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Health information exposure from information and communication technologies and its associations with health behaviors: Population-based survey

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ABSTRACT

Health information and communication technologies (ICTs) are increasingly used but little is known about routine exposure to health information from ICTs and its associations with health behaviors. A territory-wide population-based dual landline and mobile telephone survey was conducted in 2016 in Hong Kong, where smartphone ownership and Internet access are among the most prevalent, easiest and fastest in the world. Health information exposure from traditional sources (television/radio/newspaper/magazine), Internet websites, social media sites and instant messaging (IM); and information on smoking, alcohol consumption and physical activity were recorded. Prevalence was weighted by age, sex and education level of the general population. Multinomial logistic regression was used to assess the association of health information exposure with smoking and alcohol consumption, whilst multivariable linear regression was used to assess the association with frequency of moderate and vigorous physical activity (days/week). Of 3063 respondents, most (71.6%) were often or sometimes exposed to health information from traditional sources, followed by Internet websites (40.9%), social media sites (40.7%), and IM (27.0%). Respondents with lower education and household income were less frequently exposed to health information from Internet websites, social media sites and IM (all $P < 0.001$). Health information exposure from IM was associated with being never smokers, and more frequent moderate and vigorous physical activity (all P for trend < 0.05). Health information exposure from IM was least frequent but associated with healthier behaviors. Further public health education campaigns can consider using IM to deliver information, particularly to disadvantaged groups.

1. Introduction

The determinants of active health information seeking and its association with healthier behaviors have been well-documented (Anker et al., 2011; Cline and Haynes, 2001; Huerta et al., 2016). Health information also comes from passive exposure from routine use of media and interactions with family and friends. Some observational studies found frequent health information exposure is also associated with healthier behaviors such as more regular physical activity and fruit and vegetable consumption, and less cigarette and excessive alcohol consumption (Bigsby and Hovick, 2017; Hay et al., 2009; Hornik et al., 2013). However, none of these studies focused on information and communication technologies (ICTs), such as social media sites and instant messaging (IM), which are increasing dramatically and can provide convenient and low cost access to health information. Some randomized controlled trials have shown that health information delivered via text message is a cost-effective way to improve health behaviors, but population-based studies on health information exposure from IM are scarce (Armanasco et al., 2017; Badawy and Kuhns, 2017). Compared with traditional text-only message, IM enables information interaction in various forms (e.g. text, photograph, audio clip and video).

Exposure to health information is associated with health behaviors through several mechanisms including new information acquisition, normative reinforcement and reminding (Hornik et al., 2013).

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Information exposure may facilitate the access to new information. Information exposure from different sources such as television, Internet and routine conversation with others, may reinforce a normative belief and perception on health behaviors (Fishbein and Yzer, 2003). Repeated exposure to information may facilitate cognitive decisions to engage in a health behavior (Southwell et al., 2002). For instance, regular physical activity and smoking cessation which demands a higher level of commitment may require routine exposure to related information to remind of the importance.

People with low socioeconomic position (SEP) such as lower education or income often have low access and usage of ICTs for health communication (Dutton et al., 2011; Kontos et al., 2014; Van Deursen et al., 2015). We have found evidence supporting the "Inverse ICT Law" which posits that those who are most in need often receive fewer benefits from advancements in medicine and health related ICTs (Shen et al., 2017). Our results showed that online health information was socially patterned with lower SEP associated with non-possession of health apps (Shen et al., 2017) and not seeking online health information (Wang et al., 2013), and that online health information seeking partially underlie the socioeconomic disparities in self-rated health (Wang et al., 2013). However, compared with income, education was more strongly associated with the use of ICTs, indicating that cognitive skills, which are necessary to understand the content and evaluate the usefulness, are more important than physical access to the Internet.

Hong Kong is the most modernized and westernized city in China, along with a widespread penetration of smartphone and Internet owing to the advanced cyber-infrastructure and low cost of access to the Internet (Census and Statistic Department, 2016). Smartphone ownership and Internet connection in Hong Kong are among the most prevalent in the world (Pew Research Center, 2016, 2017). Hong Kong has a wide coverage of public free WiFi services (44,000+ hotspots in 2700 km^2 in 2017) (Office of the Communication Authority, 2017). The Internet connection speed in Hong Kong is also among the highest in the world (4nd in 2017) (Akamai Intelligent Platform).

Despite the high prevalence of ICT use, traditional sources such as television, newspapers, and magazines are most used in Hong Kong people (> 60%) to seek health information (Wang et al., 2013). Previous studies on health information exposure did not specify information acquired from ICTs. To the best of our knowledge, no studies have investigated health information exposure from different sources especially ICTs and its association with health behaviors. We used a large population-based telephone survey to investigate the pattern and social determinants of health information exposure from traditional sources, Internet websites and ICTs, and the associations with health behaviors including smoking, alcohol consumption, and physical activity in Hong Kong Chinese adults to examine whether the findings further support the Inverse ICT Law. We also examined whether these associations varied by respective health information (information related to smoking/alcohol quitting and physical activity) seeking.

2. Methods

2.1. Design

The Hong Kong Family and Health Information Trends Survey (FHInTS) was part of the FAMILY Project, entitled "FAMILY: a Jockey Club Initiative for a Harmonious Society". FHInTS was a regular periodic probability-based telephone survey of the general Hong Kong public, designed to assess opinions and behaviors with regard to family health, information use, and health communication. Five waves of FHInTS had been conducted since 2009, and details of previous waves were reported elsewhere (Wang et al., 2015; Wang et al., 2013). The current wave was conducted from January to August 2016 to collect data on ICT use for family and health information, family communication, and well-being (Shen et al., 2017).

All interviews were conducted by trained interviewers from the Public Opinion Program, University of Hong Kong, which is one of the largest established survey agencies, using the Web-based Computer-Assisted Telephone Interview system. The survey targeted the Cantonese-speaking adult population aged 18 years and over. Landline and mobile telephone numbers were randomly generated using known prefixes assigned to telecommunication services providers under the Numbering Plan provided by the Office of the Communications Authority, which covers nearly all Hong Kong residents. For the landline telephone number samples, when contact was successfully established with a target household, a qualified person was selected from all those present using the "next birthday" method (Ziersch and Baum, 2004). The person from the household who had the next birthday among all household members who were aged 18 years or over was selected as the respondent. No second-level sampling, that is, next birthday rule was used for the mobile sample. Interviews were mostly conducted in the afternoons and evenings (2:00–10:30 PM). Ethical approval was granted by the Institutional Review Board (IRB) of the University of Hong Kong/Hospital Authority Hong Kong West Cluster. Verbal informed consent was obtained from the respondents.

2.2. Sample

Landline survey consisted of four subsets of questionnaires: health, health information, family information, and family communication. Each subset had core questions (questions in all subsets) and subset-specific questions. Eligible respondents were randomly assigned into one subset. Mobile survey only had one set of questionnaire. A total of 6890 respondents were confirmed eligibility, with 5080 successfully interviewed. The response rate was 73.7% (71.3% (1042/1461) for the mobile survey and 74.4% (4038/5429) for the landline survey). Landline subsets with questions on health information exposure (health and health information) (n = 2021) and mobile sample (n = 1042) were included in the present analysis (n = 3063).

2.3. Measures

2.3.1. Health information exposure

Frequency of health information exposure was determined by asking the respondents how often they were incidentally exposed to health information from each source including traditional sources (television/radio/newspaper/magazine), Internet websites, social media sites (e.g. Facebook and Twitter), and IM (e.g. WeChat and WhatsApp) in the past year. Responses included "often", "sometimes", "seldom" and "never".

2.3.2. Health behaviors

Respondents were asked to report their current status on smoking and alcohol consumption. Smoking status was categorized as never smoking, current smoking and ex-smoking. Alcohol consumption was categorized as non-drinking, non-weekly drinking (occasional (less than once per month) and monthly (1–3 days per month) drinking) and weekly drinking (at least 1 day per week). The frequency of physical activity was determined by asking the respondents how many days they performed moderate and vigorous physical activity respectively in the past week (continuous variable). Relevant health information seeking was determined by asking the respondents whether they had sought health information on smoking, alcohol consumption and physical activity respectively in the past year.

SEP was measured using educational attainment, employment status, and monthly household income. Educational attainment was categorized as primary or below, secondary, and tertiary or above. Employment status was categorized as full-time, part-time, self-employed, and unemployed. Monthly household income was categorized as < HK $10,000, HK $10,000–19,999, HK $20,000–29,999, HK $30,000–39,999, and HK $40,000+ (US $1 = HK $7.8). Self-rated