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PUBLIC HEALTH & PRIMARY CARE | RESEARCH ARTICLE

Exploring social media campaigns against sugar-sweetened beverage consumption: A systematic search

Vannarath Te[1]*, Pauline Ford[2] and Lisa Schubert[1]

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*Corresponding author: Vannarath Te, School of Public Health, The University of Queensland, Australia
E-mail: vannarath.te@uq.net.au

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Additional information is available at the end of the article

Abstract: Significant evidence has supported a positive association between consumption of sugar-sweetened beverage and increased risks of the non-communicable diseases of obesity, metabolic disorders, dental caries, and dental erosion. Thus, using social marketing concepts to change people's attitude and behaviour towards the consumption is imperative. Social media is considered as a cheap and quick tool to disseminate health messages in health communication. The use of social media has increased significantly but knowledge of its utilization in sugar-sweetened beverage health campaigns is limited. This study was conducted to identify social media health campaigns against the sugar-sweetened beverage consumption, their social media platforms and types of materials distributed, and to identify health messages being highlighted in the campaigns. The authors conducted a systematic search for the campaigns and employed content analysis to identify health messages. As a result, 34 campaigns were identified. Facebook and YouTube were commonly used to disseminate campaign materials—83% of them were videos and text articles. Obesity/overweight, diabetes, and cardiovascular

ABOUT THE AUTHOR

Vannarath Te was a student doing Master of Public Health and Master of International Public Health at the University of Queensland, Australia, from 2015-2017. In partial fulfilment of the requirement for the degree of Master of International Public Health, he conducted a dissertation entitled "Communicating health messages about sugar-sweetened beverage consumption through social media", under supervision of Dr Lisa SCHUBERT (Principal Supervisor) and Professor Pauline FORD (Associate Supervisor). Research outcome of the dissertation is two drafts of manuscript including this one. The second manuscript focuses on content analysis exploring emotional appeals utilized in the identified campaign materials (videos).

PUBLIC INTEREST STATEMENT

With significant evidence supporting a positive association between consumption of sugary drinks and increased risks of obesity, diabetes, and dental diseases, public health professionals in the areas of health promotion and disease prevention have attempted to change people's attitude and behaviour towards the consumption because the above-mentioned conditions have produced negative impact on population health and socioeconomic development. With the increased coverage of internet network and availability of social media platforms, such as Facebook or YouTube, communicating health messages in a health campaign using the social media is more convenient and cost effective and able to reach a large, yet targeted, audiences. Thus, this study helps identify social media health campaigns against the consumption of sugary drinks available online. The identified health campaigns would be great sources of knowledge to communities in fighting against the obesity, diabetes, and dental diseases through behavioural change in reduced consumption of sugary drinks.

diseases were the most frequently mentioned health messages in the campaigns. The increased use of social media with their low-cost operation and capacity to increase campaign reach makes them potential communication channels for health campaigns against sugar-sweetened beverage consumption.

Subjects: Food Science & Technology; Behavioral Sciences; Communication Studies; Education; Information Science; Health and Social Care; Medicine, Dentistry, Nursing & Allied Health

Keywords: sugar-sweetened beverages; health communication; social marketing; social media campaigns

Sugar-sweetened beverages (SSBs) are those that contain added sugars such as high-fructose corn syrup (HFCS) and sucrose, and include soft drinks, fruit juice drinks, energy drinks, sports drinks, cordials, iced teas, flavoured milks, milkshakes, and smoothies (Australian National Preventive Health Agency, 2014; Marshall, 2013). Harmful health effects of SSB consumption have been investigated and confirmed by an increasing number of empirical studies. Significant evidence now supports a positive association between SSB consumption and increased risks of the non-communicable diseases (NCDs) of obesity, metabolic disorders, dental caries, and dental erosion (Australian National Preventive Health Agency, 2014; Hu, 2013; Hu & Malik, 2010; Marshall, 2013, 2014; Petersen & Kwan, 2009; WHO, 2014, 2015; WHO, & FAO, 2003; Woodward et al., 2012).

A global status report on NCDs in 2014 revealed that these conditions were the major cause of global deaths in 2012 and have posed a great burden on population health, health systems, and socio-economic development (WHO, 2014). Therefore, primary measures to reduce NCD risk factors are urgently needed. Public health professionals in the areas of health promotion and disease prevention have attempted to change people's attitude and behaviour towards SSB consumption. Boles, Adams, Gredler, and Manhas (2014) found that behavioural changes in SSB consumption may be due to increased awareness about harmful health effects of excessive SSB consumption raised through media campaigns. Tobey and Manore (2014) considered using social media as a cheap and quick way to directly help nutrition educators enlarge their programmes' scope. This is also supported by Graham, Moore, Bell, and Miller (2019) who found digital marketing, which includes the use of social media, as an important vehicle for delivering health messages to large, yet targeted, audiences. Governments have also been increasingly and widely using social media platforms to engage citizens and deliver services (Lev-On & Steinfeld, 2015; Picazo-Vela, Fernandez-Haddad, & Luna-Reyes, 2016).

Social media refers to "an array of new Web 2.0 platforms" (Schein, Wilson, & Keelan, 2010, p. 5). Chou, Prestin, Lyons, and Wen (2013) emphasized the use of Web 2.0 has significantly influenced landscape of health communication in health promotion. It allows multi-directions of communication among users and health campaigners, with low cost but increased accessibility to information and interactivity. Unlike traditional media such as television, radio, magazines and newspapers, which involves only one-way communication, social media is characterized by multiple modes of communication allowing audiences to engage in discussion, share information and materials (including photos, videos and texts), generate content, provide feedback, rate comments, or rank information quickly (Thackeray, Neiger, & Keller, 2012). Based on this definition, YouTube can be fully viewed as a social media platform only when there is collaboration and interactivity with viewers (Schein et al., 2010). Moorhead et al. (2013) conducting a systematic review to identify applications, benefits, and limitations of social media in health communication also echoed the above-mentioned benefits, although highlighting potential limitations concerning reliability of information shared and privacy issues. These functions have indeed provided health communicators with more possibilities and greater flexibility to adapt their communication strategies so that

authenticity of messages can be increased and trust between health campaigners and message receivers can be developed.

According to Chaffey (2016), in January 2016, there were 2.307 billion active social media users. The social media platforms utilized by the Centers for Disease Control and Prevention (CDC) in the United States to communicate health messages with different target audiences are Facebook, Twitter, YouTube, Buttons, Badges, Flickr, Shutterfly, RSS Feeds, Podcasts, Widgets, eCards, mHealth, and Blogs (Centers for Disease Control and Prevention, 2011). Though Facebook, YouTube, and Twitter were the most frequently studied platforms (Schein et al., 2010), other social media platforms are also useful because different platforms are utilized to develop different strategies (Centers for Disease Control and Prevention, 2011). Most of the social media strategies attempt to reach audiences, reinforce information, tailor messages, engage audiences in discussion, and facilitate information sharing (Schein et al., 2010).

In fact, the use of social media to disseminate health messages has increased significantly in the recent years but knowledge of its effectiveness and role in health promotion is limited (Centers for Disease Control and Prevention, 2011; Neiger et al., 2012; Schein et al., 2010). Morley et al. (2018) recently reported positive effect of the LiveLighter campaign in Australia (mainly through mass media but supported by also social media advertising) on reducing SSB consumption among adults aged 25–49. However, which social media platforms commonly used in disseminating health information about SSB consumption are still unknown and understanding this would offer health prevention campaigners valuable insights about reaching target populations. Thackeray et al. (2012) commented that correct use of social media can enable organizations to enhance their capacity to focus on their target audiences in the process of social marketing. Therefore, this research study aims to identify the range of social media platforms and campaign materials utilized by available social media SSB health campaigns. A second research aim is to identify the health messages being used in the social media SSB health campaigns. Three research questions are proposed.

RQ1: What are the social media SSB health campaigns currently available online?

RQ2: What are the social media platforms and types of campaign materials are frequently used to disseminate information about SSB consumption?

RQ3: What health messages about SSB consumption are being highlighted in the social media SSB health campaigns?

1. Method

To achieve the above-mentioned aims and answer the research questions, a systematic search was carried out between 1 September 2016 and 30 November 2016 via nine social media platforms on the Internet to identify English language campaigns that focus on persuading a target population to reduce their SSB consumption. The social media platforms were selected based on their popularity in 2015. The top ten platforms, in descending order of popularity, were: Facebook, YouTube, Twitter, Google+, Instagram, LinkedIn, Pinterest, Tumblr, Badoo, and Myspace (Chaffey, 2016). In this study, the inclusion criteria for social media SSB health campaigns used for the analysis were that they had to be designed by health communicators working for health institutions with the purpose of convincing the public to change their behaviour around SSB consumption. Since the sample in this study did not involve human subjects and the data collected were available in the public domain on the Internet, obtaining and verifying consent was infeasible (Buchanan, n.d.; DePoy & Gitlin, 2015). The ethics approval was granted by the School of Public Health Research Ethics Committee at the University of Queensland on 1 July 2016.

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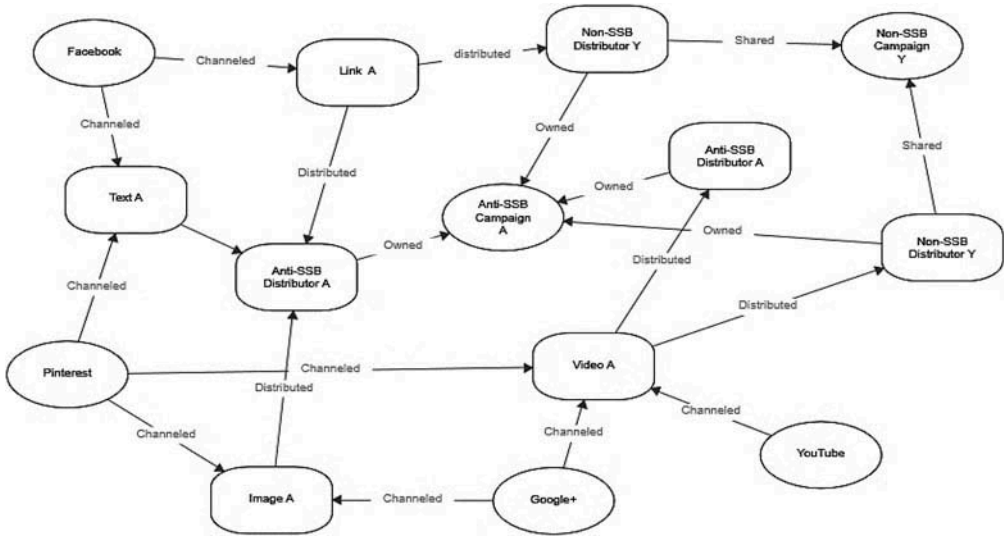

Figure 1. Diagram showing how the social media health campaigns against SSB consumption were tracked.

1.1. Defining and identifying campaigns

A social media SSB health campaign, in this study, is defined as "a collection of educational materials and activities created by a health institution and disseminated through various social media platforms to persuade a target population to reduce their SSB consumption". The campaigns were identified through the campaign materials disseminated through various social media distributors. The materials include videos, text articles, images, leaflets, or links to websites. Figure 1 shows how the campaigns were tracked. From the materials channelled through the social media platforms, the distributors of the campaign materials could be determined so as to identify the campaigns.

1.2. Search process

Two key search phrases, "SSB consumption campaign" and "sugar-sweetened beverage campaign", were used. Other key phrases such as, "sugary drink campaign", "soft-drink campaign", "soda campaign", "non-core beverage campaign", "sport drink campaign", and "energy drink campaign", were also considered, but overwhelming results were yielded. To render the study feasible, only the two key phrases were used, although the authors acknowledge the limitation of potentially excluding relevant campaigns. The searches were carried out via each social media platform using the two phrases *seriatim*. Materials were recorded as many times as they appeared in the social media platforms, except those distributed by the same distributor in the same platform. Recorded materials were those having content relevant to SSBs which include videos, images, articles, leaflets, or links focusing on health effects of SSB consumption, soda taxes, and how to quit or reduce sugar consumption. Any materials that focus on poor diet leading to obesity, general health effects of sugar consumption, or chocolates or other related foods were not considered as having content relevant to SSBs. The materials were denoted as "Items". The variables used for the analysis in this study are shown in Table 1.

In order to classify the distributors, information of the account holders was examined including content in the "About" tab. Videos having titles in English but having the content spoken in other languages were classified as "non-English", while videos having the content spoken in other languages but having English subtitles were classified as "English". In regards to the variable "Country", if there is no clue at all about the information after checking the distributor's account, "NA" was recorded. "NA" means no information available.

Table 1. Information needed for the analysis

Variable	Description of Variable
SM Platform	Social media platforms such as Facebook, YouTube,...
Content type	The types of format in which the information is distributed such as, video, image,... • Category 1 (video: story): any stories, events, or news filmed as clips for the purpose of sharing information about content relevant to SSBs through videos • Category 2 (video: lecture): any videos about lectures, presentations, events, or news. Without videotaping, the situations would have still occurred • Category 3: any images demonstrating content relevant to SSBs • Category 4: any journal articles or news articles discussing content relevant to SSBs • Category 5: any leaflets or posters designed to display content relevant to SSBs • Category 6: any links leading to webpages focusing on content relevant to SSBs
Duration	The length of each video
Distributor type	The types of organization distributing the information (e.g. profit, non-profit) • Category 1: governmental institutions • Category 2: private institutions which are profit oriented • Category 3: organizations, communities, foundations, associations, or universities (either profit or non-profit) • Category 4: personal or individual accounts
Distributor name	The names of organization or individuals distributing the information
Country	The origin of the distributors
Language use	The language used in the content of the material • Category 1: English • Category 2: Non-English
Year published	Time when the material was published or uploaded

1.3. Identifying campaigns

Inclusion and exclusion criteria were used to filter the recorded materials in order to identify social media health campaigns against SSB consumption. After obtaining all the materials having content relevant to SSBs (items), the researchers first excluded those items in which languages other than English are used. For videos, specifically, those having duration of more than 5 min and/or being lecture type were excluded because public service announcements (PSAs) utilized in health-related campaigns usually are 15, 30, or 60 s in length (Ad Council, 2004). Following this, materials distributed by individuals or private institutions were excluded due to how the campaign is defined in this study. The distributors of the included materials were thoroughly examined to identify the potential campaigns. Links to any webpage were scanned for. If any link was not found, the name of the distributor or any potential name found in the material, followed by the word "campaign", was typed into Google search engine to select the campaigns. For example, the account name "The truth about sugar" was typed with the word "campaign" at the end. Only the first page of the results was screened because it displays webpages that are most relevant to key words or phrases employed in the search (Rigotti, n.d.). Webpages were thoroughly examined against the campaign's definition given above to finally identify the social media SSB health campaigns. The campaign could be identified by the same item distributed by various distributors or multiple items distributed by the same distributor or various distributors. Figure 2 illustrates the campaign identifying process.

1.4. Analysing health messages

Health messages in the materials used in the campaigns were scanned and coded using NVivo 11 (pro) for Windows (QSR International). Content analysis was employed to identify all the health

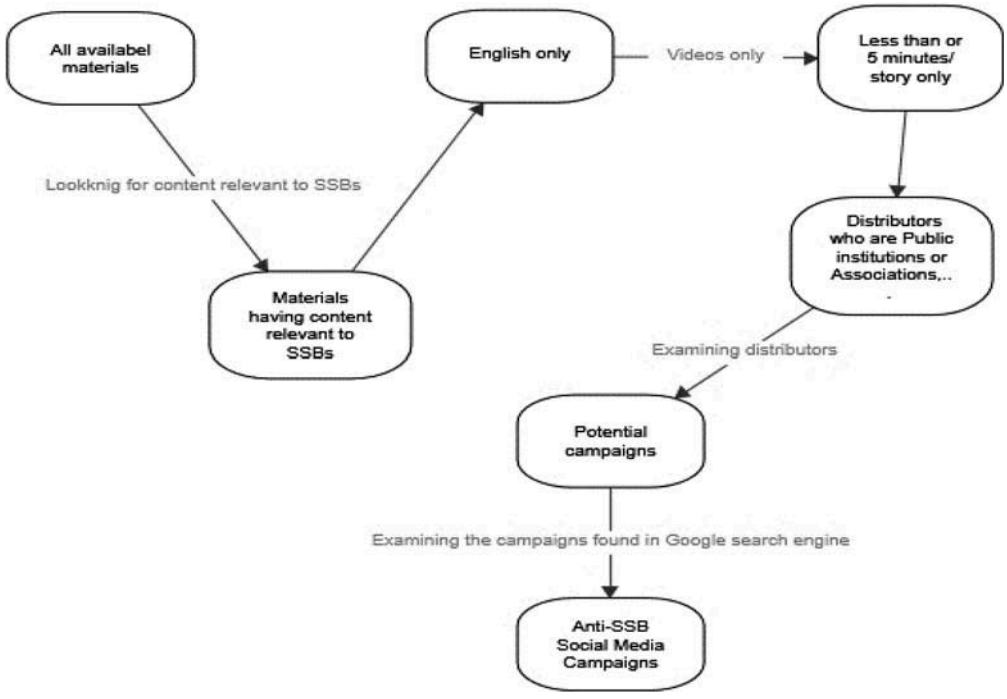

Figure 2. Inclusion criteria used to identify the social media health campaigns against SSB consumption.

effects of SSB consumption and the campaigns mentioning them (Hansen, 2006; Liamputtong, 2013).

1.5. Enhancing rigour

The rigour of this study was enhanced by several strategies, as suggested by Padgett (Padgett, 2012). First, peer debriefing and support was available through regular meetings with co-researchers (LS and PF). Second, both qualitative and quantitative research methods were utilised to collect and analyse data. Third, a sample of the data collected was crosschecked by LS. Fourth, reflexivity was constantly applied by the primary researcher (VT) during data collection, and analysis was documented in memos. Last, a rigorous audit trail was created with the use of NVivo programme to store all the research information.

2. Results

After preliminary exploration of the 10 social media platforms, Badoo was excluded from the list due to its focus which is deemed irrelevant for the current study—its features are designed for making friends, chatting, and even flirting (Hoyos, 2017). There were 496 items with content relevant to SSBs. After applying the exclusion and inclusion criteria (see Figure 3), 183 items remained for the examination of distributors. Finally, 34 social media health campaigns against SSB consumption were identified. Table 2 shows that the majority of campaigns (71%) originated in the United States, followed by Australia hosting 6 (18%) of the total campaigns. 53% of the campaigns were exclusively designed to raise awareness about SSB consumption, while the other 47% were incorporated in general health information.

In total, 56% and 41% of the total materials (496 items) were found on Facebook and YouTube, respectively. None of the materials were found in LinkedIn, Myspace, and Tumblr. Regarding content types, 39% and 36% of the materials were classified as Videos (story) and Articles, respectively. Among the total materials, 35% were distributed by communities, associations, foundations, or universities, 26% by private institutions, and 31% by individuals. Only 8% were distributed by governmental or public institutions.

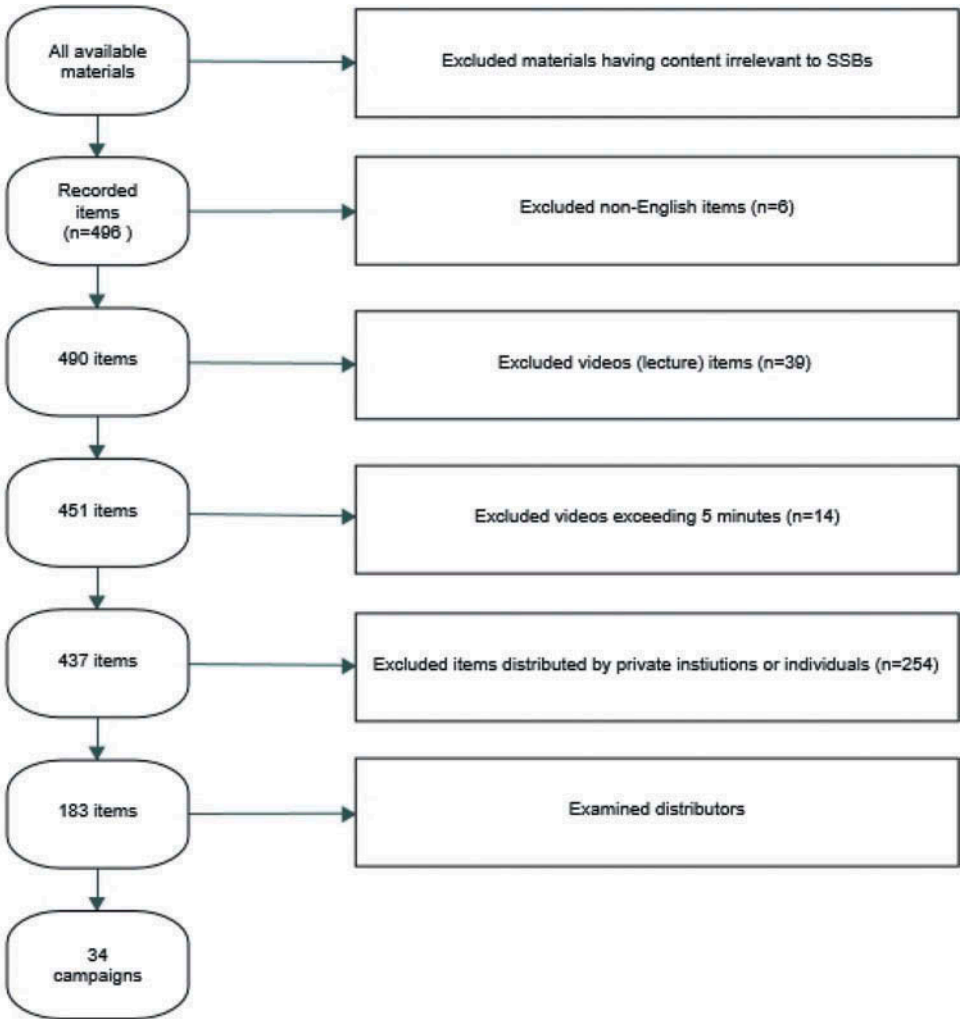

Figure 3. Social media SSB health campaigns identified after the application of the inclusion and exclusion criteria.

Table 3 shows the proportion of materials according to content type in each social media platform. 97% of Articles were distributed through Facebook, while 84% of Videos (stories) were distributed via YouTube. The Pearson's Chi-squared test was statistically significant ($X^2 = 432.34$, d.f = 25, $p < .001$), indicating that the difference was not due to sampling variability alone (Bland, 2015). Taking the timeline of the material distribution into consideration, discussions against SSB consumption via social media first appeared in 2008 and have noticeably increased every year except in 2015 (see Figure 4). The Chi-squared test was also performed, and the result was statistically significant ($X^2 = 540.05$, d.f = 45, $p < .001$), with one item first appeared on YouTube in 2008 and on Facebook in 2009.

2.1. Health messages

Regarding health risks identified in the campaigns, 91% of the campaigns mentioned obesity and/or overweight (see Table 4). Diabetes and cardiovascular diseases followed second and third. While almost half of the campaigns mentioned dental caries or tooth decay, only 9% raised awareness about dental erosion. In some campaigns (12%), the two dental problems were not discussed separately, but rather the general term "dental diseases" or "rotten teeth" were used. Across the campaigns identified, 27 of them have called for actions or measures to help communities stop or reduce consumption of SSBs. Such measures include calls for sugar taxes and restricted accessibility to sugary drinks at school campuses or other food stores, suggestions to serve more real

Table 2. List of available social media health campaigns against SSB consumption identified using the developed search strategy

N	Name	Country	Link
1	Healthy Hawaii Initiative	USA	http://www.healthyhawaii.com/rethink-your-drink/
2	NYC Health	USA	http://www1.nyc.gov/site/doh/health/health-topics/skinny-kids-ad-campaign.page
3	UCONN RudCenter	USA	http://www.uconnruddcenter.org/sugar-sweetened-beverage-resources
4	Healso	USA	http://www.healslo.com/workgroups/sugar-sweetened-beverage-policy-education-group/
5	Coalition Poids	Canada	http://www.cqpp.qc.ca/en/our-priorities/sugar-sweetened-beverages/problematics/
6	**Sugar Free Kids Maryland**	USA	http://www.sugarfreekidsmd.org/our-agenda/
7	Salud Today	USA	http://www.saludtoday.com/blog/category/latino-obesity/
8	**The Real Bear**	USA	http://therealbears.org/
9	**The Biggerpicture**	USA	http://youthspeaks.org/thebiggerpicture/home/
10	**Kick the Can**	USA	http://www.kickthecan.info/
11	Obesity Policy Coalition	Australia	http://www.opc.org.au/action-areas/sugary-drinks-tax.aspx
12	Rady Children's Hospital San Diego	USA	http://www.rchsd.org/health-safety/rethink-your-drink/
13	**FIZZ**	New Zealand	http://www.fizz.org.nz/
14	Live Lighter	Australia	https://livelighter.com.au/the-facts/about-sugary-drinks
15	**Open Truth Now**	USA	http://www.opentruthnow.org/
16	**Sugar Bites**	USA	http://www.cutsugarydrinks.org/
17	**Rethink Sugary Drinks**	Australia	http://www.rethinksugarydrink.org.au/
18	**H3O Challenge**	Australia	http://h30challenge.com.au/
19	**India Resource Center**	India	http://www.indiaresource.org/
20	**Dunk the Junk**	USA	http://www.dunkthejunk.org/video-gallery/
21	Sustain	UK	https://www.sustainweb.org/projectsandcampaigns/
22	**Sugar Free Smiles**	Australia	http://sugarfreesmiles.com/
23	Stanley Island (DH)	USA	http://www.statenislandusa.com/kickthecan.html
24	State of Rhode Island (DH)	USA	http://www.health.ri.gov/healthrisks/sugarsweetenedbeverages/
25	**Healthy Food America**	USA	http://www.healthyfoodamerica.org/sugar_advocacy_toolkit

(*Continued*)

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Table 2. (*Continued*)

N	Name	Country	Link
26	**Sydney University Beverage Initiative**	Australia	http://www.sydneyhealthybeverage.org/
27	Salud America	USA	http://www.communitycommons.org/groups/salud-america/big-bets/sa-sugary-drinks/
28	**Fatsmack**	USA	http://www.bphc.org/whatwedo/healthy-eating-activeliving/fatsmack/aboutthecampaign/Pages/aboutthecampaign.aspx
29	**Sugar smart**	USA	http://www.bphc.org/whatwedo/healthy-eating-active-living/sugar-smarts/Pages/Sugar-Smarts.aspx
30	ChangeLab Solution	USA	http://www.changelabsolutions.org/publications/SSB-playbook
31	Illinois Alliance to Prevent Obesity	USA	http://preventobesityil.org/rethink_your_drink_campaign/
32	American Academy of Pediatrics	USA	http://ohioaap.org/rethink-your-drink
33	**Rev your bev**	USA	http://www.revyourbev.com/
34	**Soda Sucks**	USA	http://www.whysodasucks.com/

(*Campaigns in **bold** are exclusively designed to raise awareness about SSB consumption.*)

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Table 3. Distribution of content types across all the social media platforms

	1.Video (story) N (%)	2. Video (lecture) N (%)	Content type				
			3.Image N (%)	4. Article N (%)	5. Leaflet N (%)	6. Webpage N (%)	Total (%)
1. Facebook	24 (12.5)	0 (0.0)	46 (92.0)	173 (96.6)	2 (100)	31 (93.9)	276 (100)
2. YouTube	162 (84.4)	40 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	202 (100)
3. Twitter	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.6)	0 (0.0)	0 (0.0)	1 (100)
4. Google+	2 (1.0)	0 (0.0)	1 (2.0)	4 (2.2)	0 (0.0)	0 (0.0)	7 (100)
5. Instagram	0 (0.0)	0 (0.0)	3 (6.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100)
6. LinkedIn	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
7. Pinterest	4 (2.1)	0 (0.0)	0 (0.0)	1 (0.6)	0 (0.0)	2 (6.1)	7 (100)
8. Tumblr	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
9. Myspace	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	192 (100)	40 (100)	50 (100)	179 (100)	2 (100)	33 (100)	496 (100)

fruits instead of juice drinks and to drink pure water, spreading voices against consumption of SSBs, etc. However, only one-third (35%) of the campaigns provided substitute behaviours by advising consumers to replace SSBs with water, fresh fruits, or fresh vegetables. It is noticed that only 7 campaigns contain messages against the beverage industry, and only 3 out of the 7 dare to directly mention names of the beverage companies.

3. Discussion

3.1. Social media SSB health campaigns

The prominence of social media SSB health campaigns in the United States could be due to the high prevalence of obesity in that country (Ogden, Carroll, Kit, & Flegal, 2012). High SSB consumption is currently positioned in public health discourse as the main culprit (Bleich, Wang, Wang, & Gortmaker, 2008). In addition, debate of SSB taxation has become increasingly intense in the United States (Niederdeppe, Gollust, Jarlenski, Nathanson, & Barry, 2013). In Australia, consumption of SSBs is also high, ranking "Australia in the top 10 global markets for sugar-sweetened beverages based on per capita consumption" (Australian National Preventive Health Agency, 2014,

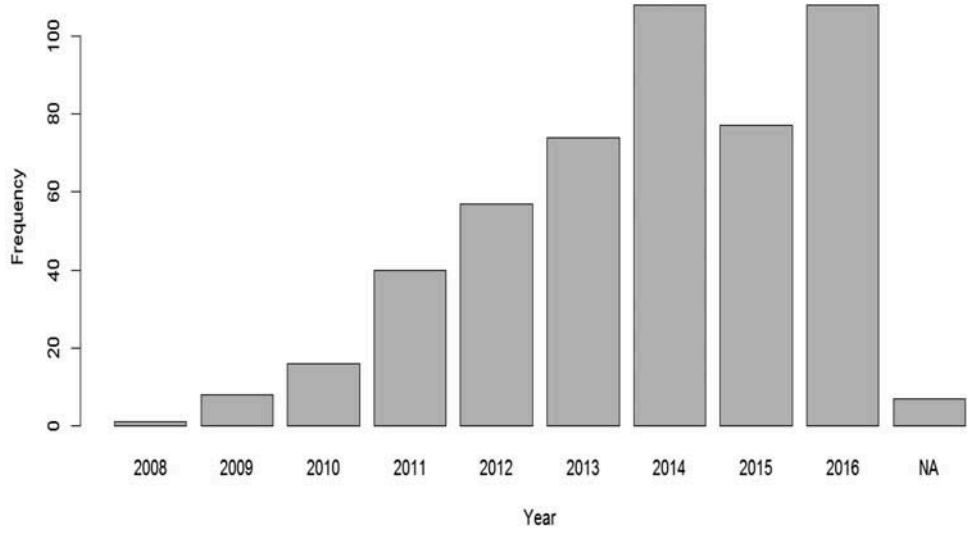

Figure 4. Timeline of material distribution.

Table 4. Health messages about health risks highlighted in the campaigns

Health risk	Frequency	%
Obesity/overweight	31	91
Diabetes	26	76
CVDs/heart diseases/stroke/hypertension	22	65
Dental caries/tooth decay	16	47
Cancers	8	24
Dental diseases/rotten teeth	4	12
Gout	4	12
Dental erosion	3	9
Liver diseases	3	9
Sexual dysfunction/erectile dysfunction	2	6
Kidney failure	2	6
Depression/anxiety/headache	2	6
Metabolic syndrome	2	6
Blindness	1	3
Visceral fat	1	3
Sleep problem	1	3

p. 1). It is thus unsurprising that of campaigns in English, after the United States, Australia hosts the second most anti-SSB campaigns.

The gradual increase in online discussion about SSBs and distribution of materials relevant to SSBs through social media platforms is a positive sign for changing people's behaviour towards SSB consumption (Boles et al., 2014). However, it is disappointing that government or public institutions have not been very active in disseminating information, despite governments' increase in adopting social media strategies to engage citizens (Lev-On & Steinfeld, 2015). What holding the government back may be due to the lack of control over what happening in the social media platforms. Mergel (2013) revealed that, nonetheless, government initiatives can produce significant impact.

3.2. Social media platforms

The findings revealed that two social media platforms—Facebook and YouTube—are commonly used by distributors to disseminate materials relevant to SSBs. According to Murphy (2013), Facebook was the most popular social networking site, with 700 million active users globally accounting for 51% of the total internet users. It has developed a variety of functions enabling users to conveniently disseminate information and a wide range of electronic content including videos, images, articles, and links, to engage in discussions, and to rate or rank the electronic content. These functions have fulfilled different needs of various users (Lee, Kim, & Ahn, 2014). Song et al. (2014) emphasized that Facebook is primarily designed to enable users to customize their use so that they can share their personal stories, and establish and maintain social relationships. The campaigners in this study may have chosen Facebook as a strategy to reach audiences due to its convenient features and popularity contributing to greater familiarity among social media users. This is consistent with the finding of Freeman, Potente, Rock, and McIver (2015) which suggests that social media campaigners should employ social media functions already familiar to users in order to increase participation. In fact, Chaffey (2016) reported that Facebook and YouTube were ranked first and second, respectively, in the top ten most popular social media platforms in 2015.

Unlike Facebook, YouTube is limited to video sharing only, but its features are also very familiar to internet users. It has become the most common video sharing site (Cheng, Liu, & Dale, 2013). Most of the videos in this study were distributed through YouTube, but it is likely that its limitation in interactive capability made it second to Facebook in terms of material sharing. Videos relevant to SSBs were minimally distributed through Facebook despite its capacity to perform the function. In fact, text articles constituted the majority of the materials distributed via Facebook. In this study, social media SSB health campaigners most frequently use videos as campaign materials. Videos can offer much richer information and be as interoperable as text messages (Bandera, 2016). The preference for video clips is supported by a recent study of a public awareness campaign in Thailand (Chansrichavala et al., 2015). In addition to this, Kite, Foley, Grunseit, and Freeman (2016) found that videos posted on Australian public health organizations' Facebook pages were associated with higher user engagement.

Interestingly, other social media platforms such as, Google+ and Pinterest, do allow multiple types of materials to be distributed (Gilbert, Bakhshi, Chang, & Terveen, 2013; Gonzalez, Cuevas, Motamedi, Rejaie, & Cuevas, 2013), but they were rarely used to distribute campaign materials relevant to SSBs. This could be related to the matter of familiarity. Gonzalez et al. (2013, p. 483) found that it was quite challenging for Google+, which was launched later in 2011, to overcome the dominance of Facebook and Twitter despite that "G+ offers a combination of Facebook- and Twitter- like services in order to attract users from both rivals". Gonzalez et al. (2013) also discovered that Google+ was utilized by internet users for propagating messages like Twitter. Similarly to Google+, Pinterest which was launched later in 2010 is a social media platform sharing images of interest to users (Mittal, Gupta, Dewan, & Kumaraguru, 2014). According to Mittal et al. (2014), Pinterest is best used for promoting commercial activities online.

Twitter came third after Facebook and YouTube based on popularity in 2015 (Chaffey, 2016); however, in this study only one item was found, although links to websites can in fact be disseminated via Twitter. Twitter is mostly used for sending and receiving short messages (tweets) (Kwak, Lee, Park, & Moon, 2010). Instagram, another social media platform that allows users to capture and share photos and videos with ease (Hu, Manikonda, & Kambhampati, 2014), was also rarely utilized to distribute SSB health campaign materials. The potential reason behind this is related to familiarity and its functions. It was launched in 2010 and is mainly used for self-promotion (Selfies) and social networking with friends (Hu et al., 2014).

No material relevant to SSBs was found when searching in LinkedIn, Tumblr, and Myspace. LinkedIn is mainly used for professional networking in relation to work and trade purposes (Hussain & Turner, 2011). Yet, Myspace, "the largest and most active online social network" (Caverlee & Webb, 2008, p. 1), and Tumblr, one of the most popular microblogging platforms focusing on sharing multimedia (Chang, Tang, Inagaki, & Liu, 2014), were both suited to the task of distributing the materials as they also contain Facebook-like functions. For Tumblr, it could be a matter of familiarity that contributed to the lack of use. It has just become noticeably successful in recent years and was acquired by Yahoo! in 2013 (Chang et al., 2014). Myspace was founded in 2003 and most of its users are teens and early twenties. A systematic review conducted to identify research on using social media to provide health information to adolescents and young adults showed that high-risk sexual behaviours, mental health issues, medical conditions, tobacco use, alcohol consumption, and other drug use are common health topics discussed (Yonker, Zan, Scirica, Jethwani, & Kinane, 2015). Yet, harmful health effects of SSB consumption are not mentioned.

It can be concluded that the popularity and familiarity of social media platforms and the preference of format in which information is distributed influence the selection of social media platforms by SSB public health campaigns. Different social media platforms are selected based on the types of campaign materials developed for different target audiences. The findings are consistent with the recommendations given by the Centers for Disease Control and Prevention (2011) and an audience–channel–message–evaluation (ACME) framework recommended by Noar

(2012). The recommendations place importance on understanding the target audiences in determining how the materials should be channelled or distributed. Thus, in planning social media campaigns, the target audience and the features or functions of the social media platform are important considerations. Noar (2012, p. 481) summarized the first three components of ACME as follows.

> The choice of audience segment(s) to focus on in a campaign affects all other campaign design choices, including message strategy and channel/component options. Although channel selection influences options for message design, choice of message design also influences channel options.

3.3. Health messages

Obesity or overweight, diabetes, and cardiovascular diseases including heart diseases, stroke, hypertension are the most frequently mentioned health effects in the identified campaigns in this study, suggesting that social media SSB health communicators do not generally consider dental conditions important. When Welsh, Lundeen, and Stein (2013) provided an overview of the association between SSB consumption and health effects, other health risks, such as dental caries and dental erosion, were not discussed at all. Such limitations in the literature are likely to influence the design of campaign materials.

Across the campaigns identified, advice on healthy alternatives to SSBs is limited (only 35% of the campaigns included any mention of substitutes). Providing substitute beverages and/or alternative behaviour is a characteristic of successful health promotion campaigns (Economos et al., 2001) and should be considered in future social media health campaigns against SSB consumption.

3.4. Limitations

To the authors' knowledge, this study is the first to conduct a systematic search to identify social media SSB health campaigns. However, there are limitations. First, the findings were restricted to English-language campaigns. Second, the campaigns identified were influenced by the sampling framework which was not randomly selected and was mainly based on the two search phrases, and generalisability is restricted accordingly. Third, this study is descriptive, and no in-depth evaluation of the effectiveness of the campaigns as well as health messages was conducted.

3.5. Conclusions

Increased consumption of SSBs has received global attention due to its harmful health effects. A number of public health measures and actions have been taken in developed countries, particularly in the United States (Welsh et al., 2013). The increased use of social media (Chaffey, 2016) and increased online discussion about SSBs from 2008 to 2016 makes social media potential communication channels for health campaigns against SSB consumption. Nonetheless, it has been under-utilized by governments. Social media is relatively new and low-cost tool for campaign dissemination and has the capacity to vastly increase campaign reach.

This current study identified a sample of social media SSB health campaigns through a systematic search which can be used as a model to identify social media campaigns for other issues. The identified campaigns can exemplify social media health campaigns against SSB consumption and be of importance to health promotion campaigners in planning future campaigns. Further research should now examine content of the identified campaigns using more in-depth content analysis and evaluate the communication strategies and various aspects of health messages including emotional appeals and ethical dimensions. User or viewer perspectives towards the campaigns should also be examined through some kind of interventional studies.

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Author details
Vannarath Te[1]
E-mail: vannarath.te@uq.net.au
E-mail: vannarath_te@yahoo.com
Pauline Ford[2]
E-mail: p.ford1@uq.edu.au
Lisa Schubert[1]
E-mail: l.schubert@sph.uq.edu.au
E-mail: lisaroseschubert@gmail.com
ORCID ID: http://orcid.org/0000-0001-5392-4221
[1] School of Public Health, The University of Queensland.
[2] School of Dentistry, The University of Queensland.

Authors' contributions
Vannarath Te (VT), the primary researcher, developed the study proposal, collected the data, analysed the data, and wrote the first draft of the manuscript.
Lisa Schubert (LS) provided regular consultations and feedback on the first and second drafts of the manuscript and cross-checked a sample of the data collected.
Pauline Ford (PF) provided valuable feedback on the first and second drafts of the manuscript.

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