Internet-based risk assessment and decision support for the management of familial cancer in primary care: a survey of GPs’ attitudes and intentions

Dejana Braithwaitea, Stephen Suttona, W Henry Smithsonb and Jon Emerya


Background. Computer decision support systems have been proposed as a suitable method to enable primary care practitioners to manage familial cancer and advise about other developments in clinical genetics.

Objective. To investigate GPs’ preferences, attitudes and intentions regarding the use of Genetic Risk Assessment on the Internet and Decision Support (GRAIDS) in clinical practice.

Methods. GPs were recruited through a physician Internet portal for UK GPs (www.ukpractice.net). Electronic questionnaires assessed the respondents’ current practice regarding family history taking and risk assessment, preferences about particular attributes of GRAIDS, intentions to use GRAIDS for familial cancer management and factors associated with these intentions.

Results. Two hundred and sixty-eight GPs completed the electronic survey (adjusted response rate = 51.2%). Seventy-two GPs participated in a telephone survey of non-respondents (adjusted response rate = 63%). Ninety-two per cent of respondents in the electronic survey and 68% in the telephone survey stated that they would be either extremely or fairly likely to use GRAIDS. Intentions were associated with positive attitudes toward GRAIDS, beliefs that colleagues and patients would find the tool acceptable, perceived control and perceived confidence about conducting risk assessment and making appropriate decisions about patient management. Key attributes for the implementation of GRAIDS in practice were the authoritativeness of the guideline, easy user interface, the validity and reliability of risk estimation and specific advice about patient management.

Conclusion. GP users of the physician portal www.ukpractice.net value GRAIDS as an aid for the management of familial cancer in primary care. These Internet-literate GPs are likely to be early adopters of GRAIDS in clinical practice and could be important in promoting the use of such technology to support high quality advice about genetic issues in primary care.

Keywords. Cancer genetics, general practitioners, Internet, risk assessment and decision support.

Introduction

Increased availability of predictive genetic tests for breast, ovarian and colon cancers, and patient demand for genetic advice, has led to the recommendation that first-line genetic risk assessment and counselling is integrated into primary care.1,2 A potential way of doing this is through the introduction of computerized risk assessment and decision support.3 Initial experimental evaluations of a pedigree drawing and risk assessment computer program (RAGs) demonstrated its potential to improve the quality of genetic advice in primary care.4,5 As a preliminary step toward evaluating Genetic Risk Assessment on the Internet and Decision Support software (GRAIDS) for managing familial cancer in primary care, we investigated current practice with respect to family history taking and risk assessment in primary...
care as well as GPs’ preferences about attributes of GRAIDS in general. We also examined GPs’ intentions to use GRAIDS in clinical practice and factors associated with these intentions.

Methods

The survey was hosted by UKPractice (www.ukpractice.net), an Internet portal aimed at primary care with 22,000 users. GPs who had accessed the UKPractice site during the previous three months were invited by e-mail to participate. The e-mail invitation contained a link to the Internet-based questionnaire. Five e-mail reminders were sent over the next three months. The survey was concluded with brief telephone interviews of non-respondents.

The selection of determinants of intention to use GRAIDS was guided by a psychological theory of attitude–behaviour relationships, the Theory of Planned Behaviour (TPB, Fig. 1). Intentions to adopt GRAIDS served in this study as a proxy measure of behaviour. According to the TPB, individual’s intention and behaviour is determined by three key factors: attitude (an evaluation of the behaviour), subjective norm (perceived social pressure to perform the behaviour) and perceived behavioural control (perceived difficulty and perceived control over performing the behaviour). Whilst salient beliefs about perceived advantages and disadvantages of performing the behaviour are assumed to determine attitudes, beliefs about perceived social pressure determine subjective norms.

Results

Response rate and sample characteristics

Of the 1003 e-mail invitations sent, 268 were rejected by the server due to incorrect or invalid e-mail addresses. Ninety-one were not practising GPs and 31 GPs did not wish to participate. Ninety-five responses were lost due to a technical error with the server and 38 questionnaires were received blank. After four reminders, the adjusted response rate accounting for invalid e-mail addresses, ineligibility of participants and lost data was 52.4% (268/511). A telephone survey of 114 out of the total of 212 non-respondents, yielded a response rate of 63% (72/114).

Seventy per cent of respondents were male, 49% had practised for no more than ten years and 42% came from suburban practices. Non-respondents were significantly more likely to be female ($P < 0.05$).

Current practice regarding family history taking and risk assessment

Sixty-eight per cent reported routinely collecting information about family history of cancer from newly registered patients. Over the previous six months 84% had discussed family history of at least one type of cancer with a patient with four patients on average requesting advice about their family history of cancer (mean = 4.26, SD = 2.62, range 0–10).

Preferences about particular attributes of GRAIDS

GRAIDS features rated as extremely important were the authoritativeness of the guideline (90%), easy

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**Figure 1**  *The theoretical framework—the theory of planned behaviour*
user interface (82%) and validity and reliability of risk estimation (92%) and advice about patient management (75%).

GPs were interested in verbal (87.4%), numerical (90.5%) and graphical (67.7%) formats of risk presentation. The appreciation of more than one format of risk presentation found here is consistent with findings of related studies of primary care professionals’ risk communication.6

**Intention to use GRAIDS for the management of familial cancer**

In the online survey (n = 268), 32% and 60% of respondents stated that they would be extremely or fairly likely respectively to use such software, if it were made available. In the telephone survey of non-respondents (n = 72), 7% and 61% reported that they would be extremely or fairly likely respectively to use GRAIDS.

**Factors associated with intentions to use GRAIDS**

Correlations between each of the statements representing behavioural and normative beliefs and intentions are shown in Table 1. All statements relating to perceived advantages of using the program were strongly positively correlated with intentions. Two out of three items representing perceived disadvantages (‘the potential to increase patient anxiety’ and ‘prolong consultation’) were negatively correlated with intention. Social influence factors were all significant correlates of intentions to use GRAIDS. The TPB components (attitudes, subjective norms and perceived control) and the measure of perceived confidence were also strongly correlated with intentions to implement GRAIDS.

**Discussion**

The majority of respondents reported that they would use GRAIDS for the management of familial cancer. Historically, many computer decision support systems have not been used in routine practice because they have not met users’ needs. Key features of GRAIDS were the authoritativeness of the guideline, easy user interface, the validity and reliability of risk estimation and specific advice about patient management. In applying the TPB, we have demonstrated the utility of the theory-based framework in describing factors associated with intentions to use GRAIDS. The finding that attitudes toward using GRAIDS are correlated with intentions to use such tools is in keeping with previous studies of GPs’ use of guidelines, where highly positive attitudes to guidelines were shown to be associated with improved uptake of guidelines.7

This study demonstrated the acceptability of the Internet as a potential resource for medical research.8,9 Internet-based data collection offers a rapid and inexpensive way of conducting surveys and automating

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
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</thead>
<tbody>
<tr>
<td>If I used Web-enabled decision support . . .</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>This would result in improved clinical outcomes</td>
<td>2.84</td>
<td>0.61</td>
<td>0.361**</td>
</tr>
<tr>
<td>This would result in more consistent diagnostic decisions</td>
<td>3.09</td>
<td>0.59</td>
<td>0.479**</td>
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<td>This would enhance my consultations</td>
<td>3.04</td>
<td>0.61</td>
<td>0.539**</td>
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<tr>
<td>This would provide a more effective way of sharing information with patients</td>
<td>3.28</td>
<td>0.58</td>
<td>0.448**</td>
</tr>
<tr>
<td>I would run the risk of increasing patient anxiety</td>
<td>2.28</td>
<td>0.65</td>
<td>–0.158**</td>
</tr>
<tr>
<td>This would prolong my consultation</td>
<td>3.38</td>
<td>0.61</td>
<td>–0.218**</td>
</tr>
<tr>
<td>There would be medico-legal consequences of incorrect advice</td>
<td>2.82</td>
<td>0.81</td>
<td>0.007</td>
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<tr>
<td>Other members of my practice would want me to use Web-enabled decision support</td>
<td>2.82</td>
<td>0.58</td>
<td>0.249**</td>
</tr>
<tr>
<td>Other GPs in this country would want me to use Web-enabled decision support</td>
<td>2.78</td>
<td>0.58</td>
<td>0.249**</td>
</tr>
<tr>
<td>If I used Web-enabled decision support, this would be acceptable to my patients</td>
<td>3.26</td>
<td>0.59</td>
<td>0.472**</td>
</tr>
<tr>
<td>Attitude toward using GRAIDS (5-pt scale)</td>
<td>4.01</td>
<td>0.76</td>
<td>0.546**</td>
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<td>Subjective norm (perceived social influence) to use GRAIDS</td>
<td>2.95</td>
<td>0.45</td>
<td>0.477**</td>
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<td>Perceived ease of using GRAIDS</td>
<td>2.79</td>
<td>0.72</td>
<td>0.109</td>
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<td>Perceived control over using GRAIDS</td>
<td>3.18</td>
<td>0.73</td>
<td>0.225**</td>
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<td>Perceived confidence about conducting appropriate risk assessment using GRAIDS</td>
<td>2.92</td>
<td>0.53</td>
<td>0.396**</td>
</tr>
<tr>
<td>Perceived confidence about making appropriate decisions using GRAIDS</td>
<td>2.94</td>
<td>0.51</td>
<td>0.394**</td>
</tr>
<tr>
<td>Intention to use GRAIDS for the management of familial cancer</td>
<td>3.23</td>
<td>0.63</td>
<td></td>
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*All 4-pt scales except where otherwise indicated. **P < 0.01.
data entry\textsuperscript{10} but can suffer from selection and response biases.\textsuperscript{11} Internet respondents are likely to have different social and demographic characteristics from the general population.\textsuperscript{10} The population that we identified for the electronic survey were Internet-literate GPs. We selected this group because they are most likely to be early adopters of Internet-based decision support technology and could be important in promoting the use of such technology in primary care.\textsuperscript{12} The results of this study are probably unrepresentative of the general GP population particularly since non-respondents demonstrated lower levels of intention to use GRAIDS.

The study has enabled a more thorough understanding of factors that influence GPs’ intention to use GRAIDS for the management of familial cancer. The findings from this study will inform the development and implementation of GRAIDS as part of a programme of research to evaluate the effectiveness of computer support in supporting the integration of genetic medicine into primary care (www.graids.org).

Acknowledgements

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References