Development of a computer tailored nutrition application software on Cardio-vascular diseases

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ABSTRACT

Diabetes is India's number one disease making it as diabetic capital. It is therefore essential to condense its likelihood and the best way to do so is education. Only education can reduce the occurrence as well as can help in better management of the disease. Education helps the user in controlling the modifiable factors so that the risk can be reduced. With the help of present software user can understand different aspects of the diseases from theoretical as well as practical point of view. In practical side, user can create his/her profile and accordingly obtain results on BMI and health risk according to the waist hip ratio classification, similarly he/she can judge his/ her knowledge or risk in the disease so that he/ she can take preventive measures in future. Biochemical presentation shows disease status whether improving or declining with the help of diary maintenance. Tracking diet and activity are equally important so as to understand the concept of energy balance. The developed software was evaluated on different criteria by a panel of 18 experts on five point scale ranging from very good to very poor for most of the parameters and in majority of section, it secured the MWS above 4.61 *i.e.* which justifies the significance of the developed system.

Key words : Software, Users, Cardio vascular diseases

INTRODUCTION

"A healthy body is the guest chamber for the soul and a sick body is a prison".

Health is one of the fundamental human rights. Without health, life is deprived of much of its joy and pleasures. In order to know the ways of preserving and promoting health as well as preventing and trounceing diseases, it is rather necessary to understand the trio of health, nutrition and disease.

Progress in technological development, industrialization and economic conditions have in addition to increasing the standard of living of people created changes in food habits and lifestyle leading to health problems. The health problems that parallel economic development are largely those of chronic diseases such as cardio-vascular diseases, diabetes mellitus and cancer.

Cardiovascular disease is a complex and multifunctional diseases characterized by many factors such as high cholesterol, hypertension, increase in blood clotting time and increased platelet aggregation. No single factor is an absolute cause for coronary heart disease, many factors are interrelated and the extents to which they are present increase the risk to the disease.

New technologies like computer software provide opportunities to nutrition educators, to enhance communication efforts which can improve the health and well being of people everywhere. Computer technologies are providing viable means of exchanging nutrition information among professionals and informing and influencing the public.

MATERIALS AND METHODS

Step 1 : Locale of the study: Planning and development of the system was carried out at College of Home Science, Udaipur.

The study was conducted in two phases.
Phase I: Development of software
Phase II: Evaluation of the developed system

Phase I: Development of software: Software on cardio-vascular diseases was developed under the present study and it was named as "Trounce cardio-vascular diseases". It was developed in c= language. For the development of software the following steps were undertaken:

Preparation of manuscript for software development:

In order to develop target oriented and user friendly software it is essential to develop a strong conceptual baseline. For the purpose a complete knowledge of the subject is must and therefore information pertaining to the different areas of the project or diseases was collected from different literature sources. The information so collected was studied, analyzed critically, concised and accordingly categorized to prepare a content outline. The collected content was then segregated into different headings *i.e.* prevalence, types, symptoms, risk factors, complications, investigative values, role of diet and exercise in the management of the diabetes. The duly categorized matter was organized in a proper sequence, judged for its continuity, edited for errors and finally placed under respective disease section and suitable modules were prepared covering information in various aspects of diseases.

Development of "Trounce cardio-vascular diseases":

Planning and development of Trounce cardio-vascular diseases was carried out at College of Home Science, Udaipur. The software was developed with the finally developed manuscript using Microsoft Visual Studio 2005 and database was developed using Microsoft Access. Knowledge and risk assessment tools developed by Paliwal (2010) were utilized in the software to assess the knowledge and risk of the users in cardio-vascular diseases.

The software was divided into 7 sections:

Section I: Create Profile section: In this section, user can create his own profile by entering information in various fields *viz.,* name, age, sex, height, weight, waist circumference, hip circumference and accordingly the designed software provide the results on BMI, WHR and health risks associated with the user's indices.

Section 2: Risk assessment section: Here user (may or may not be the patient of the cardio-vascular diseases) can assess his /her risk to the cardio-vascular diseases with the help of developed risk assessment tools.

Section 3: Knowledge assessment section: In this section, user can assess the knowledge in disease with the help of knowledge assessment tools developed by the

investigator covering every important dimension (general facts, prevalence, etiology, role of diet and exercise) in the management of the diseases.

Section 4: Biochemical profile/ Biophysical profile section: In this section, user can assess his disease status with that of normal standard levels with the help of graphical presentations. Graphical presentation helps to comprehend the disease progress made so far by the user. In this section, user can also maintain diaries of his biochemical profile levels so as to monitor the progress in long run.

Section 5: Intake calculator section: This section provides data on dietary intake of the subjects in terms of macro-micro nutrients *viz.,* energy, protein, fat, carbohydrate, thiamine, riboflavin, niacin, vitamin C, sodium and accordingly on the basis of present body weight or target body weight, software also provides information on daily nutrient requirement of the subject so as to achieve the target body weight or maintain the present weight. A database of 600 recipes commonly consumed people was prepared by the investigators in Microsoft Access using information from different sources (books, manuals, market survey of packed food items and dissertations and those prepared by the investigators).

Section 6: Activity calculator: In this section user can estimate his/her whole day energy expenditure by selecting various activities conducted by him/her in 24 hours period with duration, accordingly, the software calculates the energy expenditure. In addition, energy balancer facilitates the user to balance the input energy of the selected recipe with that of the selected activity (output energy).

Section 7: About disease section: This section is the theoretical side of the software, here user getS information about disease, types, etiology, role of diet and exercise in the management of the disease, myths and facts.

Phase II: Evaluation of the software:

Panel of 18 experts from various fields were invited to rate the content, continuity, sequence, graphical presentations, video-sound, visual quality, pictorial presentations, language, relevance to topic, calculations, practical utility and overall presentation of each disease.

Panel members included- 6 nutritionists, 6 dieticians, 3 patients and 3 doctors. Patients were included in the team of experts so as to obtain suggestions form their practical point of view as they were the true sufferers.

Based on the pertinent parameters a suitably structured evaluation sheet was developed. Scoring of the trounce cardio-vascular diseases was done separately for content, continuity, graphical presentation, video-sound, visual quality, pictorial presentation and overall presentation

of each disease on five point scale ranging from very good to very poor (5- very good, 4- good, 3- average, 2- poor, 1-very poor); for language and practical utility, the five point scale ranged from very simple to very difficult and totally adequate to totally inadequate, respectively and lastly calculations were ranked on 2 point scale (2- clear and 1 unclear).

Improvisation and finalization:

The suggestions obtained from different members of the panel of experts were put together and penned down on a piece of paper. After assertion the CD was made for its permanency and easy handling.

Statistical analysis:

Mean weight score (MWS): For each aspect, the frequency falling under each rating *i.e.* very good, good, average, poor and very poor were tabulated, then the frequency in each of the category were multiplied by the assigned scores *i.e.* 5,4,3,2,1, respectively and added. The resulting sum for each aspect was divided by the total noumber of respondents. Thus, in this way, the MWS in each aspect were calculated.

RESULTS AND DISCUSSION

Software so developed on cardio-vascular disease was evaluated in two parts on the basis of different criteria in Part I subject matter, continuity, graphical presentation, video-sound and visual quality were judged for different sections of the system.

In Part II Pictorial presentations, language, relevance to topic, calculations and practical utility and overall presentations were judged.

Table 1 portrays the MWS rating of experts in view of Part I criteria. Experts rated the create profile section with MWS of 4.77 which indicated that the subject matter in the section was very good. Overall the knowledge assessment section was rated with mean weight score of 4.5 which can be rated in between good to very good. Data in Table 1 also indicate that the MWS of biophysical/

biochemical section and intake calculator section was 4.61 which placed the content of the two sections in very good category. The content of the last theoretical section *i.e.* about disease section was rated with overall MWS of 4.72. As apparent from observations given in Table 1, the continuity of the create profile section was grouped under the very good category with the MWS of 4.77. MWS of the 4.61 was held by activity calculator section. Risk assessment, biochemical or biophysical, intake calculator, about disease sections secured the MWS of 4.77, 4.55, 4.72 and 4.72, respectively which shows that the content of all these sections was under very good category. MWS besides these two criteria, indicate that graphical presentation of biochemical/ biophysical and intake calculators were very good with MWS of 4.77 and 4.61, respectively. The overall MWS was 4.77 and 4.72 of about disease section in view of video-sound and visual quality seize it at very good position.

As can be seen in Table 2, the MWS of diet and activity calculator sections in view of pictorial preesentations was 4.77 and 4.83, respectively. The language aspect of majority of the sections was given a MWS of 4.66. Relevance to topic obtained the MWS of 4.88, 4.83, 4.94, 4.72, 4.72, 4.77 and 4.61 in create profile, risk assessment, knowledge assessment, biochemical/ biophysical, intake calculator, activity calculator and about disease sections, respectively. MWS of 4.94 was achieved by create profile, biochemical /biophysical and activity calculator section which shows that the practical utility of all the above mentioned sections was totally adequate. MWS count of =4.83 confirmed that the overall presentation of all the seven sections was very good.

Looking to the range of scores attained *i.e.* in between 4.2 to 5 (good to very good) in most of the sections of the three diseases, it can be concluded that IDMS so developed on diabetes, osteoporosis and cardio-vascular diseases was found close to the point of perfection and hence it is optimum for its wider application and use.

Goswami (2009) conducted a study to assess the impact of audio-visual aid on knowledge gain of the

Sr. No.	Sections	Subject matter	Continuity	Graphical presentation	Video sound	Visual
1	Create profile	4.77	4.77	-	-	-
2.	Risk assessment	4.61	4.77	-	-	-
3	Knowledge assessment	4.5	4.61	-	-	-
4.	Biochemical/ Biophysical	4.61	4.55	4.77	-	-
5	Intake calculator	4.61	4.72	4.61	-	-
6	Activity calculator	4.66	4.61	-	-	-
7	About disease	4.72	4.72	-	4.77	4.72

Table 1: MWS rating of Part I of cardio-vascular disease

Sr. No.	Sections	Pictorial presentations	Language	Relevance to topic	Calculations	Practical utility	Overall presentation
	Table 2 : MWS rating of Part II of cardio-vascular disease						
1.	Create profile	-	4.72	4.88	2	4.94	4.83
2.	Risk assessment	-	4.72	4.83	-	-	4.94
3.	Knowledge assessment	-	4.61	4.94	-	-	4.83
4.	Biochemical/ Biophysical	-	4.66	4.72	-	4.94	4.94
5.	Intake calculator	4.77	4.66	4.72	2	4.77	4.94
6.	Activity calculator	-	4.66	4.77	2	4.94	4.83
7.	About disease	4.83	4.66	4.61	-	-	4.83

overweight/ obese children. The aid was got evaluated by a panel of 10 experts from the filed of nutrition on the basis of different parameters *viz.,* visual quality, sound, content, organization, continuity, authenticity and vocabulary. Credibility of the authenticity and vocabulary of the developed aid was established on getting full scores (5). Organization and continuity of its presentation also received 4.9 scores. Scores on visual quality (4.6) and content (4.7) reveals high satisfaction levels of judges. General rating so obtained was 4.7 which apparently showed that the aid was excellent.

Nutrition software namely, Diet Master 2100, Nutrinote, Diet Power, Kathleen's Diet Planner, Diet Organizer, Fit Day, Be Nutrifit, Diet Pro, Meal Information and Do-It are the top ten nutrition softwares developed by different researchers. These all softwares were together rated on different features *viz.*, ease of use, diet management, general nutrition features and help criteria. They were rated on 0-4 point scale from poor to excellent. Majority of the softwares were rated in between 2-4, Do-It obtained the least score of 2, whereas Diet Master 2100 obtained a highest score of 4 which portray it in excellent category. These software were able to evaluate the food intake, track progress of individual in regard to weight, diet, exercise and body fat goal (www. nutritionsoftwarereviews.toptenreviews.com , 2010).

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