768	0.738	0.808	0.747	0.828
	8	P1-23		0	0	3	2	9	0.857	0.827	0.897	0.836	0.917
	9	P1-24		0	1	2	4	7	0.804	0.774	0.844	0.783	0.864
	10	P1-25		0	1	3	4	6	0.768	0.738	0.808	0.747	0.828
	11	P1-26		0	1	3	4	6	0.768	0.738	0.808	0.747	0.828
	12	P1-27		0	1	3	4	6	0.768	0.738	0.808	0.747	0.828
	13	P1-28		0	0	2	5	7	0.839	0.809	0.879	0.818	0.899
	14	P1-29		0	1	1	3	9	0.857	0.827	0.897	0.836	0.917
	15	P1-30		0	1	2	5	6	0.786	0.756	0.826	0.765	0.846
	16	P1-31		0	0	2	4	8	0.857	0.827	0.897	0.836	0.917
	17	P1-32		1	0	3	5	5	0.732	0.702	0.772	0.711	0.792
	18	P1-33		0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	19	P1-34		0	1	1	4	8	0.839	0.809	0.879	0.818	0.899
	20	P1-35		0	1	2	3	8	0.821	0.791	0.861	0.800	0.881
	21	P1-36		0	1	4	2	7	0.768	0.738	0.808	0.747	0.828
	22	P1-37		0	1	1	4	8	0.839	0.809	0.879	0.818	0.899
	23	P1-38		0	1	2	3	8	0.821	0.791	0.861	0.800	0.881
	24	P1-39		0	1	1	2	10	0.875	0.845	0.915	0.854	0.935
	25	P1-40		0	2	4	2	6	0.714	0.684	0.754	0.693	0.774
Two	26	P2-5		0	1	3	3	7	0.786	0.756	0.826	0.765	0.846
	27	P2-6		0	2	2	4	6	0.750	0.720	0.790	0.729	0.810
	28	P2-7		0	0	4	3	7	0.804	0.774	0.844	0.783	0.864
	29	P2-8		0	0	4	2	8	0.821	0.791	0.861	0.800	0.881

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Questionnaire				Rating Frequency					Aiken's V	95% CI		99% CI	
Part #	Q#	Q code	Theme	1	2	3	4	5		Lower Limit	Higher Limit	Lower Limit	Higher Limit
Two	30	P2-9	Dietary habits	0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	31	P2-10		0	0	4	4	6	0.786	0.756	0.826	0.765	0.846
	32	P2-11		1	0	2	6	5	0.750	0.720	0.790	0.729	0.810
	33	P2-12		1	1	2	7	3	0.679	0.649	0.719	0.658	0.739
	34	P2-13		0	1	4	5	4	0.714	0.684	0.754	0.693	0.774
	35	P2-14		0	0	2	4	8	0.857	0.827	0.897	0.836	0.917
	36	P2-15		0	1	2	6	5	0.768	0.738	0.808	0.747	0.828
	37	P2-16		0	1	2	4	7	0.804	0.774	0.844	0.783	0.864
	38	P2-17		0	0	3	5	6	0.804	0.774	0.844	0.783	0.864
	39	P2-18		0	0	1	5	8	0.875	0.845	0.915	0.854	0.935
	40	P2-19		0	0	2	4	8	0.857	0.827	0.897	0.836	0.917
	41	P2-20		0	1	2	3	8	0.821	0.791	0.861	0.800	0.881
	42	P2-21		0	1	2	2	9	0.839	0.809	0.879	0.818	0.899
	43	P2-22		0	0	2	4	8	0.857	0.827	0.897	0.836	0.917
Three	44	P3-5		0	0	1	6	7	0.857	0.827	0.897	0.836	0.917
	45	P3-6		1	0	0	7	6	0.804	0.774	0.844	0.783	0.864
	46	P3-7		0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	47	P3-8		0	0	2	6	6	0.821	0.791	0.861	0.800	0.881
	48	P3-9		0	0	1	6	7	0.857	0.827	0.897	0.836	0.917
	49	P3-10		0	0	1	8	5	0.821	0.791	0.861	0.800	0.881
	50	P3-11		1	0	1	6	6	0.786	0.756	0.826	0.765	0.846
	51	P3-12		0	1	1	6	6	0.804	0.774	0.844	0.783	0.864
	52	P3-13		0	0	2	6	6	0.821	0.791	0.861	0.800	0.881
	53	P3-14		0	0	1	5	8	0.875	0.845	0.915	0.854	0.935
	54	P3-15		0	0	2	5	7	0.839	0.809	0.879	0.818	0.899
	55	P3-16		0	0	3	3	8	0.839	0.809	0.879	0.818	0.899
	56	P3-17		0	1	2	3	8	0.821	0.791	0.861	0.800	0.881
	57	P3-18	Physical activity	0	0	1	3	10	0.911	0.881	0.951	0.890	0.971
	58	P3-19		0	0	2	3	9	0.875	0.845	0.915	0.854	0.935
	59	P3-20		0	1	1	2	10	0.875	0.845	0.915	0.854	0.935
	60	P3-21		0	1	2	3	8	0.821	0.791	0.861	0.800	0.881

Table 2. Indexes of content validity (Aiken's V) and CI of 95% and 99% in the aspects of pertinence of the newly developed tool

Questionnaire				Rating Frequency					Aiken's V	95% CI		99% CI	
Part #	Q#	Q code	Theme	1	2	3	4	5		Lower Limit	Higher Limit	Lower Limit	Higher Limit
Three	61	P3-22	Sun Exposure	0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	62	P3-23		0	2	1	5	6	0.768	0.738	0.808	0.747	0.828
	63	P3-24		0	1	3	3	7	0.786	0.756	0.826	0.765	0.846
	64	P3-25		0	2	3	2	7	0.750	0.720	0.790	0.729	0.810
	65	P3-26		0	0	2	5	7	0.839	0.809	0.879	0.818	0.899
	66	P3-27		0	1	2	5	6	0.786	0.756	0.826	0.765	0.846
	67	P3-28		0	0	5	2	7	0.786	0.756	0.826	0.765	0.846
	68	P3-29		0	0	2	5	7	0.839	0.809	0.879	0.818	0.899
	69	P3-30		0	0	2	6	6	0.821	0.791	0.861	0.800	0.881
	70	P3-31	Sleeping pattern	0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	71	P3-32		0	0	2	7	5	0.804	0.774	0.844	0.783	0.864
	72	P3-33		0	0	3	4	7	0.821	0.791	0.861	0.800	0.881
	73	P3-34		1	0	3	4	6	0.750	0.720	0.790	0.729	0.810
	74	P3-35		0	1	2	5	6	0.786	0.756	0.826	0.765	0.846
	75	P3-36		0	0	3	7	4	0.768	0.738	0.808	0.747	0.828

Table 3. Qualitative evaluations issued by the experts

Qualitative evaluation	Action
E1: "Further clarify on water intake needed"	The question was rephrased to cover all fluids intake
E4: "Briefing and making some questions more clear"	Some long questions were shorten and more clear
E9: "Asking the subject in the heading of the question to write the meal/food they eat directly before sleeping and its time"	Rephrased
E8: "Adding flavored milk to the list of food items"	Added
E8: "Adding more options to some MCQ question"	More options were added

Table 4: Internal consistency of the items that make up the ABCQ

Statistic	Pertinence
n	75
alpha	0.886

carried out in nutrition a valid and reliable instrument to collect the data. The panel of experts that participated in the validation of the instrument showed an excellent understanding of the items and definitions as illustrated in the results in Tables 1-3. However, the study suffers from a number of limitations.

Among the limitations, it should be pointed out that the HLST has many assessment elements; and therefore, the coders are recommended to undergo a teaching-learning process to ascertain how it should be implemented before using it. The respondents need to be trained how to properly respond to each item of the questionnaire during studies where the questionnaire is used for actual data collection. This process will lead to a better use and recognition of nutrition and related lifestyle behaviors and is aimed at avoiding the uncertainty that the instrument may generate.

Conclusion

The values obtained in the validation process highlight that the HLST possesses a high degree of content validity and internal consistency, and it is thus valid and reliable for measuring comprehensively healthy lifestyle habits including dietary habits, physical activity, sun exposure and sleeping pattern. The strong point of the HLST, in comparison with the rest of the nutritional status assessment instruments is that it assesses various attributes of a healthy lifestyle. It also makes it possible to resolve specific research problems.

Acknowledgment: The authors would like to extend their gratitude to King Saud University, Riyadh, Saudi Arabia, for the funding of this research through Researchers Supporting Project number RSPD2023R716.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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