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USE OF ONLINE HEALTH COMMUNITIES IN SMOKING CESSATION: A SOCIAL SUPPORT PERSPECTIVE

Chenglong Li
Turku School of Economics, University of Turku, chenglong.li@utu.fi

Hongxiu Li
Tampere University, hongxiu.li@tuni.fi

Reima Suomi
Turku School of Economics, University of Tuku, reima.suomi@utu.fi

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Completed Research Paper

Chenglong Li
University of Turku
Turku, Finland
chenglong.li@utu.fi

Hongxiu Li
Tampere University
Tampere, Finland
hongxiu.li@tuni.fi

Reima Suomi
University of Turku
Turku, Finland
reima.suomi@utu.fi

Abstract

Online health communities could be effective interventions for smoking cessation. This study aims to explore the reason why smokers turn to online health communities to support their smoking cessation from the social support perspective. We conducted a qualitative study by interviewing seven users of an online smoking cessation community in Finland. Our findings uncover that emotional support, informational support, and companionship are strong motivators for smokers to use smoking cessation online communities. Further, informational support and companionship are found to have different importance for people at different stages of smoking cessation. The role of companionship also varies between posters and lurkers of smoking cessation online community. The findings in this research provide practical guidelines to smoking cessation online health communities on how to understand smokers' needs and retain them to use smoking cessation online health communities from the social support perspective, aiming to support their smoking cessation.

Keywords: Online health community, Social support, Smoking cessation, Emotional support, Informational support, Companionship.

Introduction

Tobacco use is one of the most significant threats to human health, and kills more than 7 million people around the world annually (World Health Organisation 2017). Various traditional interventions have been developed to assist smokers to achieve long-term abstinence from tobacco use, for instance, individual behavioural counselling, telephone counselling, and group behaviour therapy. However, these traditional methods typically have a low participation rate because these methods cannot reach the smoking population as much as possible due to the time and geographical limitations (Lancaster and Stead 2017; Stead et al. 2017; Stead et al. 2013). Also, these traditional methods are usually dependent on the physician-patient communication which might not fully meet individualized and tailoring needs of smokers, for example, their needs for prompt and specific support based on their quitting stage, age, or social-economic status (Bhattacharya et al. 2017). Moreover, many smokers are wary of disclosing their smoking status to healthcare providers due to smoking-related-stigma, such as

blame, shame, or embarrassment (Brown-Johnson and Popova 2016; Graham 2011). This potentially make smokers reluctant to seek help via traditional ways even though they are in need of support. Nowadays, new tools based on information technologies have emerged to offer effective and convenient smoking cessation interventions, such as smoking cessation online health community (OHC).

An OHC is defined as *"a collective of individuals who communicate with each other on health-related matters through dedicated sites in [sic] the Internet"* (Mpinganjira 2018, p. 686). A smoking cessation OHC is specialized in smoking cessation, which offers users access to online communication across time and space to support smoking cessation. Users can interact with current and former smokers who have similar smoking cessation experiences, ask for advice, and share own smoking cessation struggles via generating text, photos, audio or video content in smoking cessation OHCs (Naslund et al. 2017). As peer-centred alternatives, smoking cessation OHCs offer anonymity to help lower smoking related-stigma. Smokers that actively participate in a smoking cessation OHC have been found to have greater quit motivation, less relapse, and better abstinence (e.g., Baskerville et al. 2016; Cheung et al. 2015; Kurko et al. 2015; Pechmann et al. 2017). But smoking cessation OHCs are still facing challenges of low participation and poor retention (Naslund et al. 2017) in spite of the convenience and efficacy in smoking cessation. It is necessary to examine the reasons beyond smokers' use of smoking cessation OHCs in order to understand why smokers use smoking cessation OHCs and find the right strategies to attract and retain users of smoking cessation OHCs.

Prior literature on smoking cessation OHCs has investigated the social support patterns in OHCs based on analysing user-generated content in smoking cessation OHCs (e.g., Myneni et al. 2015; Ploderer et al. 2013; Rocheleau et al. 2015; Zhang et al. 2013), but little research has attempted to provide a comprehensive understanding of motivations for the active and passive users of smoking cessation OHCs, such as the posters who generate posts actively and the lurkers who only read posts in smoking cessation OHCs. Determinants of using smoking cessation OHCs may be different between posters and lurkers. It is meaningful to distinguish the motivations for both active and passive users in order to get a comprehensive understanding of user behaviour regarding smoking cessation OHCs. In addition, social support in offline settings has been found to operate differently at different stages of smoking cessation (Mermelstein et al. 1986), but little research has attempted to investigate how the role of social support from smoking cessation OHCs varies for smokers at the different stages of smoking cessation.

To address the above discussed research gaps, we conducted a qualitative interview study based on the social support theoretical framework. This study aims to provide answers to the call for understanding why smokers use smoking cessation OHCs to support their smoking cessation (Cobb et al. 2011). Specifically, this study identifies three components of online social support as the drivers for users to use smoking cessation OHCs. In addition, this study explores how the roles of the different components of social support vary for different user groups, such as smokers at different cessation stages and with different behaviour patterns in using smoking cessation OHCs.

The rest of this paper is structured as follows: First, a literature review on smoking cessation OHCs and social support theory is presented. Second, the research method is introduced. Third, the findings of this study are presented. Finally, the contributions and limitations of this study are discussed.

Literature review

Smoking cessation OHCs

As tobacco addition involves the interplay of cognitive, physiological, and behavioral factors, most smokers who want to stop smoking require ongoing assessments and repeated treatments before achieving long-term abstinence. OHCs have been suggested as new solutions to supersede the limitations of traditional interventions, such as the limited audiences, time and effort consuming, and inconvenience to the recipients in individual behavioral counselling, group behavior therapy, and telephone counselling (Lancaster and Stead 2017; Stead et al. 2017; Stead et al. 2013). Like other OHCs, smoking cessation OHCs have the potential to reach a wide audience and to be accessed anytime and anywhere via computers and smartphones because of the penetration and convenience of the Internet. OHCs are available in rural areas where there are limited or even no local resources for a smoking cessation treatment (Taylor et al. 2017). Smoking cessation OHCs also provide a high level of

anonymity than traditional interventions, and have the potential to reach people who do not seek assistance in smoking cessation due to social stigma (Taylor et al. 2017). The highly interactive feature of smoking cessation OHCs appears to be more promising for social interaction among participants of smoking cessation OHCs compared to smoking cessation websites, such as asking for advice, sharing smoking cessation experiences, and chatting with others. The social interaction in smoking cessation OHCs has been found to help smokers buffer stress in smoking cessation and to develop confidence and coping skills in smoking cessation (Graham et al. 2016; Naslund et al. 2017).

Prior research has also validated the impact of OHCs as intervention tools in smoking cessation. Graham et al. (2015) found that smoking cessation OHC users were more likely to achieve 30-day point prevalence abstinence at 3 months than non-users. The weighted abstinence rates were 4.2% for nonusers, 15.1% for lurkers, and 20.4% for users who engaged in smoking cessation OHCs actively. Pechmann et al. (2017) found that a smoking cessation OHC in Twitter doubled sustained abstinence out to 60 days follow-up (40.0%) versus the control group (20.0%). These two studies suggest a causal effect for OHCs on abstinence in smoking cessation. Some studies have also found that OHCs are more effective than traditional interventions in smoking cessation. Baskerville et al. (2016) found that smoking cessation OHCs in social media platforms were more effective than the telephone-based intervention for young adult smokers. At the following 3-month follow-up, they found that the smokers who use smoking cessation OHCs had significantly higher 30-day abstinence rate (32.4%) than those who use helpline (SHL) (14%), and a higher quit attempt (91%) than SHL users (79.1%).

However, questions are still exist about low participation and continuance intention (Naslund et al. 2017). Cobb et al. (2010) suggested that super users and key players might be responsible for integrating new members to use smoking cessation OHCs. But it cannot fully explain why users would like to use smoking cessation OHCs, and whether there are different reasons for users in different contexts, such as posters and lurkers, smokers at different stages of smoking cessation. There is a call for research on investigating why smokers use smoking cessation OHCs to support their smoking cessation and the different reasons for smokers with different contexts, such as smoking stage, behavior pattern in using smoking cessation.

Social support theory

Social support refers to *"exchange of resource between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient"* (Shumaker and Brownell 1984, p. 13). It has been examined as a basic research framework in predicting individuals' use of different online systems. For instance, Liang et al. (2011) found that social support, measured by informational and emotional support, had a positive effect on intention to continue using microblog. Lin et al. (2016) and Bao (2016) found that social support, including informational support, emotional support, and network management support, positively affected continuance intention of social networking sites (SNS). Moreover, social support has been found positively to affect social influence, which was a predictor of continuance use in mobile SNS (Zhou 2017). Wang et al. (2017) found that offering informational support, seeking emotional support, and companionship were related to users' continued participation in OHCs.

Prior studies have categorized social support into different dimensions based on different research contexts. Some studies suggested that social support mainly consisted of three dimensions: informational support, emotional support, and companionship (Huang et al. 2014; Wang et al. 2017; Yan and Tan 2014). These three dimensions of social support have been argued to be the main components of social support in the research context of OHCs. For instance, based on content analysis of the discussion threads in a breast cancer OHC, Huang et al. (2014) found that 60% of threads were for informational support and emotional support whereas 40% were for companionship. In a prostate cancer OHC, 75% of threads were for information and emotional support, and 25% for companionship. In a smoking cessation OHC, Zhang and Yang (2015) found that most of posts were offering informational support, while most of comments were offering emotional support, esteem support, and companionship. Prior research mainly examined social support based on the posts generated in OHCs, little research has attempted to get a deep understanding of the reason for smoking cessation OHCs from the social support perspective via survey or interview the users of smoking cessation OHCs.

Methods

Study context

This study cooperated with a non-profit smoking cessation website in Finland, Stumppi.fi. Stumppi.fi is a national Internet-based platform for smoking cessation maintained by the Organization for Respiratory Health. It was financed by Slot Machine Association (RAY) in Finland from 2004 to 2016, and from January 2017 it was supported by the Ministry of Social Affairs and Health (STM) and the Funding Centre for Social Welfare and Health Organizations (STEA). Stumppi.fi offers updated information on smoking cessation and tobacco consumption in Finland, and also provides an online community for smokers in Finland. By the end of October 2018, there have been 8418 registered members in this community.

Data collection

The data was collected via semi-structured interviews among users of Stumppi.fi, who have used the online community. We conducted an online survey in the online community since 9th November 2018, aiming to investigate user engagement in this smoking cessation OHC. In the survey, we asked the respondents to provide emails for our further interview voluntarily. Till the date of 4th February 2019, 40 respondents answered our survey, and 29 of them left their contact email information.

Ethical approval has been granted by the Ethics Committee of the home university of the research project before data collection. Each interviewee has been informed of the aim of this study, the voluntariness of participation, the anonymity and confidentiality of the research data, and the contact information of the research team before interviews. The questions to the interviewees were in Finnish as the online community mainly runs in Finnish and the users are familiar with Finnish language. We asked the interviewees about the reason for them to use the smoking cessation OHC at Stumppi.fi based on the social support in using the smoking cessation OHC. The interview questions in English are shown in Table 1. Each interviewee obtained an electronic movie ticket as an incentive for joining in this study after their participations in the interview.

The interview questions were sent to 29 users via email. Seven of them (24.1%) responded to the interview. The participants' characteristics are collected via the survey (see Table 2). The measurements of smoking cessation stage were taken from the work of Prochaska and Velicer (1997), and the online activities were adapted from Batenburg and Das (2015). The survey questions is presented in Appendix A.

In this study interview via email was applied because of the suitability for obtaining participants' real-life smoking cessation OHC use experiences conveniently and inexpensively as well as keeping their privacy (Meho 2006).

Table 1 Questions included in the email interview in this study

Open questions		
	1.	Why do you use Stumppi.fi in your smoking cessation?
	2.	Is Stumppi.fi useful to support your smoking cessation? Please provide explanations for your answer.
	3.	Do you get information such as advice/suggestions to support your smoking cessation from Stumppi.fi? If yes, could you tell us one of your stories?
	4.	Do you get support from other members of Stumppi.fi when you need more support for smoking cessation rather than from your family? If yes, could you tell us one of your stories?
	5.	Do you feel accompanied and support emotionally by the other members of Stumppi.fi in your smoking cessation? If yes, could you tell us one of your stories?

Note: We indicated to the interviewees that when we asked them about Stumppi.fi, we referred to the smoking cessation OHC in Stumppi.fi, but not the Stumppi.fi website.

Table 2 Sociodemographic and descriptive characteristics of the respondents

	Characteristics	Number (%)
Age	15-24	1 (14.3%)
	25-44	4 (57.1%)
	45-64	1 (14.3%)
	65 years or older	1 (14.3%)
Gender	Female	4 (57.1%)
	Male	3 (42.9%)
Education level	Less than upper secondary school or vocational school	2 (28.6%)
	Upper secondary school or vocational school	4 (57.1%)
	Short-cycle tertiary education	1 (14.3%)
Personal income in previous year	Less than €15,000	3 (42.9%)
	€15,000 - €29,999	2 (28.6%)
	€30,000 - €44,999	1 (14.3%)
	More than €45,000	1 (14.3%)
Smoking cessation stage	Contemplation	1 (14.3%)
	Preparation	1 (14.3%)
	Maintenance	2 (28.6%)
	Termination	3 (42.9%)
Activities	Posting	3 (42.9%)
	Lurking	4 (57.1%)

Data analysis

We analyzed the answers from the 7 interviewees to identify the components of social support and their importance based on their perceptions and feelings in their use of the smoking cessation OHC run by Stumppi.fi. Specifically, the unit of analysis is users' perceptions and feeling in regard to social support in smoking cessation OHC use.

First, we extracted social support from the data through the social support framework. Information on smoking cessation such as advice or personal experiences was considered as informational support, communicating on emotional concerns such as empathy or encouragement as emotional support, social interaction with others such as chatting or building a friendship as companionship. Further, we examined whether the three different social support components were mentioned as reasons for using the OHC or not in the smoking cessation by different user groups, such as posters and lurkers, smokers with different smoking cessation stage. In this study, we applied narrative analysis in data analysis (Berg and Lune 2017). Through the procedures, we were able to identify three different components of social support in driving smoking cessation OHC use for different user groups. Particularly, three different answers regarding the three components of social support were identified, including Yes, No, and No answer. Yes means social support was considered as a motivator, No means social support was not a motivator, and No answer means social support was not mentioned as a driver in their answers.

To ensure that the data analysis was appropriate, this study followed the guidelines of interpretive research from Bhattacherjee (2012). *"Rigor in interpretive research is viewed in terms of systematic and transparent approaches for data collection and analysis rather than statistical benchmarks for construct validity or significance testing"* (Bhattacherjee 2012, p. 105). In the following we included a table for the main concepts (such as information support, emotional support, companionship, and cessation stage) used in our analysis and their descriptions (see Table 3). We also combined participants' demographical data from the online survey and their answers from email interviews to establish contextualization (Such as cessation stage and behavior pattern in using smoking cessation OHCs).

Table 3 Key concepts and descriptions

Concept	Description
Informational support	Informational support refers to offering information on smoking cessation and how to deal with it, such as advice, personal experiences, and referrals (Cutrona and Suhr 1992).
Emotional support	Emotional support refers to communicating caring or understanding, such as empathy, encouragement, and congratulations (Cutrona and Suhr 1992).
Companionship	Companionship is defined as engaging in social interaction with others, such as chatting, groupness, friendship and other activities (Huang et al. 2014; Yan and Tan 2014).
Cessation stage	According to the trans-theoretical model (TTM) (Prochaska and Velicer 1997), there are six stages of smoking cessation, including pre-contemplation, contemplation, preparation, action, maintenance, and termination.

Findings

The interviewees reported their reasons to use the OHC based on their experiences of using the smoking cessation OHC. Based on social support framework, we identified three components of social support for understanding reasons why they use the OHC. An overview of each component was presented in Table 4.

Table 4 An overview of three components of social support and participants' characteristics

| Participant	Age	Gender	Activities	Cessation stage	Informational support	Emotional support	Companion-ship
1	25-44	Female	Posting	Maintenance	Yes	Yes	Yes
2	≥ 65	Female	Posting	Termination	No	Yes	Yes
3	15-24	Male	Lurking	Contemplation	Yes	Yes	No answer
4	25-44	Female	Lurking	Preparation	Yes	Yes	No answer
5	45-64	Male	Posting	Termination	Yes	Yes	No answer
6	25-44	Female	Lurking	Termination	No	No	No
7	25-44	Male	Lurking	Maintenance	Yes	Yes	Yes

Five of the interviewees reported that informational support is an important reason for them to use the smoking cessation OHC, whereas 2 others not. For emotional support, 6 interviews answered that it is important and 1 answered not important. For companionship, 3 interviewees reported that it is important, 1 not important, and 3 others provide no answer on it.

Emotional support

Emotional support was one of the main reasons for smokers to use the smoking cessation OHC. The emotional support mentioned in interviewees' answers consisted of empathy and congratulation. Empathy was repeatedly mentioned in interviews as an important reason for using the smoking cessation OHC. Interviewees emphasized how necessary and important the OHC was in their smoking cessation process, as they were unable to get enough empathy from other sources, such as their partners or family. They pointed out that their partners or family obviously could not empathize with their situation and concern about their discomforts and feelings in the smoking cessation process because of

the lack of similar experiences. The effective support from partners and family was very limited. But the OHC members could understand and empathize with the agony of smoking cessation, and were able to respond empathetically to their requests or needs. The other emotional support mentioned was congratulation. One interviewee declared that praise from others for his achievements in smoking cessation, even a very small step in smoking cessation process, was important for him, which might be the source of encouragement and confidence for a smoker.

The detailed examples of answers related to emotional support are presented in Figure 1. Participant 2, 5 and 7 highlighted the role of empathy in their use of the cessation OHC, and participant 5 mentioned congratulation from other members was important in his cessation process. In sum, empathy and congratulation were two dimensions of emotional support that motivate users to use the OHC, especially empathy was emphasized as a crucial driver.
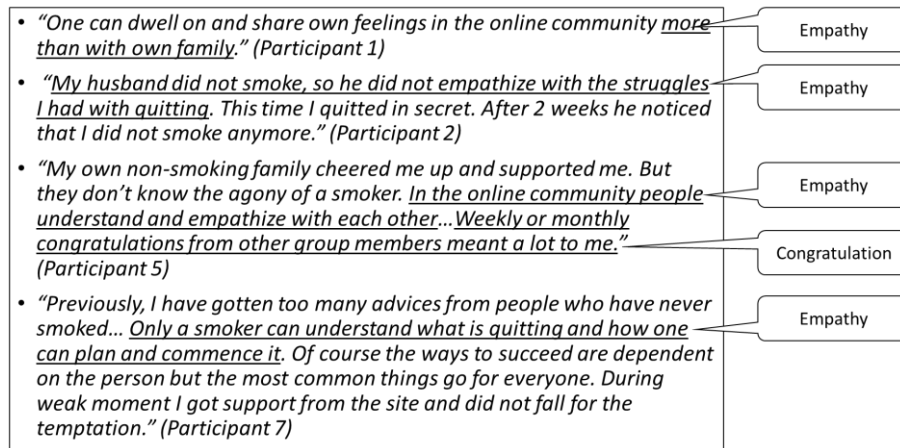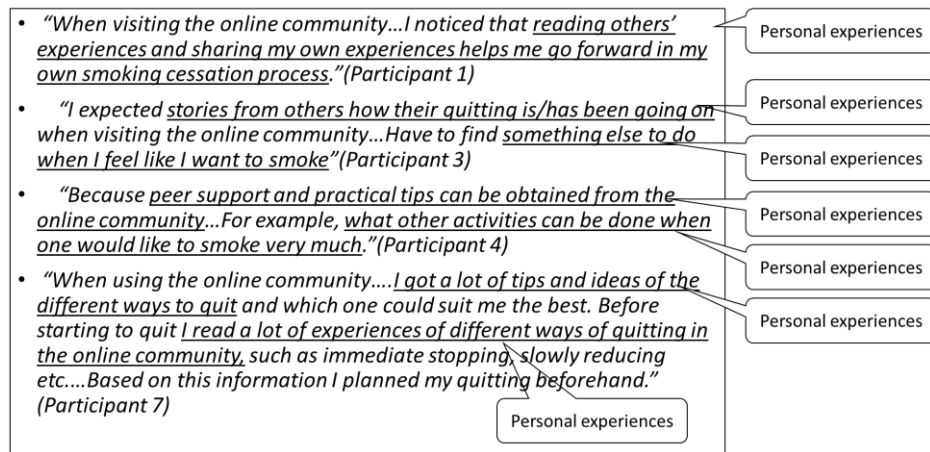

Figure 1 Evidence of emotional support

Informational support

The informational support was another important reason for the interviewees' use of smoking cessation OHCs. The information support interviewees expected from smoking cessation OHCs use included shared personal experiences from others, and information on substitutive products or medicines and their side effects.
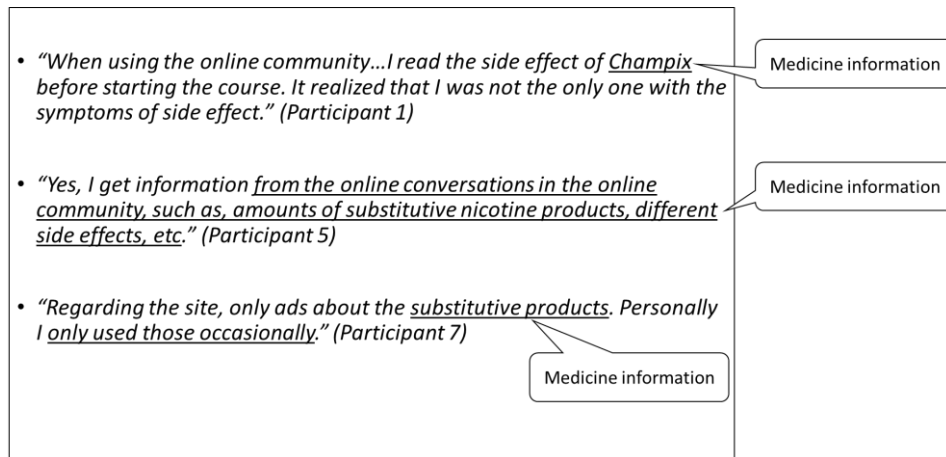
Shared personal experiences on quitting were often mentioned to be an important reason to use smoking cessation OHCs. Interviewees emphasized the role of the experience sharing of smoking cessation in helping them to quit smoking. They pointed out that advice from people without smoking cessation experiences usually was ineffective for smoking cessation as they were not knowledgeable about what would happen in cessation process and what should do to cope with challenges and barriers to quitting. Peers who shared similar experiences disclosed the ups and downs of the cessation journey in detail, talked about difficulties and struggling in smoking cessation, and often shared their coping strategies and practical tips. These were important information for smokers when they made their quitting plan and implemented their quitting plan. Examples are shown in Figure 2, participants 1, 3, 4, and 7 declared that personal experiences were one main reason for their use of the smoking cessation OHC.

- *"When visiting the online community…I noticed that <u>reading others' experiences and sharing my own experiences helps me go forward in my own smoking cessation process.</u>"(Participant 1)*
- *"I expected <u>stories from others how their quitting is/has been going on</u> when visiting the online community…Have to find <u>something else to do when I feel like I want to smoke</u>"(Participant 3)*
- *"Because <u>peer support and practical tips can be obtained from the online community</u>…For example, <u>what other activities can be done when one would like to smoke very much</u>."(Participant 4)*
- *"When using the online community….<u>I got a lot of tips and ideas of the different ways to quit</u> and which one could suit me the best. Before starting to quit <u>I read a lot of experiences of different ways of quitting in the online community,</u> such as immediate stopping, slowly reducing etc….Based on this information I planned my quitting beforehand."* (Participant 7)

Personal experiences

Figure 2 Evidence of personal experiences

The other information support mentioned was information regarding substitutive products or medicines and their side effects. As shown in Figure 3, participants 1 and 5 pointed out that they used OHC for getting information on medicine. But such medicine information might not highly required and needed by other users, as participant 7 said: *"…only used those occasionally."* (See Figure 3).

- *"When using the online community…I read the side effect of <u>Champix</u> before starting the course. It realized that I was not the only one with the symptoms of side effect." (Participant 1)*

- *"Yes, I get information <u>from the online conversations in the online community, such as, amounts of substitutive nicotine products, different side effects, etc</u>." (Participant 5)*

- *"Regarding the site, only ads about the <u>substitutive products</u>. Personally I <u>only used those occasionally</u>." (Participant 7)*

Medicine information

Figure 3 Evidence of Medicine information

Companionship

The companionship was demonstrated as the third reason for using smoking cessation OHCs. Three interviewees declared that using OHCs made them feel connected with others and not lonely in their smoking cessation. Companionship they mentioned included presence, subgroup forming, friendship, and other activities out of the OHC. One interviewee pointed out that the presence of key users was helpful. Moreover, social bond with others could be generated in this OHC, as two interviewees declared, they formed a subgroup for contemporary smokers at similar cessation stage. Furthermore, such bonds could be strengthened, as participant 2 reported, she had built a friendship with other users on Facebook, and planned a meeting with others. Examples are shown in Figure 4, participants 1, 2 and 7 considered companionship as a reason for using this OHC.
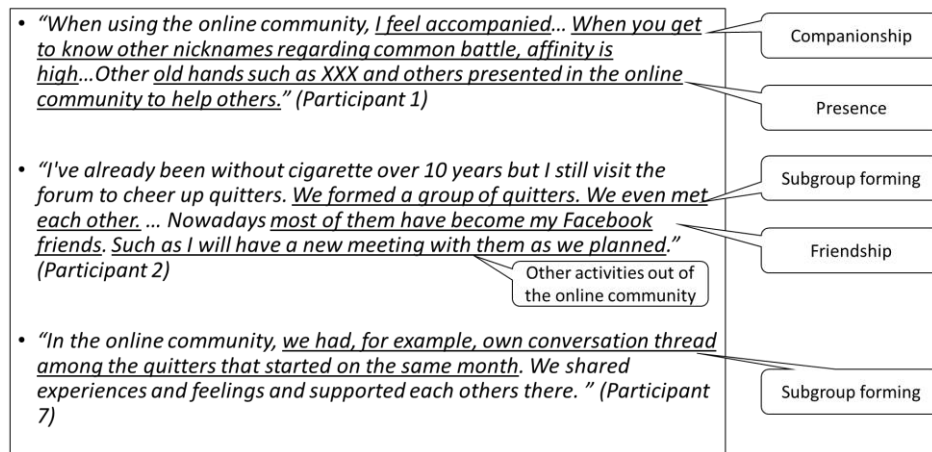
Figure 4 Evidence of companionship

Social support and user behavior

In our analysis, only participant 6 did not consider informational support, emotional support, and companionship as motivators for smoking cessation OHC use. Participant 6 pointed out that using the smoking cessation OHC only as a diary or a tailored tool for recording, as she said:

"When using Stumppi.fi…I wanted to see concretely how many cigarettes I haven't smoked and how much money I've saved… I only use the calculator feature on the service and it's really useful and concrete in demonstrating the savings created by not smoking."

The other six participants all viewed emotional support as a motivator for their use of smoking cessation OHC. Informational support was considered as a motivator for lurkers (participant 3, 4, and 7), while varied among posters (participant 1 and 5 for Yes, participant 2 for No). Companionship was considered as a driver by two posters (participant 1 and 2), and one lurker (participant 7), but not mentioned by other lurkers (participant 3 and 4) and poster (participant 5). In sum, emotional support was considered as a motivator for both posters and lurkers, informational support was considered as a motivator for lurkers, and companionship was a motivator for most of posters.

Social support and smoking cessation stage

Except participant 6, the other participants viewed emotional support as a motivator of the smoking cessation OHC use no matter which cessation stage they were.

Except participant 6, informational support was viewed as a motivator by five participants at different cessation stages (including contemplation, preparation, maintenance, and termination stages), but not considered as a motivator by participant 2. Participant 2 was at termination stage, which meant that she had already successfully quitted smoking with zero temptation. She pointed out that she used OHC not for informational support even though such support was offered in the OHC, as she said:

"There's a lot of information on quitting smoking in Stumppi.fi. Information is important since it supports quitting…I did not get information from Stumppi.fi due to the fact that I didn't look for it."

Companionship was viewed as a driver for participants 1, 2 and 7 who were at maintenance, termination and maintenance stages separately. In other words, all three of them were at the later stages of smoking cessation. Other participants who were at earlier stages (including contemplation and preparation) did not mention companionship at all, as well as participant 5 who was at termination stage. In sum, emotional support was considered by users as an important reason for using the cessation OHC regardless of cessation stages. Informational support was viewed as a motivator for users who were not at termination stage. Companionship was considered as a driver for users who were at later stages of smoking cessation.

Discussion and conclusion

This study identifies three components of social support that illustrate why individuals use a smoking cessation OHC to support their smoking cessation. In particular, empathy and congratulation are identified as emotional support to motivate users to use OHCs, personal experiences and medicine information are considered as informational support to drive users, and presence, group forming, friendship, and other activities out of OHCs are viewed as companionship to encourage OHCs use. In addition, the roles of informational support and companionship vary for different users with different behaviour patterns and at different cessation stage (see Figure 5).
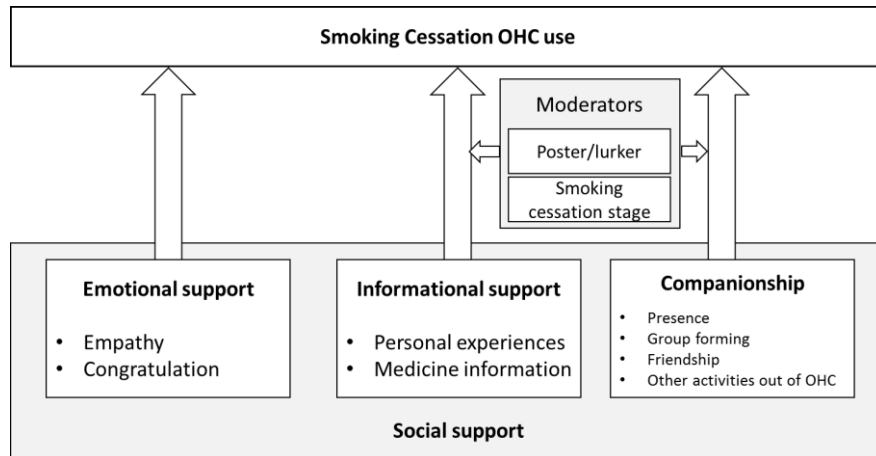
Figure 5 Social support for smokers to use smoking cessation OHCs

First, this study has applied social support framework to examine the reason for smokers to use smoking cessation OHCs, and has found that the three components of social support as motivators for smokers' OHC smoking cessation use: informational support, emotional support, and companionship.

Second, empathy has been identified as a crucial emotional support to motivate users to use OHCs. This finding is contrary to previous research findings that empathy is not important in explaining OHC use (e.g, Britt 2017; Yan and Tan 2014). Empathy refers to understanding both cognitive and emotional aspects of the recipients' experiences (Moyers and Miller 2013). Compared to partners, families, or even healthcare providers, OHC members provide greater empathic concern as they have similar smoking cessation experiences (Hodges et al. 2010). They are more likely to be able to offer suitable advice in coping with craving, and appropriate comfort to reduce stress and anxiety. Empathy is rarely reflected through expressing understanding via messages directly in OHCs, but integrating with suggesting, caring, or encouraging (Pounds et al. 2018). Previous content analyses based on messages generated in OHCs might categorize messages that containing empathy into suggestions, or encouragement subcategories, which might lead to overlooking the importance of empathy in OHCs use.

Third, personal experiences have been reported as key informational support in smokers' use of smoking cessation OHCs. Personal experiences consist of practical tips with quitting, success stories from former smokers, and treatment details. The information from smoking cessation OHCs can help smokers in making plans for smoking cessation, and provide practical tips in alleviating withdrawal symptoms, and complementing professional medical information for smokers. Personal experiences have been found commonly exchanged in OHCs as one subcategory of informational support (e.g, Zhang and Yang 2015; Zhang et al. 2013). Personal experiences can also provide advice and referrals to smokers on how to deal with smoking cessation.

Fourth, this study has identified four components of companionship in the OHC, including presence, group forming, friendship, and other activities out of the OHC. Smokers who use smoking cessation OHCs would like to get companionship in the OHC and to develop a sense of belonging to the OHC (Bogart et al. 2017; Song et al. 2018; Wang et al. 2017). Huang et al. (2014) identified five types of companionship in OHCs via content analysis of messages in OHCs, including celebration, chat/idea sharing, life events, update, and event/information sharing, which is different from our findings on the

components of companionship in smoking cessation OHCs. This inconsistency might be explained by the different research methods and different contexts of OHCs.

Fifth, in this study the motivators vary for different user groups. Lurkers at earlier cessation stages (such as contemplation and preparation) are more likely to use smoking cessation OHCs for informational support, this might because beginners in smoking cessation need more information on quitting strategies and implementations to build their confidence and to develop their skills in smoking cessation (World Health Organization 2014). Posters at termination stage of cessation are less likely to use smoking cessation OHCs for informational support, but more likely for companionship. This might because those smokers at the termination stage have already had enough information to support their smoking cessation and achieved long-term abstinence, they would like to get companionship in using smoking cessation OHCs.

This study makes a couple of theoretical implications. First, this study disentangles the three components of social support in the research context of smoking cessation OHC use, namely informational support, emotional support, and companionship. The research findings in this study indicate that social support theory is a good theoretical framework to explain smokers' use of smoking cessation OHCs. Second, this study identifies the different patterns of informational support, emotional support, and companionship in the context of smoking cessation OHCs, and provides a detailed explanation why the three components of social support are important for smokers' use of smoking cessation OHCs. Third, the findings on the different roles of the informational support, emotional support, and companionship on different user groups in smoking cessation OHCs indicates that it is important to take the user context into consideration in investigating user behaviour regarding OHCs.

The research findings in this study also bear practical implications. This study identifies three social support components and highlights the importance of empathy and shared personal experiences in smoking cessation OHCs use. The findings indicate that smoking cessation OHC designers or managers should take the three different supports into consideration in the community system function design in order to meet users' needs as well as to attract and retain users. Moreover, the study findings on the different roles of the three different motivators for different user groups indicate that it might be necessary for smoking cessation OHC designers take the different needs of different user groups into consideration in community system design in order to provide tailored services to different user groups of smoking cessation OHCs.

Limitations and future research directions

There are certain limitations to this study. First, this study applies the email interview. The data collected via mail interview in this study may not offer a deep understanding of user behavior regarding smoking cessation OHC use as email interviews have been argued to be hard to obtain in-depth information (Meho 2006). So future research should use other interview ways to investigate smoking cessation OHC use, such as face-to-face or by calls. Second, the number of interviews is relatively small, only seven interviewees, and there is a lack of smokers who are at pre-contemplation and action stages. The two groups are two very important stages in smoking cessation. Missing samples in the two stages might lead to bias in our research. More interviews are needed in further research to offer robust evidences on smoking cessation OHC use. Third, social desirability bias might occur in this study as interview respondents are from a smoking cessation OHC. More careful approaches should be conducted to reduce such bias when collecting data (Fisher 1993). Finally, this study focuses on the research context of smoking cessation OHCs, it may not be generalized to other OHCs. Future research can duplicate this research in other OHCs to further understand OHCs from social support perspective.

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Appendix A. Survey questions and their references

Items	Questions	Reference
Smoking cessation stage	Please select the statement that best describes your intention towards quitting smoking. 1.I am not intending to quit smoking in the next 6 months 2.I am intending to quit smoking in the next 6 months 3.I am intending to take actions on smoking cessation in the next month 4.I have taken actions to quit smoking in the past 6 months 5.I am in the maintenance stage of smoking cessation (maintenance means that I am still working on preventing relapse) 6.I have successfully quitted smoking with zero temptation and 100% self-efficacy	(Prochaska and Velicer 1997)
Online activities	What do you do when you visit stuppi.fi? You can select multiple options. 1.Reading posts 2.Commenting on posts 3.Starting a new topic or asked a question	(Batenburg and Das 2015)