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Computerised dietary assessment interviews: health professionals and patients opinions about web communications

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Abstract

Aim: To describe the acceptance of DietAdvice, an automated dietary assessment website, by its stakeholders. **Methods:** One month evaluation study using audio-recorded telephone interviews with ten patients who had used DietAdvice, 10 dietitians, 10 General Practitioners who recruited many patients and 10 General Practitioners who recruited few or no patients to the website to obtain their beliefs and opinions about DietAdvice, health, nutrition and technology. Interviews were transcribed verbatim and analysed for categorical themes using NVivo software. **Results:** Patients were concerned about Internet difficulties and had a preference for face-to-face interviews and dietitians felt that DietAdvice could save time prior to dietary education and counselling. Recruiting General Practitioners believed that patient computer literacy was a limitation, though increased availability of dietary services created by DietAdvice. Non-recruiting General Practitioners felt that they had a lack of time available to recruit patients, patient computer literacy was limited and there was a need for face-to-face contact. **Conclusion:** The perspectives of patients and healthcare providers show variation based on their experience with DietAdvice, their focus on nutrition and their role in the healthcare system. Automated technologies are likely to play a significant part in the future of dietetics.

Keywords

opinions, patients, assessment, computerised, interviews, communications, dietary, web, about, health, professionals

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Computerised dietary assessment interviews: Health professional and patient opinions about web communications

Aim: To describe the acceptance of *DietAdvice*, an automated dietary assessment website, by its stakeholders.

Methods: One month evaluation study using audio-recorded telephone interviews with ten patients who had used *DietAdvice*, 10 dietitians, 10 General Practitioners who recruited many patients and 10 General Practitioners who recruited few or no patients to the website to obtain their beliefs and opinions about *DietAdvice*, health, nutrition and technology. Interviews were transcribed verbatim and analysed for categorical themes using NVivo software.

Results: Patients were concerned about Internet difficulties and had a preference for face-to-face interviews and dietitians felt that *DietAdvice* could save time prior to dietary education and counselling. Recruiting General Practitioners believed that patient computer literacy was a limitation, though increased availability of dietary services created by *DietAdvice*. Non-recruiting General Practitioners felt that they had a lack of time available to recruit patients, patient computer literacy was limited and there was a need for face-to-face contact.

Conclusion: The perspectives of patients and healthcare providers show variation based on their experience with *DietAdvice*, their focus on nutrition and their role in the healthcare system. Automated technologies are likely to play a significant part in the future of dietetics.

Keywords: Dietary methodology, Evaluation, Health Services, Technology

INTRODUCTION

Nutrition is an important factor in the management of many lifestyle related diseases¹ for which many people visit their general practitioner (GP). The busy working environment faced by general practice, however, often limits the provision of detailed dietary advice and the limited nutrition knowledge also limits GP confidence for providing such advice.² The use of computer technology may be a means for overcoming this challenge.

Computers are now used widely in the area of health for a number of functions including electronic patient medical records, patient simulations and decision support.³⁻⁴ Computers were previously used in dietetics for nutrient analysis⁵ when interviewing patients⁶, developing instructions⁷ and for food service management⁸ though are now also being used in an increasing capacity for client management.⁹

The 1970s saw computers used for dietary interviews providing the ability to generate weight reducing diets and offer dietary suggestions for the nutritionist or dietitian to use with their patient.⁶ A study found that patients who used the computer first had faster consultation times with the dietitian than those who saw the dietitian first⁶. This approach in general practice may provide the opportunity to overcome the challenges faced by GPs. Inclusion of a dietitian would also allow for assessment of the patient's diet, a process which may again utilise technology.

Dietary assessment methodology has changed dramatically since its published beginnings. From the early use of food frequency questionnaires with limited foods and hand calculated nutrient data; dietary assessment now regularly incorporates automated nutrient analysis, computerised interview programs and specialist dietitians working in a number of practice domains. Today, many dietary studies are utilising technology particularly for dietary assessment.¹⁰ The forms of technology are also moving beyond the computer and/or Internet. The use of mobile phone¹¹⁻¹³ and personal digital assistants (PDA)¹⁴ technologies have become common practice due to their portability, popularity and convenience for the health professional.

Moving far from the lengthy interview and manually calculated nutrient profiles, the current day assessments involve a faster interview due to automation.¹⁵ This automation, in Australia, was largely limited to nutrient analysis with few research groups automating the assessment process itself. Use of the computer for the assessment has many advantages including cost-effectiveness, time saving, reliability, standardisation, and facilitation of statistical analysis.¹⁶ The assessment process can be completely or partially automated allowing health professionals to focus on their dietary recommendations¹⁵ rather than the need for coding and analysis of food data.

DietAdvice is a website developed for self-administered entry of a person's food intake. The website was tested in the primary healthcare setting. GPs referred patients with metabolic syndrome to the website by providing eligible patients with a unique login code and the URL for the website. The patients completed the assessment answering questions about their usual food intake.¹⁷ The food information was electronically accessed by a dietitian who developed individualised dietary advice for the patient. This advice for the website trial (implementation

phase), was sent back to the patient's GP for discussion with the patient. In the future the advice could be provided directly to the patient by the dietitian. The aim of this study was to determine the acceptance of the *DietAdvice* website by its users and healthcare providers.

METHODS

Participants

The *DietAdvice* website had three key stakeholder groups – patients (website users), dietitians (providing dietary advice) and GPs (recruiting the patients).

For the selection of patients, all patients who had logged on to *DietAdvice* by October 2005 were considered eligible. The novel nature of the technology meant publication of the research was delayed until commercial negotiations were underway. The patients of this evaluation were those recruited by GPs and were required to have at least one component of the metabolic syndrome. As address information was not collected for the patients, it was assumed that the GP practice to which the recruiting GP belonged would be the practice closest to the patient's home. This assumption allowed stratified randomisation to be utilised. The patients were therefore, listed in order of login and by GP practice. A random selection of ten patients was taken using random digits from the www.randomisation.com website.

The evaluations for the GPs were based on systematic sampling of 'recruiting' and 'non-recruiting' GPs. Due to the large variations seen in the recruitment rates of the GPs, a profile of

recruitment practice was the basis of selection for the evaluation enabling a range of opinions about the project to be expressed. Randomised sampling may not have captured both ends of the recruitment spectrum. The selection process was as follows: of the 41 GPs the total number of patients recruited by October 2005 was taken and divided by the total number of months the GP had been involved in the project. The figure then further divided by the total number of patients recruited by that GP for the study, giving a weighted percentage of total patient recruitment and allowing all GPs to be rank ordered based on recruitment. The ten highest recruiting GPs were selected for the 'recruiting' GP group and the ten lowest recruiting GPs were selected for the 'non-recruiting' group.

As only two dietitians were involved in the pilot of the *DietAdvice* model (GP, patient and dietitian), dietitians recruited for the evaluation had not been involved directly with the website. Selection needed to span the Illawarra region and also cover a range of different fields of practice. The Dietitians Association of Australia (DAA) conducts annual surveys of dietitians Australia-wide including a breakdown of dietitians in each practice area per state of Australia. Using NSW data of 2004¹⁸ a percentage of each work area was determined and used to determine the proportion of dietitians for inclusion in the evaluation. A list of dietitians within the Illawarra region of NSW was created by contacting area health service managers, managers of nutrition and dietetics departments within the local hospitals, the Illawarra Division of General Practice and searches of online and printed versions of yellow pages directories. Dietitians were listed by suburb and work area – public hospital, private practice, community and education. Dietitians within the education field were excluded as all were from the [blinded for review] and already aware of the *DietAdvice* website model. The flexibility of the website, however, meant

that the work areas of other dietitians were not restricted. Selection was determined by random sampling (www.randomisation.com website) within these two groupings ensuring the percentage of work areas equated to the state level and achieved an even spread within the region. Though this form of sampling encompassed random sampling, it was felt that stratified random sampling alone would not ensure the same degree of representation.

Stakeholders selected from each of the three groups were contacted by email or by telephone to determine interest in the study. Interviews were conducted over the telephone unless otherwise requested. Participants were informed that their responses would be audio recorded and further coded for anonymity during analysis.

Data Collection and Analysis

The interview schedule was based on key areas related to the *DietAdvice* website model (recruitment, website use, dietary advice etc) and included additional questions about the stakeholder beliefs on health, nutrition and technology. The questioning scheme was designed to capture maximum information in minimal time. The questions for each stakeholder group followed a similar sequence of questioning to allow analysis of the data to be combined for the three groups (See supplementary material). As the dietitians had not been involved in the study, an information sheet about the website was sent prior to the interview. Ethics approval was granted by the [blinded for review] Human Research Ethics Committee.

Interviews of participants who consented to audio recording were transcribed verbatim. Face-to-face and self-administered interviews were also transcribed. Transcriptions were uploaded to

NVivo qualitative analysis software (version 2.0.161, 2003: QSR International, NSW, Australia).

Content analysis was employed for all interviews with the coding based on the key questions used in the interviews. Categories were developed from the sections of questioning with sub-categories developed as required to capture emerging ideas and opinions.¹⁹ To illustrate the ideas, the data is presented as examples of each of the categories developed.

RESULTS

Of the ten patients selected, two were not interested and one withdrew due to time restrictions. All patient interviews were conducted by telephone (four male, three female). One dietitian was unable to participate as she was overseas. Of the remaining dietitians, eight completed telephone interviews and one completed a face-to-face interview (all female). All ten GPs in the 'recruiting' GP group participated. Two were interviewed face-to-face due to medical centre policies, and one did not consent to audio-recording (four female, six male). Of the 'non-recruiting' GPs, three were not interested. Six of the remaining seven GPs completed the interview by telephone and one on paper due to time restraints (two female, five male). In total, 33 stakeholder interviews were conducted with 83% participation. Overall similar numbers of male and female stakeholders were interviewed and an even spread of locations within the Illawarra region covered.

Patient Perspectives

As the implementation phase of the study used action-based research, the total number of eligible patients could not be obtained due to the impact on the time limitations of the GPs. Total figures reached n=50 recruited by 5.5 months, n=100 by 8 months and n=200 by about 11.5 months. Patients ranged from 19-79yrs (mean 49.1+/-14.6 yrs), 33.5% female, 97.8% English speaking and 72.6% self-reported overweight (though actually obese based on BMI), 80.3% owning a computer and the majority reported themselves as computer literate.

The patients all felt that nutrition was important as it helped them to manage their health. The majority obtained nutrition information from magazines, books and the Internet. Although they expressed concerns about the privacy of their information, they felt that technology was beneficial (Table 1).

Patients reported that the website made them more aware of their eating patterns (Table 1). One patient who had a very simple eating pattern suggested that the website was too complicated and that she would prefer face-to-face interviews instead.

“Well you know, um it’s just you see, I eat very simply, and that was a bit, a bit over the top...I mean a lot of people eat differently I suppose and some are answering it from another perspective might be alright with it, but I find it a bit difficult sort of, you know, answer. Face-to-face would be better.” (28110501P)

This patient’s comment did not appear to be related to her computer skills which she self-reported as eight out of ten. Similar findings were suggested by another two patients, of which one preferred face-to-face contact as she was of a non-English speaking background. The patients all reported feeling that the website food questions were

repetitive. When asked what changes should be considered, a suggestion was made to include instructions outlining the period of food intake to be considered (Table 1), information already included in the introductory screens of the website. Two patients who had used the computer in GP practices also reported difficulty because the Internet disconnected thus interfering with their ability to use the website.

Of the seven patients interviewed it was identified that three had not received their dietary advice from their GP. All had returned to their GP since and two had forgotten about the advice. One patient had returned specifically to pick up the advice and was told by the GP that it had been lost. The four patients who had received their advice reported finding the advice very useful (Table 1), although not all had had the opportunity to discuss it with their GP. On average, the patients reported their computer skills at six out of ten, with one patient never having used a computer before.

Dietitian Perspectives

The dietitians felt that the education component of the dietary interview was the most important for the patients. They also felt that technology is beneficial, although at the time of the evaluation was very generic and generalised (Table 2). Although the dietitians had not used or been involved in *DietAdvice* model, it was seen as a positive addition to current dietetic practice. Many identified it as a time saving mechanism which could be used before patients came to see them, allowing additional time to be spent educating and counselling their patients (Table 2). They were primarily supportive of the inclusion of technology into dietetic practice, indicating

that the number of patients requiring dietary advice outweighed the number of dietary services which could be provided. They felt that *DietAdvice* was a means of addressing this problem.

Computer literacy was still seen to be a concern and identified as a possible reason for potentially limited use of the website. Another concern was the provision of the dietary advice to the patient by the GP, and the fact that the GP may not be available for more serious medical cases whilst discussing diet with these patients (Table 2). It was felt that a person who had been trained in dietetics should be the person discussing the advice with the patient. The relationship of the GP, patient and dietitian was seen as beneficial. The majority of the dietitians saw the *DietAdvice* model as complementary to current dietetic practice, while three felt it would compromise a dietitian's role (Table 2). On average the dietitians reported their computer skills at eight out of ten.

GP Perspectives

The availability of information through the Internet was identified by both the 'recruiting' and 'non-recruiting' GPs as an advantage of technology in healthcare. The 'recruiting' GPs were more likely to routinely refer to a dietitian, whilst the 'non-recruiting' GPs only referred for specific conditions. Similarly the 'recruiting' GPs felt that they did not have the expertise to give dietary advice (Table 3), whilst 'non-recruiting' GPs turned to other resources such as pamphlets and books for nutrition advice for their patients (Table 3).

Both the 'recruiting' and 'non-recruiting' GPs identified *DietAdvice* as beneficial due to its accessibility from a number of locations, and because patients could obtain information about

their personal eating patterns (Tables 3). Computer literacy was identified as the limiting factor for patient recruitment by both groups of GPs. Time was also raised by the ‘non-recruiting’ GPs as a reason for limited recruitment (Table 3). The need for a face-to-face component in the *DietAdvice* model was also suggested. Some GPs suggested that face-to-face assessment could be used to complement the use of the website and others suggested its use to provide advice to the patients (Table 3). Although this was already a component of the *DietAdvice* model, the GPs felt that the dietitian should be the one providing advice to patients, as the GPs did not feel confident discussing the advice with their patients due to limited training and access to resources. Only two of the ‘non-recruiting’ GPs could recall receiving dietary advice for their patients. On average the ‘recruiting’ GP group reported their computer skills at six out of ten whilst the ‘non-recruiting’ GPs reported their computer skills at seven out of ten.

DISCUSSION

Conducting stakeholder interviews with the three very different stakeholder groups identified an overall acceptance of the website by all groups. The GPs who had successfully recruited a number of patients to the website were all willing and able to participate in the stakeholder interviews, whilst the GPs who had not or minimally recruited, were not as willing to participate. A study comparing recruiting and non-recruiting GPs found that a strong patient relationship, as well as a topic area of interest, encouraged GPs to participate in research.¹⁸ This is believed to be the reason for the varied participation rates of the GPs in this evaluation study.

Similarly, dietitians who were available at the time of the study all agreed to participate in the stakeholder evaluation. It is hypothesised that this similarly related to their interest in the innovation and its relevance to their daily practice.²⁰ Due to advances in technology since this evaluation, it is suspected that the level of interest of dietitians generally would have increased as e-health becomes increasingly a part of dietetic practice.²¹ The patients appeared to be willing to participate, even if they had had negative experiences with the website. This may be related to altruism, which has been associated with participation in research independent of other socio-demographic, psychosocial and clinical features.²² Though it is not known what the experiences of the non-participating patients was like, it may be assumed that those who did participate were more motivated, or had become increasingly motivated as a result of using the website. Other studies, have also found acceptance of the use of computers in healthcare practice²²⁻²³ to relate to the level of participation. This acceptance of computers as well as access to and understanding of the information provided may influence patients beliefs in the effectiveness of technologies.²⁴

An interesting result from the patient stakeholder interviews was their suggestion for instructions to avoid repetition of reported foods an area in which saturation of responses was identified. The website, however, indicates on numerous occasions the need to report only a one week period of food intake. This would suggest that patients were not reading the instructions, a common finding for adult learners who are more likely to use self-initiated exploration and learn from their mistakes, rather than read manuals or instructions.²⁶ Despite the repetition, patients reported an increased awareness of their eating patterns, a benefit mirrored by the GPs. The patients captured in the evaluation also had varying levels of computer experience and were from

different socio-economic backgrounds (by location only). Skipping the instructions was found both in this study and others for all levels of computer experience.²⁵

The primary issues identified by the dietitians related to the GP providing the dietary advice. It was suggested that this could be overcome by including *DietAdvice* in dietetic practice due to its time saving abilities. The education of patients was of primary importance to dietitians though patients who were more likely to obtain their information from magazines, books and the Internet. The relationship of the dietitian and GP was also felt to be of benefit if the website was used to complement dietetic practice. The computer literacy of the patients was also of concern though with current access to computers and the Internet would not affect use of the website in practice.²⁶ The term computer literacy previously defined as the ability to use or the skills to operate a computer, it now also encompasses the level of comfort felt when using the computer and applications associated with it and is more commonly referred to as information literacy or digital literacy.²⁷ This broad term may relate to the vast differences seen when participants were asked to simply rate their computer skill level for this evaluation. The same concern of computer literacy was expressed by both GP groups as well, reaching saturation for the health professional groups. Interestingly, however, computer literacy did not arise as a significant concern for the patients, Internet privacy was seen to be more important. Privacy was also one of the key issues addressed during websites development.²⁸

The GPs who did not recruit many patients, self-reported higher computer skill levels than the GPs who recruited many patients. It may be assumed that with the increasing numbers of clinical resources now available online,²⁹ this 'computer literacy' had allowed those GPs to find their

own resources for patients, rather than use the *DietAdvice* model or a dietitian. These GPs also felt that technology was vital in healthcare services again, potentially encouraging their participation in the study. Other than this, time limitations were the primary reason for lower recruitment rates. This was a concept which reached saturation amongst the ‘non-recruiting’ GPs. The main issues identified by ‘recruiting’ GPs related to their patients increased satisfaction with the dietary advice received as part of the study and in turn the increased availability of dietary services created by the *DietAdvice* model. This was despite many of the patients interviewed reporting to not have received their advice. Interestingly, these GPs also placed greater importance on nutrition in health management. The ‘non-recruiting’ GPs identified the need for face-to-face contact in the *DietAdvice* model which coincides with the dietitians concerns of GPs providing the dietary advice to the patients. These concerns from the two stakeholder groups is in line with the future model of practice for the *DietAdvice* website i.e. use in dietetic rather than GP practice.

The ‘recruiting’ GPs also had established referral systems in place for their patients, whilst the ‘non-recruiting’ GPs were more likely to use the resources to which they had access. This may further relate to the willingness of GPs to refer their patients to a dietitian. A study found GPs were more willing to refer patients with complex nutrition needs to a dietitian, although they felt that cost was the main limitation for the patient,² a problem partly overcome by care plan models which were suggested to the GPs to allow continued management.³⁰ At the time of the study, the incorporation of e-health into a care plan model required special approval.

The patients' demographic had the strongest influence on their perceptions of the usefulness and ease of use of the website. The patients had all used *DietAdvice*, which indicated that they had perceived the website as useful and easy to use. In line with the technology acceptance model,³¹ this perception impacted upon their attitude toward the website, their intention to use it, and in turn resulted in use of the system. Overall, a positive or negative experience with the system as well as the perceived benefit of the dietary advice provided potentially influenced the reported beliefs of each of the patients. The influences of the external environment have the ability to determine a person's beliefs and in turn their resultant behaviour.³¹ The external influences in the *DietAdvice* model may have been the environment of the GP practice, the GP, or family and friends. If a positive experience resulted from using *DietAdvice*, then positive beliefs may have been formed about the website which would be further supported by positive results brought about by behaviour change.

The dietitians and GPs were similarly affected. Rather than the technology acceptance model leading to use of the system, it appears to have run in reverse for health professionals. Use of *DietAdvice* by their patients (for the GPs) influenced their behavioural intention to recruit additional patients, as well as their attitude toward the system. Repeated many times, this process was likely to lead to a changed perception of usefulness and ease of use of the system.³² This ease of use appears to have encouraged GPs to recruit patients, though they were also influenced by the external variable of their own time. The perceived usefulness for the dietitian, however, could have been related to their ability to identify the system as beneficial to their daily practice and potentially easier to use than a traditional face-to-face interview. The external variable likely to persuade the dietitian would have been the field within which they work. These findings

suggest that the perspectives of patients and health professionals (dietitians and GPs) show some variation based on their experience with the automated system, their focus on nutrition and the roles they play in the healthcare system.

The main limitation to this research was the need to provide the dietitians with information sheets about the website. Time restrictions prevented them from being able to use the system and evaluate it as a component of the stakeholder evaluation. Further research would include a range of dietitians from different practice areas utilising the system with their patients for a given period of time. This would allow opinions and beliefs to be established from actual use of the website, rather than from the assumptions made after reading an information sheet. Furthermore, the small sample size does not allow for the data to be generalised beyond the participants studied in this research. Although a qualitative framework was employed and saturation was achieved in some of the participant groups (ie. patients advantages and disadvantages of *DietAdvice*), further participants were not sought in the remaining groups until saturation was achieved.

Use of *DietAdvice* appears to be well accepted by its stakeholders. The use of the GP-patient-dietitian model appears to have worked within the Illawarra region of NSW although a number of changes would be required before such a model could become part of everyday practice. Suggestions such as the dietitian discussing the dietary advice with the patient appear to be more feasible and more readily accepted by the healthcare providers and may also combat the time limitation faced by the GPs. The suggestion that the website rather be used in dietetic practice may however, be a more feasible option overall. The use of computerised technologies is

increasingly becoming a part of dietary practice and testing models such as the *DietAdvice* model will allow healthcare providers to work efficiently together providing maximum benefit for their patients.

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