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In-depth statistical analysis of the use of a website providing patients' narratives on lifestyle change when living with chronic back pain or coronary heart disease

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ABSTRACT

Objective: To investigate the use of lebensstil-aendern.de ("lifestyle change"), a website providing peer narratives of experiences with successful lifestyle change, and to analyze whether peer model characteristics, clip content, and media type have an influence on the number of visitors, dwell time, and exit rates.
Methods: An in-depth statistical analysis of website use with multilevel regression analyses.
Results: In two years, lebensstil-aendern.de attracted 12,844 visitors. The in-depth statistical analysis of usage rates demonstrated that audio clips were less popular than video or text-only clips, longer clips attracted more visitors, and clips by younger and female interviewees were preferred. User preferences for clip content categories differed between heart and back pain patients. Clips about stress management drew the smallest numbers of visitors in both indication modules.
Conclusions: Patients are interested in the experiences of others. Because the quality of information for user-generated content is generally low, healthcare providers should include quality-assured patient narratives in their interventions. User preferences for content, medium, and peer characteristics need to be taken into account.
Practice implications: If healthcare providers decide to include patient experiences in their websites, they should plan their intervention according to the different needs and preferences of users.
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1. Introduction

Unhealthy lifestyle behaviors such as physical inactivity, smoking, and unhealthy eating are associated with a higher risk for various diseases, including coronary heart disease (CHD) and chronic back pain (CBP) [1–4]. Lifestyle changes can positively influence the progression of these conditions. Thus, patient education is a core component in secondary prevention. However, secondary prevention programs do not reach all patients in need and often fail to generate long-term effects in everyday life [5]. According to social-cognitive theory [6], peer modeling can help patients learn complex behavioral patterns.

The integration of peer support and peer experiences in health education is therefore seen as a promising way to improve long-term effects in disease management [7–11]. Accordingly, people with health issues, especially those living with a chronic disease, report a special interest in peer support and peer experiences [12–15]. In addition to face-to-face interventions such as support groups or peer coaches, peer support is increasingly available online. The main advantages of using the Internet to provide health interventions are its low costs, anonymity, and large reach. Already more than 70% of American Internet users [16], 63% of the German population, and 51% of the European population [17] seek health-related information on the Internet. Every fourth American using the Internet to search for health-related information reads or watches someone else's health experience online [16].

Abbreviations: CBP, chronic back pain; CHD, coronary heart disease; IP, internet protocol; URL, uniform resource locator.

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These patient narratives of illness experiences can be found in various web forums, in personal blogs, on social media websites (e.g. YouTube [18] and Facebook), on publicly funded websites (e.g. healthtalk.org, formerly DIPEx [19]), and as part of structured health interventions (e.g. to quit smoking [20]). Whereas high-quality information and a balanced sample of the experiences presented can be assumed for publicly funded websites and health interventions, personal experiences from private websites and social media platforms may contain harmful behavior [21] or misleading information [22] and might lead to biased decisions [23,24]. Therefore, it is crucial for healthcare providers to understand which characteristics of patient narratives lead to higher user engagement in order to provide a relevant alternative to the non-reviewed, user-generated content widely available on the Internet.

Social cognitive theory suggests that learning from a peer model works best if the model features similarities to the observer, provides salient information, and shows the consequences of a certain behavior. The importance of similarity has been supported by qualitative research on healthtalk.org [19,25,26], according to which patient narratives of persons of the same age and origin or in the same situation are preferred, whereas sex was not shown to play a role [19]. Experimental studies have demonstrated that, in accordance with the cognitive theory of multimedia learning, narrative audiovisual content is remembered better [27], perceived as more comprehensible, attractive, and emotionally supportive [28] and more believable [29] than text-only, formal information. A study with cancer patients demonstrated audio patient narratives to be less popular than text or video patient narratives [26]. These results were derived from qualitative and experimental evaluations. Data on what content characteristics lead to an actual increase in use is still lacking.

Therefore, we performed an in-depth analysis of web analytics data collected from the German website lebensstil-aendern.de ("lifestyle-change"). It contains over 1,000 patient narratives from persons living with CHD and CBP on successful strategies and perceived barriers on the path to a healthy lifestyle. Development of the website was part of a funded research project that ended in March 2014. Details on implementation, usability evaluation [30], and dissemination strategies [31] are reported elsewhere. During the project, we conducted a controlled trial for efficacy evaluation [32] in which we also investigated how patients evaluated the website. Ninety percent of the trial participants rated the website as informative to some extent and 82% as rather helpful. Sixty percent stated that they would recommend the website to other patients. Two years after the pilot evaluation, this study examines how Internet users actually use the website and especially the patient narratives. From these analyses, we hope to better understand the information needs of persons interested in the website content and to better understand which characteristics of patient narratives lead to higher user engagement.

2. Methods

2.1. The patient narratives on lebensstil-aendern.de

The patient narratives on the website were derived from problem-centered interviews with CHD and CBP patients who reported that they had successfully modified their behavior in at least one lifestyle domain for more than six months. The interviewees were recruited from all over Germany with a sampling strategy following the principle of theoretical saturation. The one-to-three-hour interviews focused on experiences and strategies for overcoming barriers in adopting and maintaining a healthy lifestyle. The interviews were analyzed thematically for presentation on the website and split into short clips addressing different aspects of lifestyle modification. All clips were provided with text and might, according to the interviewees' preferences, have additionally contained a video or audio clip. Before publication, patients were contacted again to decide which clips should be published, whether statements should be removed, and whether they wanted to be presented with a pseudonym or their real name. For quality assurance and to avoid potentially harmful suggestions, experienced cardiologists and orthopedists reviewed all patient statements before they were published. In total, we published 1,117 patient narratives from 37 CHD and 28 CBP patients on their experiences and strategies in maintaining a healthy lifestyle. The mean age of CHD patients was 64.0 years (SD = 11.1), and the mean age of CBP patients was 50.4 years (SD = 14.1). Four CHD (10.8%) and 18 CBP (64.3%) interviewees were female. About half of the patients agreed to publish their statements as videos (CHD: n = 21, CBP: n = 11), 35% opted for audio clips (CHD: n = 12, CBP: n = 11), and the remaining 15% (CHD: n = 5, CBP: n = 5) decided to have their statements published as text only. The average CHD clip length in characters was 1,381 characters (SD = 481); the average CBP clip length was 1,375 (SD = 539).

The patient narratives were divided into two indication-specific modules. The navigation path to the patient narratives in each module on the website was structured by a vertical menu with alphabetically ordered categories addressing disease competencies and aspects of behavior change towards a healthy lifestyle (Fig. 1). The categories were derived from a literature analysis on lifestyle related risk factors for CHD and CBP. We assigned each patient narrative to one of these categories according to the main topic addressed in the clip. Within the categories, the patient narratives were presented in a randomly changing order. In addition to using the menu, suitable clips could be found via a filter for the age and sex of the interviewee, a tag cloud, a full text search engine, or via the overview pages for each patient.

2.2. Data collection

We collected usage statistics with the open source web analytics tool Piwik. The software works with "counting pixels," invisible images that are included in every single webpage on lebensstil-aendern.de, which track the IP address of every user who opens the webpage. Compared with analyzing server log data, this method allows search bots to be excluded from the usage statistics. Using cookies, Piwik is able to collect data on visit duration and visited webpages, distinguish between returning and new visitors, and analyze how visitors were directed to the webpage. Other than the popular web analytics tool Google Analytics, Piwik is designed to work in accordance with German privacy regulations. This is mainly reflected in users' choice to "opt out" of being tracked by ticking a box on the privacy section of the website or by using a privacy browser plugin. IP addresses collected by Piwik are also stored anonymously.

For an in-depth analysis of the usage statistics, we used data from April 1, 2014 to March 31, 2016. We chose this period for several reasons: First, the funded research project ended in March 2014, which means that from then on, the website content did not change any further, the evaluation trial was finished, and active dissemination activities were no longer performed. This ensured that all website visitors had access to the same content and could be considered "real" users (compared with trial participants or researchers). Second, we chose an exact two-year period to exclude the possibility that seasons, media coverage, or other external events could influence the user engagement.

Users were informed about data anonymity and data security on a special webpage accessible in the footer menu of the website. The Ethics Committee of the Medical Faculty, University of Leipzig

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