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Abstract

An automated dietary assessment website has been developed for patients with metabolic syndrome. Computers have been set up in local GP practices to which the GP may refer their patients. These patients enter their dietary information into the website and receive an individualised dietary prescription put together by a dietitian. This study outlines the profile of patients using the website and their rates of completion of the assessment. Recruited patients were primarily female(66%). Ranging between 22 and 75 years of age patients reported to be overweight(77%), have high cholesterol (53%), elevated blood pressure (54%) and/or type 2 diabetes mellitus (35%). Intermediate levels of computer experience were reported with most patients preferring to use the website at home as opposed to in their GP practice. Of the 84 patients recruited 63 completed the entire assessment, 15 allowed their accounts to expire and the remainder had partially completed the assessment or had reset/void accounts. Results indicated that use of a computer for dietary assessment appears to capture a large proportion of the population who otherwise would not be able or willing to receive face-to-face advice from a dietitian. Such an application is highly useful in the field of nutrition due to the ever increasing rates of overweight and obesity within Australia.

Keywords

metabolic syndrome, primary healthcare, patient, computer, nutrition

Disciplines

Arts and Humanities | Life Sciences | Medicine and Health Sciences | Social and Behavioral Sciences

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Patients with metabolic syndrome:

a study using automated dietary
assessment in primary care

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SMART FOODS CENTRE

An automated dietary assessment website has been developed for patients with metabolic syndrome. Computers have been set up in local GP practices to which the GP may refer their patients. These patients enter their dietary information into the website and receive an individualised dietary prescription put together by a dietitian. This study outlines the profile of patients using the website and their rates of completion of the assessment. Recruited patients were primarily female (66%). Ranging between 22 and 75 years of age patients reported to be overweight (77%), have high cholesterol (53%), elevated blood pressure (54%) and/or type 2 diabetes mellitus (35%). Intermediate levels of computer experience were reported with most patients preferring to use the website at home as opposed to in their GP practice. Of the 84 patients recruited 63 completed the entire assessment, 15 allowed their accounts to expire and the remainder had partially completed the assessment or had reset/void accounts. Results indicated that use of a computer for dietary assessment appears to capture a large proportion of the population who otherwise would not be able or willing to receive face-to-face advice from a dietitian. Such an application is highly useful in the field of nutrition due to the ever increasing rates of overweight and obesity within Australia.

Rhizome 1, 193-201 (2005)

194 Introduction

Automated dietary assessment software in Australia is not widely available to allow dietitians to assess their patients' dietary intake.¹ Furthermore the application of self-reported dietary intake has not been captured in the existing software packages. Self-reported dietary intake has however been utilised in traditional dietary assessment methods in the form of a food frequency questionnaire (FFQ). Provided with a list of food items patients are requested to indicate the amount and frequency of the food items eaten.² This provides dietitians with a *defined summary* of foods commonly eaten by the patient but is limited in the number of foods that can be addressed as greater numbers of questions become a burden. An alternative to this method is that of the diet history interview during which a patient, face-to-face with a dietitian, is prompted to recall their usual dietary intake. These interviews have the ability to capture a wider range of food items.^{3,4} Primarily focusing on the *actual* dietary intake through use of a food record or food diary, existing software packages have not utilised the diet history as a method of capturing usual dietary intake.

The use of computer technology as a medium for administering questionnaires also has advantages over traditional pen and paper methods. When questioning about a person's diet, social desirability has a strong influence over the responses provided to the dietitian. The patient feels that they should be reporting 'healthy' food items and resultantly omit or underreport 'unhealthy' food items or groups of food items.⁵ Such practices are commonly found in overweight (BMI > 25 kg/m²) patients.⁶ The use of computer technology largely decreases this social desirability bias⁷ as the face-to-face interaction has been removed from the interview. Therefore an automated dietary assessment website utilising the diet history assessment method has been developed for patients with metabolic syndrome, of which overweight and obesity is a major component.⁸

As this form of automated dietary assessment does not presently exist in Australia, this study aims to develop and trial the technology by implementing it in the primary healthcare setting over a one year time frame. Computers have been set up in GP practices throughout the Illawarra region of New South Wales, Australia to which the GP may refer their patients. These patients enter their dietary information into the website. In order to comply with the strong band of literature supporting the benefits of individualised dietary advice,^{9,10} patients do not receive any output directly from the website. Each patient receives an individualised dietary prescription put together by a dietitian who is electronically sent the patient data upon completion of the questionnaire. This paper aims to outline the profile of patients using the website (at 6 months) in this pilot project and their rates of completion of the assessment. This will allow clinicians to

determine the types of patients who are willing and able to use a computerized dietary assessment.

Methods

Fourteen GP practices within the Illawarra were provided with computers for patient access to the website. GPs were requested to refer their patients to the website. Inclusion criteria for patients were any patient over 45 years of age who would benefit from dietary advice and any patient under 45 years of age with any one component of metabolic syndrome including overweight, high blood pressure, high cholesterol and type 2 diabetes mellitus.^{11,12} The study was explained to patients during an unrelated visit to their GP and consenting patients were provided with a unique ID code to allow them to login to the website. This code was provided to patients on a business card which also listed the URL of the website. Patients were informed they would have the option to complete the dietary assessment questionnaire in either the GP practice (at the computer provided) or in the comfort of their own home if ADSL internet access was available.

When using the website patients were first faced with an electronic consent form followed by website instructions and a demographic information questions. This section asked patients to self-report data about their height, weight and medical conditions as well as dietary restrictions, physical activity, shopping practices, employment status and basic computer knowledge. Patients then were asked to report which meals they consumed regularly and how often, in a one week time frame, each meal was eaten. The dynamic nature of the website then allowed for further questions about the meal components. Stage 1 of the website asked the patient to report broad food categories consumed for each meal. Progressing through each meal eaten, beverages are considered as a meal of their own. Stage 2 asked further information about the foods selected in stage 1. The final stage, stage 3, required the patient to report the portion size and frequency of consumption (per week) for each of the food items selected. Upon completion of all three stages a 'finish' button is available and once clicked by the patient, electronically informs the dietitian that data is ready to analyse for dietary advice.

The dietary information is uploaded into a specially designed dietary analysis package containing nutrient data for each of the food items in the website. The demographic information section is deidentified and loaded into a Microsoft Excel database and was used for this study to determine the profile of the patients using the website.

196 Results

At the 6 month time point, 84 patients had logged into the dietary assessment website, recruited by 22 different GPs. As these patients were recruited as they visited their doctor for an unrelated purpose, data is unavailable for the total number of eligible patients who visited each of the doctors during the first six months of the trial.

Depending on the stage of completion patient demographic information could be downloaded by the Dietetics Laboratory at the University of Wollongong. Two accounts were void, as unique identification codes created errors in the website database. The recruited patients included 54 females (66%) and 28 males (34%). Patients ranged in age between 22 and 75 years of age with a mean age of 51 ± 12 years.

Medical conditions of the patients primarily related to overweight/obesity with 77% of patients classified as overweight ($BMI > 25 \text{ kg/m}^2$), (Fig. 1). The mean BMI for the study sample was $34 \pm 8 \text{ kg/m}^2$ ($24\text{--}58 \text{ kg/m}^2$). When considering the components of metabolic syndrome the patient profile indicated a high proportion of patients having more than one diagnostic component and therefore having metabolic syndrome (Fig. 2).

Intermediate levels of computer experience were reported by almost half (47%) of the study sample (Fig. 3). Most patients also preferred to use the website at home ($n=52$) as opposed to in their GP practice ($n=21$) or other locations ($n=8$).

Of the 84 patients recruited at the time of this study, 63 patients had completed the entire questionnaire. The remainder were in the process of completing the questionnaire or had had their accounts reset. Fifteen additional patients had allowed their accounts to expire (2 weeks after initial login) (Fig. 4).

Conclusion

Results indicated that use of a computer for dietary assessment captures a large number of people who otherwise may not be able to or willing to receive face-to-face advice from a dietitian (e.g. Obese patients). This study was able to capture patients who not only were overweight ($BMI 25\text{--}30 \text{ kg/m}^2$) but also patients who are obese ($BMI > 30 \text{ kg/m}^2$) including morbidly obese patients ($BMI > 40 \text{ kg/m}^2$). The literature reports that overweight or obese patients, the primary users of our automated dietary assessment website, either do not visit a dietitian regularly or under report their dietary intakes when visiting a dietitian.^{13,14} The large proportion of overweight subjects agreeing to use this website may be related to

the decreased face-to-face interaction involved in reporting dietary information to a computer. This decreases the social desirability bias which in turn could have resulted in a high response rate.

Similarly the ability of the website to capture one third of the sample as males for dietary assessment is also a promising finding. Correlations have been found between gender and health beliefs¹⁵ as well as between gender and acceptance of technology. Although the majority of recruited patients were female, use of the website was voluntary and the number of male website users indicates that use of technology may be an avenue to increase male participation in health programs.¹⁶ It has been estimated that approximately one in four people have metabolic syndrome with little difference between males and females,¹⁷ though males are at a higher risks of cardiovascular disease.¹⁸ The proportion of males with 2 or more components of metabolic syndrome (80%) in this study compared with females (61%) shows that it is important to consider new options for health assessment to entice male patients.

Computer experience did not affect the profile of the website users. Although a large proportion of users reported having intermediate computer experience, a number of users were beginners or had never used a computer before. This willingness to use the computer for an assessment dietary intake sees opportunities for future practice in dietetics. Such an application is highly useful in the field of nutrition due to the ever increasing rates of overweight and obesity within Australia.

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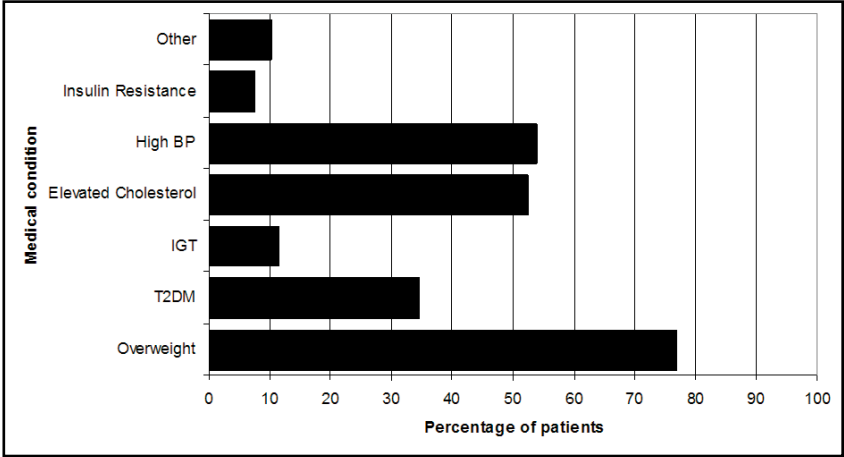


Fig. 1. Percentage of patients with components of the metabolic syndrome

Abbreviations: T2DM – Type 2 Diabetes Mellitus, IGT – Impaired Glucose Tolerance, BP – Blood pressure.

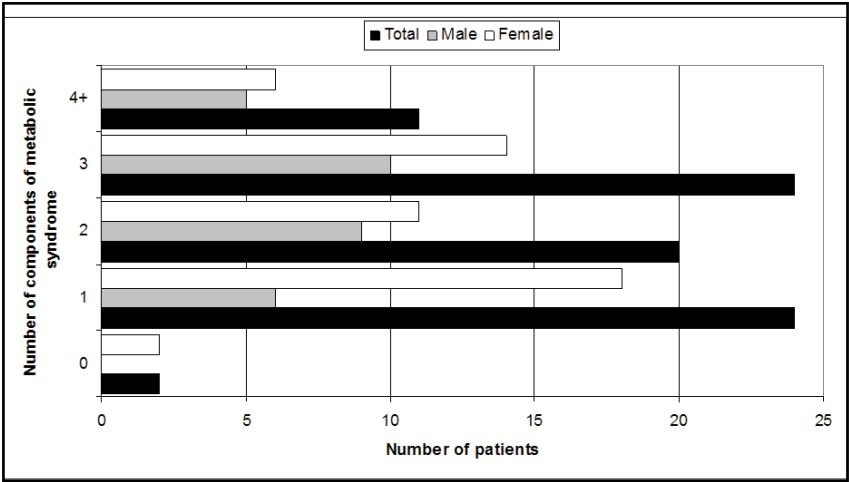


Fig. 2. Number of patients with elements of metabolic syndrome

NB: Metabolic syndrome included Type 2 Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Insulin resistance, Overweight/Obesity, High cholesterol, High blood pressure.

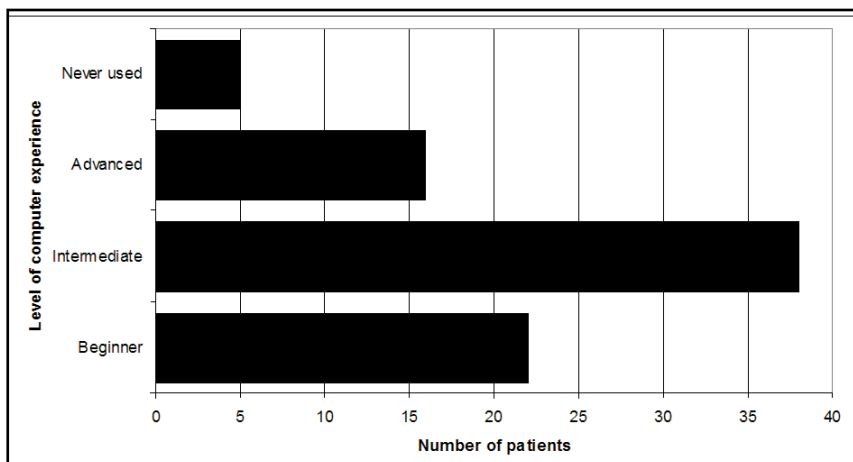


Fig. 3. Level of computer experience of patients recruited to use the website

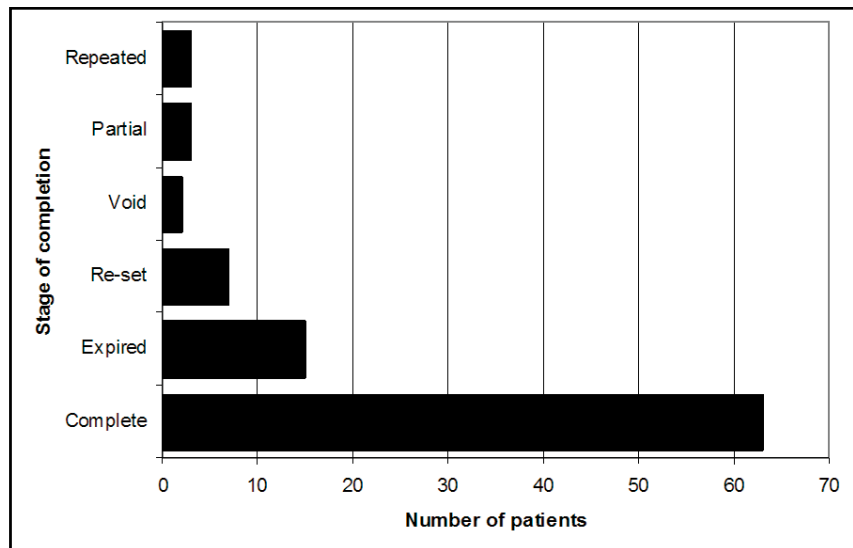


Fig. 4. Stage of progression through the dietary assessment website

NB/ Repeated – patients doctor gave patient a second code after the first expired, Partial – not all stages of the website complete, Void – invalid ID code use, Re-set – patient given an additional two weeks to complete questionnaire, Expire – patient did not access website for more than 2 weeks, Complete – all questions answered.

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