

## Review Article

# Research trends in teens' health information behaviour: a review of the literature

Sung Un Kim & Sue Yeon Syn

Department of Library and Information Science, The Catholic University of America, Washington, DC, USA

### Abstract

*Objective:* This study aims to examine trends in studies of teens' health information behaviour.

*Methods:* Eighty-two articles published between 2000 and 2012 were selected and analysed in various aspects: health topics by year, information sources, data collection methods, use of theories and models, collaborative and interdisciplinary efforts and published journals.

*Results:* Fifty-seven per cent of the studies focused on specific health topics, such as sexual health, while the rest covered general health topics. Almost half of the studies examined how teens search for and use health information on the Internet. Surveys were the most popular data collection technique. Only 12.2% were based on a theory or model. About 42% were conducted collaboratively by authors from multiple disciplines.

*Discussion and Conclusions:* With the increasing attention to specific health topics and online resources, the health information behaviour of teens has been examined more frequently since the mid-2000s. Its interdisciplinary nature was evidently shown from various disciplines that the authors were affiliated with and the journals of the published studies represented. This study suggests that there should be efforts to reflect new technology tools, apply mixed methods and increase the engagement level of collaboration to evolve this research domain.

*Keywords:* information literacy; research capacity; review, literature

### Key Messages

- Health librarians should recognise their clients' challenges in grasping the trends of teens' health information behaviour studies because of their interdisciplinary and quickly evolving nature.
- Health librarians should provide research support and information literacy programmes that reflect the various involved disciplines and their research trends in teens' health information behaviour.
- Future studies should devote effort to including new technology tools, applying mixed methods and increasing the engagement level of collaboration to evolve this research domain.
- Professionals in library and information science should be proactive in reaching out to other disciplines to gain insight from diverse perspectives and methodological approaches.

### Background and significance

With the rapid development and spread of technology, recent research on health information behaviours has explored how individuals seek and use health-related information from various channels – such as the Internet and mobile

devices – as well as face-to-face interactions with professionals, family and friends. Among various groups of health information users, teens are considered noteworthy in both research and practices because the developmental period of adolescence establishes health-related habits, behaviours, attitudes and values that will impact

Correspondence: Sung Un Kim, Department of Library and Information Science, The Catholic University of America, 620 Michigan Ave., N.E., Washington, DC 20064, USA, E-mail: kimi@cua.edu

their future health.<sup>1</sup> Also, risk behaviours involving tobacco, alcohol, depression and violence are often experienced for the first time during adolescence.<sup>2</sup> In addition, in spite of the increasing availability of various types of information sources, research has found that teens show low health literacy levels; that is, they have difficulty locating and understanding the basic health information needed to solve health issues and make informed decisions.<sup>3,4</sup>

In spite of the importance of the topic, it has been difficult for researchers to aggregate and understand the common knowledge base of teens' health information behaviour for the following reasons. Because the health information behaviour of teens has been studied in various disciplines, including medicine, nursing, psychology, information science and education, findings of the studies have spread out to journals in multiple disciplines. Therefore, researchers in one discipline may have difficulty in recognising and locating relevant studies that have been conducted in other disciplines. In addition, the field of health informatics is quickly evolving with the development of technology, which makes it even more challenging to grasp the trends and characteristics of the field in a prompt manner. Although analysis of relevant literature from various involved disciplines could effectively contribute to further development of information services and research in teens' health information behaviour, little attention has been paid to understanding trends and interdisciplinary characteristics in the literature.

## Objectives

This study aims to examine trends and interdisciplinary characteristics of studies on teens' health information behaviour from 2000 to 2012. The definition of *information behaviour* used in this study is 'the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use'.<sup>5(p.49)</sup> The authors decided to review the articles published from 2000 when the Internet was widely spread and a majority of the Internet users, including teens, started to seek health information online.<sup>6</sup> At the time, teens' health information behaviour obtained

more attention, as a variety of health information sources became available to teens and concerns were raised over access and quality issues of online health information.<sup>7</sup> The results will shed light on the holistic understanding of teens' health information behaviour studies from multiple disciplines. In practices, the comprehensive snapshot of relevant studies will help health librarians extend their subject knowledge beyond the library and information science discipline. Health librarians can apply their knowledge from multi-disciplines to research support and information literacy instructions to enable their clients to promptly grasp the updated research. Also, this study will provide suggestions for future research on teens' health information behaviour.

## Methods

Research articles published between January 2000 and May 2012 were collected from online databases in multiple disciplines. The article selection process is described below and visualised in Fig. 1.

### Search strategy

The Initial Search Stage was conducted with online databases in medicine, education and library and information science to obtain a general understanding of studies on the health information behaviour of teens and the disciplines of the topic. The databases included Academic Search Premier, PsycINFO, ERIC, MEDLINE, and LISA. The search string encompassed the main ideas of the topic – teens, health and information seeking – and included synonyms: (adolescent\* OR teen\* OR 'young adults' OR 'young people' OR youth) AND (health OR nutrition OR sex OR wellness OR illness) AND 'information seeking'. Titles and abstracts of the retrieved articles were reviewed. Among them, the 18 most relevant articles published from January 2000 to May 2012 were identified, and their full texts were reviewed to build a more concrete search strategy with new related search terms and to recognise other disciplines involved in this topic.

Search Stage 1 was conducted with 22 online databases in various disciplines including sociology, psychology, and social work as well as medicine, education and library and information

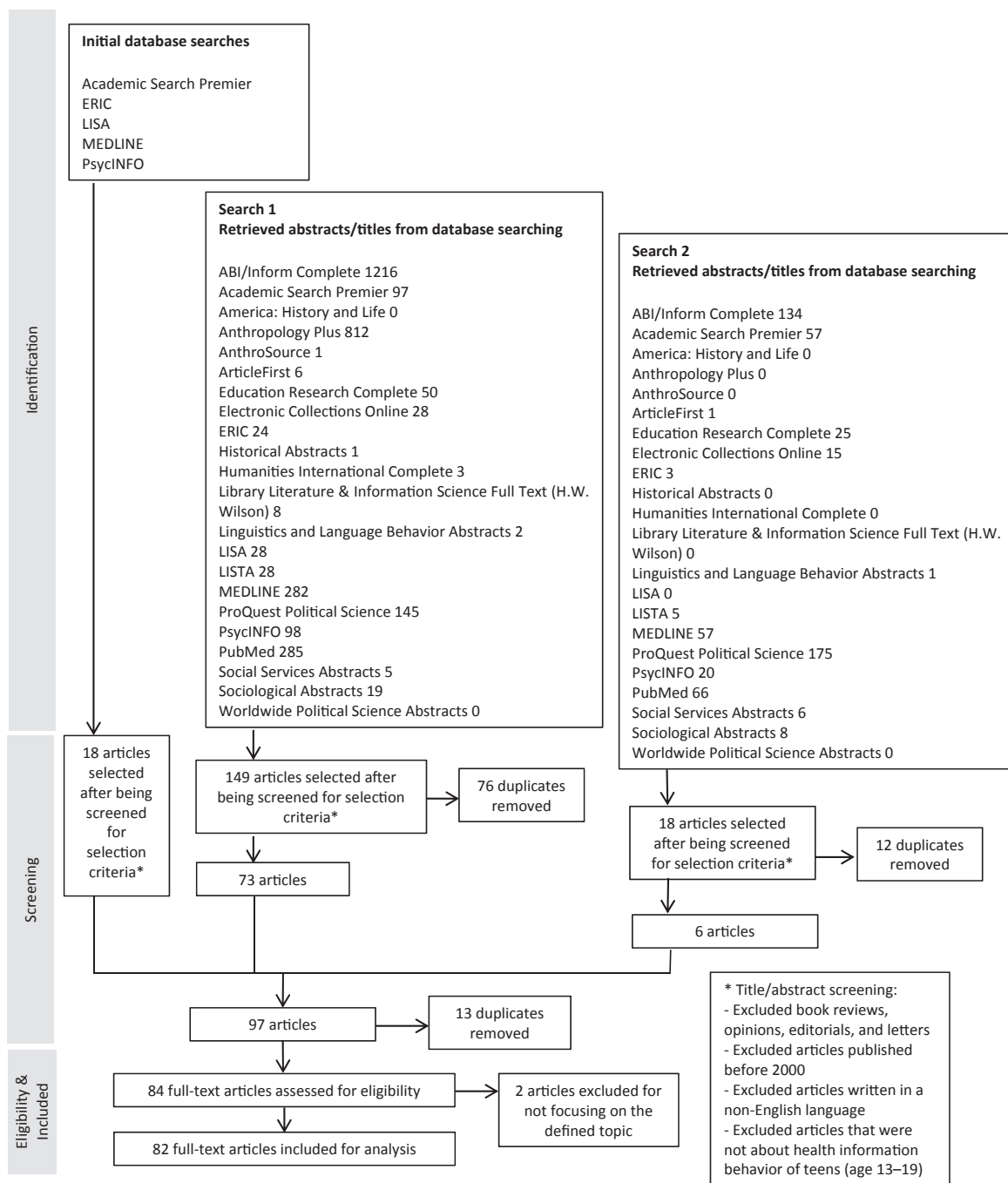


Figure 1 Article selection process

science. The databases identified and used were ABI/Inform Complete, Academic Search Premier, America: History and Life, Anthropology Plus, AnthroSource, ArticleFirst, Education Research Complete, Electronic Collections Online, ERIC, Historical Abstracts, Humanities International Complete, Library Literature & Information Science Full Text, Linguistics and Language

Behavior Abstracts, LISA, LISTA, MEDLINE, ProQuest Political Science, PsycINFO, PubMed, Social Services Abstracts, Sociological Abstracts, and Worldwide Political Science Abstracts. The search string was expanded to include terms that we learned from the results of the initial search. The new search string used for Search Stage 1 was: (adolescent\* OR teen\* OR 'young adult\*' OR

'young people' OR youth OR 'secondary school\*' OR 'middle school\*' OR 'high school\*') AND (health OR nutrition OR sex OR wellness OR illness OR drugs OR alcohol OR tobacco OR 'physical activity' OR safety) AND ('information seeking' OR 'information literacy' OR 'information use' OR 'information source' OR 'information behaviour' OR 'information search'). In the search string, specific health topics, such as nutrition, sex, and drugs, were selected from the previous studies on teens' health information needs<sup>8,9</sup> and phrases relevant to information behaviour, such as information seeking and information use, were added based on the definition of information behaviour.<sup>5</sup> Titles and abstracts of the retrieved articles were screened and reviewed independently by the two authors to determine their relevance using the selection criteria described in the following section. Disagreements were discussed and resolved by reviewing the full-text article. When a database retrieved more than 100 articles in search results, the titles and abstracts of only the first 100 articles ordered by relevance were reviewed, because the titles listed later appeared to be less relevant to the topic. When a database did not provide the 'sort by relevance' feature, the titles and abstracts of all retrieved articles were reviewed.

While reviewing articles from Search Stage 1, we identified studies that focused on how teens share health information with others. Thus, we decided to conduct another search to include the keywords 'information sharing' in the article selection process. Search Stage 2 was conducted with the same online databases with Search Stage 1, but with the addition of the search term 'information sharing': (adolescent\* OR teen\* OR 'young adults' OR 'young people' OR youth OR 'secondary schools' OR 'middle schools' OR 'high schools') AND (health OR nutrition OR sex OR wellness OR illness OR drugs OR alcohol OR tobacco OR 'physical activity' OR safety) AND 'information sharing'. The review process for Search Stage 2 was identical to Search Stage 1.

### Selection criteria

Studies published in peer-reviewed journals between 2000 and 2012 and written in English were selected from the retrieved articles. In selecting

research articles, materials such as book reviews, opinions, editorials, and letters were excluded. However, review studies were included. Also, it was noted whether the articles focused on health information behaviour of teens (ages 13–19). Articles that involved teens as a subgroup of the participants were also included. For example, studies with the participants aged 16–24 or 8–25 were included as they involved the age range of teens. As a result of the selection process, a total of 97 articles were obtained from the Initial Search Stage, Search Stage 1, and Search Stage 2 (18, 73 and six articles, respectively). After removing duplicates, 84 articles remained.

### Eligibility

The 84 selected articles were reviewed in detail in full-text level for eligibility. The focus of the study, peer-review, written language, publication year and ages of target populations were checked independently by the two authors in full text articles. After a detailed review of the set, two of the 84 articles were eliminated because of their discordance with the focus of the topic: one focused on integrating online health information into the middle school curriculum, and the other on librarians' roles for adolescent sexuality education. As a result, 82 articles were included for analysis.

### Data analysis

Data were extracted from the 82 sample articles. To examine the trends in teens' health information behaviour studies, the articles were reviewed to collect data about publication year, health topics, information sources, data collection methods and use of theory and model. Information source in our study indicates various means by which information is provided or shared with people or organisations. In addition, to understand collaboration and interdisciplinary efforts, data about the number of authors, their affiliated departments/organisations, nations and the title of published journal were extracted from the sample articles. The collected data were categorised and coded to be analysed with descriptive statistics. Based on the coding scheme developed by the two authors,

each author coded half of the data and cross-reviewed the other author's coding. The coding scheme is available in the online supporting information Appendix S1. Disagreements were resolved through discussion between the authors. Detailed methods of data analysis are also described in each section of results.

## Results

### Study distribution by year and health topics

The sample included 82 articles published from January 2000 to May 2012. As shown in Table 1, general health topics have been steadily examined since the early 2000s, whereas specific health topics started to gain attention in the middle (i.e. sexual health and mental health) and late 2000s (i.e. eating issues and nutrition, and alcohol, drugs and tobacco). The total number of studies increased substantially in 2011, with various health topics covered. The online supporting information Appendix S2 provides data about the 82 articles.

To examine the distribution of health topics, studies were classified into eight health topic categories devised from the researchers' analysis of the collected articles. Among 82 studies, 35 studies (42.7%), which covered various health topics, were coded as *general*. Among the remaining 47 studies with specific health topic categories, *sexual health* topics have been most frequently studied ( $n = 22$ , 26.8%), followed by *eating issues and nutrition* ( $n = 7$ , 8.3%), *mental health* topics

( $n = 6$ , 7.3%), and *alcohol, drugs and tobacco* ( $n = 4$ , 4.9%). Eight articles (9.8%) focused on *specific diseases* that did not apply to any other health categories, such as asthma or inflammatory bowel disease. It is noteworthy that five of the eight articles categorised as *specific diseases* encompassed the topic of chronic disease.<sup>1,70,80–82</sup> Two studies were categorised as *others* (2.4%), which included topics of self-management, well-being, violence, and suicide. Studies that covered two health topics were counted in both categories ( $n = 2$ , 2.4%).

### Information sources

Information sources were largely categorised as physical resources (e.g. TV, radio, books, magazines and brochures), online resources (e.g. search engines, health-related websites and social media), people resources (e.g. health professionals, family members and friends) and others. Studies were classified into people resources only when they focused on people without specific emphasis on media. When any media were involved, they were classified into physical resources, online resources or others by format of media.

Of all the information sources observed in the collected studies, 23 studies (28.0%) identified various kinds of information sources from physical and online resources, to people resources. Thirty-nine studies (47.6%) focused only on the use of *online resources*, and seven studies (8.5%) included *both physical and online resources*. Some

**Table 1** Study distribution by year and health topics

Year	00	01	02	03	04	05	06	07	08	09	10	11	12 (by May)	Total
General <sup>2–4,10–41</sup>	0	1	3	1	3	3	0	3	8	1	2	5	5	35
Sexual Health <sup>42–63</sup>	0	0	0	0	1	2	1	1	2	3	1	8	3	22
Mental Health <sup>64–69</sup>	0	0	0	0	0	0	1	0	1	0	1	2	1	6
Eating Issues and Nutrition <sup>70–76</sup>	0	0	0	0	0	0	0	0	0	1	0	6	0	7
Alcohol, Drugs, and Tobacco <sup>46, 77–79</sup>	1	0	0	0	0	0	0	0	0	2	0	1	0	4
Specific Diseases <sup>1,70,80–85</sup>	0	0	0	1	0	0	1	0	0	2	1	2	1	8
Others <sup>86,87</sup>	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Total*	1	1	3	2	4	5	3	4	11	9	5	24	10	82
%	1.2	1.2	3.7	2.4	4.9	6.1	3.7	4.9	13.4	11.0	6.1	29.3	12.2	100.0

\*Studies that covered two health topics were double-counted; therefore, the sum of the number of studies in each health topic may not be identical to the total number of studies per year.



studies focused on particular information sources, such as *print resources* ( $n = 5$ , 6.1%), *health professionals* ( $n = 3$ , 3.7%) and *family members* ( $n = 2$ , 2.4%). There were also studies that included texting, mobile phones, software and medical statistical data as information sources, which were categorised as *others* ( $n = 4$ , 4.9%). There were two studies (2.4%) that did not specify specific information sources. Three studies (3.7%) were double-counted because they covered both online resources and texting.

#### Data collection methods

Studies on teens' health information behaviour collected data from various sites. Among 82 studies, 26 studies collected data from *secondary schools or school districts* (31.7%), 16 studies from *local communities* (19.5%), 10 studies from *hospitals or health clinics* (12.2%), 10 studies from the *Internet* (12.2%), eight studies from *colleges* (9.8%) and two studies from *professional organisations or conferences* (2.4%). Twelve studies (14.6%) did not indicate specific sites for data collection and six studies (7.3%) were based on *literature*. Eight studies (9.8%) collected data from more than one data collection site, and they were double-counted.

*Surveys* were the most popular data collection technique ( $n = 40$ , 48.8%), followed by *individual interviews* ( $n = 16$ , 18.8%), *focus group interviews* ( $n = 11$ , 13.4%) and *observations* ( $n = 5$ , 6.1%), and *quasi-experiments* ( $n = 1$ , 1.2%). Fourteen studies (17.1%) used *other* data collection techniques including email analysis, Internet searches, diary study and ethnography. Eight studies (9.8%) were based on *literature or website reviews*. Twelve studies (14.6%) used mixed methods, and they were double-counted. Of the twelve studies using mixed methods, eight studies used *survey with individual interviews* ( $n = 2$ ), *focus group interviews* ( $n = 1$ ) or one of the techniques categorised as *other* ( $n = 5$ ).

#### Use of theory and model

Among 82 studies, 72 studies (87.8%) were not based on a theory or model. Theories and models that were used included Behavioural Model ( $n = 1$ ),<sup>42</sup> Framework for Adolescent Health

Literacy ( $n = 1$ ),<sup>28</sup> Health Belief Model ( $n = 1$ ),<sup>65</sup> Integrative Model of Behavioural Change ( $n = 1$ ),<sup>43</sup> Information Search Process ( $n = 1$ ),<sup>72</sup> Media Practice Model ( $n = 1$ ),<sup>44</sup> Network Episode Model ( $n = 1$ ),<sup>42</sup> Primary Socialisation Theory ( $n = 2$ ),<sup>25,26</sup> Social Cognitive Theory ( $n = 1$ ),<sup>53</sup> and Uses and Gratification Theory ( $n = 1$ ).<sup>33</sup> One study used two theories and was double-counted.<sup>42</sup>

#### Collaboration and interdisciplinary efforts

To examine collaborative and interdisciplinary efforts, information about the author(s) of the sample articles was collected regarding their affiliated departments/organisations, disciplines and nations. The information about departments/organisations and nations was identified from the article's author information. We categorised disciplines into *health-care, public health and policy, communication and media studies, psychology, sociology, information science/library and information science, education, independent research institute* and *others* (Appendix S1). *Others* included business, English studies, social work and non-specified units in university. When an author was affiliated with more than one department/organisation, all of them were coded and counted. Figure 2 shows the ranges and average numbers of authors, disciplines, departments, organisations and nations per study.

Among 82 studies, 11 studies were conducted by a single author (13.4%), 21 studies by two authors (25.6%), 16 studies by three authors (19.5%), 15 studies by four authors (18.3%), eight studies by five authors (9.8%), eight studies by six authors (9.8%), two studies by seven authors (2.4%) and one study by eight authors (1.2%). The average number of authors per study by year ranged from 2.0 to 4.6. Figure 3 demonstrates that interdisciplinary and interdepartmental collaborations increased as the number of authors increased. International collaborations occurred only when there were three to five authors.

Most studies ( $n = 76$ , 92.7%) were conducted in one country (Table 2). The countries were USA ( $n = 52$ , 63.4%), UK ( $n = 8$ , 9.8%), Canada ( $n = 4$ , 4.9%), the Netherlands ( $n = 4$ , 4.9%), Australia ( $n = 1$ , 3.7%), Croatia ( $n = 1$ , 3.7%), Denmark ( $n = 1$ , 3.7%), Nigeria ( $n = 1$ , 3.7%), Pakistan ( $n = 1$ , 3.7%) and Sweden ( $n = 1$ ,

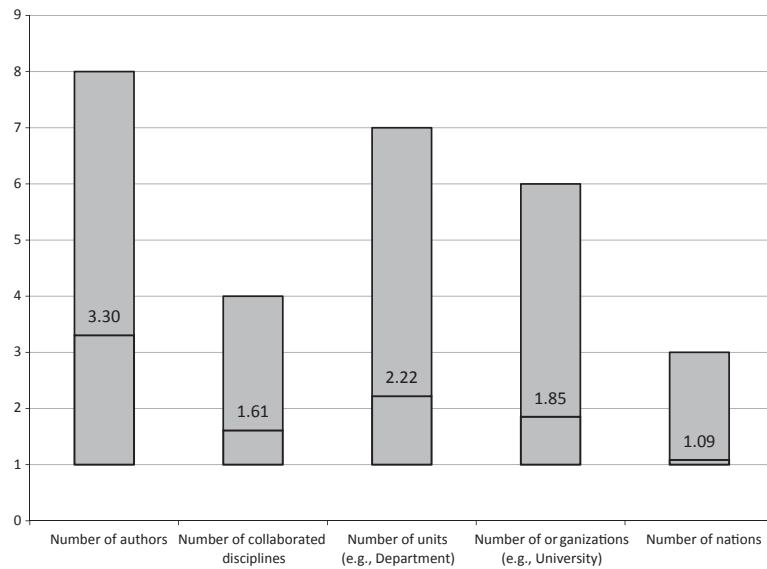


Figure 2 Ranges and average of authors, disciplines, departments, organisations and nations per study

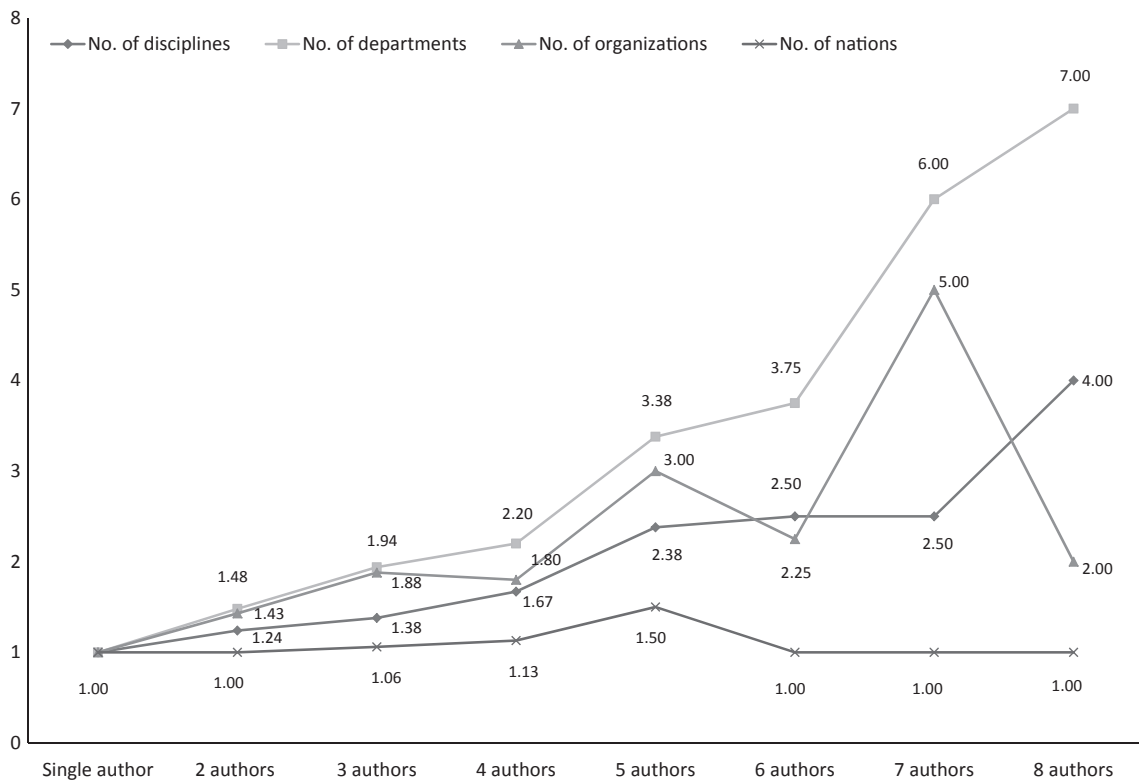


Figure 3 Average numbers of disciplines, departments, organisations and nations by co-authorship

3.7%). Among studies conducted within the USA or the UK, 39.5% and 32.7% were interdisciplinarily collaborated, respectively. Although Canada, Croatia, Denmark, the Netherlands and Pakistan had fewer studies than the USA and the

UK, they demonstrated a higher interdisciplinary collaboration rate.

There were six studies that showed international collaboration. Three studies involved collaboration between the USA and the UK, one study between

**Table 2** Average number of authors and number of interdisciplinary studies by country

Number of countries	Country	Number of studies	Average number of authors	Number of interdisciplinary studies (%)
1	Australia	3	2.0	1 (33.3)
	Canada	4	5.3	3 (75.0)
	Croatia	1	2.0	1 (100.0)
	Denmark	1	6.0	1 (100.0)
	The Netherlands	4	4.0	4 (100.0)
	Nigeria	1	1.0	0 (0.0)
	Pakistan	1	2.0	1 (100.0)
	Sweden	1	2.0	0 (0.00)
	UK	8	3.3	2 (25.0)
	USA	52	3.1	17 (32.7)
	Subtotal	76	3.2	30 (39.5)
2	Australia & USA	1	3.0	1 (100.0)
	Uganda & USA	1	5.0	1 (100.0)
	UK & USA	3	4.3	1 (33.3)
	Subtotal	5	4.2	3 (60.0)
3	Australia, Canada, & USA	1	5.0	1 (100.0)
	Subtotal	1	5.0	1 (100.0)
Total		82	3.3	34 (41.5)

the USA and Australia, one study between the USA and Uganda, and one study among the USA, Australia and Canada. All international studies were not necessarily based on interdisciplinary collaborations. International collaborations sporadically appeared between 2000 and 2012. There was no specific pattern found in the health topics of internationally collaborated studies.

Interdisciplinary studies in teens' health information behaviour have been steadily conducted since 2003 and have comprised about half of the total studies since 2010 (Fig. 4). As to the involvement of each discipline (Fig. 5), *healthcare* was the most dominant discipline ( $n = 42$ , 51.2%) in interdisciplinary collaboration, followed by *public health and policy* ( $n = 19$ , 23.2%), *communication and media studies* ( $n = 9$ , 11.0%), *sociology* ( $n = 9$ , 11.0%), *information science/library and information science* ( $n = 8$ , 9.8%), *psychology* ( $n = 7$ , 8.5%) and *education* ( $n = 5$ , 6.1%). Nine studies were categorised as *others* ( $n = 9$ , 11.0%), which included disciplines of business ( $n = 1$ ), English studies ( $n = 1$ ), social work ( $n = 1$ ), and non-specified units in university ( $n = 6$ ). There were 24 studies (29.3%) involving *independent research institutes* that are not affiliated with a university or hospital, such as non-profit organisa-

tions, government organisations and research centres. Studies related to multiple disciplines were double-counted.

Collaborating disciplines per study ranged from one to four. Among 82 studies, 48 studies (58.5%) were conducted by a single author ( $n = 11$ , 13.4%) or authors from one discipline ( $n = 37$ , 45.1%), and 34 studies (41.5%) were conducted by authors from multiple disciplines. Among the 34 interdisciplinarily collaborated studies, 27 studies involved *healthcare* (79.4%), 15 studies *public health and policy* (44.1%), six studies *psychology* (17.6%), five studies *education* (14.7%), four studies *communication and media studies* (11.8%), three studies *sociology* (8.8%) and two studies *information science/library and information science* (5.9%). In addition, 17 studies involved an *independent research institute* other than universities or hospitals (50.0%) (Fig. 5).

As to the portion of interdisciplinary studies among the total studies per discipline, among the seven dominant disciplines observed, *education* had the highest interdisciplinary collaboration rate (100.0%), followed by *psychology* (85.7%), *public health and policy* (78.9%), *healthcare* (64.3%), *communication and media studies* (44.4%), *sociology* (33.3%) and *information science/library*



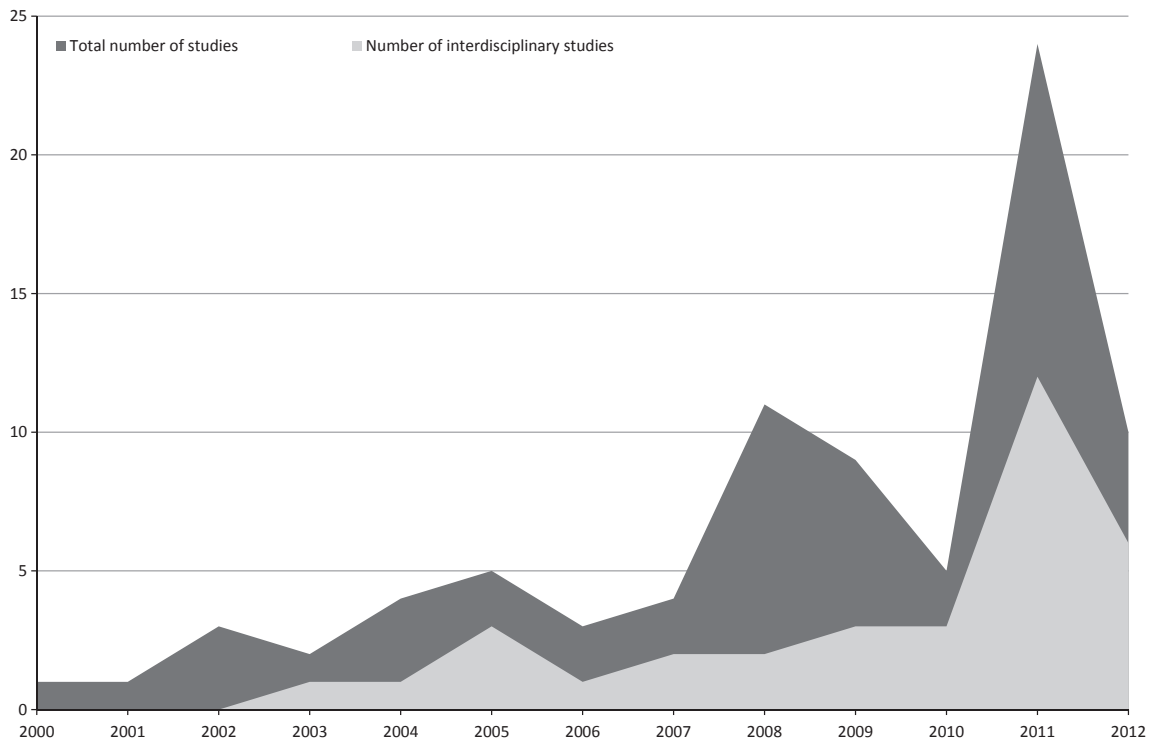


Figure 4 Total number of studies and number of interdisciplinary studies by year

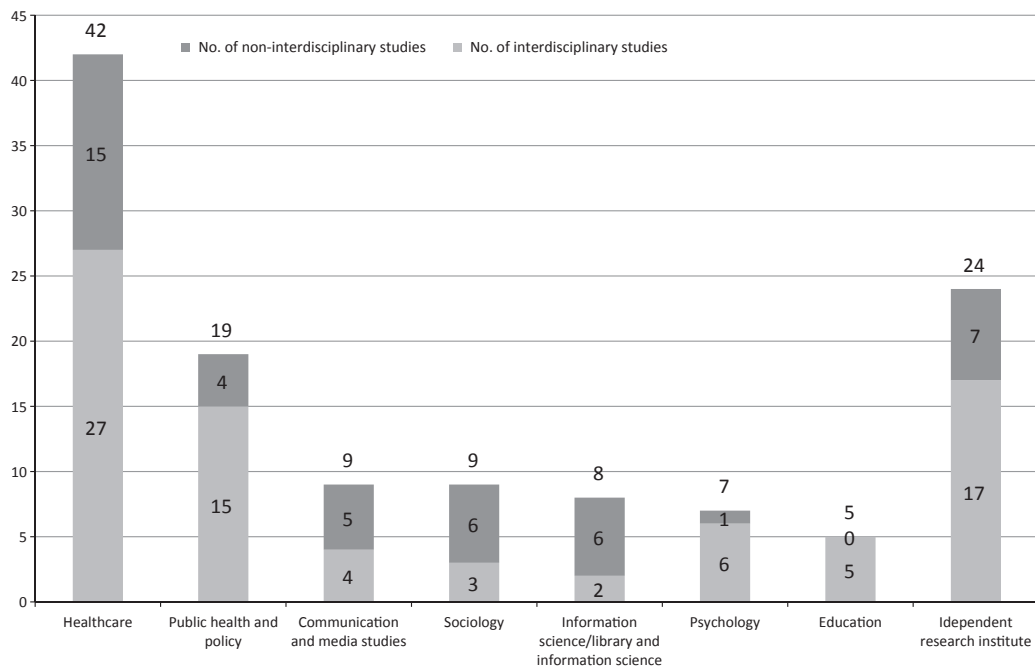


Figure 5 Involvement of disciplines and their interdisciplinary efforts

and information science (25.0%). Independent research institutes showed a 70.8% collaboration rate.

Table 3 shows how each discipline or independent research institute collaborated within the discipline/institute and with others. It is apparent

that *healthcare* played a major role in both inter- and intradisciplinary studies. Frequent collaborations were detected between *healthcare* and *independent research institute* ( $n = 14, 17.1\%$ ), *healthcare* and *public health and policy* ( $n = 10, 12.2\%$ ), *public health and policy* and *independent research institute* ( $n = 6, 7.3\%$ ) and *healthcare* and *psychology* ( $n = 5, 6.1\%$ ). It is also interesting to observe that some disciplines were more active in interdisciplinary collaboration (i.e. *psychology* and *education*) whereas others conducted more intradisciplinary studies (i.e. *information science/library and information science*).

### Journal distribution

Teens' health information behaviour studies were published in a large range of journals. The 82 sample articles were published in 65 different journals. Among 65 journals, only 10 journals had more than one study about teens' health information behaviour: *Journal of Adolescent Health* ( $n = 5$ ),<sup>46,48,65,73,81</sup> *Social Science & Medicine* ( $n = 5$ ),<sup>14,22,34,41,49</sup> *Health Education Research* ( $n = 3$ ),<sup>28,39,40</sup> *Journal of Health Communication* ( $n = 3$ ),<sup>27,50,77</sup> *American Journal of Health Education* ( $n = 2$ ),<sup>59,62</sup> *Health Communication* ( $n = 2$ ),<sup>10,17</sup> *Journal of Medical Internet Research* ( $n = 2$ ),<sup>18,23</sup> *Sex Education* ( $n = 2$ ),<sup>57,61</sup> *Sexuality Research & Social Policy* ( $n = 2$ ),<sup>51,55</sup> and *Young Adult Library Services* ( $n = 2$ ).<sup>24,56</sup> The list of journals represented various disciplines and their combinations where teens' health information behaviour was studied with different perspectives.

### Discussion

With the increasing attention to online resources and specific health topics such as sexual health and mental health, the health information behaviour of teens has been examined more frequently since the mid-2000s. The majority (84.1%) of the reviewed articles included online resources as teens' health information sources in their studies; 47.6% focused only on online resources and 36.5% examined online resources along with other types of information sources. As personal devices have become more available, future studies will need to consider including new technology tools, such as mobile apps, to examine how teens use those tools for their health issues.

Regarding data collection techniques, surveys were most frequently used to efficiently collect a large number of responses. The studies using surveys often included cross-sectional analysis,<sup>3,12,17,47,52,80</sup> pre- and post-assessments,<sup>82</sup> or comparison between control- and experimental groups<sup>82</sup> to examine factors that influence teens' health information behaviour. Online surveys were utilised to evaluate Internet-based health services for adolescents, such as a STD prevention website<sup>48</sup> or an artificially intelligent chat agent.<sup>46</sup> It allowed to survey teens' experiences and opinions right after their use of Internet-based health services when their memory was still fresh, and to analyse transaction logs in combination with survey responses.<sup>46</sup> As for interviews, individual or focus group interviews provided opportunities to explore an under-researched topic of teens' health information behaviour and directly interact with

**Table 3** The tendency of inter- and intra-disciplinary collaboration

HC	14							
PHP	10	3						
CMS	2	1	4					
Psych	5	0	0	1				
Socio	2	2	0	0	3			
IS/LIS	2	0	1	1	0	3		
Edu	4	2	1	1	1	0	0	
Research Inst	14	6	2	2	0	1	0	5
	HC	PHP	CMS	Psych	Socio	IS/LIS	Edu	Research Inst

HC, Healthcare; PHP, Public health and policy; CMS, Communication and media studies; Psych, Psychology; Socio, Sociology; IS/LIS, Information science/Library and information science; Edu, Education; Research Inst, Independent research institutes.

specific target groups, for example, those who had experienced certain diseases.<sup>81</sup> Although limited by anonymity and generalisation of results, interviews offered a deep understanding of teens' health information behaviour by answering *why* and *how* questions, which could not be answered by surveys alone.<sup>57,72</sup> Nevertheless, the results showed that studies heavily relied on a single method, whereas only 14.6% of them used mixed methods. Using either quantitative or qualitative approaches is not adequate to address complicated problems in social and health sciences,<sup>88</sup> and various types of data from mixed methods provide cross-data validity checks with minimising errors linked to a particular method.<sup>89</sup> Thus, it is recommended that future studies about teens' health information behaviour consider combining multiple research methods to utilise the strengths of both quantitative and qualitative research.

It is also notable that most studies were not theory- or model-based. According to Niessen's designation of the interdisciplinary collaboration development level,<sup>90</sup> researchers take notice of each other and provide mutual assistance at a low level, share common terminology at a medium level and develop integrated theoretical approaches at the highest level. Interdisciplinary studies or an interdisciplinary approach is considered 'the best way to conduct research and organise learning experience in such a way that will produce knowledge helpful in providing comprehensive understanding and solutions to complex problems that plague our contemporary societies'.<sup>91(p. 57)</sup> The ultimate goal of interdisciplinary collaboration is to integrate different perspectives to produce a theory or a methodology that solves complex problems.<sup>91</sup> In this regard, it is recommended that disciplines working on teens' health information behaviour studies devote more effort to increasing the engagement level of their collaboration, beyond mutual assistance and common terminology, to develop comprehensive understanding.

Interestingly, coauthorship and interdisciplinary or international collaboration steadily occurred between 2000 and 2012, regardless of the total number of studies and their topic coverage each year. The interdisciplinarity of the domain was clearly shown from the analysis of associated disciplines. The results indicated that healthcare

appears to be the most involved discipline, followed by public health and policy, communication and media studies, sociology, information science/library and information science, psychology and education. Among 71 studies with multiple authors, 37 studies (52.1%) were conducted from one discipline, while 34 studies (47.9%) resulted from interdisciplinary collaborations. The results demonstrated that multiple academic or research disciplines are interested in and actively collaborate on teens' health information behaviour research. Healthcare is clearly a discipline that actively contributes to teens' health information behaviour research for both inter- and intradisciplinary collaboration. In terms of interdisciplinary efforts, collaborations among healthcare, public health and policy and an independent research institute were most often observed. Also, it was found that education and psychology are active in interdisciplinary collaboration while information science/library and information science tend towards intradisciplinary collaboration. It implies that researchers in the library and information science discipline need to reach out more to other disciplines to obtain insight from diverse perspectives and methodological approaches for their research as well as share their knowledge with other disciplines.

The number of journals ( $n = 65$ ) where the 82 sample studies were published demonstrated the wide scatter of the teens' health information behaviour studies across different journals. Also, the titles of the journals represented the diversity of and collaboration among the disciplines that are involved in teens' health information behaviour studies.

As the field of teens' health information behaviour has been rapidly evolving across multiple disciplines, this study suggests that health librarians provide research support and information literacy programmes for their clients who are challenged in aggregating and grasping the research trends in teens' health information behaviour. With a broader viewpoint, health librarians can help researchers recognise related disciplines outside of their fields and locate and access major resources in teens' health information behaviour studies. For this, librarians can use content management systems, such as LibGuides, in which they can provide links to relevant databases and journals from

multi-disciplines as well as online resources in customised ways to meet the clients' needs. Good examples of utilising content management systems to support information discovery includes the LibGuides of Consortium Library at the University of Alaska Anchorage (<http://libguides.consortiumlibrary.org/content.php?pid=372892&sid=3054367>). This site aggregated web resources and journal articles about teens' health and categorised them by specific health topics for multiple audiences such as teens/parents, educators/practitioners and researchers. Also, it is recommended that health librarians provide continuing education activities by keeping their clients updated on emerging research findings and current health information services or tools for teens. Web 2.0 (e.g. wikis, blogs, social media), newsletter and email can be used for easy and interactive communications to share updates timely and regularly. Such research support will facilitate medical practitioners to apply evidence-based healthcare practice for teens and enable researchers to reflect views from multi-disciplines on their studies in teens' health information behaviour areas.

#### Limitation

This study was conducted with a relatively small sample collection because the focused topic we dealt with, namely, the information behaviour of a specific group of users with regards to health issues, limited the number of studies available. Also, this study may not include all relevant studies published from 2000 to 2012 because of the selection of certain databases and search terms. However, to ensure the multi-disciplinary coverage of the collected articles and also to avoid sampling bias, the process of selecting online databases and search query terms was carefully performed with multiple processes of search where the researchers could confirm search query terms and figure out disciplines covering the targeted research topic area.

#### Future studies

Although the current analysis method does not interpret the underlying reasons for different collaboration tendencies, it creates potential for further analysis to investigate what factors lead to

inter- or intradisciplinary collaborations among various disciplines along with increased interest in this research domain. Interdisciplinarity of teens' health information behaviour studies can be further examined using various methods. For example, research methods for citation analysis can be applied for further understanding of interdisciplinary trends, including a citation count determining how many citations have been received, a cocitation analysis reviewing two documents that are jointly cited in one or more subsequently published documents, and a bibliographic coupling analysing two document that share one or more of the same cited documents.<sup>92</sup>

Moreover, the collaboration and interdisciplinary trends can be interpreted better by evaluating the backgrounds of the authors. The current study analysed author relationships based on author information provided in the publications such as affiliations and nations. Additional information including their educations, specialties, research interests and previous research projects could provide insights on how the co-authorships were undertaken and how the collaborations were supported with interdisciplinary knowledge.

Finally, the search strategy for collecting literature for a review study can be designed in a reflective way for future studies. The authors used three search steps to collect articles for analysis in this study. The Initial Search Stage was conducted to build a concrete search strategy with new search terms and to recognise involved disciplines for Search Stage 1. After Search Stage 1, an additional search, Search Stage 2, was conducted to include the key words 'information sharing' which were found during the process of reviewing articles from Search Stage 1. As a result, six additional relevant articles, which would have been missed otherwise, were added to the set of articles for analysis. Our experience indicated that a reflective search strategy was useful to develop and refine search terms to include as many relevant articles as possible for literature review. As the field of teens' health information behaviour evolves quickly and is getting more attention from researchers, a future study would benefit from a reflective search strategy which will broaden the collection of literature for analysis to better understand holistic trends of the field.

## Conclusions

This study investigated research trends in teens' health information behaviour in terms of health topics, information sources, data collection methods, use of theory and model, collaboration and interdisciplinary efforts and journal distribution. The findings of this study suggest that research on teens' health information behaviour devote effort to including new technology tools, applying mixed methods and increasing the engagement level of collaboration. Also, it is suggested that involved disciplines work towards more in-depth collaboration to incorporate different perspectives and develop a common knowledge base through integrated theories or methodologies. Particularly, professionals in library and information science should be proactive in reaching out to other disciplines to incorporate diverse perspectives and methodological approaches in their research. This study also implies that health librarians should provide research support and information literacy programmes that reflect the various involved disciplines and research trends in teens' health information behaviour. It will help their clients grasp updated research of the quickly evolving and multi-disciplinary field in a prompt manner.

For future studies, interdisciplinarity of teens' health information behaviour studies can be further examined by analysing direct citations, bibliographic coupling, details of co-authorship, and educational backgrounds of authors.

## Contributions

Both authors contributed to study design, data collection and analysis, and manuscript preparation.

## Source of funding

This research received no specific grant from any sources of institutional, private and corporate financial support.

## Conflict of interest

None.

## References

- 1 Rhee, H., Wyatt, T. & Wenzel, J. Adolescents with asthma: learning needs and Internet use assessment. *Respiratory Care* 2006, **51**, 1441–1449.
- 2 Brindis, C. D., Hair, E. C., Cochran, S., Cleveland, K., Valderrama, L. & Park, M. Increasing access to program information: a strategy for improving adolescent health. *Maternal and Child Health Journal* 2007, **11**, 27–35.
- 3 Ghaddar, S. F., Valerio, M. A., Garcia, C. M. & Hansen, L. Adolescent health literacy: the importance of credible sources. *Journal of School Health* 2012, **82**, 28–36.
- 4 Skopelja, E. N., Whipple, E. C. & Richwine, P. Reaching and teaching teens: adolescent health literacy and the Internet. *Journal of Consumer Health on the Internet* 2008, **12**, 105–118.
- 5 Wilson, T. D. Human information behavior. *Informing Science* 2000, **3**, 49–56.
- 6 Rucker, N. L. Risk, respect, responsibility: educational strategies to promote safe medicine use. *Journal of Medical Systems* 2003, **27**, 519–530.
- 7 Borzekowski, D. L. G. & Rickert, V. I. Adolescents, the Internet, and health: issues of access and content. *Journal of Applied Developmental Psychology* 2001, **22**, 49–59.
- 8 McIntyre, P. *Adolescent Friendly Health Services: An Agenda for Change*. Geneva: World Health Organization, 2002.
- 9 Lukenbill, W. B. & Immroth, B. F. Youth health information needs: theories, products, and designs. In: Lukenbill, W. B. & Immroth, B. F. (eds). *Health Information for Youth: The Public Library and School Library Media Center Role*. Westport, CT: Libraries Unlimited, 2007: 81–106.
- 10 Austin, E., Pinkleton, B. E., Hust, S. T. & Cohen, M. Evaluation of an American Legacy Foundation/Washington State Department of Health media literacy pilot study. *Health Communication* 2005, **18**, 75–95.
- 11 Bleakley, A., Merzel, C. R., VanDevanter, N. L. & Messeri, P. Computer access and Internet use among urban youths. *American Journal of Public Health* 2004, **94**, 744–746.
- 12 Borzekowski, D. L. & Rickert, V. I. Adolescent cybersurfing for health information: a new resource that crosses barriers. *Archives of Pediatrics and Adolescent Medicine* 2001, **15**, 813–817.
- 13 Bowler, L., Hong, W. Y. & He, D. The visibility of health web portals for teens: a hyperlink analysis. *Online Information Review* 2011, **35**, 443–470.
- 14 Cotten, S. R. & Gupta, S. S. Characteristics of online and offline health information seekers and factors that discriminate between them. *Social Science and Medicine* 2004, **59**, 1795–1806.
- 15 D'Auria, J. Health Web sites for teens. *Journal of Pediatric Health Care* 2011, **25**, e1–e5.
- 16 Dervin, B. Libraries reaching out with health information to vulnerable populations: guidance from research on



- information seeking and use. *Journal of the Medical Library Association* 2005, **93**, S74–S80.
- 17 Dobransky, K. & Hargittai, E. Inquiring minds acquiring wellness: uses of online and offline sources for health information. *Health Communication* 2012, **27**, 331–343.
  - 18 Flicker, S., Goldberg, E., Read, S., Veinot, T., McClelland, A., Saulnier, P. & Skinner, H. HIV-positive youth's perspectives on the Internet and ehealth. *Journal of Medical Internet Research* 2004, **6**, e32.
  - 19 Franck, L., Noble, G. & McEvoy, M. Enquiring minds want to know: topics requested by users of a children's health information website. *Patient Education and Counseling* 2008, **72**, 168–171.
  - 20 Gray, N. J., Klein, J. D., Cantrill, J. A. & Noyce, P. R. Adolescent girls' use of the Internet for health information: issues beyond access. *Journal of Medical Systems* 2002, **26**, 545–553.
  - 21 Gray, N. J., Klein, J. D., Cantrill, J. A. & Noyce, P. R. Adolescents' perceptions of the Internet as a health information source. *International Journal of Pharmacy Practice* 2002, **10**, R53.
  - 22 Gray, N. J., Klein, J. D., Noyce, P. R., Sesselberg, T. S. & Cantrill, J. A. Health information-seeking behavior in adolescence: the place of the Internet. *Social Science and Medicine* 2005, **60**, 1467–1478.
  - 23 Hansen, D., Derry, H., Resnick, P. & Richardson, C. Adolescents searching for health information on the Internet: an observational study. *Journal of Medical Internet Research* 2003, **5**, e25.
  - 24 Hughes-Hassell, S., Hanson-Baldauf, D. & Burke, J. E. Urban teenagers, health information, and public library web sites. *Young Adult Library Services* 2008, **6**, 35–42.
  - 25 Lariscy, R., Reber, B. & Paek, H. Exploration of health concerns and the role of social media information among rural and urban adolescents: a preliminary study. *International Electronic Journal of Health Education* 2011, **14**, 16–36.
  - 26 Lariscy, R. W., Reber, B. H. & Paek, H. Examination of media channels and types as health information sources for adolescents: comparisons for Black/White, male/female, urban/rural. *Journal of Broadcasting & Electronic Media* 2010, **54**, 102–120.
  - 27 Manganello, J. A. & Clayman, M. L. The association of understanding of medical statistics with health information seeking and health provider interaction in a national sample of young adults. *Journal of Health Communication* 2011, **16**, 163–176.
  - 28 Manganello, J. A. Health literacy and adolescents: a framework and agenda for future research. *Health Education Research* 2008, **23**, 840–847.
  - 29 Mårtensson, E. K., Fagerskiöld, A. M. & Berteró, C. M. Information exchange in paediatric settings: an observational study. *Paediatric Nursing* 2007, **19**, 40–43.
  - 30 McKillen, D. How young people use the Internet for health information. *Medical Marketing & Media* 2002, **37**, 10–11.
  - 31 Notley, C., Scaife, V., O'Brien, M., Mceune, R., Biggart, L. & Millings, A. Vulnerable young people and substance-use information-seeking: perceived credibility of different information sources and implications for services. *Journal of Substance Use* 2012, **17**, 163–175.
  - 32 Nustad, J., Adams, T. & Moore, M. Health information sources accessed by college females: differences between body-image distorted and non-body-image distorted. *Health Marketing Quarterly* 2008, **25**, 241–253.
  - 33 Nwagwu, W. E. The Internet as a source of reproductive health information among adolescent girls in an urban city in Nigeria. *BMC Public Health* 2007, **7**, 354.
  - 34 Rooks, R. N., Wiltshire, J. C., Elder, K., BeLue, R. & Gary, L. C. Health information seeking and use outside of the medical encounter: is it associated with race and ethnicity? *Social Science and Medicine* 2012, **74**, 176–184.
  - 35 Rushing, S. C. & Stephens, D. Use of media technologies by Native American teens and young adults in the Pacific Northwest: exploring their utility for designing culturally appropriate technology-based health interventions. *The Journal of Primary Prevention* 2011, **32**, 135–145.
  - 36 Smith, C. E., Massey-Stokes, M. & Lieberth, A. Health information needs of d/Deaf adolescent females: a call to action. *American Annals of the Deaf* 2012, **157**, 41–47.
  - 37 Trettin, L. D., May, J. C. & McKeehan, N. C. Teaching teens to “get net smart for good health”: comparing interventions for an internet training program. *Journal of the Medical Library Association* 2008, **96**, 370–374.
  - 38 Wu, A. D., Begoray, D. L., MacDonald, M., Higgins, J. W., Frankish, J., Kwan, B., Fung, W. & Rootman, I. Developing and evaluating a relevant and feasible instrument for measuring health literacy of Canadian high school students. *Health Promotion International* 2010, **25**, 444–452.
  - 39 Ybarra, M. & Suman, M. Reasons, assessments and actions taken: sex and age differences in uses of Internet health information. *Health Education Research* 2008, **23**, 512–521.
  - 40 Ybarra, M. L., Emenyonu, N., Nansera, D., Kiwanuka, J. & Bangsberg, D. R. Health information seeking among Mbararan adolescents: results from the Uganda Media and You survey. *Health Education Research* 2008, **23**, 249–258.
  - 41 Zhao, S. Parental education and children's online health information seeking: beyond the digital divide debate. *Social Science and Medicine* 2009, **69**, 1501–1505.
  - 42 Barman-Adhikari, A. & Rice, E. Sexual health information seeking online among runaway and homeless youth. *Journal of the Society for Social Work and Research* 2011, **2**, 88–103.
  - 43 Bleakley, A., Hennessy, M., Fishbein, M. & Jordan, A. How sources of sexual information relate to adolescents' beliefs about sex. *American Journal of Health Behavior* 2009, **33**, 37–48.
  - 44 Bond, B. J., Hefner, V. & Drogos, K. L. Information seeking practices during the sexual development of lesbian, gay, and bisexual individuals: the influence and effects of coming out in a mediated environment. *Sexuality and Culture* 2009, **13**, 32–50.
  - 45 Bui, E. R., Daley, E. M., Fuhrmann, H. J. & Smith, S. A. An observational study of how young people search for online sexual health information. *Journal of American College Health* 2009, **58**, 101–111.



- 46 Crutzen, R., Peters, G., Portugal, S., Fisser, E. & Grolleman, J. An artificially intelligent chat agent that answers adolescents' questions related to sex, drugs, and alcohol: an exploratory study. *Journal of Adolescent Health* 2011, **48**, 514–519.
- 47 Fogel, J., Fajiram, S. & Morgan, P. D. Sexual health information seeking on the Internet: comparisons between White and African American college students. *The ABNF Journal* 2010, **21**, 79–84.
- 48 Gilbert, L. K., Temby, J. R. E. & Rogers, S. E. Evaluating a teen STD prevention Web site. *Journal of Adolescent Health* 2005, **37**, 236–242.
- 49 Harvey, K., Brown, B., Crawford, P., Macfarlane, A. & McPherson, A. 'Am I normal?' Teenagers, sexual health and the internet. *Social Science and Medicine* 2007, **65**, 771–781.
- 50 Jones, R. K. & Biddlecom, A. E. Is the internet filling the sexual health information gap for teens? An exploratory study. *Journal of Health Communication* 2011, **16**, 112–123.
- 51 Jones, R. K. & Biddlecom, A. E. The more things change...: the relative importance of the internet as a source of contraceptive information for teens. *Sexuality Research and Social Policy* 2011, **8**, 27–37.
- 52 Lauszus, F., Kloster, A., Nielsen, J., Boelskifte, J., Falk, J. & Rasmussen, K. Gender-specific knowledge on sex. *Archives of Gynecology and Obstetrics* 2011, **283**, 281–287.
- 53 Lehr, S. T., Demi, A. S., Dilorio, C. & Facticeau, J. Predictors of father-son communication about sexuality. *Journal of Sex Research* 2005, **42**, 119–129.
- 54 Magee, J., Bigelow, L., DeHaan, S. & Mustanski, B. Sexual health information seeking online: a mixed-methods study among lesbian, gay, bisexual, and transgender young people. *Health Education and Behavior* 2012, **39**, 276–290.
- 55 Pascoe, C. J. Resource and risk: youth sexuality and new media use. *Sexuality Research and Social Policy* 2011, **8**, 5–17.
- 56 Pattee, A. The secret source: sexually explicit young adult literature as an information source. *Young Adult Library Services* 2006, **4**, 30–38.
- 57 Powell, E. Young people's use of friends and family for sex and relationship advice. *Sex Education* 2008, **8**, 289–302.
- 58 Reznik, Y. & Tebb, K. Where do teens go to get the 411 on sexual health? A teen intern in clinical research with teens. *The Permanente Journal* 2008, **12**, 47–51.
- 59 Rosengard, C., Tannis, C., Dove, D. C., van den Berg, J. J., Lopez, R., Stein, L. R. & Morrow, K. M. Family sources of sexual health information, primary messages, and sexual behavior of at-risk, urban adolescents. *American Journal of Health Education* 2012, **43**, 83–92.
- 60 Rothbauer, P. "People aren't afraid anymore, but it's hard to find books": reading practices that inform the personal and social identities of self-identified lesbian and queer young women. *Canadian Journal of Information and Library Sciences* 2004, **28**, 53–74.
- 61 Secor-Turner, M., Sieving, R. E., Eisenberg, M. E. & Skay, C. Associations between sexually experienced adolescents' sources of information about sex and sexual risk outcomes. *Sex Education* 2011, **11**, 489–500.
- 62 Selkie, E. M., Benson, M. & Moreno, M. Adolescents' views regarding uses of social networking websites and text messaging for adolescent sexual health education. *American Journal of Health Education* 2011, **42**, 205–212.
- 63 Shoveller, J., Knight, R., Davis, W., Gilbert, M. & Ogilvie, G. Online sexual health services: examining youth's perspectives. *Canadian Journal of Public Health* 2012, **103**, 14–18.
- 64 Burns, J. R. & Rapee, R. M. Adolescent mental health literacy: young people's knowledge of depression and help seeking. *Journal of Adolescence* 2006, **29**, 225–239.
- 65 Bussing, R., Zima, B. T., Mason, D. M., Meyer, J. M., White, K. & Garvan, C. W. ADHD knowledge, perceptions, and information sources: perspectives from a community sample of adolescents and their parents. *Journal of Adolescent Health* 2012, **51**, 593–600.
- 66 Edwards-Hart, T. & Chester, A. Online mental health resources for adolescents: overview of research and theory. *Australian Psychologist* 2010, **45**, 223–230.
- 67 Havas, J., de Nooijer, J., Crutzen, R. & Feron, F. Adolescents' views about an Internet platform for adolescents with mental health problems. *Health Education* 2011, **111**, 164–176.
- 68 Neal, D. M., Campbell, A. J., Williams, L. Y., Liu, Y. & Nussbaumer, D. "I did not realize so many options are available": cognitive authority, emerging adults, and e-mental health. *Library & Information Science Research* 2011, **33**, 25–33.
- 69 Scott, L. & Chur-Hansen, A. The mental health literacy of rural adolescents: Emo subculture and SMS texting. *Australian Psychiatry* 2008, **16**, 359–362.
- 70 Chisolm, D., Hardin, D., McCoy, K., Johnson, L., McAlearney, A. & Gardner, W. Health literacy and willingness to use online health information by teens with asthma and diabetes. *Telemedicine Journal and E-Health* 2011, **17**, 676–682.
- 71 Heuberger, R. A. & Ivanitskaya, L. Preferred sources of nutrition information: contrasts between younger and older adults. *Journal of Intergenerational Relationships* 2011, **9**, 176–190.
- 72 Larsen, J. N. & Martey, R. M. Adolescents seeking nutrition information: motivations, sources, and the role of the Internet. *International Journal of Information and Communication Technology Education* 2011, **7**, 74–85.
- 73 Laz, T. H. & Berenson, A. B. Association of web-based weight loss information use with weight reduction behaviors in adolescent women. *Journal of Adolescent Health* 2011, **49**, 446–448.
- 74 Lochrie, A. S., Wysocki, T., Burnett, J., Buckloh, L. M. & Antal, H. Youth and parent education about diabetes complications: health professional survey. *Pediatric Diabetes* 2009, **10**, 59–66.
- 75 Ranilović, J. & Barić, I. C. Differences between younger and older populations in nutrition label reading habits. *The*

- British Food Journal and Hygienic Review* 2011, **113**, 109–121.
- 76 Smith, A., Kelly-Weeder, S., Engel, J., McGowan, K., Anderson, B. & Wolfe, B. Quality of eating disorders websites: what adolescents and their families need to know. *Journal of Child and Adolescent Psychiatric Nursing* 2011, **24**, 33–37.
- 77 Belenko, S., Dugosh, K. L., Lynch, K., Mericle, A. A., Pich, M. & Forman, R. F. Online illegal drug use information: an exploratory analysis of drug-related website viewing by adolescents. *Journal of Health Communication* 2009, **14**, 612–630.
- 78 Jones, R., Finlay, F., Crouch, V. & Anderson, S. Drug information leaflets: adolescent and professional perspectives. *Child: Care, Health and Development* 2000, **26**, 41–48.
- 79 Muilenburgh, J. L. & Legge, J. S. Jr Investigating adolescents' sources of information concerning tobacco and the resulting impact on attitudes toward public policy. *Journal of Cancer Education* 2009, **24**, 148–153.
- 80 Baptist, A. P., Thompson, M., Grossman, K. S., Mohammed, L., Sy, A. & Sanders, G. M. Social media, text messaging, and email: preferences of asthma patients between 12 and 40 years old. *Journal of Asthma* 2011, **48**, 824–830.
- 81 Beresford, B. A. & Sloper, P. Chronically ill adolescents' experiences of communicating with doctors: a qualitative study. *Journal of Adolescent Health* 2003, **33**, 172–179.
- 82 Grootenhuis, M., Maurice-Stam, H., Derkx, B. & Last, B. Evaluation of a psychoeducational intervention for adolescents with inflammatory bowel disease. *European Journal of Gastroenterology and Hepatology* 2009, **21**, 430–435.
- 83 Henderson, E. M., Rosser, B. A., Keogh, E. & Eccleston, C. Internet sites offering adolescents help with headache, abdominal pain, and dysmenorrhoea: a description of content, quality, and peer interactions. *Journal of Pediatric Psychology* 2012, **37**, 262–271.
- 84 Kean, S. Children and young people's strategies to access information during a family member's critical illness. *Journal of Clinical Nursing* 2009, **19**, 266–274.
- 85 Thaver, A. & Kamal, A. Impact of information sources on the knowledge of adolescents about hepatitis B. *Journal of the Pakistan Medical Association* 2010, **60**, 1072–1075.
- 86 Alpay, L., van der Boog, P. & Dumaji, A. An empowerment-based approach to developing innovative e-health tools for self-management. *Health Informatics Journal* 2011, **17**, 247–255.
- 87 Dunlop, S., More, E. & Romer, D. Where do youth learn about suicides on the Internet, and what influence does this have on suicidal ideation? *Journal of Child Psychology and Psychiatry* 2011, **52**, 1073–1080.
- 88 Creswell, J. W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4th edn. Thousand Oaks, CA: Sage Publications Inc., 2013.
- 89 Patton, M. Q. *Qualitative Research and Evaluation Methods*, 3rd edn. Thousand Oaks, CA: Sage Publications Inc, 2001.
- 90 Niessen, M. *The German research council: structural provisions for interdisciplinarity and some observations on them*. In: The Design and Delivery of Inter and Pluri-disciplinary Research: Proceedings from MUSCIPOLI Workshop Two. The Danish Institute for Studies in Research and Research Policy, 2002.
- 91 Zalanga, S. Interdisciplinary studies and scholarship: issues, challenges, and implications for “third world” development and social change. *Human Architecture: Journal of the Sociology of Self-Knowledge* 2009, **7**, 57–76.
- 92 Linda, S. C. Citation analysis. *Library Trends* 1981, **30**, 83–106.

Received 9 July 2013; Accepted 19 December 2013

## Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Appendix S1.** Coding scheme.

**Appendix S2.** Selected articles.