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Introduction

Digitalization in the healthcare sector leads to new requirements and challenges in the doctor-patient relationship (Brockes et al., 2018; Meinzer, 2019; Schmidt-Weitmann et al., 2015). Online communication between doctors and patients is one aspect of eHealth that may greatly impact the use of health systems, patient-doctor roles and relations, and individuals' health (Meinzer, 2019; Santana et al., 2010). The role of the patient has changed in recent years, from passive, dependent recipient of medical treatment to active, informed, and responsible participant (Brockes et al., 2018; Meinzer, 2019). Besides the traditional face-to-face doctor-patient interactions, there are new anonymous online consultations, which define a different social context (Brockes et al., 2018; Schmidt-Weitmann et al., 2015; Meinzer, 2019; Umefjorda, Hamberga, Malkerb, & Petersson, 2006). The internet is increasingly used for health matters, but little is known on the use of internet-based consultation services.

Online consultation allows users to ask a question anonymously, often combined with related health narratives (Brockes et al., 2018; Meinzer, 2019; Schmidt-Weitmann et al., 2015). Health narratives are individual, social, and cultural (re)constructions of a personal health issue or medical problem, subjective disease experience, and the question(s) that result (Birkner, 2006; Gray, 2009; Meinzer, 2019). They are defined as "linguistic constructions of lived experiences that attempt to make sense of actions, motives, and consequences, as well as interactions, relationships, and emotions" (Gray, 2009, p. 259). These systems of disease-or health-related ideas, knowledge, convictions, beliefs, and evaluations are the subject of substantial research (e.g., psychological, linguistic, sociological, consumer, and medical research; Birkner, 2006; Birkner & Vlassenko, 2015).

Health narratives are mainly coping and defense mechanisms in the context of a disease, including the management of emotions (Birkner, 2006; Verres, 1989). Emotions form a recurrent element of disease presentations and are frequently mentioned by affected people as a (central) component of subjective disease experience and health narratives (Birkner &

Vlassenko, 2015; Lindemann, 2015). Emotions are intertwined with narratives: Narrative evokes emotion, and emotion shapes narrative and has a narrative nature (Beatty, 2010; Kleres, 2010; Rees et al., 2013). Overall, the study of emotions in narratives (Habermas et al., 2009; Kleres, 2010) and medical communication is still in the early stages (Lindemann, 2015). The extant research has not yet identified which emotions are relevant and dominant.

In the online consultation context, users anonymously formulate their health narratives and resulting questions for doctors. Thus far, science knows little about users and the content of their health narratives. We investigate the inquirers themselves and the content of their inquiries in relation to the health narratives, the queried diseases, and the emotions that are expressed. The article begins with a reflection on the status of online health consultation as a source of health information and a review of the research on health narratives and emotions, from which we derive our research questions and hypotheses. The methodology of the automated content analysis and results are presented next, followed by a discussion.

1. Online Health Consultation

The internet is becoming an important tool in health care; more and more individuals use it as a health-related information source for medical decisions (Eurobarometer, 2014; Golder & Jans, 2018; Meinzer, 2019). In the European Union and Switzerland, women in particular are more interested in health-related and medical issues and search more for information about these issues online than men do (Eurobarometer, 2014; Schäfer, Füchslin, Metag, Kristiansen, & Rauchfleisch, 2018). Older people are more interested in health-related topics, but younger people search more for health-related information online, perhaps because younger people use the internet more frequently overall (Eurobarometer, 2014; Golder & Jans, 2018; Schäfer et al., 2018). Internet use and the competence of the population has generally increased steadily in Switzerland in recent years (BfS, 2018). However, not only is more and more general health information consumed on the internet but there is also active exchange in forums and active advice on specific health issues in online consultations with doctors (Eurobarometer,

2014). Both commercial and non-commercial online consultation services have been available on the internet for some time, and these seem to be increasing in popularity (Brockes et al., 2018; Meinzer, 2019; Umefjorda et al., 2006, 2008). A representative survey of citizens from seven European countries found that almost a quarter of health-related internet users expect to have an online consultation with a health professional in the future (Santana et al., 2010).

Various studies investigated the Swedish online consultation service "Ask the Doctor" (Umefjorda et al., 2006; Umefjord, Petersson, & Hamberg, 2003; Umefjord et al., 2008) and found that these services were appreciated for their convenience and flexibility but also because of the mode of communication, such as the ability to reflect on the written answer without having to hurry and to read it more than once (Umefjorda et al., 2006). Almost three out of four inquirers using the online consultation service were women; this mirrors the difference seen in regular health care and health information behavior in general (Umefjorda et al., 2006, 2008). The preponderance of female use was partly reflected by the fact that 12 percent of the inquiries were classified as about female genitals or pregnancy and contraceptives (Umefjorda et al., 2008). The anonymous context allows users to address even diseases that often cause shame, such as venereal diseases (9.1%), mental and behavioral disorders (4.2%), and certain infections (e.g., those with a predominantly sexual mode of transmission; 5.0%). However, a wide variety of medical inquiries were submitted to the service, representing all categories of the international statistical classification of diseases and related health problems (the ICD-10-WHO; WHO, 2016); most questions were about symptoms and signs, which are not classified (11.7%), and infections (5%; Umefjorda et al., 2008). The studies also detected what the inquirers hoped to achieve (in descending order of frequency): primary analysis of medical symptoms, explanation and information, relief of worry, second opinion, and advice on lifestyle (Umefjorda et al., 2006). Participants indicated (in descending order of frequency) their major reasons for choosing to consult unknown doctors on the internet: convenience, anonymity, "doctors too busy," difficulty in finding time

to visit a doctor, difficulty in getting an appointment, feeling uncomfortable when seeing a doctor, and not being able to afford a doctor's visit (Umefjord et al., 2003). Further reasons and motives elicited for Swedish and Swiss online consultation services included seeking a second opinion, discontent with previous doctors and a wish for a primary evaluation of a medical problem, asking embarrassing or sensitive questions (shame and inhibition to visit a doctor), seeking information on behalf of relatives, preferring written communication, and (from expatriates, travelers, and others) living far away from regular health care (Schmidt-Weitmann et al., 2015; Umefjord et al., 2003). The online consultation services were mostly used as a first stop for new medical concerns and to obtain a second opinion or more information on medical issues and problems that were already under treatment (Schmidt-Weitmann et al., 2015; Umefjorda et al., 2006).

The role of the internet doctor is and should be distinct from that of the personal doctor (Meinzer, 2019). The internet doctor interprets inquiries, provides comments, explains, teaches, and should empower the inquirer to continue to be active in acquiring medical knowledge and to take an active part in treatment decisions (Umefjorda et al., 2006). Accordingly, online consulting services meet different needs for different inquirers (Meinzer, 2019), and there is currently little empirical knowledge about these inquirers.

In a one-sided laypeople-to-expert online consultation, the users received as much time and space for their inquiries as they would like (Brockes et al., 2018; Schmidt-Weitmann et al., 2015). Such internet consultation could be regarded as patient-centered, as it is led by the inquirer with the full freedom to choose what to tell the doctor (Umefjorda et al., 2006). In face-to-face doctor-patient interactions, patients often cannot finish talking, and doctors interrupt them (Beckman & Frankel, 1984; Heritage & Robinson, 2006; Marvel et al., 1999). However, if patients are allowed to speak as long as they wish, some statements provide critical information for doctors' decision making that otherwise would have been omitted, which leads to a higher quality of treatment (Frankel, 2001; Greenhalgh & Hurwitz, 1999;

Heritage & Robinson, 2006; Langewitz et al., 2002; Levinson et al., 2000; Marvel et al., 1999). Online consultation gives the users a safe, time- and place-independent, and anonymous space to ask health-related questions combined with related individual health narratives.

2. Health Narratives and Emotions

Health narratives offer information, meaning, context, and individuals' perspectives (Gray, 2009); they concern how someone feels and transport another person into the situation of someone else (Greenhalgh & Hurwitz, 1999, Habermas et al., 2009). They are influenced by socialization and cultural models (Birkner, 2006, 2015), and they are shaped, socially constructed, the result of authorial decisions, and derived from a variety of personal motives (e.g., self-presentation, emotion management, and asking for help; Birkner, 2006; Garden, 2010; Meinzer, 2019; Paley & Eva, 2005; Verres, 1989). The narrator and the assumed listener affect how the health narrative is conveyed; the same sequence of health-related events told by another person to a different audience might be presented differently without being any less "true" (Greenhalgh & Hurwitz, 1999). The choice of what to tell and what to omit lies entirely with the narrator (Greenhalgh & Hurwitz, 1999). Health narratives are context sensitive (e.g., depending on the interlocutor, there are differences in the expressed emotions, control beliefs, causal attributions, and assessments of the nature of a disease; Birkner, 2006, 2015).

Narratives offer a method for addressing existential qualities, such as inner hurt, despair, hope, grief, and pain, which frequently accompany, and may even constitute, people's diseases (Greenhalgh & Hurwitz, 1999). Health narratives about diseases are often associated with emotions (Birkner & Vlassenko, 2015; Charon, 2001; Lindemann, 2015). Health narratives, therefore, are mainly coping and defense mechanisms in the context of a disease and related emotions (Birkner, 2006; Verres, 1989). All diseases are socially constructed at the experiential level based on how individuals understand, experience, live, and cope with

the disease (Conrad & Barker, 2010). Diseases are a state of disharmony, disequilibrium, and disability in which one finds oneself separated from the familiar everyday world (Toombs, 1987). There is a loss of certainty that causes great anxiety, personal loss of control, and fear (Toombs, 1987).

Emotions can affect health-related behaviors (Dolezal, 2015; Dolezal & Lyons, 2017). The emotion shame[1] is especially considered a strong barrier to talking about diseases (Dolezal, 2015; Dolezal & Lyons, 2017). Visits to doctors and medical professionals involve potentially humiliating physical and psychological exposure (Dolezal, 2015). There is scientific evidence for a negative relationship between the perception of shame and seeking professional help (e.g., Davidoff, 2002; McCambridge & Consadine, 2014; Neishaboury et al., 2015; Weiss, Ramakrishna, & Somma, 2006). However, despite shame being recognized as a powerful force in the clinical encounter, it is under-researched in the contexts of health, diseases, and medicine (Dolezal & Lyons, 2017). Patients often regard their diseases as personal shortcomings or as arising from personal inadequacies, and the experience of health-related stigma is crucially bound up in experiences of shame (Davidoff, 2002; Dolezal, 2015; Dolezal & Lyons, 2017; Weiss et al., 2006). The tendency to avoid shame "is of particular relevance when considering the dynamics of the clinical encounter where the […] exposure of the physical body is the centerpiece" (Dolezal, 2015, p. 571). Exposure of the body is inherently shameful in our cultural context, and there is stigma attached to instances of diseases (Dolezal, 2015; Weiss et al., 2006). Intimate diseases (those that are genital or gastrointestinal) and diseases associated with addiction, mental health, sexual activity, or overeating are particularly strongly stigmatized because stigmatization often follows the idea

[1] Shame is „a negative emotion that arises when one is seen and judged by others (whether they are present, possible or imagined) to be flawed in some crucial way, or when some part of one's self is perceived to be inadequate, inappropriate or immoral" (Dolezal & Lyons, 2017: 257). Shame is linked to threats to one's core identity and to social bonds especially one's feelings of belonging and acceptance within interpersonal and social contexts (Davidoff, 2002; Dolezal, 2015; Dolezal & Lyons, 2017).

that “people with ‘organic’ conditions are blameless, and ‘socially’ or ‘psychological’ based disorders are blameworthy” (Weiss et al., 2006, p. 286).

Thus far, there is no binding definition for emotions accepted by all disciplines (Schwarz-Friesel, 2013; Shiota & Kalat, 2012). There is agreement, however, that they are constitutive phenomena and experience in the state of subjective ego evaluation (Schwarz-Friesel, 2013; Shiota & Kalat, 2012). Emotions can be classified, for example, by intensity, duration, valence (e.g., negative or positive), and functionality (Habermas et al., 2009; Schwarz-Friesel, 2013; Shiota & Kalat, 2012). They are elicited by and directed toward others and have an overall communicative function (Shiota & Kalat, 2012). Emotions are internal, subjective constructs and observable only through expressive manifestations (Schwarz-Friesel, 2013). They are individually perceived differently in their intensity and severity, based on experience and socialization (Toombs, 1987; Schwarz-Friesel, 2013; Shiota & Kalat, 2012). Socialization strengthens stereotypes regarding the expression of emotions. Men and women from various cultures have been shown to accept the Western stereotype that women are more emotional and express more emotions than men do (Fischer & Manstead, 2000; Kring & Gordon, 1998).

Even if the interplay of health narratives and emotions is scientifically evident, it is as yet unknown which emotions are explicitly mentioned in health narratives in anonymous online consultations.

3. Research Questions

From the previous empirical findings about online consultation services and health narrative theory, the following research questions (RQ) and hypotheses (H) are formulated. The hypotheses are drawn from general findings about the use of online health communication.

RQ1: Who are the inquirers?

H1: More women than men make inquiries.

H2: Over time, more and more older adults make inquiries.

RQ2: In relation to which diseases are online inquiries made?

H3: The diseases in online inquiries correlate with the statistical emergence of diseases in Switzerland.

RQ3: Which emotions are expressed in the health narratives of the online inquiries?

4. Object of Investigation

Since 1999, the University Hospital Zurich (USZ) has offered a medical online consultation service for patients. This high-quality "Doc2Patient" service is unique in this form in the German-speaking countries (Brockes et al., 2018). The medical team answers about 2,500 questions per year, usually within 24 to 48 hours. The team is made up of a maximum of six physicians who are specialists in clinical telemedicine at the USZ and have many years of experience, mainly in internal and general medicine (Brockes et al., 2018). The service has charged money between 2008 and 6/2018. From 07/2010 to 09/2011, the USZ started public relations (PR) activities and a Google AdWord campaign about the service. In December 2011, the price per inquiry increased from 20 to 75 CHF and the response time was reduced from 48 to 24 hours. From June 2012 to the end of 2012, there was a second Google AdWord campaign. How the online consultation service works (Brockes et al., 2018; Schmidt-Weitmann et al., 2015) is that its online questionnaires are accessed via the home page of the USZ (www.usz.ch). The request can be made anonymously, because only a valid email address is required to send the answer. In addition to the general question, the questionnaire began asking in 2003 for optional information (e.g., about personal characteristics [age, sex, height, and weight]) of the user. Further, an assignment of the ICD-10 codes of the diseases is carried out exclusively by the doctors. The user can choose whether the request may be used for scientific purposes. Finally, the user receives an email with an active link to the answer, which is stored on a server in the USZ and thus protected against unlawful access.

5. Method

An automated content analysis of all online inquiries to the USZ from 09/08/1999 to 07/06/2018 was conducted via the WordStat software with QDA-Miner. There was a full sample of 59,360 inquiries in the dataset, but only those with the questioner's consent for scientific evaluation were used. After data cleaning, there were 55,476 inquiries.[2]

To compare the diseases in the online inquiries with the statistical emergence of diseases in Switzerland, we used the annual statistics of Swiss hospitals according to the ICD-10-WHO (WHO, 2016). These online statistics from 1999 to 2016 are available, open access, from the Swiss Federal Statistical Office (BfS, 2016).

Emotions are articulated on the level of perceptible expression by three forms of realization (verbal, nonverbal, and physical; Schwarz-Friesel, 2013; Shiota & Kalat, 2012). They can be constituted verbally in text form both lexically (emotion words) or syntactically (Habermas et al., 2009; Kleres, 2010; Schwarz-Friesel, 2013). Lexical languages have lexemes to refer to a given emotion category by explicit naming of emotional states (e.g., *fear*, *concern*, *scared*, and *dread* refer to the emotion category FEAR; Schwarz-Friesel, 2013). In WordStat, a dictionary for emotions (positive versus negative) and expressions (uncertainty) was constructed from the German Regressive Imagery Dictionary[3] for emotions, with supplements from German linguistic literature about emotions (Schwarz-Friesel, 2013; Bergenholtz, 1980; Shiota & Kalat, 2012) and a German online dictionary of synonyms[4].

In a reliability test, a trained coder manually coded the expressed emotions of 300 cases, which was then compared with the automatic coding. Table 1 displays the reliability values. It turned out that the automated content analysis measured the expressed emotions in the inquiries with a good validity. Emotions can be expressed not only by emotion words but also

[2] For the data cleaning the following cases are delated: English (545), French (66), Italian (17) inquiries, test questions and cases with empty text field (337), double cases (2455) and cases without permissions oft he inquiers (464). Plausibilitytests were made for different variables: age ($0<x<111$), weight ($1<x<200$), height ($50<x<210$), and BMI ($5<x<100$).

[3] By C. Martindale (translated by R. Delphendahl); retriewed from https://www.provalisresearch.com/products/content-analysis-software/wordstat-dictionary/regressive-imagery-dictionary/

[4] Retriewed from https://www.synonyme.woxikon.de/

syntactically or by metaphors (Habermas et al., 2009; Kleres, 2010; Schwarz-Friesel, 2013), and people make spelling mistakes, especially in the Swiss context (Swiss German is sometimes written in a way that lacks official spelling rules). This explains the expressed emotions that the automated content analysis could not capture.

6. Results

6.1 Inquirers

The 55,476 inquiries were performed by 43,111 different people, most of whom were one-time users (n = 35,160; 81.6%); 6,244 users (14.5%) made two to five inquiries, 496 (1.2%) made six to 14 inquiries, and 37 (0.1%) made 15 to 32 inquiries. As of 2008, the service was subject to a charge. In 2007, there was a record of 7,134 requests per year, and from the cost barrier in 2008 on, there were only a maximum of 3,243 requests in 2011 (see Figure 1). The PR activities and Google AdWord campaigns launched from 07/2010 to 09/2011 and 06/2012 to 12/2012 had a visibly positive effect on the number of inquiries (see Figure 1). Since 08/2017 the service was offered again free of charge and the number of inquiries increased again.

On average, a person wrote a health narrative with a question that was 654 words long (SD = 499). Since 2003, specific personal characteristics of the inquirers have been surveyed separately (Table 2). The average BMI of the inquirers was calculated from their height and weight, broken down by gender and age. On average, the inquirers were 169 cm tall, weighed 68 kilograms, and had a BMI of 23.2 (i.e., a normal weight). Only a few inquirers took advantage of the additional options and specified their other diseases and treatments in an extra field (Table 2). The majority of the inquirers were female (58%), which supports H1 (see Figure 2). On average, the inquirers were 38 years old. However, the inquirers changed from 1999 to 2018. Over time, significantly more men ($rs(37908) = -.02$, $p < .001$) and more older adults began making inquiries ($r(42415) = -.12$, $p < .001$). This initially supports H2. Before the cost increase, the inquirers were, on average, younger than afterward (Table 3).

From 12/2011 onward (after the price increase) to 08/2017, the average inquirers were older and, eventually, became younger again (see Figure 3). That contradicts H2.

6.2 Health Narratives and Diseases

Most inquiries were about symptoms and signs that were not classified, about health services related to reproduction, diseases of pulmonary circulation, disorders of the skin, health services, disorders of the eye and nervous system, injuries, and disorders of the female genital tract (Table 4). The frequencies of the diseases were compared separately by year with the statistical frequencies of the diseases in the Swiss hospitals from 1999 to 2016. Correlations were calculated according to Pearson product-moment correlation coefficients for each year (Table 5). Statistically significant correlations were found for most years, which supports H3. Approximately one sixth of the questions addressed intimate diseases related to the genitals, gastrointestinal and venereal diseases, obesity, or mental disorders (17.7%; n = 6,586).

6.3 Health Narratives and Emotions

Negative emotions were most frequently expressed (about 33% of health narratives; n = 18048). These were most frequently suffering (17.4%; n = 9,677), anxiety or fear (6.8%; n = 3,786), worry (3.4%; n = 1,865), sadness (3%; n = 1,670), and shame (0.8%; n = 442). Positive emotions were expressed in only 12% of cases (n = 6,667). The emotion joy was most frequently expressed (4.8%; n = 2,694). Overall, more negative than positive emotions were expressed (see also Figure 4). In 6% of cases, narratives contained both positive and negative emotions (n = 3,327); these narratives are, on average, significantly longer than narratives without emotions (word count with positive and negative emotions: M = 1,183 (SD = 451) versus without emotions: M = 600 (SD = 451); t[5](55,473) = -69.2, p < 0.001). Narratives that mentioned positive or negative emotions (n = 21,388) are, on average, only scarcely significantly longer than those without emotions (word count with positive or

[5] Levene's test for equality of variances was indicated unequal variances (F = 781.8, p < .001).

negative emotions: $M = 641$ ($SD = 491$) versus without emotions: $M = 632$ ($SD = 491$); t[6](55,472) = -2.1, $p < 0.05$).

Women more often mentioned emotions in the health narratives than men did (n(f) = 8,972 versus n(m) = 5,830). An independent samples t test was conducted to compare the mention of emotions by women and men and found a significant difference (t[7](37905) = -8.09, $p <$ 0.001). This is also reflected in the expressed positive and negative emotions (positive emotions: n(f) = 2,751 versus n(m) = 1,819; t[8](37,906) = -3.13, $p < 0.01$; negative emotions: n(f) = 7,678 versus n(m) = 4,882; t[9](37,906) = -8.55, $p < 0.001$). A quarter of the inquiries contain uncertainty expressions (n = 15,272; 27.5%), such as "uncertain," "uncertainty," "I suspect," "no idea," "do not know," "not sure," "probably," and "perhaps." The emotion *shame* was addressed in the health narratives 427 times; 124 (29.0%) of these mentions refer to diseases that are often considered to be potentially shameful and stigmatized (Dolezal, 2015; Weiss et al., 2006). Accordingly, shame was mentioned disproportionally often in the case of diseases related to the genitals, gastrointestinal and venereal diseases, obesity, and mental disorders. Women also significantly more frequently mentioned shame (n(f) = 228 versus n(m) = 88; t[10](37,906) = -5.10, $p < 0.001$).

Regarding all emotions related to specific diseases ($n > 100$), emotions were mentioned in more than half the inquiries for the following diseases: (F30–F39) mood (affective) disorders (82.2%); (F40–F48) neurotic, stress-related, and somatoform disorders (72.2%); (I60–I69) cerebrovascular diseases (59.3%); (F50–F59) behavioral syndromes associated with psychological disturbances and physical factors (58.6%); (G40–G47) episodic and paroxysmal disorders (57.6%); (R40–R46) symptoms and signs involving cognition, perception, emotional state, and behavior (57.5%); (F90–F98); behavioral and emotional

[6] Levene's test for equality of variances was indicated unequal variances ($F = 4.2$, $p < .05$).
[7] Levene's test for equality of variances was indicated unequal variances ($F = 270.8$, $p < .001$).
[8] Levene's test for equality of variances was indicated unequal variances ($F = 39.4$, $p < .001$).
[9] Levene's test for equality of variances was indicated unequal variances ($F = 302.4$, $p < .001$).
[10] Levene's test for equality of variances was indicated unequal variances ($F = 104.6$, $p < .001$).

disorders with typical onset in childhood and adolescence (56.6%); (K55–K64) other diseases of the intestines (53.7%); (N70–N77) inflammatory diseases of the female pelvic organs (52.1%); (R50–R69) general symptoms and signs (50.9%); and (R00–R09) symptoms and signs involving the circulatory and respiratory systems (50.9%). Regarding the negative emotions related to specific diseases ($n > 100$), it can be seen that negative emotions were mentioned in more than half of the inquiries of the following diseases: (F30-F39) mood (affective) disorders (in 78.6% of the cases); (F40-F48) neurotic, stress-related and somatoform disorders (68.4%); (I60-I69) cerebrovascular diseases (56.9%); (R40-R46) symptoms and signs involving cognition, perception, emotional state, and behavior (52.8%); (G40-G47) episodic and paroxysmal disorders (52.0%); and (F90-F98) behavioural and emotional disorders (in 50.8% of the cases). Emotions in general and specific negative emotions were expressed primarily in relation to diseases and symptoms affecting mental or behavioral health. However, emotional expressions also appear in more than half the health narratives related to other diseases, such as inflammatory diseases of the female pelvic organs and diseases affecting the circulatory system or the intestines.

7. Discussion

By using automated content analysis, a full sample of anonymous inquiries to an online consultation service was investigated with regard to the inquirers themselves and the content of their health narratives. Inquiries were made relatively often about those diseases that frequently are likely to cause shame. Shame is often significant when considering an individual's health (Dolezal, 2015; Dolezal & Lyons, 2017). As in a Swedish online consultation service (Umefjorda et al., 2008), one sixth of the questions related to diseases of the genitals, gastrointestinal and venereal diseases, obesity, and mental disorders. Shame is often a feeling that inhibits people from openly speaking about health concerns (Consadine et al., 2011; Dolezal, 2015; McCambidge & Consadine, 2014). That is especially important in the Western cultural context, which values autonomy, discipline, and self-restraint. For certain

diseases, “afflicted individuals are made to feel ashamed of their supposed lack of self-control and weak will” (Dolezal, 2015, p. 572). There is an increased tendency in medicine to moralize about disease and shift the onus onto the individual, who is responsible for personal health literacy and maintaining it through (increasingly commercialized) practices involving diet, exercise, digital “wearables,” and other disciplinary lifestyle choices and practices (Dolezal, 2015). The more responsible an individual feels for a disease, the greater the potential for shame and avoidance, which can stand in the way of individual help and information search and thus health literacy (Dolezal, 2015). An online consultation offers an anonymous space for users where they can talk about diseases that often cause shame. Accordingly, online consultation services can strengthen patient empowerment and health literacy through the individual provision of health information (Brockes et al., 2018; Schmidt-Weitmann et al., 2015; Umefjord et al., 2008).

In terms of the function-oriented classification of emotions (Schwarz-Friesel, 2013), in particular, negative emotions that people relate to themselves and/or their inner behavior (e.g., suffering, worry, shame), that are triggered by certain situational factors (e.g., sadness), and that arise in response to threat and cause strong physical symptoms (e.g., anxiety or fear, aggressiveness) are expressed. Expressed emotions contain a communicative function and also an appeal to the addressee (Shiota & Kalat, 2012), so the importance and urgency but also the justification of the inquiry should presumably be supported. Consistent with meta-analyses (Else-Quest, Higgins, Allison, & Morton, 2012; Fischer & Manstead, 2000), women expressed emotions and especially shame in this study more often than men did. However, the range of emotional expression is based, in large part, on a culture’s expectations for femininity and masculinity and not on biology (Fischer & Manstead, 2000; Kring & Gordon, 1998). Emotional experience stimulates the production of narration (Rimé, 2009). In this study, health narratives with emotions are longer than those without emotions. A possible explanation is that, to cope with the aversive effect of the problem, individuals may need to

work through an issue, reflecting on how and why something happened and how they feel about it (Bohanek et al., 2005; Habermas et al., 2009; Rimé, 2009). Overall, this study confirms the close connection between health narratives and emotions.

However, we do not know whether the emotions are the result of the disease, the disease was the result of the emotions, or the emotions are or were a part of the disease. This is one of the main limitations of this study. A second limitation regarding the chosen method is that, with automated content analysis, emotional expressions can only be analyzed by detecting emotion words. Emotions that are written in words with spelling mistakes in Swiss German, expressed syntactically, or by means of metaphors without explicit emotion words could not be captured in this study. Another limitation with regard to a negative impact on the generalizability of the study results depends on the introduction of the cost barrier in 2008, after which people with more limited resources could be excluded from the online consultation service.

Internet-based applications like an online consultation offer the opportunity of a low-threshold provision of professional medical advice. In particular should future research focus on special needs and behavior of target groups (Meinzer, 2019) like men who normally tend to avoid professional help or individuals with illnesses that are known to provoke shame. The visibility of professional medical online consultation services could be increased by internet ad campaigns that provides targeted information for those affected.

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Appendix

Table 1: Comparison of the automated coding with manual coding

Category	Cohen's kappa coefficient
negative emotions	0.90
positive emotions	0.85
joy (happiness, fun…)	0.92
fear (panic, fright…)	0.96
shame	0.92
uncertainty	0.80

Note: n = 300

Table 2: Information about the inquirers

Variable	Descriptives	Comments
Person ID	n = 43111	persons first registration
Age	M = 38 (SD = 17,3); p25 = 25; p50 = 35; p75 = 49	missing = 13061
Sex	m = 15901; 41%; f = 22007; 58%	missing = 17568
Weight	M = 68kg (SD = 18kg)	missing = 13147
Height	M = 169cm (SD = 15,8cm)	missing = 15469
Ailments	no = 34057; yes = 1809	missing = 19610
Medication	no = 35790 ; yes = 2885	missing = 16598
Other diseases	no = 28119; yes = 998	missing = 26175
Treatments	no = 13242; yes = 970	missing = 41077
BMI (Body-Mass-Index)	M = 23,4 (SD = 4,9)	missing = 15706

Note: total n = 55476

Table 3: Average age of online inquirers per year

Year	Age M(SD)
2003	35.6 (15.4)
2004	34.5 (15.4)
2005	35.3 (15.5)
2006	35.5 (15.3)
2007	35.8 (15.5)
2008[A]	38.7 (17.2)
2009	39.2 (16.9)
2010	43.1 (18.2)
2011	45.0 (19.0)
2012	45.0 (19.4)
2013	43.4 (20.0)
2014	38.6 (18.8)
2015	36.5 (18.7)
2016	36.5 (18.8)
2017	36.6 (18.1)
2018	35.9 (18.8)
Total	38.1 (17.3)

Note: n = 42415; [A]year of cost introduction

Table 4: Frequencies of diseases in the inquiries

WHO | International statistical classification of diseases and related health problems, ICD-10-WHO version 2016 (WHO, 2016)	Frequency > 250[A]	Percent
(A00-A49) Intestinal infectious & bacterial diseases	292	0.8
(A50-A74) Infections with a predominantly sexual mode of transmission	525 [B]	1.4
(B00-B09) Viral infections by skin & mucous membrane lesions	542	1.5
(B15-B34) Viral hepatitis & other viral diseases	311	0.8
(B35-B89) Mycoses, protozoal diseases, helminthiases, & pediculosis	508	1.4
(C00-C49 & C69-C96) Malignant neoplasms	848	2.3
(C50-C68) Malignant neoplasm of breast, genital organs, & urinary tract	459[B]	1.2
(D10-D48) Benign neoplasms & neoplasms of uncertain	715	1.9
(D50-E14) Diseases of blood, of thyroid gland, & diabetes mellitus	667	1.8
(E20-E64) Endocrine glands disorders, malnutrition, & nutritional deficiencie	446	1.2
(E65-E68) Obesity and other hyperalimentation	350 [B]	0.9
(E70-E90) Metabolic disorders	279	0.7
(F00-F09, F20-F29, & F60-F99) Mental and behavioural disorders	412 [B]	1.1
(F10-F19) Mental & behavioural disorders due to psychoactive substance use	235 [B]	0.6
(F30-F39) Mood (affective) disorders	309 [B]	0.8
(F40-F48) Neurotic, stress-related, and somatoform disorders	678 [B]	1.8
(F50-F59) Behavioural syndromes ass with psych disturbances & phys factors	476 [B]	1.3
(G00-G99) Disorders of the nervous system	1124	3.0
(H00-H59) Disorders of eye	1332	3.6
(H60-H95) Diseases of ear	757	2.0
(I00-I99) Diseases of pulmonary circulation	1510	4.1
(J00-J99) Diseases of respiratory tract	840	2.3
(K00-K14) Diseases of oral cavity, salivary glands and jaws	597	1.6
(K20-K54 & K65-K93) Diseases of the digestive system	896	2.4
(K55-K64) Other diseases of intestines	376 [B]	1.0
(L00-L14 & L40-59) Diseases of skin	565	1.5
(L20-L30) Dermatitis and eczema	657	1.8
(L60-L75) Disorders of skin appendages	1398	3.8
(L80-L99) Other disorders of the skin and subcutaneous tissue	560	1.5
(M00-M25) Arthropathies	992	2.7
(M30-M54) Systemic connective tissue disorders & dorsopathies	874	2.3
(M60-M79) Soft tissue disorders	938	2.5
(M80-M99) Disorders of bone density and structure	228	0.6
(N00-N39) Disorders of the genital-urinary system	475 [B]	1.3
(N40-N51) Diseases of male genital organs	867 [B]	2.3
(N60-N77) Disorders of breast & female pelvic organs	362 [B]	1.0
(N80-N98) Noninflammatory disorders of female genital tract	1061 [B]	2.8
(O00-O99) Maternal disorders predominantly related to pregnancy	504	1.4
(Q00-Q07) Congenital malformations	814	2.2
(R00-R99) Symptoms and signs, which are not classified	5357	14.4
(S00-T35) Injuries	1118	3.0
(Y40-Y59) Substances causing adverse effects in therapeutic use	712	1.9
(Z00-Z13) Health services for examination & investigation	282	0.8
(Z20-Z29) Health hazards related to diseases	741	2.0
(Z30-Z39) Health services related to reproduction	1586	4.3
(Z40-Z54) Health services for specific procedures & health care	307	0.8
(Z70-Z76) Health services in other circumstances	1383	3.7
Total (18229 not categorizes=32,86%)	37247	100.0

Notes: [A] Summarized according to the ICD-10-WHO classification up to a frequency > 250; [B] Intimate diseases related to genitals, bowel, venereal diseases, obesity, & mental disorders

Table 5: Correlations between the diseases of the online inquiries and the statistical emergence of diseases in Switzerland's hospitals

Year	Pearsons *r*
1999	2.29*
2000	4.90***
2001	4.13***
2002	6.07***
2003	4.89***
2004	5.62***
2005	4.34***
2006	5.14***
2007	4.68***
2008	4.05***
2009	3.60***
2010	5.04***
2011	3.14***
2012	3.09***
2013	2.53*
2014	2.02*
2015	2.55*
2016	1.57

Notes: ***$p < .001$; **$p < .01$; *$p < .05$

Figures

Figure 1: Number of inquiries over time

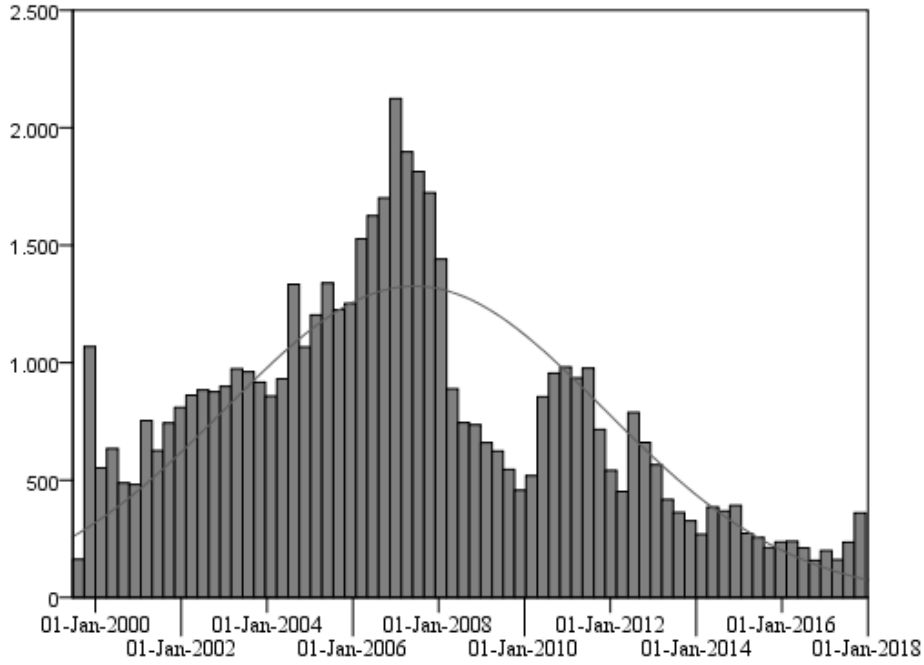

Figure 2: Number of inqueries by sex

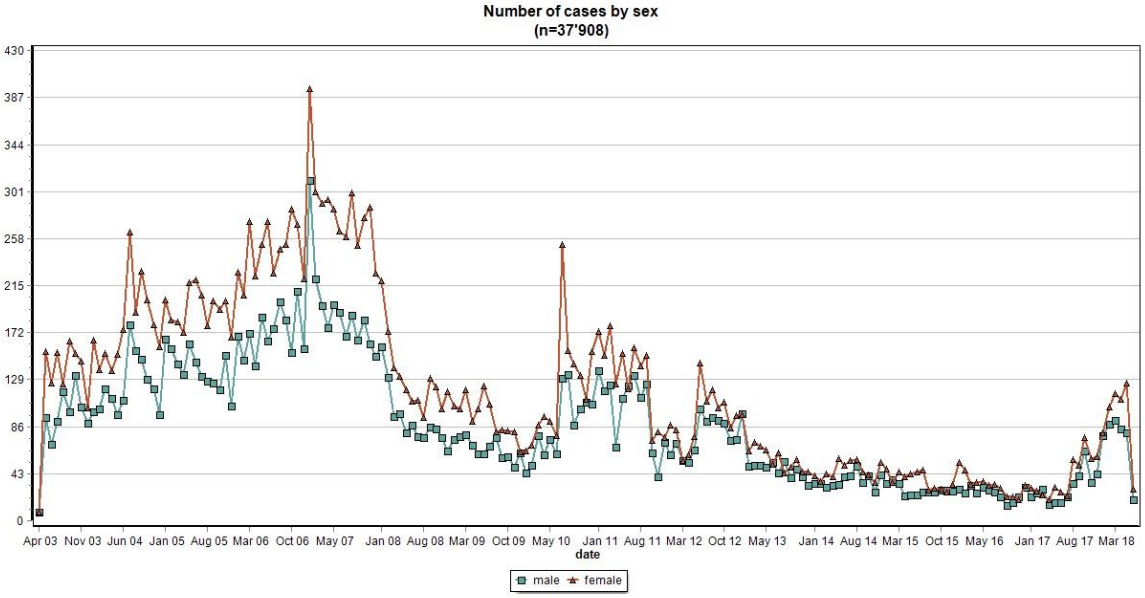

Figure 3: Number of inqueries with negative, positive, and no emotions

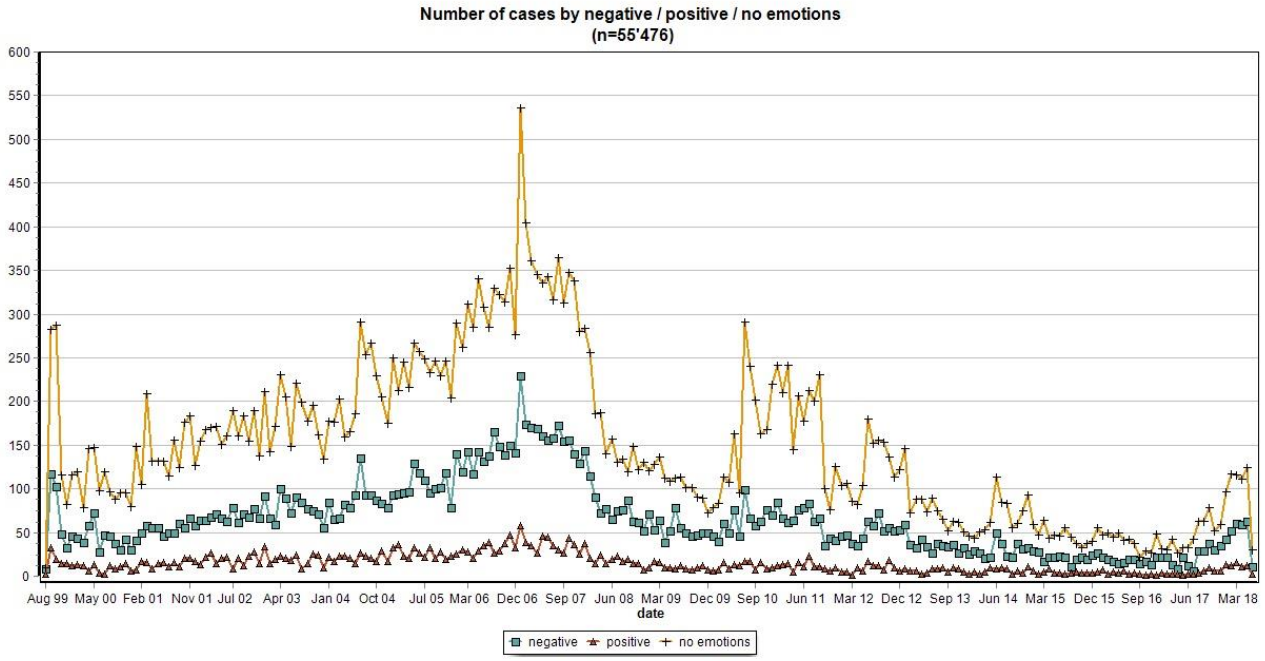

Figure 4: Propotion of inqueries by age