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Promising Interventions to Prevent Liver Cancer in Idaho

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Abstract

Introduction: The Idaho Comprehensive Cancer Control Program (ICCCP) collaborated with the Idaho Immunization Program (IIP) to plan and implement activities to increase knowledge and awareness of liver cancer prevention through tailored hepatitis B immunization messaging to the Idaho community and health care providers.

Purpose and Objectives: In this article, we report findings from an evaluation of these activities.

Interventions Approach: The two programs implemented liver cancer prevention activities between May 2017 and December 2017; strategies included a social media vaccination awareness campaign and health care provider education.

Evaluation Methods: Facebook Insights was used to report, and descriptive statistics were used to analyze, data from the social media campaign. Descriptive statistics were used to analyze data collected from a retrospective pre–post survey for the health care provider presentations and paired t-tests were conducted to detect differences between pre- and postexposure.

Results: For the social media campaign, ICCCP and IIP posted a total of 32 liver cancer and hepatitis B vaccination posts on their respective Facebook pages, which reached 42,804 unique users. For the health care provider presentations, there was a statistically significant increase in awareness, knowledge, ability, and intention among health care providers.

Implications for Public Health: Our evaluation serves as an example of how public health social media can reach consumers and how educating providers can raise awareness on the importance of hepatitis B vaccination as a means of preventing liver cancer.

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Disclaimer

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Keywords

liver; hepatitis; education; knowledge; awareness

Each year, about 33,000 new liver and intrahepatic bile duct cancer cases and 26,000 deaths from these cancers are reported in the United States (Centers for Disease Control and Prevention [CDC], 2018). Since 2008, cancer has been a leading cause of death in Idaho. In 2016, there were 8,354 total new cancer cases, with 152 liver cancer cases that were newly diagnosed among Idaho residents (Cancer Registry Data of Idaho, 2017). Among Idahoans, liver cancer is the eighth leading cause of cancer mortality with a rate of 6.1 deaths per 100,000 people (U.S. Cancer Statistics Working Group, 2018).

Hepatitis B virus (HBV) infection is a major risk factor for hepatocellular carcinoma, one of the most common types of liver cancer. The best way to prevent HBV infection is by vaccination (CDC, 2021). Based on the National Immunization Survey (NIS)–Child vaccination data, the Idaho rate of HBV vaccination at birth decreased from 75.4% in 2014 to 69.8% in 2015 and was well below the Comprehensive Cancer Alliance for Idaho (CCAI, 2016) goal of 85%.

Comprehensive cancer control (CCC) is an approach that brings together multisector partners to collectively address the cancer burden in a community by leveraging existing resources and identifying and addressing cancer-related issues and needs (Given et al., 2018). In an analysis of content in CCC plans that address chronic hepatitis B and C virus infections as major risk factors for liver cancer, it was reported that few plans discuss specific actions needed to reduce the burden of liver cancer (Momin & Richardson, 2012). A more recent review of the literature and cancer plan activities in the National Comprehensive Cancer Control Program reported that a majority of the intervention articles published focused on HBV infection in Asian/Pacific Islander American populations, and a small percentage of CCC plans included liver-related content (Momin et al., 2018). Since 2005, the Idaho Comprehensive Cancer Control Program (ICCCP) has worked to address cancer through prevention, early detection, and survivorship activities. The current Idaho Comprehensive Cancer Strategic Plan, developed by CCAI, includes a goal to increase vaccination rates for vaccines shown to reduce the risk of cancer.

The ICCCP was one of two CCC programs that began a project with CDC to implement two liver cancer prevention interventions: a liver cancer prevention/hepatitis B vaccination campaign and general liver cancer prevention education of health care providers in Idaho.

PURPOSE AND OBJECTIVES

In 2017, ICCCP expanded their existing partnership efforts with the Idaho Immunization Program (IIP) aimed at increasing human papillomavirus (HPV) vaccination rates to also include increasing hepatitis B vaccination rates in the state. Therefore, the purpose of this partnership was to increase public and provider knowledge and awareness of the hepatitis B vaccine's ability to prevent certain types of liver cancer. ICCCP and IIP collaboratively developed digital and print marketing content on how the birth-dose hepatitis B vaccine can

prevent liver cancer along with a content calendar for social media posting and developed a presentation for health care providers to be presented at immunization workshops. This evaluation brief reports on the findings from the two interventions aimed at highlighting the role of the hepatitis B vaccination as a means of preventing liver cancer

INTERVENTION APPROACH

The programs implemented liver cancer prevention activities between March 2017 and December 2017. The primary message for all interventions was that the hepatitis B vaccine can prevent certain liver cancers with the objective of improving vaccination rates. A health education specialist developed all messaging content. The prevention strategies aligned with the provider and community education recommendations from the 2010 Institute of Medicine (IOM, 2010) report on the control of hepatitis virus infection.

ICCCP and IIP used social media to inform and educate the public on the availability of a hepatitis B vaccine and how it can prevent some liver cancers. Prior to this partnership, program or state-specific content related to hepatitis B or liver cancer did not exist. ICCCP and IIP partnered with a marketing contractor to develop new hepatitis B and liver cancer public education materials to use for social media promotion and print materials to mirror the existing “Cancer in Idaho” slate of materials format. The tone and style of messages focused on happy, healthy families, and preventive options. While not quite a positive social norms campaign, the goal of the messages was to inform new or soon-to-be parents whose liver cancer can be prevented by starting early in life and that vaccination for hepatitis B is the best way to prevent liver cancer. Materials developed included a hepatitis B and liver cancer in Idaho infographic, two posters (Idaho Department of Health and Welfare, 2017a, 2017b), short-form video (ICCCP, 2017), and 13 social media graphics. ICCCP and IIP provided the content for these materials, pulling data and information from the NIS-Child and Cancer Data Registries of Idaho and the CCAI strategic plan. Content development began in May 2017, and final products were delivered in June 2017. Beginning August 2017 and through November 2017, ICCCP and IIP began posting hepatitis B and liver cancer prevention content on their respective Facebook pages. Facebook posts were planned and organized via a social media content calendar shared between both ICCCP and IIP. Some posted content was “boosted” to increase the reach of the post. Boosting is a form of paid advertising that allows posts to be pushed to people who like the page of interest and/or people specifically selected through targeting. The ICCCP and IIP selected a boosting strategy that targeted Idahoans of childbearing age interested in parenting-themed content. The cost of boosted posts ranged from $20.00 to $400.00. ICCCP and IIP staff reviewed Facebook insights data monthly, specifically looking at reach measures for each post with project period end data included in this evaluation report.

ICCCP partnered with IIP to deliver health care provider presentations at their annual Booster Shots regional workshops. The Booster Shots workshops occurred at six cities (Twin Falls, Idaho Falls, McCall, Caldwell, Ponderay, and Lewiston) throughout Idaho in September and October 2017. Booster Shots participants were recruited via IIP’s Vaccine for Children program listserv. The dates and registration announcements were sent out electronically in the months leading up to the regional workshops. For the

presentations, ICCCP delivered general information on liver cancer, including incidence and risk factors, and ways to increase birth-dose hepatitis B vaccination rates in practice. Content for the presentation included graphics from the new social media and print campaigns as well as information from the Cancer Data Registry of Idaho and CCAI strategic plan. Table 1 provides a summary of the methods for this intervention, the specific strategies implemented, type of settings, and length in practice for the health care provider intervention. The type of provider or provider specialty was not collected.

EVALUATION

Using data from Facebook insights, ICCCP and IIP staff reviewed reach measures monthly for each post. Definitions for Facebook measures are (a) lifetime post total reach (the total number of people the page post was served to); (b) lifetime post organic reach (the number of people who saw the page post in news feed or ticker, or on the page's timeline); and (c) lifetime post paid reach (the number of people the advertised page post was served to). ICCCP staff compiled and analyzed evaluation results from the social media campaign and Booster Shots presentations. Social media engagement was not evaluated.

For the health care provider presentations, ICCCP assessed participants' changes in awareness, knowledge, ability, and intention to vaccinate against hepatitis B for the purpose of liver cancer prevention through the administration of a brief, paper-based, retrospective pre- then-posttest (RPTP) survey. *Awareness* measured the provider's awareness of liver cancer statistics in Idaho, the relationship between hepatitis B and liver cancer, and liver cancer resources made available by ICCCP; *knowledge* measured the provider's knowledge on ways to prevent liver cancer, and on CDC's hepatitis B vaccination guidelines; *ability* measured the provider's ability to remind patients when they are due for vaccination; and *intention* measured the provider's intent to recommend vaccination, track data, and order or utilize education resources developed by ICCCP. The RPTP survey included a Likert-type scale with a scale from 1 to 5 to assess pre- and post-exposure for each measure, with 5 being the best score. Survey questions were developed by ICCCP in alignment with the presentation content and reviewed by subject matter experts in immunization administration and cancer prevention prior to administration. In addition, process data were collected at each presentation to account for the total number of people attending and the number and types of medical professionals or organizations in attendance.

SAS version 9.4 was used to conduct all analyses. Descriptive analyses were conducted for the social media campaign (count and mean) to understand the characteristics of the Facebook posts, including type, messaging, and content of each post as well as lifetime reach of the social media campaign. For the health care provider presentations, analyses focused on whether the presentations had any effect on participants' awareness, knowledge, abilities, and intentions. Mean scores were calculated for each measure pre- and post-exposure and mean change was calculated to determine the change for each variable of interest from pre- to postexposure. Paired t-tests were calculated to detect differences from pre-exposure to postexposure for each variable of interest. Statistical significance was determined at p value < .05. Missing responses were excluded from our analyses.

RESULTS

ICCCP and IIP posted a total of 32 liver cancer and hepatitis B vaccination posts on their respective Facebook pages. Table 2 provides an overview of the characteristics of the Facebook posts developed for the social media campaign, including type, messaging, and content of each post as well as the lifetime reach (organic and paid). Of the 18 unique messages developed, 13 aimed to increase awareness about HBV and the importance of vaccination, and 5 provided liver cancer statistics. Overall, 42,804 unique users were reached through this campaign. Lifetime posts total reach (both organic and paid) ranged from 67 to 11,201 users per post. The two posts with the highest lifetime post total reach were boosted posts in November: one was a post about the importance of the hepatitis B vaccine birth dose that reached 11,201 users (combined lifetime organic and paid reach) and the other was a video about the importance of the hepatitis B birth-dose vaccine that reached 10,471 users (combined lifetime organic and paid reach). The posts that reached the greatest number of organic users were posts that included photos (e.g., photos of children and families to promote the birth dose of the HBV vaccine) with the highest organic post reaching 1,402 unique users.

For the health care provider presentations, there was a statistically significant increase in all domains measured (awareness, knowledge, ability, and intention) among health care providers. Table 3 describes pre- and post-test intervention scores for the health care provider presentations. The greatest improvement was observed in awareness, specifically awareness of hepatitis B and liver cancer patient and public education resources developed by ICCCP (1.90 vs. 4.27 $t_{145} = -25.93$, $p < .0001$). Awareness of liver cancer statistics for Idaho (e.g., incidence and prevalence) also saw a large improvement from pre- to postexposure (1.86 vs. 4.17 $t_{147} = -26.80$, $p < .0001$). While improvement in scores was not as drastic as seen in the awareness domain, there was a statistically significant increase in scores for the knowledge, ability, and intention domains from pre- to postexposure, and pretest scores were relatively higher than those in awareness domain.

IMPLICATIONS FOR PUBLIC HEALTH

Our evaluation has implications for the cancer control community, health care providers, and CCC programs as they move forward and address the risks associated with liver cancer. The evaluation serves as an example of how public health social media can reach consumers and how educating providers can raise awareness on the importance of hepatitis B vaccination as a means of preventing liver cancer. The interventions implemented in Idaho are promising interventions that can be adopted by other programs.

This evaluation also serves as an example of the use of social media to increase reach for cancer prevention messages at a relatively low cost. In our evaluation, the use of graphics, including photos and videos in the social media posts, garnered the greatest reach compared to those posts with links only. In addition, boosting posts was a worth-while investment to increase reach with content. Other CCC programs may consider allocating resources to boost the reach of their social media messaging.

A critical finding is the increased awareness of liver cancer statistics in Idaho, the relationship between hepatitis B and liver cancer, and the resources developed and made available by the ICCCP among health care providers. Knowledge of statistics helps providers understand the populations most at risk for liver cancer and identify target areas for increasing hepatitis B vaccination (U.S. Cancer Statistics Working Group, 2018). Improved knowledge of ICCCP resources may lead to increased use of these resources during provider–patient interactions, which may result in increased patient satisfaction with their care (Martinez et al., 2009).

A limitation of the evaluation is the lack of an evaluation of consumer knowledge and awareness. Another limitation is the lack of immunization data or system-level changes to demonstrate long-term outcomes beyond changes in knowledge and awareness, and the limited time span of the intervention and therefore lack of ability to assess retention of the changes in knowledge and awareness or behavior change among providers. However, the changes in knowledge and awareness observed among providers serve as a stepping stone for facilitating system-level changes for preventing liver cancer. In addition, these changes serve as an example of the impact educational interventions can have on improving knowledge and awareness of liver cancer and its risk factors among health care providers. The findings also indicate the impact of social media in making available important patient education resources developed by the CCC program.

Liver cancer incidence is increasing in the United States, and CCC programs across the United States are encouraged to build and diversify their work in addressing viral hepatitis for liver cancer prevention. The partnership developed by ICCCP and IIP serves a successful model to address liver cancer prevention and should be expanded to include viral hepatitis prevention and surveillance coordinators in the future. All presentations in Idaho were well-received and effective in increasing knowledge, awareness, ability, and intention among health care providers. The partnership between ICCCP and IIP and its regional Booster Shots workshops was an effective way to capitalize on educating health care providers already committed to this existing event. This increased focus on hepatitis B vaccination and vaccine preventable cancers overall has strengthened the relationship between Idaho public health programs and will allow for ongoing collaboration on public health and health care interventions to increase rates for vaccinations that are known to prevent cancer.

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TABLE 1

Liver Cancer Prevention Methods and Strategies Implemented by ICCCP and IIP

Strategy	Description	Completed surveys/ attendees	Description of participants
Conduct social media campaign	Developed content for social media use to provide information and education to the general public	N/A[+]	General public
Facilitation of provider education sessions	Six provider education presentations were conducted within the state of Idaho including in Twin Falls, Idaho Falls, McCall, Caldwell, Ponderay, and Lewiston	163/291	Participants represented various sectors of vaccine administration[a]: 76/163 (46.63%)—Private practice 50/163 (30.67%)—Public clinic 16/163 (9.82%)—Public health district 10/163 (6.13%)—Hospital 2/163 (1.22%)—School 28/163 (17.18%)—“Other”, respondents stated FQHC, family practice, tribal health, urgent care, and juvenile corrections among some of the responses Provider length of practice ranged from 2 weeks to 38 years (median of 8.8 years in practice)

Note. ICCCP = Idaho Comprehensive Cancer Control Program; IIP = Idaho Immunization Program.

[a]Respondents could select multiple options.

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TABLE 2

Characteristics of Social Media Campaign Facebook Posts and Reach

Variable	n	%
Type of Facebook post ($n = 32$)[a]		
Photo	28	87.5
Link	3	9.4
Video	1	3.1
Type of messaging ($n = 18$)[b]		
HBV vaccination awareness	13	72.2
HBV vaccination statistics	5	27.8
Facebook post content ($n = 18$)[b]		
HBV vaccination	4	22.2
HBV vaccination birth dose	6	33.3
Liver cancer	5	27.8
HBV and liver disease/liver cancer	3	16.7
Lifetime reach of Facebook post ($n = 42,804$)		
Organic	11,251	26.3
Paid	31,553	73.7

Note. HBV = Hepatitis B virus.

[a]There were not 32 unique posts; some posts were duplicated across two media campaigns.

[b]This is the number of unique posts.

Table 3

Pre- and Post-test Intervention Scores for Health Care Provider Presentations

Change in awareness	***n***	**Pretest[a] mean (*SD*)**	**Posttest[a] mean (*SD*)**	***df* (*t* value)**	**Mean change**	***p* value***
Liver cancer statistics for Idaho (e.g., incidence and prevalence)	148	1.86 (0.99)	4.17 (0.67)	147 (−26.80)	2.31	<.0001
The relationship between hepatitis B and liver cancer	147	2.88 (1.07)	4.30 (0.67)	146 (−16.68)	1.42	<.0001
Hepatitis B and liver cancer patient/public education resources developed by the Idaho Comprehensive Cancer Control Program	146	1.90 (1.00)	4.27 (0.68)	145 (−25.93)	2.37	<.0001
Change in knowledge	***n***	**Pretest[a] mean (*SD*)**	**Posttest[a] mean (*SD*)**	***df* (*t* value)**	**Mean change**	***p* value***
Ways to prevent liver cancer	146	2.81 (0.98)	4.06 (0.74)	145 (−16.54)	1.25	<.0001
Hepatitis B vaccination dose guidelines	146	3.90 (1.12)	4.45 (0.68)	145 (−7.69)	0.55	<.0001
Change in ability	***n***	**Pretest[a] mean (*SD*)**	**Posttest[a] mean (*SD*)**	***df* (*t* value)**	**Mean change**	***p* value***
Remind providers that patients are due for hepatitis B vaccination	145	4.03 (0.94)	4.41 (0.70)	144 (−6.75)	0.38	<.0001
Remind patients that they are due for hepatitis B vaccination	144	4.14 (0.87)	4.44 (0.71)	143 (−5.72)	0.30	<.0001
Change in intention	***n***	**Pretest[a] mean (*SD*)**	**Posttest[a] mean (*SD*)**	***df* (*t* value)**	**Mean change**	***p* value***
Recommend hepatitis B vaccination at birth	98	4.34 (1.09)	4.72 (0.77)	97 (−4.79)	0.38	<.0001
Track hepatitis B vaccination data	132	3.96 (1.11)	4.55 (0.77)	131 (−7.85)	0.59	<.0001
Remind providers that patients are due for the hepatitis B vaccine	133	4.41 (0.87)	4.77 (0.55)	132 (−5.77)	0.36	<.0001
Remind patients that they are due for the hepatitis B vaccine	138	4.54 (0.74)	4.87 (0.36)	137 (−6.09)	0.33	<.0001
Order/utilize hepatitis B and liver cancer patient/public education resources developed by the Idaho Comprehensive Cancer Control Program	137	2.45 (1.31)	4.34 (0.82)	136 (−17.57)	1.89	<.0001

[a]Participants scored their awareness, knowledge, ability, and intention on pre- and posttests using a Likert-type scale from 1 to 5, with 5 being the highest score for each variable measured.

*p value statistically significant when p is .05 or less.