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Y. Probst

University of Wollongong, yasmine@uow.edu.au

Linda C. Tapsell

University of Wollongong, ltapsell@uow.edu.au

M. Batterham

University of Wollongong, marijka@uow.edu.au

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Recommended Citation

Probst, Y.; Tapsell, Linda C.; and Batterham, M.: Relationships between patient age and BMI and use of a self-administered computerised dietary assessment in a primary healthcare setting 2008.
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Relationships between patient age and BMI and use of a self-administered computerised dietary assessment in a primary healthcare setting

Abstract

The objective of this paper was to determine relationships between patient age and BMI and use of a self-administered dietary assessment website in the primary healthcare setting. Chi-square and ordinal regression models were used to determine the relationships between age and BMI and computer experience, ownership, and usage from 188 patients using a self-administered dietary assessment website over 12 months. One hundred and twenty-five (66.5%) female and 63 (33.5%) male patients used the website. A total of 72.9% were overweight (BMI ≥ 25 kg/m²). Advanced/intermediate computer users were 17.1 times more likely to own a computer than beginners or patients who had never used a computer. Patients with a higher BMI were 1.9 times ($P = 0.04$) more likely to use the computer at home than in the GP practice, and patients aged ≥ 35 years and using the computer at home were 16.8 times more likely to be advanced computer users than patients aged ≤ 16 years using the computer in the GP practice. Finding innovative ways for overweight patients in the primary healthcare setting to report intakes may include the use of computers. Overweight patients may feel greater comfort having their diet assessed in their own home and any social desirability bias related to food and/or the interviewer may be decreased due to the limited face-to-face contact required.

Keywords

Internet, dietary assessment, primary healthcare

Disciplines

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

Publication Details

This article was originally published as Probst, Y, Tapsell, L and Batterham M, Relationships between patient age and BMI and use of a self-administered computerised dietary assessment in a primary healthcare setting, *Journal of food composition*, 21, 2008, S56-59.

Relationships between patient age and BMI and use of a self-administered computerised dietary assessment in a primary healthcare setting

Yasmine Probst* BSc, MSc, GradCertBus, APD. PhD

Smart Foods Centre, School of Health Sciences, University of Wollongong, Northfields Avenue, Wollongong, Australia.

Phone: +612 4221 5302, Fax: +612 4221 4844, Email: yasmine@uow.edu.au

Linda Tapsell BSc, DipEdNutr, MHPed, PhD, FDAA

National Centre of Excellence in Functional Foods, University of Wollongong, Northfields Avenue, Wollongong, Australia.

Phone: +612 4221 3152, Fax: +612 4221 4844, Email: ltapsell@uow.edu.au

Marijka Batterham BSc, MSc, MStat, PhD, AdvAPD

Smart Foods Centre, School of Health Sciences, University of Wollongong, Northfields Avenue, Wollongong, Australia.

Phone: +612 4221 5303, Fax: +612 4221 4844, Email: marijka@uow.edu.au

* Corresponding author

Abstract

Objectives: To determine relationships between patient age and BMI and use of a self-administered dietary assessment website in the primary healthcare setting.

Methods and Materials: Chi square and ordinal regression models were used to determine the relationships between age and BMI and computer experience, ownership, and usage from 188 patients using a self-administered dietary assessment website over 12 months.

Results: 125 (66.5%) female and 63 (33.5%) male patients used the website. 72.9% were overweight (BMI >25kg/m²). Advanced/intermediate computer users were 17.1 times more likely to own a computer than beginners or patients who had never used a computer. Patients with a higher BMI were 1.9 times (p=0.04) more likely to use the computer at home than in the GP practice, and patients aged <35 years and using the computer at home were 16.8 times more likely to be advanced computer users than patients aged ≥56 years using the computer in the GP practice.

Conclusions: Finding innovative ways for overweight patients in the primary healthcare setting to report intakes may include the use of computers. Overweight patients may feel greater comfort having their diet assessed in their own home and any social desirability bias related to food and/or the interviewer may be decreased due to the limited face-to-face contact required.

Keywords:

Internet

Dietary assessment

Primary healthcare

Introduction

Dietary assessment, face-to-face with a patient can be time consuming for the researcher or clinician and alternate methods are needed to automate and/or speed up this process. In the field of dietetics, dietary assessment has traditionally been performed face-to-face with a patient using paper and pencil methods following which computer software is used to assist with nutrient analysis of the reported food items (Probst and Tapsell, 2005). The computer software traditionally utilises a regionally appropriate food composition database to determine nutrient intakes. In the Australian study reported here, a diet history interview was automated. Using a web-based interface known as DietAdvice, the program drew on aspects of self-report methodology (Furnham and Henderson, 1983) to establish a meal-based diet history with features of a food frequency dietary assessment. Combining diet history (Tapsell et al, 1999) and food frequency questionnaire (Horwarth, 1990) features, the DietAdvice website allowed patients to enter their usual dietary intake from a location at which Internet access was available.

During the twelve-month implementation phase in the primary healthcare setting a number of different patients used the website. This paper reports on the relationships between patient variables (age and BMI) and use of the self-administered dietary assessment website in the primary healthcare setting.

Methods

The DietAdvice website was implemented in the primary healthcare setting just south of Sydney, in the Illawarra region of New South Wales, Australia from November 2005 to November 2006. Fourteen medical practices were selected from which General Practitioners (GPs) recruited patients with metabolic syndrome, a cluster of conditions including hypertension, hypercholesterolemia, overweight, and type 2 diabetes mellitus (International Diabetes Federation, 2005). Computers were available with Internet access in each of the GP practices for the patients to use. Patients could, however, use the DietAdvice website at a more convenient location with Internet access if needed. This also allowed patients to complete the assessment in one sitting or in multiple sittings as needed. Patients were given a unique identification code to allow them to securely log in to the website. The patients were then asked a series of questions about their usual dietary intakes. Questions were also included about the patients' demographic status, medical history, socio-economic status, and experience with computers. Following this, patients were asked about their usual food intakes using a multiple pass approach. Firstly their meal patterns were determined, followed by general descriptions of foods eaten per meal (pass 1). These were then further refined in pass 2 in which more detail was obtained about the specific foods in each meal. The final pass asked about the portion size and frequency of consumption of each of the food items (Probst et al, 2007). No incentives were provided for the patients. Upon completion of the questionnaires on the website by the patient (Probst and Tapsell, in press), a dietitian from the Smart Foods Centre, University of Wollongong electronically accessed the food intake data by downloading it to the 'dietitians interface'. This 'dietitians interface' was a separate interface utilising a

modified version of the Australian Nutrient Tables (AUSNUT). The dietitians used the patient's dietary intake to develop a suitable dietary prescription for the patient. This dietary prescription was sent back to the patient's GP for discussion with the patient.

A database was developed to track patient recruitment and progress with the website. This database recorded the patient ID code, recruiting GP, and time taken to use the website. The time spent reporting food intake was recorded automatically by the website in each patient's log file. The demographics section of the website asked the patient to select the location in which they were using the website (home, physician's office, or other location), to allow location of use to be determined.

Patient demographic data from the website was coded and transferred into SPSS (version 12.0.1, 2003: Lead Technologies, Chicago, USA) for analysis. The proportion of patients using the website in the GP practice, home, and other location was determined. Demographic questions were primarily multiple-choice, therefore, the proportion of responses for each question, were determined. The only free-text questions were those relating to age, height and weight. The number of responses for computer experience, ownership, and usage were established. Mean (\pm SD) values were calculated for age, height, weight, and BMI. Age data were categorised into <35years, 35-55years and \geq 56years. BMI data was similarly categorised into not overweight (<25kg/m²), overweight (25-30kg/m²), and obese (>30kg/m²).

Relationships between age and BMI compared with computer experience, computer ownership, computer usage, and location of computer use were assessed through chi square analysis. Age and BMI were assessed as they were believed to be the two

variables that strongly influence dietary intake reporting. Ordinal regression models were developed for variables where significant relationships existed.

Results

Of the 200 consenting patients over the twelve month period, 190 accessed the web interface, though 28.5% let their accounts expire (Table 1). Of the 190 patients, most preferred to use the website at home (n=110; 58.5%), rather than the GP practices (n=24; 12.8%), and a further 54 (28.7%) used other locations such as work or relatives' homes. Data for two patients were excluded due to typographical errors in the demographic information leaving n=188 patients.

Patients who completed the questionnaires on the website described themselves as advanced (n=20), intermediate (n=73), beginners (n=40), and 'never used' a computer (n=10). One hundred and twenty-five (66.5%) female and 63 (33.5%) male patients used the website of which 72.9% were overweight (BMI >25kg/m²). The majority of patients were approximately 50 years of age, spoke English at home, were smokers, and owned a computer at home (Table 2).

Patients with the most computer experience were significantly more likely to report being the most comfortable using a computer (P=0.00), and those who had never used a computer reported being the least comfortable (Table 3). Likewise, patients owning a computer were more likely to be advanced or intermediate computer users than beginners or those who had never used a computer (P=0.00). Advanced/intermediate computer users were 17.1 times more likely to own a computer than beginners or patients who had never used a computer (Table 4).

Patients with a higher BMI were significantly more likely to use the computer at home or at another location other than the GP practice (P=0.04) (Table 4), as were advanced computer users, who were 2.8 times more likely to do so and were 4.5 times more likely

to be below 35 years of age than over 56 years ($P=0.00$). There was a significant relationship between computer experience, age, and location of use, with a strong interaction effect. Patients aged below 35 years and using the computer at home were 16.8 times more likely to be advanced computer users than patients over 56 years who used the computer in the GP practice (Table 5). Only data for patients over 56 years and using the computer in locations other than home or the GP practice, e.g., at a relative's place, did not exhibit a significant relationship with the demographic variables.

Discussion

Throughout the twelve-month implementation period, over 200 patients were recruited by their GP to use the website. Not all of these patients completed the questionnaires on the website, indicating that recruitment to a study does not imply motivation to participate. Patients who completed the required tasks on the website preferred locations other than the GP office with the home the most preferred location. It may be assumed that this is the result of increased feelings of comfort within the home as well as the added convenience. This may have implications for planning future dietary assessments in clinical practice.

The demographics of the subjects within this study may also be indicative of the results. The majority were intermediate computer users, spoke English, and owned their own computer (Table 2). It may be assumed that due to the high general ownership of computers, patients who owned computers were likely to be recruited for the study and were more confident and willing to use the website in locations other than in the GP practice. This level of comfort was found to increase with increased computer experience and younger age. Younger and more experienced participants were more likely to use the

website at home. Comparatively, older and less experienced participants were more likely to use the website in the GP practice where help was available to them. The model for experience, age and location developed in the study, strongly supported these findings ($P=0.00$) (Table 5). The large proportion of smokers within this group was unexpected and will be assessed for accuracy in future studies.

The majority of website users were overweight ($BMI >25\text{kg/m}^2$) and female. Patients with these characteristics are known to underreport their dietary intake to a dietitian (Black and Cole, 2001; Braam et al, 1998) which has implications for the accuracy of dietary data obtained. Underreporting has been related to social desirability bias (Herbert et al, 1995), which has been shown to be minimised when reporting to a computer (de Leeuw and Nicholls, 1996). Therefore the use of computers for self reporting of dietary intake may in fact result in more accurately reported dietary data. This is an area for further investigation using the current model.

Furthermore, it was found that increased BMI was also related to a tendency to use the website at home. This may also be related to both comfort, convenience, and the social desirability factors which may accompany a dietary assessment. Decreased social desirability bias accompanies use of a computer (de Leeuw and Nicholls, 1996) when compared to speaking to a dietitian or other person. Patients are more likely to report all food items consumed when using the computerized system as they are less likely to feel judged. Computerised assessment may therefore be favourable to the patient and to the outcomes for the researcher or clinician. Finding innovative ways for overweight patients to report intakes, may include the use of computers. This may effectively address dietary

issues such as underreporting in those where biased reporting, e.g. overweight patients, was previously a concern (Probst and Tapsell, in press).

Funding Disclosure

ARC linkage grant between the University of Wollongong, Illawarra Division of General Practice and Xyris Software Australia.

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Table 1 Stage of completion of the dietary assessment questionnaire (n=200)

<i>Stage of completion</i>	<i>Frequency</i>	<i>%</i>
Complete	143	71.5
Account expired/void	57	28.5
Stage of expiry for incomplete responses:		
- Food type questions	21	10.5
- Meal questions	14	7.0
- Not started	10	5.0
- Sub-category questions	5	2.5
- Eating pattern questions	3	1.5
- Portion size and frequency	2	1.0
- Other	2	1.0

Table 2 Demographic profile of patients using the website

<i>Variable</i>	<i>Value (n=188)</i>
Age (mean + SD) *	49.1 +14.6 yrs
Height (mean + SD)*	166.7 +9.6cm
Weight (mean + SD)*	91.8 +18.9kg
BMI (mean + SD)*	32.6 +6.5 kg/m ²
Male (number, %)	63 (33.5%)
Female (number, %)	125 (66.5%)
English speaking (number, %)	184 (97.8%)
Physically active (number, %)	104 (55.6%)
Smoker (number, %)	166 (88.3%)
Single/divorced separated (number, %)	130 (69.1%)
Main shopper (number, %)	110 (58.5%)
Fulltime paid employment (number, %)	61 (32.4%)
High school level education (number, %)	95 (50.5%)
Own a computer (number, %)	151 (80.3%)
* <i>n=186 (data lost for n=2)</i>	

Table 3 Computer experience and comfort of DietAdvice website users (n=188)

<i>Comfort using a computer</i>	<i>Computer Experience</i>				<i>p-value (χ^2)</i>
	<i>Advanced</i>	<i>Intermediate</i>	<i>Beginner</i>	<i>Never used a computer</i>	
Very comfortable	25	41	0	0	0.00 ($\chi^2=197.9$)
Comfortable	2	49	16	0	
Slightly uncomfortable	0	5	25	1	
Uncomfortable	1	0	10	13	
Total	28	95	51	14	

Table 4 Odds between demographic variables (n=188)

<i>Dependant</i>	<i>Reference</i>	<i>Factor</i>	<i>Odds</i>	<i>p-value</i>
Comfort using a computer	≥56 years	35-55 years	1.9	0.03
Comfort using a computer	≥56 years	<35 years	6.0	0.00
BMI	Use computer in GP practice	Use computer at home/other location	1.9	0.04
Own a computer	Beginner/Never used a computer	Advanced/Intermediate computer user	17.1	0.00

Comfort using a computer: 1 – Very comfortable, 2 – Comfortable, 3 – Slightly uncomfortable, 4 – Uncomfortable; BMI: 1- <25kg/m², 2- 25-30 kg/m², 3- >30 kg/m²; Own a computer: 1 - Yes, 2 - No

Table 5 Association between computer experience, age, and location of computer use (n=188)

<i>Dependant</i>	<i>Reference</i>	<i>Factor</i>	<i>Odds</i>	<i>p-value</i>
Computer experience	≥56 years,	≥56 years, Other location	1.6	0.47
	GP practice	≥56 years, Home	7.1	0.00
		35-55 years, GP practice	5.6	0.01
		35-55 years, Other location	6.3	0.02
		35-55 years, Home	8.1	0.00
		<35 years, GP practice	9.2	0.00
		<35 years, Other location	11.2	0.02
		<35 years, Home	16.8	0.00
<i>Computer experience: 1 – Advanced, 2 – Intermediate, 3 – Beginner, 4 – Never used a computer</i>				