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A social media approach to inform youth about breast cancer and smoking: An exploratory descriptive study



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Summary Tobacco exposure during periods of breast development has been shown to increase risk of premenopausal breast cancer. An urgent need exists, therefore, to raise awareness among adolescent girls about this new evidence, and for adolescent girls and boys who smoke to understand how their smoking puts their female peers at risk for breast cancer. The purpose of this study was to develop two youth-informed, gender specific YouTube-style videos designed to raise awareness among adolescent girls and boys about tobacco exposure as a modifiable risk factor for breast cancer and to assess youths' responses to the videos and their potential for inclusion on social media platforms. Both videos consisted of a combination of moving text, novel images, animations, and youth-friendly music.

A brief questionnaire was used to gather feedback on two videos using a convenience sample of 135 youth in British Columbia, Canada. The overall positive responses by girls and boys to their respective videos and their reported interest in sharing these videos via social networking suggests that this approach holds potential for other types of health promotion messaging targeting youth. The videos offer a promising messaging strategy for raising awareness about tobacco exposure as a modifiable risk factor for breast cancer. Tailored, gender-specific messages for use on social media hold the potential for cost-effective, health promotion and cancer prevention initiatives targeting youth.

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Introduction

Evidence from recent systematic reviews and independent studies demonstrates a causal link between cigarette smoking at a young age and an increased risk for premenopausal breast cancer (Bjerkaas et al., 2013; Collishaw et al., 2009; Dossus et al., 2014; Gantz & Johnson, 2014; Johnson, 2005, 2012). In addition to active smoking, long-term exposure to second-hand smoke is also associated with an increased risk for breast cancer among never smokers (Collishaw et al., 2009; Reynolds et al., 2009). Physiological mechanisms that have been proposed to explain the link between exposure and increased breast cancer risk are based on research demonstrating that growing and differentiating mammary tissue, as occurs during puberty and pregnancy, is especially vulnerable to the carcinogens found in cigarette smoke (Innes & Byers, 2001; Lash & Aschengrau, 1999). There is, therefore, an urgent need for adolescent girls to know about this new evidence, and for adolescent girls and boys who smoke to understand how their smoking puts their female peers at risk for breast cancer. Although various tobacco control measures have contributed to reductions in tobacco use (Frieden, 2014), smoking among adolescents and exposure to second-hand smoke remains too common in Canada and other countries. In 2011, 11.8% of Canadian youth ages 15–19 were current smokers, and the highest rates of second-hand smoke exposure occurred among youth ages 12–19 (Canadian Partnership Against Cancer, 2012; Reid, Hammond, Burkhalter, Rynard, & Ahmed, 2013). Rates are similar in the United States, with 14% of high school students reporting current smoking, and in Australia where rates range from 4.1% (12–15 years old) to 12.9% (16–17 years old) (Centers for Disease Control & Prevention, 2013; White & Bariola, 2012). Some have argued that traditional, school-based print and mass media campaigns have become increasingly less effective in supporting smoking cessation efforts among adolescents, largely due to lack of tailored content and their inability to connect with students on a social level (Backinger, Fagan, Matthews, & Grana, 2003). As a result, new and innovative approaches to smoking prevention and cessation are needed. The aim of this study was twofold: (a) to develop youth-informed, gender-specific YouTube-style videos designed to raise awareness about tobacco exposure as a modifiable risk factor for breast cancer, and (b) to assess youths' responses to the videos and their potential for inclusion on social media platforms. The ultimate goal of the videos was to engage adolescent girls and boys at an early age in protecting themselves and others from tobacco exposure and thereby contribute to decreasing the incidence of breast cancer. For the purposes of this study, adolescents were defined as those individuals currently in a transitional stage of physical and psychological development generally occurring between the periods of puberty and legal adulthood (National Library of Medicine, 2008). Although family members and other adults who smoke may also present a second-hand smoke exposure risk to girls, this study focused solely on messaging youth as a first step to addressing this modifiable risk factor for breast cancer.

Literature review

Recent advances in information technology and access have heralded a new era in the dissemination of health information. In the past, radio, television, and print media (including posters, pamphlets, and magazines) were dominant techniques used in dissemination of preventive health messaging campaigns. While these outlets continue to play a role, they are now thought to be less effective in reaching the public as more and more health information is accessed online (Atkinson, Saperstein, & Pleis, 2009; Backinger et al., 2003; Fox, 2011; Koch-Wesser, Bradshaw, Gualtieri, & Gallagher, 2010; Pechman & Reibling, 2000). Indeed, the growth of the internet as a significant source for health information has been established, and has been achieved in large part by the advent of social media. Because social media is a "communication channel" that delivers messages, it provides easy and cost-effective opportunities for users to generate, share, receive and comment on digital content, in the form of words, pictures, videos, and/or audio (Moorhead et al., 2013). Engagement with online content has now become a participatory activity and anyone with access to the internet can now obtain information almost instantaneously and interact with online discussions and content (Chou, Prestin, Lyons, & Wen, 2013). This interaction mimics interpersonal communication and allows the Internet to act as a medium providing two-way audible and visual feedback that is inherent in the persuasive process (Cassell, Jackson, & Chevront, 1998). Moreover, although people of all demographics are currently adopting these technologies to varying degrees, social media is desirable for health promotion in that content can be customized and tailored to the needs and preferences of different audiences (e.g., the distribution of tailored content to matched recipients' socio-demographic profiles via advertising services like Google or Facebook ads) (Korda & Itani, 2013). Message development, therefore, should account for user characteristics and take into account target audience preferences for specific types of content and preferred technologies or tools (Korda & Itani, 2013). As youth are some of the most avid users of social media, the development and availability of tailored content for this age group provides an opportunity to extend health promotion efforts. Needed now is empirical evidence regarding the impact and usefulness of social media and the evaluation of internet-based interventions directed at disease prevention and health behaviour change to guide future initiatives.

Statistics Canada estimates that approximately 7 in 10 Canadians aged 16 and older currently search the internet for health information (Statistics Canada, 2009), with similar rates reported in the United States and the United Kingdom (Dutton & Blank, 2011; Pew Internet & American Life Project, 2013). This trend has been particularly significant among adolescents. Like many of their counterparts around the world, Canadian teens spend a significant amount of time online, with the majority of their time spent visiting websites like YouTube (79%) and other social networking sites (69%) (Ipsos Reid, 2012). Previous research has found that young people regularly identify the internet as an important resource for health information (Buhi, Daley, Fuhrmann, & Smith, 2009; Fergie, Hunt, & Hilton,

2013; Gray, Klein, Noyce, Sesselberg, & Cantrilol, 2005; Skinner, Biscope, Poland, & Goldberg, 2003; Struik, Bottorff, Jung, & Budgen, 2012). Adolescents today are a unique group – they are of a generation that has grown up with virtually unlimited access to online technology and it is estimated that approximately 83 percent own or share a home computer and over 67 percent own a mobile phone (Ipsos Reid, 2012). Social media includes a broad range of communication tools and mechanisms of access that cross multiple socio-demographic groups and can facilitate a sense of connectedness among individuals all the while providing a sense of anonymity and control (Korda & Itani, 2013). Because of their large-scale popularity, social media websites are primed for their application to the health field and, not surprisingly, have emerged as common sources of health information (Korda & Itani, 2013; Sarasohn-Kahn, 2008). Indeed, efforts to engage diverse audiences including youth in health messaging are more likely to be successful if they involve digital media that interface easily with social media platforms and mobile devices, including Facebook, Twitter and, most notably, YouTube (Neiger et al., 2012).

According to YouTube, more than 1 billion unique international users visit the website each month (YouTube, 2013) and the potential power YouTube holds for disseminating health information, such as smoking cessation, cannot be underestimated (Vance, Howe, & Dellavalle, 2009). As a result, YouTube has also become the most researched social media site among tobacco control researchers (Freeman, 2012). A 2007 study of YouTube content related to smoking cessation by Richardson, Vettese, Sussman, Small, and Selby (2011) found of the over 2200 videos available related to smoking cessation (using the terms “quit smoking stop smoking”), few offered strategies for quitting smoking that were known to be effective and the authors noted there was a pressing need for research-based and professional YouTube content to facilitate smoking cessation efforts online. A subsequent search of similar YouTube content one year later found similar results and called for further investigation into whether YouTube videos are effective in increasing knowledge and changing behaviours and attitudes regarding smoking cessation (Backinger et al., 2011). In 2013, a cursory search of the same terms used in Richardson et al.’s (2011) study yielded over 279,000 videos. Similarly to previous studies, however, the quality of these videos cannot always be established, because authorship can be difficult to determine, there is often an absence of source citation, and many users post personal opinions as fact (Paek, Kim, & Hove, 2010; Vance et al., 2009). Additionally, because social media content is not heavily regulated, adolescents can also be exposed to content that is harmful or age-inappropriate (Kim, Paek, & Lynn, 2010). Research has shown that many adolescents are regularly exposed to pro-tobacco content online and the tobacco industry continues to exploit social media websites such as YouTube and Facebook with pro-tobacco advertising (Gray, Freeman, & Chapman, 2010; Freeman, 2012; Jenssen, Klein, Salazar, Daluga, & DiClemente, 2009; Paek, Kim, Hove, & Huh, 2013). What is clear is that social media platforms have become an integral part of adolescent life. As a result, health professionals and researchers must learn more about the use of these platforms and explore their potential in delivering

research-based tobacco control messages in a variety of ways and to develop effective counter-advertising initiatives to combat the effects of pro-tobacco advertising to prevent unwanted exposure to tobacco. Additionally, these ‘new media’ also reflect an opportunity for tobacco control experts to collaborate on online social marketing campaigns and provide a means of distribution of media and information that can assist online users in avoiding or quitting smoking (Freeman, 2012). However, Dawson et al. (2011) caution that the successful creation of effective prevention messages can be challenging and a “one-size-fits-all” approach is unlikely to have a large impact and efforts to address specific audience characteristics likely enhance a message’s effectiveness. While both young women and men appear to use the internet in equal amounts, current data suggest there are gender-related factors in online activities among adolescents (Pujazon-Zasik & Park, 2010) and efforts to develop gender-specific interventions are warranted (Struik et al., 2012). Girls aged 17–19 years of age who participated in a focus group study recommended that tobacco control messages on social networking sites targeting girls reinforce positive health behaviours associated with being smoke-free, avoid stereotypes and sexualized images, and involve young women in the development to ensure age-specific content (Struik et al., 2012).

Researchers have begun to gather youth perspectives on messages about smoking and breast cancer. Bottorff et al. (2014) reported a high level of interest in information about tobacco exposure and breast cancer, a finding that stands in direct contrast to tendencies among youth to discount the health effects associated with tobacco use. In interpreting these findings, it was suggested that breast cancer consumerism and public awareness campaigns along with physical changes during puberty and gender identity construction associated with transition into womanhood serve to reinforce the salience of the information about breast cancer risk and smoking among young women. Interestingly, because young women viewed the link between breast cancer and smoking as more than an individual concern, they recommended that health messages be developed to include the notion of protecting others. In addition, they expressed interest in learning more about this risk factor and were adamant that they be provided with “the facts.”

Despite the need for early age prevention programmes, there have been few efforts to develop detailed information about smoking and breast cancer for young women. Researchers examining breast cancer messages targeting young women have been critical of the use of sexualized images and messages, and emphasized the value of involving young women in guiding the development of age appropriate and gender-sensitive breast cancer messages in the future (Haines et al., 2010). The benefit of social media is that it can be easily customized to the needs and preferences of target audiences and there is evidence that tailored messaging encourages users to engage with interventions (Webb, Rodriguez-Esquivel, & Baker, 2010).

In our previous research, we set out to develop tailored messages for online use to increase adolescent girls’ and boys’ awareness of the breast cancer risk associated with smoking and second-hand smoke exposure. We began by holding eight focus groups with 43 youth aged 12–17 (18 girls; 20 youth of Aboriginal descent originating in Canada)

to generate ideas for age-appropriate and gender-sensitive messages [Bottorff et al. \(2014\)](#). Since boys and young men who smoke could expose girls to second-hand smoke, we also invited boys to provide suggestions for messages about breast cancer and smoking that would be directed at them. Gender-specific, infographic style messages were developed based on youths' suggestions and then tested in an online, longitudinal study involving 1499 youth in British Columbia ([Richardson et al., 2013](#)). The messages were positively framed, gender-sensitive and included novel images. Findings from the study indicated that web-based gender-specific messages are effective in increasing youths' awareness of tobacco exposure as a modifiable risk factor for breast cancer and stimulated interest among girls in receiving more information on the topic. The present study focused on extending these findings to the development of other social media approaches.

Methods

In this exploratory descriptive study, there were two phases: video development and youth evaluation. The study was reviewed and approved by a university ethics board.

Video development

Two gender-specific YouTube style videos (one tailored for girls, the other for boys) were developed for dissemination via social media by the research team and were based on the findings from our previous studies. Both videos consisted of a combination of moving text, images, animations, and youth-friendly music. The videos were approximately two minutes in length and were designed to be viewed via a computer, mobile device, or smartphone. The aim of the videos was to raise awareness about breast cancer and smoking, and encourage youth to engage in behaviours to reduce girls' tobacco smoke exposure.

The girls' video (<http://www.youtube.com/watch?v=jN8alidGceQ>), entitled "Too young to think about breast cancer?" provided adolescent girls with important information related to breast cancer incidence, the risk of breast cancer associated with tobacco smoke exposure, the developmental stage when girls are most at risk, locations where girls are most often exposed to tobacco smoke, and advice on what girls can do to reduce their risk of breast cancer ([Fig. 1](#)). Similarly, the boys' video (<http://www.youtube.com/watch?v=6J0B2p0tpw4>) entitled "Guys: a lesson on breasts", provided adolescent

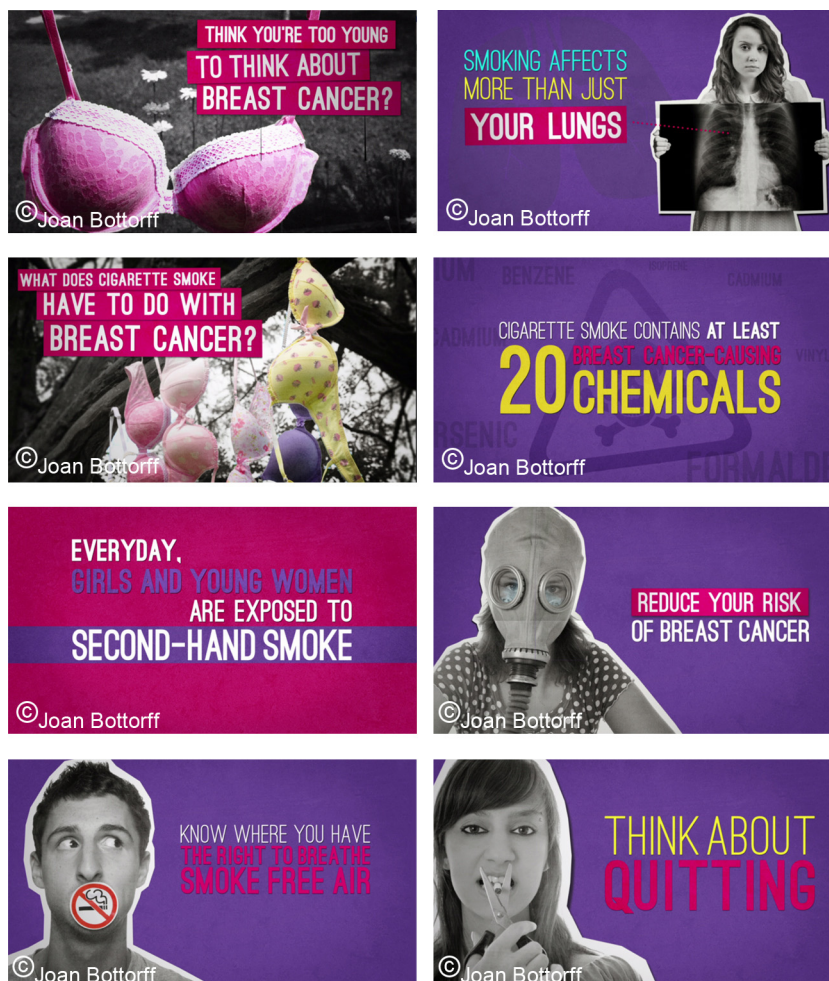


Figure 1 Girls' video snapshots.

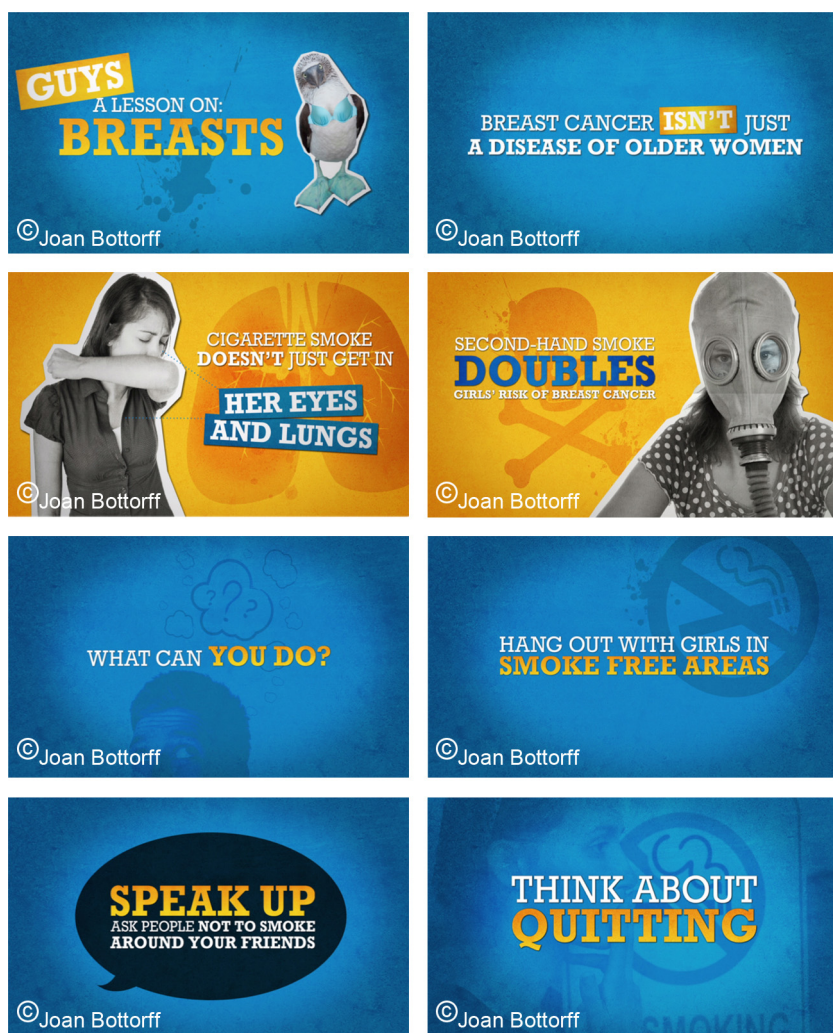


Figure 2 Boys' video snapshots.

boys with information related to the risk of breast cancer associated with girls' exposure to tobacco smoke, locations where girls are most often exposed, and advice on respecting girls by not exposing them to tobacco smoke. In both videos, girls and boys who smoked were encouraged to avoid exposing girls to second-hand smoke and to think about quitting for themselves and the young women in their lives (Fig. 2).

Youth evaluation

Sample: A convenience sample of 135 adolescents viewed the videos and completed a feedback questionnaire. Participants were recruited from three sources in British Columbia: a conference for Aboriginal youth residing throughout the province ($n=98$), and two high school classrooms ($n=37$) in one community. An effort was made to recruit approximately the same number of girls and boys, and include youth of difference ages as well as those identifying as Aboriginal (originating in Canada).

Data collection and analysis: Upon recruitment, students were advised that their participation was voluntary

and completion of the questionnaire implied their consent to participate. Youth attending the conference were approached during lunch and refreshment breaks and invited to view their corresponding gender's videos on a tablet with headphones and complete a paper-based feedback questionnaire. The research team also presented the videos in two high school classrooms that included both girls and boys. For both classroom viewings, the boys' video was presented first, and the boys were then invited to complete a questionnaire. Following this the girls' video was shown and girls were invited to complete a questionnaire for only their gender-specific video. The brief survey questionnaire included a series of Likert scale-style questions to gather opinions about the features of the video, whether anything new was learned from viewing the video, and attitudes towards sharing the video with friends and family. Youth were also asked how much they agreed with a series of statements related to exposure to cigarette smoke and breast cancer risk, including: (a) 'exposure to cigarette smoke increases my/girls' risk for breast cancer', and (b) 'I am worried that exposure to cigarette smoke increases my/girls' risk for breast cancer.' Girls were asked one additional question related to the importance of protecting

themselves from exposure to cigarette smoke. Response options were based on a five-point scale, where 1 = strongly disagree and 5 = strongly agree. The last question was an open-ended question where youth could make suggestions for revisions to the videos. Descriptive statistics were used to summarize youth feedback. Narrative comments were content analyzed.

Results

The average age of participants (54% female) was 15.58 years ($n = 135$; age range: 11–19) and most were currently enrolled in grade 9 ($n = 130$; grade range: grade 6–12). Below are youths' responses to the videos.

Girls' responses to "Too young to think about breast cancer"

Overall the girls provided strong endorsement of the information shared in this video (Table 1). The majority strongly agreed or agreed that that they learned something new, that the video contained important information for teens, and that all teens should watch the video. After viewing the

video, most girls strongly agreed or agreed with the need to protect themselves from second-hand smoke, and that they worried about exposure to cigarette smoke increasing their risk for breast cancer. A large majority also agreed that protecting themselves from exposure to cigarette smoke was important.

Most girls agreed or strongly agreed that the video was easy to follow (86%) and had a good balance of pictures and words (86%). The music in the video received less positive ratings, with only 63% stating they liked the music.

The video was viewed favourably for use in social networking contexts. The majority agreed that the video should be posted on YouTube, and that they would share the video with friends and family. Suggestions for improvement included slowing the pace of the video, adding a voice over, updating the music, and sharing a personal story of breast cancer.

Boys' responses to "Guys: a lesson on breasts"

Overall the boys evaluated this video positively (see Table 2). The majority strongly agreed or agreed that the video contained important information for teen boys (93%),

Table 1 Video feedback questions – girls and boys.

Question	Gender	Mean ^a (SD)	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
I think the message in this video is important to know	Girls ($n = 73$)	4.48 (0.67)	0.0	1.4	5.5	37.0	56.2
	Boys ($n = 62$)	4.60 (0.61)	0.0	0.0	6.5	27.4	66.1
I think this video includes a good balance of pictures and words	Girls ($n = 73$)	4.22 (0.71)	0.0	1.4	12.3	49.3	37.0
	Boys ($n = 62$)	4.24 (0.64)	0.0	0.0	11.3	53.2	35.5
I like the music in this video	Girls ($n = 73$)	3.79 (0.97)	2.7	4.1	30.0	37.0	26.0
	Boys ($n = 62$)	3.50 (1.20)	8.1	6.5	35.5	25.8	24.2
I learned something new from this video	Girls ($n = 73$)	4.14 (1.10)	2.7	9.6	9.6	27.4	50.7
	Boys ($n = 61$)	4.08 (1.10)	3.3	1.6	16.4	31.1	47.5
The messages were easy to follow	Girls ($n = 72$)	4.26 (0.86)	1.4	2.8	9.7	40.3	45.8
	Boys ($n = 61$)	4.36 (0.84)	1.6	1.6	8.2	36.1	52.5
I think that all teens should watch this video	Girls ($n = 73$)	4.25 (0.81)	0.0	2.7	15.1	37.0	45.2
	Boys ($n = 62$)	4.55 (0.67)	0.0	0.0	9.7	25.8	64.5
I want to share this video with my friends/family	Girls ($n = 72$)	3.82 (0.98)	1.4	5.5	32.9	30.1	30.1
	Boys ($n = 61$)	4.02 (0.99)	3.3	3.3	16.4	39.9	37.7
I would like/share this video on Facebook	Girls ($n = 72$)	3.81 (1.00)	1.4	9.7	23.6	37.5	27.8
	Boys ($n = 62$)	4.03 (1.00)	3.2	4.8	14.5	38.7	38.7
I would tweet about this video on Twitter	Girls ($n = 69$)	3.39 (1.10)	1.4	20.3	34.8	24.6	18.8
	Boys ($n = 54$)	3.61 (1.10)	5.4	8.9	32.1	26.8	26.8
I would send links of this video to my friends	Girls ($n = 72$)	3.68 (1.10)	0.0	16.7	27.8	26.4	29.2
	Boys ($n = 62$)	3.94 (1.00)	3.2	3.2	27.4	27.4	38.7
I would text this video to my friends	Girls ($n = 73$)	3.53 (1.10)	0.0	23.3	24.7	27.4	24.7
	Boys ($n = 61$)	3.64 (1.10)	4.9	6.6	34.4	26.2	27.9
This video should be available on YouTube	Girls ($n = 73$)	4.40 (0.78)	0.0	2.7	9.6	28.8	58.9
	Boys ($n = 62$)	4.53 (0.78)	0.0	4.8	3.2	25.8	66.1

^a On a scale of 1–5, where 1 = strongly disagree and 5 = strongly agree.

Table 2 Post-video awareness of tobacco use as a risk for breast cancer.

Questions	Mean ^a (SD)	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
<i>Girls' post-video awareness (N=73)</i>						
Exposure to cigarette smoke increases my risk for breast cancer	4.48 (0.69)	0.0	1.4	6.8	34.2	57.5
Protecting myself from exposure to cigarette smoke is important	4.42 (0.85)	1.4	1.4	11.0	26.0	60.3
I am worried that exposure to cigarette smoke increases my risk for breast cancer	4.32 (0.86)	1.4	1.4	13.7	31.5	52.1
<i>Boys' post-video awareness (N=62)</i>						
Exposure to cigarette smoke increases girls' risk for breast cancer	4.58 (0.61)	0.0	1.6	1.6	33.9	62.9
I am worried that exposure to cigarette smoke increases girls' risk for breast cancer	4.45 (0.74)	0.0	1.6	9.7	29.0	59.7

^a On a scale of 1–5, where 1 = strongly disagree and 5 = strongly agree.

they learned something new (79%), and that all teens should watch the video (90%). Following the video, over 63% of the boys strongly agreed that exposure to cigarette smoke increases girls' risk for breast cancer, and the majority (89%) strongly agreed or agreed that they were worried that exposure to cigarette smoke increases girls risk for breast cancer.

Over two thirds of boys agreed or strongly agreed they wanted to share the video with their friends/family (78%). Interestingly, a majority of boys also strongly agreed or agreed that they would send links of the video to their friends (66%) and that the videos should be made available on YouTube (92%).

Similar to the girls, the messages in the boys' video were endorsed as being easy to follow (87%), and has having a good balance of pictures and words (89%). Only half of the boys indicated they liked the music in the video. Suggestions for improvements included adding a voice over, slowing down the video to assist with reading, updating the music, and adding more images.

Discussion

The two youth informed, gender-specific YouTube videos developed in this project to raise awareness about tobacco exposure as a modifiable risk factor for breast cancer provide new, cost-effective resources for disseminating this information to youth. The overall positive responses by girls and boys to their respective videos and their reported interest in sharing these videos via social networking suggests that this approach holds potential for other types of health promotion messaging targeting youth.

The ultimate goal of the videos was to engage girls and boys at an early age in protecting themselves and others from tobacco exposure and thereby contribute to decreasing the incidence of breast cancer. The positive endorsement of the information in these videos is encouraging and

indicates that the video format appeals to youth. While it is not possible to determine whether the videos are effective in changing youths' behaviour, the findings indicated that the message approach was effective in increasing awareness of the risk of tobacco exposure.

The youth demonstrated enthusiasm about sharing the videos with their family and friends through a variety of methods, including posting the videos on Facebook, tweeting about the videos on Twitter, sending a video link, and texting the videos to their friends. This finding is important because it is well established in the literature that peers play an influential role in adolescent health behaviours, particularly smoking (Kobus, 2003; Maxwell, 2002). The use of online-based platforms for health promotion efforts directed towards youth afford health researchers with the opportunity to harness this peer influence and promote positive health behaviours in this age demographic. This approach also counters the promotion of pro-risk health behaviours, such as smoking, commonly found in adolescents' online social networks (Huang et al., 2013). Indeed, the interactive and social nature of Web 2.0 platforms inherently puts youth at the forefront of health promotion, indicating that the creation and dissemination online health promotion messages to youth, such as these studied videos, is imperative.

In light of evidence that audience-generated messaging strategies are an essential component of reaching adolescents with health promotion messages (Krieger et al., 2013), particularly in relation to tobacco control (Kong, Singh, & Krishnan-Sarin, 2012), the inclusion of a youth-informed approach to the design and development of the videos was an important aspect of this project. The findings of this study add to the growing body of literature that a youth-informed approach merits inclusion in the development of health promotion messages directed towards this population. Given that adolescents represent the largest users of social media, their insights and ideas for the design, development, and dissemination of online health messages,

should be included in efforts to extend online cancer prevention messages directed towards youth.

Tailoring health promotion messages based on gender was also important in this project. In particular, the level of interest by boys in a video designed to inform them of a women's health issue (i.e., breast cancer) and the relevance of this information to them suggests that it is possible to design gender-sensitive messages that engage boys by appealing to emerging masculinities. Similarly, the positive response to the girls' video may also, in part, be attributed to the gender-sensitive approach.

In relation to youths' suggestions for improving the video, the girls suggested that personal stories about young women's experiences with breast cancer be incorporated into the video designed for girls. This finding reflects previous research findings in relation to young women's preferences for receiving information about the link between smoking and breast cancer risk (Bottorff et al., 2010). While researchers have identified cancer narratives as a powerful tool in raising women's awareness about breast cancer risk (Chou, Hunt, Folkers, & Augustson, 2011; McQueen, Kreuter, Kalesan, & Alcaraz, 2011), it is still not possible to identify the specific causes of a woman's breast cancer with certainty. Hence, it is not possible to use a story of a young woman's experience of breast cancer as a real world example of the link between tobacco exposure and early breast cancer (Collishaw et al., 2009).

Suggestions from the youth that the speed of the video be slowed and a voice over be added may reflect varying levels of literacy among the youth included in this study. To accommodate for this, a voice over was added to both the girls' and boys' video. The music was also changed on both videos so that it would be more appealing to youth.

Implications for nursing

Nurses working with youth in schools or in the community can use these videos to help youth understand how smoking puts girls at risk for breast cancer and support efforts to minimize girls' exposure. Targeted, gender-sensitive messages may hold distinct benefits over general messages about smoking and cancer. Additionally, the findings indicate that nurses should begin to augment health promotion strategies using online approaches. Youths' strong endorsement of the videos and the use of a variety of social media to disseminate the videos is encouraging and demonstrates that social media are innovative platforms ripe with opportunities to effectively reach this population with health promotion and cancer prevention messages. These positive findings combined with evidence that social media are dominated by the presence of youth bring forward the importance of engaging with youth in these contexts. Nurses are trusted by public and as such are in an ideal position to engage youth in collaborating with them to design and disseminate evidence-based social media content (Olshansky, 2011).

Limitations and future research

The findings need to be considered in light of several limitations. It is possible the findings of this study may have been influenced by the convenience sampling strategy used.

Additionally, these findings may not be generalizable to other regions where youth have less access to social media or where adolescent smoking behaviours differ based on cultural and socio-demographic factors. In future research, it will be important to evaluate the use of these videos and related social media strategies with a broader population of youth and focus on youths' larger scale engagement with the content, changes to risk behaviours after viewing these videos, and the development of indicators and strategies for effectively measuring these behaviour changes (Neiger et al., 2012; Neiger, Thackeray, Burton, Giraud-Carrier, & Fagan, 2013). In addition, research is needed on the ways in which the method of delivery (e.g., shared on Facebook, YouTube, via email) impacts the understanding of health-related information online and the influence of peer-to-peer sharing on youths' exposure to health-related information online. Finally, the development of messages related to breast cancer and smoking for adult smokers who expose girls and young women to second-hand smoke are required.

Conclusion

There is an urgent need to share current knowledge about the breast cancer risks associated with active smoking and second-hand smoke with girls and young women as well as boys and young men who may expose them to second-hand smoke. Interactive technologies hold promise for cost-effective, gender-specific messages. Not only do these media enable broad reach, but they also bring an interactive nature to cancer prevention programmes for young people.

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