The potential for a web based intervention to improve young adult passenger safety

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Abstract

Young drivers aged 17-24 are consistently overrepresented in motor vehicle crashes. Research has shown that a young driver’s crash risk increases when carrying similarly aged passengers, with fatal crash risk increasing two to three fold with two or more passengers.

Recent growth in access to and use of the internet has led to a corresponding increase in the number of web based behaviour change interventions. An increasing body of literature describes the evaluation of web based programs targeting risk behaviours and health issues. Evaluations have shown promise for such strategies with evidence for positive changes in knowledge, attitudes and behaviour. The growing popularity of web based programs is due in part to their wide accessibility, ability for personalised tailoring of intervention messages, and self-direction and pacing of online content. Young people are also highly receptive to the internet and the interactive elements of online programs are particularly attractive.

The current study was designed to assess the feasibility for a web based intervention to increase the use of personal and peer protective strategies among young adult passengers. An extensive review was conducted on the development and evaluation of web based programs. Year 12 students were also surveyed about their use of the internet in general and for health and road safety information. All students reported internet access at home or at school, and 74% had searched for road safety information. Additional findings have shown promise for the development of a web based passenger safety program for young adults. Design and methodological issues will be discussed.

Keywords

Web based programs, Young adults, Passenger safety
Introduction

Young drivers aged 17-24 are consistently overrepresented in motor vehicle crashes. In 2003, young persons constituted 12% of Queensland’s population, but represented 27% of all crash fatalities (1). Evidence shows that a young driver’s crash risk increases with the number of similarly aged passengers (2,3). A two to three fold increase in fatal crash risk for young drivers has been shown with two or more passengers (2).

It is well documented in the literature that the presence of a male passenger is associated with a high crash risk for young people. However, figures from the Australian Transport Safety Bureau’s fatal road crash database reveal that females accounted for 36% of the passenger fatalities for those aged 14-18 years during the years 1999 – 2009 (4). Additionally, claimant data sourced from the Motor Accident Insurance Commission, showing the total number of claimants from motor vehicle accidents in Queensland during the period 1994 - 2008, reveals that those aged 16-25 years had the highest rate of claims, with female claimants in this age group being slightly more represented (54%) (5). These figures indicate that motor vehicle crash related injury is a significant problem for both male and female young drivers and passengers.

The Youth Risk Behavior Surveillance survey is a large scale bi-annual school based survey conducted in the United States, monitoring adolescent participation in risk behaviours. The most recent results indicate that 29% of students in grades 9-12 had ridden with a drink driver in the month prior to the survey (6). A survey conducted by the current authors of 595 Year 9 students (aged 13-14 years) from Queensland high schools supports the finding of a high level of passenger risk behaviour among adolescents. This survey showed that 26% of males and 20% of females had ridden with a dangerous driver, while 22% of males and 18% of females indicated that they had ridden with a drink driver in the past 3 months. Data from this same survey showed that 14% of students reported having been injured as a passenger in a vehicle, with 17% of injured students requiring medical treatment (7).

Theories of development have shown that peer groups become increasingly important through adolescence and that peers may act to shape behaviour. Most commonly in research, peer influence has been considered as a risk factor for adolescent risk taking behaviour. For example, research on young drivers shows that with the presence of peers in the car they are at increased likelihood of traffic violations (2). However, there is some research which also shows that positive peer behaviours are related to adolescents’ risk taking. Research on prosocial peer interaction suggests that peers can and do exert a protective effect on other young adults’ risk taking behaviour by intervening. For example, Smart and Stoduto (8), in a study of 1,184 adolescents, found that approximately one-third to one-half of students reported having intervened in their friends’ illegal drug use, cigarette smoking, alcohol use and drink driving behaviour. Research with college students has also shown that prevention of friends’ drink driving was more likely within close relationships, and that those students who reported protective behaviour most often offered to call a taxi or took car keys away from friends who had been drinking (9).

The aim of the current study was to determine the feasibility for a web based intervention to reduce young adult driving and passenger related injury by increasing the use of personal and peer protective strategies among young adult passengers. The feasibility study involved an extensive review on young adult internet use and methods used to develop and evaluate web based programs. Additionally, Grade 12 students were surveyed about their use of the internet in general and for health and road safety information.

Young adults’ use of the internet

Australian Bureau of Statistics (ABS) figures for 2006 reveal that 66% of households at the national level have internet access, although this rate varies according to location (lower levels of access in rural areas).
and household composition (families with children have higher levels of access) (10). The ABS also reports that 79% of males and females aged 15-24 years have access to the internet at home. Data from Quantum Market Research’s YouthScan project, in which in-home interviews are conducted bi-annually with 600 NSW and Victorian 10-17 year olds and their parents, reveals that 85% of adolescents report having used the internet in the past month (11). Additionally, a US study of internet accessibility and usage among urban adolescents in California revealed that, while only 40% reported internet access at home, 90% reported access at school, with nearly all (99%) being able to access the internet at either school or home (12).

Internet health information-seeking behaviour

While there is a lack of research to date on young adults’ use of the internet for road safety information, there have been a number of studies examining adolescents’ use of the internet for health information. These studies have been primarily conducted in the United States. One such study of 412 Grade 10 adolescents in suburban New York, using an in-class paper and pencil survey method, showed that 49% of students had used the internet to obtain health information (13). In response to items asking for the health information they searched for, students indicated that the topics most often explored included sexual health, diet, fitness and exercise. These adolescents perceived online health information to be of high value in terms of worth, trustworthiness, use and relevance.

A qualitative study of health information-seeking behaviour among 11-19 year olds conducted in the UK and the US revealed that the internet was the primary information source for many of the participants (14). Those participants in this study most likely to use the internet for health information were female and older male adolescents, although adolescents from both public and private schools reported health information seeking behaviour, suggesting that there were no socioeconomic differences. Perceived credibility of health information found on the internet varied for this sample, because of difficulties in assessing the expertise and trustworthiness of specific sites.

Web based health promotion programs: evaluation research

Growth in access to and use of the internet has led to a corresponding increase in the number of web based intervention programs aimed at health-related behaviour change. While there are a number of websites for young drivers that provide road safety information, there is an increasing body of literature that describes the evaluation of web and computer based programs moving beyond simple information provision and targeting behaviour change in health risk behaviours. Web based programs for smoking (e.g. 15-17), violence (e.g. 18,19), sexual activity (e.g. 20,21), alcohol use (e.g. 22), and mental health issues including depression, anxiety and eating disorders (e.g. 23-25), have all been trialled with young adult samples. Many of these have shown success in changing knowledge of and attitudes to risk behaviours, or the risk behaviour itself. Several of these more relevant to the current project, including web based programs for young peoples’ alcohol use and general risk taking (including those implemented in a school based context) are discussed in further detail below.

Alcohol interventions: There has been a recent increase in the number of web and computer based programs targeting change in young peoples’ alcohol use. A recent randomised control trial conducted in 16 Australian schools compared a multi-session, curriculum-integrated and computerised harm minimisation program with usual classes on changes in Year 8 students’ knowledge, alcohol use, alcohol related harms and alcohol expectancies (26). Findings showed significant positive behavioural changes of reduced alcohol use among females who used the computerised program as well as increased knowledge and decreased positive social expectations among all intervention students as compared to controls. Wall (22) reports on the evaluation of AlcoholEdu, an interactive web based program made available to college students. Findings suggested that this 5-chapter program was particularly effective with first year
students. Chiauzzi et al. (27) also report on the effectiveness of the interactive alcohol component of the My Student Body website, which promotes healthy behaviours among college students across the US. The findings of this study indicate that the site was especially effective among women and persistent binge drinkers, when compared to users of a text based alcohol education website. The website was also reported to be successful in capturing students’ interest, with many students indicating that they would visit the website again.

**General risk taking intervention:** An older but more broadly focused computer based program, the BARN (Body Awareness Resource Network) System, targeted adolescent health promotion and behaviour change across a number of risk behaviours including alcohol and other drug use, smoking, and sexual activity. The program was provided to adolescents in grades 6-12 in schools in the US (28). BARN was made available in schools where students could choose to use the program during their free time, and made use of games and simulations to attract teens. The evaluation of BARN revealed that it was widely used by both middle and high school students, and that it particularly was attractive to students who had already experimented with risk behaviours. Overall, the study found that BARN users were more likely to abstain from risk behaviours than were nonusers.

**Summary and research aim**

A review of the literature therefore reveals many different programs targeting a number of adolescent risk behaviours. Overall, evaluation of these programs has revealed varying results, however the conclusions reached in these studies indicate that web based programs show promise for adolescent samples and that research should continue into their effectiveness. Particularly, web based programs have shown promise because they allow for consistent delivery, wide accessibility, personalised tailoring, and because adolescents are more likely to disclose information on risky behaviour and other sensitive issues online. Adolescents are also receptive to the internet, and interactive elements of online programs such as multimedia information and games are appealing and attractive to this age group (29). Programs can also be self directed and paced at a level suitable to the individual adolescent and their interests and priorities (29). Therefore web based programs can be engaging and effective for adolescents, especially when the topic is one that is relevant to them.

The review therefore indicates that web based programs may be an effective means of targeting young adult health behaviour change. It is apparent, however, that more information is needed about the use of the internet by young people outside of North America. Further, while there are a number of examples of web based programs targeting health behaviour change, there are few examining road safety. An initial step to developing a web based road safety program is to examine the scope and demand in the context in which the program may be implemented. The current study therefore aimed to explore internet use among a group of young adults in Australia and determine the potential for a web based program targeting a reduction in young adult passenger related injuries.

**Method**

**Participants**

Seventy-two Grade 12 students (n=42 females, n=30 males; mean age = 16.9 years) from one high school in the greater Brisbane area participated in this exploratory study. The Index of Relative Socio-Economic Advantage/Disadvantage, as derived from the 2001 Australian Census, was noted for the Statistical Local Area, or geographical area in which the school is located. The Index of Relative Socio-Economic Advantage/Disadvantage is a rating constructed from attributes of the population in the area, such as educational attainment, income, employment and occupation. Index rating scores range from 1-10, with
low values indicating disadvantage and high values indicating advantage. The school was located in a disadvantaged area, with an Index score of 1 (30).

The majority (55.2%) of students identified their background as being White Caucasian, with 16.4% identifying as Pacific Islander, 10.4% as Asian, and 4.5% as Aboriginal/Torres Strait Islander. Many students were beginning to have driving experiences; 46.7% of males held a driver’s license (26.7% learners; 20.0% provisional) and 63.2% of females held a license (55.3% learners; 7.9% provisional). In Queensland, young people are eligible for a Learner permit at 16 years, and first stage Provisional at 17 years.

Measures

The 10 minute survey consisted of items relating to internet access, frequency of internet use, internet activity, and road related items including possession of a driver’s license, use of the internet for road safety information (e.g. RACQ Free2Go1), and likelihood of visiting a passenger safety website. Demographic items were also included.

Procedure

Approval to conduct this research was initially obtained from the school principal as per the Queensland Department of Education and Training and university (QUT) research protocol. Parental consent was obtained prior to the students’ participation by sending an information sheet and consent form home about the survey. Students were only able to participate with written parental consent. Participants were invited to complete the survey while attending a ‘Schoolies’ expo held at the school. Students with parental consent who approached the stand were initially provided with their own information sheet and consent form. Upon providing written informed consent, students completed the survey at the ‘Schoolies’ expo stand.

Results

General internet use

Table 1 shows the proportion of students who reported having access to the internet in different locations. Overall, 100% of the students surveyed in this research indicated that they have access to the internet either at home, school or a friend’s house.

<table>
<thead>
<tr>
<th>Access to internet at…</th>
<th>Males %</th>
<th>Females %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>96.7</td>
<td>95.2</td>
</tr>
<tr>
<td>School</td>
<td>90.0</td>
<td>92.9</td>
</tr>
<tr>
<td>Friend’s house</td>
<td>86.7</td>
<td>88.1</td>
</tr>
<tr>
<td>No access to internet</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. No missing data

Table 1: Proportion of Grade 12 students reporting internet access

Table 2 shows the length of time in an average day that students reported spending on the internet. Overall, 83.4% of males and 92.5% of females reported spending at least 30 minutes on the internet in an average day, with 23.3% of males and 15.0% of females spending greater than 3 hours.

1 Free2Go is RACQ’s youth membership program. The RACQ Free2Go website also provides information to young people about getting a license, learning to drive, buying a car, road safety, etc.
Table 2: Length of time in an average day spent on the internet

Table 3 shows the proportion of students indicating that they used the internet regularly for particular activities. Health related information searches were the least commonly reported internet activity (in comparison to other activities such as emailing, messaging and downloading music), with 25.0% and 12.8% of males and females respectively indicating that they regularly used the internet for health information. Of those who searched for health related information, alcohol (51.5%), violence (42.4%) and diet (42.4%) were the most commonly reported topics, with injury information also reported by 37.9% of these students.

Table 3: Activities/information Grade 12 students reported regularly using the internet for

Road safety related internet use

Students were asked if they had used the internet to search for road safety information, and whether they had visited the RACQ Free2Go website. They were also provided with a description of an idea for a passenger safety website, as follows: “We are planning to develop an interactive, educational website for people your age (with videos, surveys, and educational activities etc.) that will teach young people about road safety, particularly in terms of being a passenger of dangerous drivers”. Students were asked to indicate whether they would visit such a site. Table 4 shows student responses to these questions, by gender and license status. Chi square tests revealed no significant differences by sex or license status on having searched for road safety information or likelihood of visiting a passenger safety site.
Further chi square tests were conducted to determine whether there were any differences in having searched for road safety information or visiting a passenger safety site by ethnic background, frequency of internet use, or past use of the internet for health related information. No significant differences were found. A chi square test conducted on differences in likelihood of visiting a passenger safety site by past use of the internet for road safety information did however show a result approaching significance for males $\chi^2(1, N = 28) = 3.70, p = .054$. Males who had searched for road safety information in the past were more likely to report that they would visit a passenger safety site (86.4%) than those who had not searched for road safety information (50.0%). This difference did not hold for female participants $\chi^2(1, N = 38) = 0.03, ns$.

**Discussion**

The results of this study reveal high levels of internet access and usage among young adults, with 100% of the sample having access to the internet either at home, school or a friend’s house. Additionally, the large majority of students in this study reported using the internet for at least 30 minutes in an average day. It therefore appears as though the internet is potentially an important way to provide large scale health communication to this age group.

The current results also reveal that many young adults are already accessing health and road safety information online. The internet may therefore be a useful method of delivery for injury prevention and road safety messages and particularly relevant to adolescents beginning to drive. An important finding in the current study was that licensed and unlicensed students were equally likely to have searched for road safety information online, and were also equally likely to indicate that they would visit a passenger safety site. Overall, 86.6% of the students in this study suggested that they would visit the passenger safety site described in the survey, with the result not differing by sex. These are encouraging findings, suggesting that a web based intervention may be a feasible method of delivery passenger safety information. The findings indicate that this may hold true for unlicensed young adults and also females who are likely to be passengers of risky drivers and be injured in such a scenario.

The processes for the design and evaluation of a web based intervention to improve young adult passenger safety are important to consider. Repeatedly, the literature reveals several design aspects of web based programs that have impacted on program effectiveness. Nearly all evaluations indicate that the provision of immediate, personalised feedback is an essential component to ensure program effectiveness. Many programs do this based on demographic variables entered on commencement of the program, as well as on responses provided throughout navigation of the webpage. The capacity of web based programs to provide automatic, tailored feedback to each participant at key intervals throughout the program is one reason for the increasing popularity of such programs in health promotion research. Results of the current survey with Grade 12 students also show that they are familiar with the interactive features of internet sites and therefore may be quite comfortable with web programs that provide tailored and interactive feedback.

Another aspect frequently mentioned in web based program research involving young adult samples is the attractiveness of interactive games and activities. Several evaluations (e.g. 28) have shown that interactive games are the most frequently accessed components of the intervention. The results of the survey in the current study also show that young adults use the internet primarily for social networking (e.g. emailing, instant messaging) or interactive activities (e.g. watching videos and playing games). Harnessing the power of the internet to deliver health messages in an interactive and engaging manner is an important design consideration for web based programs targeting adolescents.
The behavioural change goals of the proposed web program, which are to increase the use of personal and peer protective strategies among young adult passengers, would also seem to require an interactive approach that moves beyond simple information provision. Many programs aiming to change behaviour also require access to the program over multiple sessions. Evaluations of multi-session web based programs, however, are often faced with high levels of attrition (31). Rates of attrition are reported as much lower in studies involving school-based samples (where participation is required as part of a classroom activity) or in those involving incentives. While the use of incentives is beneficial for evaluation research, this approach is much less likely to be sustainable when moving beyond a research trial. Researchers and program designers therefore need to consider ways in which to encourage sustained participation throughout a multi-session program. This may include, for example, providing email reminders or enhancing interactive aspects of the program to encourage return. Ideally, however, a web based road safety program for young adults would be attached to required senior high school class work or homework activities, to encourage maximum participation and reduce attrition over multiple sessions. The findings from the current study do suggest that the majority of young people do regularly use the internet for schoolwork, and that many students would also consider visiting a website relating to young adult passenger safety.

The development and trial implementation of a web based passenger safety program would also require consideration of evaluation and data collection methodologies, several of which are unique to web based interventions. For example, site usage tracking has also been frequently raised as a consideration in web based program evaluation. Tracking can involve, for example, continued monitoring of the pages that are viewed most often, the paths that users take through a site, the length of time that users stay on the site, and the links that are clicked on most often. At the very least, research indicates that monitoring needs to include the number of times that a user has logged on with their individual username and password (e.g. 15). One limitation to online tracking has been suggested as knowledge of whether a user is actually ‘on task’ when they are logged on to the program, as opposed to browsing in another open window or in fact away from their computer (31). Some studies have attempted to address this limitation through the use of self report methods to gather tracking information (e.g. survey items asking about percentage of content accessed, etc.). Web based programs may also make use of online forum/discussion boards, where comments about the site and reactions to program content can be discussed by users. Some studies have in fact made it an intervention requirement for users to post at least one message or response to another user’s message on the program discussion board during each session (e.g. 32). Approximately one-quarter of females and one-third of males in the current study indicated that they regularly visit or use chat rooms or message boards on the internet, suggesting that this may be a potentially useful method for program evaluation.

A limitation of many web based programs to date has been the lack of understanding of the effectiveness of specific program components in terms of web based delivery. Future research has been recommended into assessing components of programs that may be particularly suited to a web based structure and identifying those that require more personalised face to face delivery (29). For the currently considered passenger safety program, this would mean identifying aspects of passenger safety information that would be appropriate to cover online in an individualised context, and aspects which are better explored in group settings, such as a classroom environment, facilitated by a teacher or road safety professional.

A limitation of the current research is the small size and homogeneous nature of the sample. The survey was conducted in one school with 72 Grade 12 students. The results of the current study may therefore not generalise to the wider young adult population. It is interesting to note, however, that despite conducting this survey in a low socioeconomic area, all participating students reported having access to the internet. Web based interventions may therefore be a feasible and easily accessible method of communication to young adults in both low and high socioeconomic urban areas. Further research with
young adults in regional and rural areas regarding access to and scope of the internet for road safety information would be required. The current research also did not look at aspects of the design of a program that would encourage young adults to make use of it. Although we may be able to infer from the current results that interactive activities are preferred when using the internet, future research may look at the aspects and features of web pages and programs that would encourage potential users to access and return to such sites.

Summary and conclusions

It therefore seems as though a web based program may be a feasible method for the prevention of young adult passenger related injuries. The results of the current survey with Grade 12 students revealed that young adults are active internet users and are already accessing health and road safety information online. Additionally, the majority of these students (importantly, both licensed and unlicensed) report that they would access a website dedicated to young adult passenger safety. A number of considerations relevant to the design, implementation and evaluation of such a program require consideration, however, prior to development. Specifically, the goals of the proposed program, to increase the use of personal and peer protective strategies among young adult passengers, would seem to require an interactive approach moving beyond simple information provision. A comprehensive evaluation of the program would also be required, ideally with recruitment through senior high school curriculum activities or homework assignments to avoid the high levels of attrition frequently observed with multi-session programs. Evaluations of other web based programs targeting change in young adults’ risk behaviours have shown promising successes, however, indicating that the development of such a program for young adult passenger safety would be both feasible and worthwhile.

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References


