The Application Of A Weight Management System

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Abstract: The objective of this project is developingthe application of weight management for adults between 20 – 60 years. This application utilizes a computer analysis of a,body mass index, basal metabolic rate, body fat percent, heart rate, exercise level and taste preferences to provide a menu of a specified number of calories to maintain a reasonable weight. The system provides consultation with a dietitian in order for a participant to recognize the deficiencies in the past diet. The system further provides consultation to effect behavior modification of the participant by offering instruction in nutrition.

Key words: Weight, Management Information System

INTRODUCTION

The present invention is directed to the application of a weight management system which educates the participant in nutrition and in developing a lifestyle necessary to reach and consistently maintain one's weight. More particularly, the invention provides an analysis of physical parameters, past eating, exercise habits and taste preferences determine an individualized weight control program. It is well known that a large percentage of the population is overweight.Otherwise, itis likely to be overweight and constantly trying to lose weight by experimenting with various diet programs to reduce their caloric and carbohydrate intake. Moreover to diet programs, there are numerous dietetic foods, drugs, weight reduction programs and machines offered to aid people in reducing their weight.Maintaining a reasonable balance between the caloric intake and the energy expended during the day is necessary in order to lose weight and continue a constant weight.

Currently, different departments in the healthcare center have their own separated systems, leading to the lack of communications and the inefficient data sharing. For example, the finance department uses simple EXCEL spreadsheets to record the paycheck information of the employees which is inconvenient to retrieve and update employees' information; in the clinical department, the doctors have to write down the prescriptions for the patients and keep paper documents, and also do not have any information about the patients' insurance plans. By reason of these disadvantages of the current system, a weight management systemis proposed. A weight management system is a database management system (DBMS), which is based on a personal computer, using the relational database technology to construct, maintain, and manipulate various kinds of data in a database system (DBS).The DBMS can track and update all the information of recorded users in the healthcare center during a particular time span. The major advantages of the DBMS are easy to retrieve and update information.

BODY MASS INDEX (BMI)

Assessment of a patient should include the evaluation of body mass index (BMI), waist circumference,and overall medical risk. To estimate BMI, multiply the individual's weight (in pounds) by 703, then divide by the height (in inches) squared. This approximates BMIin kilograms per meter squared(kg/m2).[1][2] There is evidence to support the use of BMI in risk assessmentsince it provides a more accurate measure of total body fat compared with the assessment of body weight alone.

Neither bioelectric impedance nor height-weight tables provide an advantage over BMI in the clinical management of all adult patients, regardless of gender. Clinical judgment must be employed when evaluating very muscular patients because BMI mayoverestimate the degree of fatness in these patients. Therecommended classifications for BMI, adopted by the Expert Panel on the Identification, Evaluation, andTreatment of Overweight and Obesity in Adults and endorsed byleading organizations of health professionals, are shown in Table 1.

Table 1: Classifications for BMI

Category	BMI
Underweight	<1835 kg/m^2
Normal weight	18.5 – 24.9 kg/m^2
Overweight	25 – 29.9 kg/m^2
Obesity (Class 1)	30 – 34.9 kg/m^2
Obesity (Class 2)	35 – 39.9 kg/m^2
Extreme Obesity (Class 3)	≥ 40 kg/m^2

The BMI can be obtained from the following equation:

Weight in kg / (Height in m x Height in m)   (1)

WAIST CIRCUMFERENCE

Excess abdominal fat is an important, independent risk factor for disease. The evaluation of waist circumference to assess the risks associated with obesity or overweight is supported by research. The measurement of waist-to-hip ratio provides no advantage over waist circumference alone. Waist circumference measurement is particularly useful in patients who are categorized as normal or overweight. It is not necessary to measure waist circumference in individuals with BMIs $\geq$ 35 kg/m2 since it adds little to the predictive power of the disease risk classificationof BMI. Men who have waist circumferences greater than 40 inches, and women who have waist circumferences greater than 35 inches, are at higher risk of diabetes, dyslipidemia, hypertension, and cardiovascular disease because of excess abdominal fat. Individuals with waist circumferences greater than these values should be considered one risk category above that defined by their BMI [2][3].

RISK FACTORSOR COMORBIDITIES

Overall risk must take into accountthe potential presence of other riskfactors. Some diseases or riskfactors associated with obesity placepatients at a high absolute risk for subsequent mortality; these willrequire aggressive management.Other conditions associated withobesity are less lethal but stillrequire treatment.Those diseases or conditions thatdenote high absolute risk have established coronary heart disease,other atherosclerotic diseases,type 2 diabetes, and sleep apnea.Osteoarthritis, gallstones, stressincontinence, and gynecologicalabnormalities such as amenorrheaand menorrhagia increase risk butare not generally life-threatening**.**Three or more of the followingrisk factors also confer highabsolute risk: hypertension, cigarettesmoking, high low**-**densitylipoprotein cholesterol, lowhigh-density lipoprotein cholesterol,impaired fasting glucose,family history of early cardiovasculardisease, and age (male $\geq$ 45years, female $\geq$ 55 years)[2][3][4].

BASAL METABOLIC RATE (BMR)

BMR is the rate of energyexpenditure by humans and other animals at rest. Rest is defined as existing in a neutrally temperateenvironment while in the post-absorptive state. In plants, different considerations apply.The release, and using, of energy in this state is sufficient only for the functioning of the vital organs: the heart, lungs, nervous system, kidneys, liver, intestine, sex organs, muscles, brain, and skin.

Equations have been developed to estimate BMR when testing is not practical. We use the Harris-Benedict equation for BMR. The Harris-Benedict equation has been the standard for decades and is still the most widely used for estimating BMR[5][6][7].

The Harris-Benedict equation for BMR:

For men: (13.75 x w) + (5 x h) - (6.76 x a) + 66
For women: (9.56 x w) + (1.85 x h) - (4.68 x a) + 655
Where: w = weight in kg
h = height in cm
a = age   (2)

VISUAL BASIC (VB)

Visual basic is derived from the BASIC programming languages, it is a Microsoft Windows programming language, the visual basic programis created in an integrated development environment (IDE), which allows the programmer to create, run and design, visual basic programs conveniently it's also allowed a programmer to create working programs in a fraction of time that normally takes to code programs without using IDES. The widespread use of BASIC Language with various hardware platforms led to many enhancements to the languages in the development of Microsoft Windows graphical user interface (GUI). VB is the worlds most widely use rapid application development (RAD) language.

VBprovides apowerful features such as graphical user interface, events handling assess to Win 32 API, object-oriented features, error handling, structured programming and much more. VB is a graphical based language which allows the user to work directly with graphic.

MICROSOFT ACCESS

Microsoft Access is a relational database management system from Microsoft, which combines the relational Microsoft Jet Database Engine with a graphical user interface and software development tools. One of the benefits of Access from a programmer's perspective is its relative compatibility with SQL queries. MS Access is used by small businesses, within departments of large corporations, and by hobby programmers to create ad hoc customized desktop systems for handling the creation and manipulation of data. Some professional application developers use Access for rapid application development, especially for the creation of prototypes and standalone applications.

IMPLEMENTATION

The application will calculate weight for adults between 20 – 60 years.Fig.1 is the process decomposition diagram. It shows overall of a weight management system.

After requirements gathering and system needs analysis of the weight management system, an Entity Relationship (E-R) Diagram was designed, which is shown in Fig.2. Seven(7) entities/tables(include the information needed) associated with six (6) relations are proposed based on the E-R Diagram.
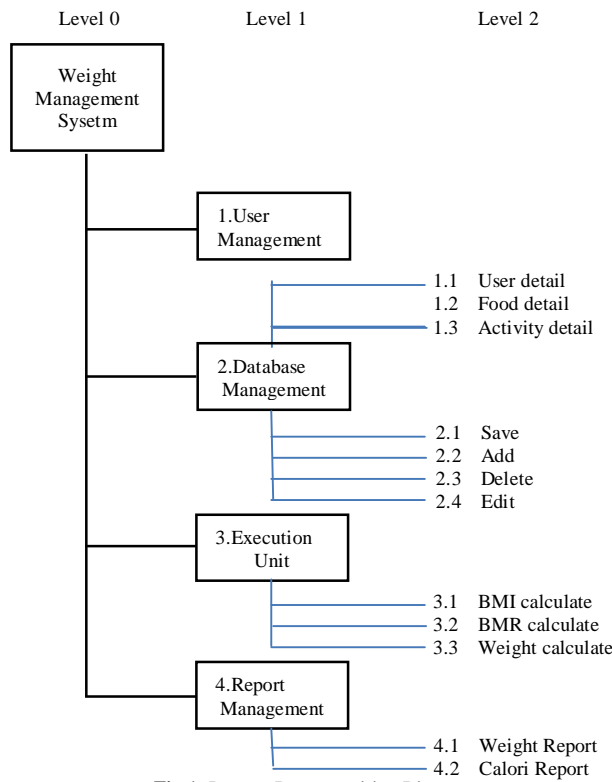
Fig.1 : Process Decomposition Diagram

CONCLUSION

This paper presents the application of a weight management system. It is looking to develop a state of the participant's portfolio management system which is able to track their weight control history. From the questionnaires, the average usability testing is good. The application interface is effective, efficient, and created satisfaction for the users(participants, nutritionists and health experts). The quantitative results for the usability test revealed that all of the tasks' performance ratings meet the study's acceptable maximum level of usability of Acceptable.

The system provides consultation with a dietitian in order for a participant to recognize the deficiencies in the past diet. The system further provides consultation to effect behavior modification of the participant by offering instruction in exercise and proper cooking techniques.
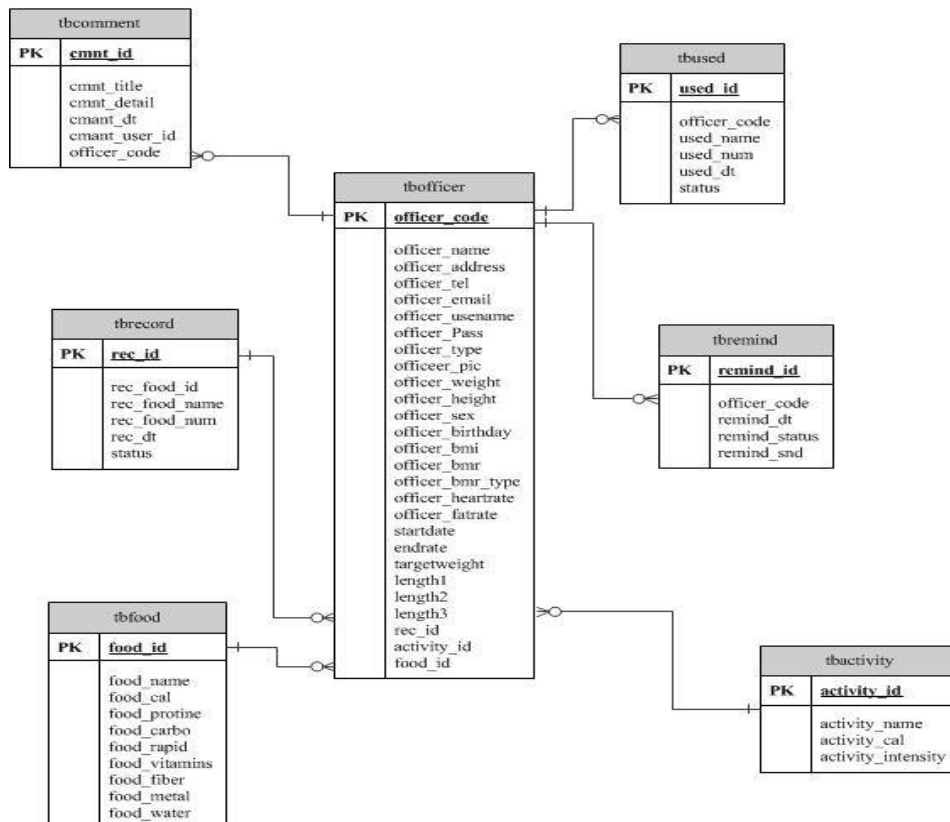

Fig.2 : Entity Relationship Diagram

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REFERENCES

[1] BMI Classification. Global Database on Body Mass Index. World Health Organization. 2006. Retrieved July 27, 2012.

[2] Al-Lawati JA, Jousilahti P. Body mass index, waist circumference and waist-to-hip ratio cut-off points forcategorization of obesity among Omani Arabs. *Public Health Nutrition*, Vol.11, No.1, pp.102-108, 2008

[3] APCSC. Central obesity and risk of cardiovascular disease in the Asia Pacific Region. *Asia PacificJournal of Clinical Nutrition,* Vol.15, No.3, pp. 287-292, 2006

[4] Bigaard J, Tjonneland A, Thomsen BL et al. Waist circumference, BMI, smoking, and mortality inmiddle-aged men and women. *Obesity Research,* Vol.11,No.7,pp.895-903,2003

[5] Harris J, Benedict F. "A Biometric Study of Human Basal Metabolism". Proceedings of the National Academy of Sciences of the United States of America, Volume 4, Issue 12, pp. 370-373, 1918

[6] Roza, Allan M; Shizgal, Harry M (1984). "The Harris Benedict equation reevaluated: resting energy requirements and the body cell mass", *The American Journal of Clinical Nutrition,* Vol **40**,pp. 168–182, 1984

[7] Hulbert AJ, and Else PL. "Basal metabolic rate: history, composition, regulation, and usefulness", Physiol Biochem Zool, Vol.77, No.6,pp.869-876, Nov-Dec 2004