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Schmidt-Weitmann S, Zimmerli L

Battegay E, Lennart Neumann C

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Medical Online Consultation Regarding Hypertension

C. Brockes[1], A. Frei[1], S. Schmidt-Weitmann[1], L. Zimmerli[2], E. Battegay[2], C. Lennart Neumann[3], E. G. Schulz[3]

Abstract: *Background:* The extension of the classical physician-patient relationship by communication via internet is becoming an increasing reality. Our aim was to characterise the users of medical online consultations with enquiries regarding blood pressure and influence of given answers on knowledge, behaviour, and therapy.

Methods: An online survey was carried out in people who made an enquiry regarding blood pressure to the online consultation service of the University Hospital Zurich. Data regarding general health, blood pressure, preventive measures, and evaluation of the online consultation was asked.

Results: 49 people (35 male, 14 female, mean age 52 ± 16 years) answered the survey (return rate 53 %). 27 (55 %) users knew about their arterial hypertension. 24 (49 %) respondents were under antihypertensive treatment. The majority of respondents were asymptomatic (n = 26, 53 %) and rated their quality of health as good to excellent (n = 30, 61 %). 24 (49 %) regularly obtained information regarding health topics from the internet. 29 (59 %) reported that they had received new information using the online service and most users (n = 42, 86 %) evaluated the online answer as helpful. Information and recommendations of the online consultation was able to increase physical activity, dietary change, weight reduction, and smoking cessation. Eleven (22 %) respondents felt an improved state of health as a result of the suggestions provided by the online consultation.

Conclusion: Telemedical consultations complement the conventional physician-patient relationship and traditional healthcare for patients with blood pressure-related requests. Therefore, the admittance of telemedical consultations as an inherent part of modern healthcare of hypertension is essential.

Key words: telemedicine, online consultation, hypertension, prevention, physician-patient relationship

Kurzfassung: Medizinische Online-Konsultation zur Hypertonie. *Hintergrund:* Die Erweiterung der klassischen Arzt-Patient-Beziehung durch Kommunikation über das Internet wird immer mehr zur Realität. Unser Ziel war es, die Nutzer von medizinischen Online-Konsultationen zu charakterisieren, die Anfragen bezüglich Blutdruck stellten, und den Einfluss der erhaltenen Informationen auf Wissen, Verhalten und Therapie.

Methoden: Eine Online-Umfrage wurde durchgeführt bei Personen, die eine Anfrage bezüglich Blutdruck an den Online-Konsultationsdienst des Universitätsspitals Zürich gestellt hatten. Daten zu allgemeiner Gesundheit, Blutdruck, Vorsorgemaßnahmen und Beurteilung der Online-Konsultation wurden erhoben.

Ergebnisse: 49 Personen (35 männlich, 14 weiblich, Durchschnittsalter 52 ± 16 Jahre) beantworteten die Umfrage (Rücklaufrate 53 %). 27 (55 %) Anwender wussten über ihre arterielle Hypertonie Bescheid, 24 (49 %) erhielten eine antihypertensive Medikation. Die Mehrheit der Antwortenden war asymptomatisch (n = 26, 53 %) und schätzte die Qualität ihrer Gesundheit als gut bis sehr gut ein (n = 30, 61 %). 24 (49 %) bezogen regelmäßig Informationen zu Gesundheitsthemen aus dem Internet. Die meisten User (n = 42, 86 %) beurteilten die Online-Antwort als hilfreich. Informationen und Empfehlungen aus der Online-Konsultation halfen, die physische Aktivität zu steigern sowie die Ernährung umzustellen, das Gewicht zu reduzieren und das Rauchen einzustellen. Elf (22 %) Antwortende fühlten einen verbesserten Gesundheitszustand als Resultat der Vorschläge aus der Online-Konsultation.

Schlussfolgerung: Telemedizinische Konsultationen ergänzen die konventionelle Arzt-Patient-Beziehung und die traditionelle medizinische Versorgung für Patienten mit Anfragen zum Blutdruck. Daher ist die Aufnahme von telemedizinischen Konsultationen als inhärenter Bestandteil der modernen Gesundheitsversorgung bei Hypertonie essenziell.
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Schlüsselwörter: Telemedizin, Online-Konsultation, Hypertonie, Prävention, Arzt-Patient-Beziehung

Background

E-Health is a relatively new subdomain of healthcare. The term describes the use of information and communication technologies (ICT) in health services with the aim of increasing service quality as well as patient security while lowering medical costs [1–3]. Telemedicine – a subdomain of eHealth, in which ICT are used with a diagnostic and therapeutic aim – has become increasingly popular since the early 1990s. Its specific feature is the interaction between patient and physician amongst themselves over long distances at separate locations [4]. Telemedical consultation is in line with the development of a new patient role – "patient empowerment" – and enhances the individual responsibility of the patient [5, 6].

An investigation conducted in 8 European countries showed that the majority of citizens wish for more medical information and like to take part in medical decisions [7]. They gather information on health subjects primarily from the media [8]. Furthermore, the internet is of increasing importance for healthy as well as unwell people [9, 10]. While some like to learn about preventive measures, others are searching for information about the specific disease and possible treatments. However, for both groups the assessment of the quality of information found on the internet can be confusing. In this situation, physicians providing telemedical consultations can clarify the situation and allow access to reliable information [11, 12]. Several investigations have proven that telemedicine is a sensible complement to conventional medicine and managed care models [13–15] particularly for patients with chronic diseases. Self-management of blood pressure patients with training and additional care by a professional via the internet is able to improve the management of hypertension [16].

Arterial hypertension is the leading risk factor for arteriosclerosis and cardiovascular deaths in the western world [17]. Even though adequate treatment with antihypertensive drugs as well as life-style interventions (eg, dietary change, weight reduction, and physical activity) could reduce morbidity and mortality, those achieving target blood pressure values are only 34 % of the hypertensive population [18]. Information

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From the [1]e-Health, University Hospital Zurich; [2]Division of Internal Medicine, University Hospital Zurich, Switzerland; [3]Nephrologisches Zentrum Göttingen, Germany

Correspondence to: PD Maria Christiane Brockes, MD, eHealth, University Hospital Zurich, CH-8091 Zürich; e-mail: christiane.brockes@usz.ch

and education of patients with hypertension can significantly promote understanding of the disease as well as compliance [19].

The aim of the present study was to examine whether medical online consultation has the potential to increase primary and secondary prevention issues in patients with hypertension-related issues. Furthermore, we investigated whether the online service could expand the range of knowledge of the users and have an influence on the behaviour as well as the therapy.

Methods

Since 1999, the Medical Online Consultation Service of the University Hospital Zurich (www.onlineberatung.usz.ch) has been offering a quick, free-of-charge, and professional means of consultation on individual health questions independent of time and place [6]. The number of incoming enquiries has been steadily growing in recent years and since the service was started, > 40,000 questions have been answered. The procedure is straightforward.

Users making a request enter their concern as well as some additional anamnestic parameters such as age, height, weight, and the approximate district of domicile (eg, canton) into a Hypertext Transfer Protocol Secure (HTTPS) form via a secure SSL connection and send it to the online consultation service. Further details about the patient's medication and previous treatments can be provided voluntarily, helping the online physician to understand the patient and the medical history. Questions are usually answered within 48 hours by a team of physicians from the eHealth office. The service team consists of 5 medical doctors. If an enquiry requires more in-depth expertise, specialized clinicians at any department of the University Hospital of Zurich can be consulted; this assures that patients obtain high-quality and evidence-based information. It is clearly illustrated on the homepage of the online consultation service that the service must not be used in emergencies.

Table 1. Patient characteristics

Characteristic	Sample
Gender (male/female)	35/14
Age (years)	Mean 52.3 ± 15.9 (n = 49)
BMI (kg/m^2)	Mean 25.0 ± 4.1 (n = 49)
Marital status	Married: n = 28 (57 %) Other (single/divorced/widowed): n = 16 (33 %) Missing: n = 5 (10 %)
Education	Basic: n = 1 (2 %) Secondary, apprenticeship: n = 25 (51 %) University, advanced technical college: n = 20 (41 %) Missing: n = 3 (6 %)
Under the care of a GP	Yes: n = 40 (82 %) No: n = 8 (16 %) Missing: n = 1 (2 %)
Antihypertensive medication	Yes: n = 24 (49 %) No: n = 20 (41 %) Missing: n = 5 (10 %)
Positive family history of cardiovascular disease	Yes: n = 26 (53 %) No: n = 21 (43 %) Missing: n = 2 (4 %)
Smoking	Yes: n = 4 (8 %) No: n = 43 (88 %) Missing: n = 2 (4 %)

BMI: Body Mass Index; GP: general practitioner

Between 2003 and 2006, a total of 97 people requested online consultation regarding high blood pressure and cardiovascular co-morbidities (eg, coronary heart disease). In 2006, an email was sent to these people containing information regarding the purpose of this study, an informed consent form, and a link to an internet-based online questionnaire. 92 people were contacted successfully by e-mail.

The online questionnaire included items regarding demographic data, general health, blood pressure status including antihypertensive treatment, cardiovascular risk factors, and questions related to the medical online consultation. We were interested in whether the information provided was new to the patients, how it affected preventive measures, and whether they would recommend the online service.

The study was approved by the local ethics committee. All statistical analyses were performed using the SPSS software package (SPSS for Windows 12.0, SPSS Inc, Chicago, IL, USA). The Kolmogorov-Smirnov test was used to test for normal distribution of the data. Data is expressed as mean ± standard deviation. Categorical variables are presented as frequency counts, and intergroup comparisons were analyzed by χ^2-test.

Results

Of the 92 people successfully contacted, 35 men and 14 women completed the online questionnaire (mean age male: 56 ± 16 years, female: 44 ± 13 years; $p < 0.05$). This corresponds to a rate of return of 53 %. The details of the respondents are shown in Table 1. The majority of the respondents had a higher level of education: 25 (51 %) had attended a vocational school or had an apprenticeship position, 13 (27 %) attended an advanced technical college, and 7 (14 %) held a university degree. 27 (55 %) users knew about their arterial hypertension. 24 (49 %) respondents were under medical treatment for arterial hypertension. The majority of respondents were asymptomatic (n = 26, 53 %) and rated their quality of life as good to excellent (n = 30, 61 %; 66 % of men, 50 % of women). A minority had symptoms such as dizziness (n = 14, 29 %), headaches (n = 7, 14 %), a reduction in physical or mental abilities (n = 7 [14 %] and n = 5 [10 %], respectively), or palpitations (n = 6, 12 %) which they attributed to the high blood pressure. 33 (67 %) respondents took home blood pressure readings on a regular basis, 20 (41 %) at least once a week. 40 (82 %) patients had regular consultations with their primary care physicians (3.4 ± 4.0 consultations per year).

The following cardiovascular risk factors were present in the respondents: 15 (31 %) were overweight, 9 (18 %) had dyslipidemia, 4 (8 %) were smokers, and 26 (53 %) had a positive family history of cardiovascular disease.

Almost half of all respondents regularly obtained information regarding health topics from the internet (n = 24, 49 %), followed by print media (n = 8, 16 %) and relatives (n = 4, 8 %).

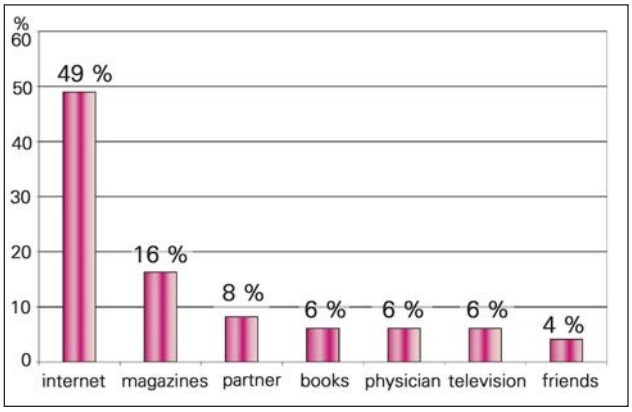

Figure 1. Frequency distribution: used sources of information on health subjects evaluated by the enquirers (n = 49, missing n = 2).

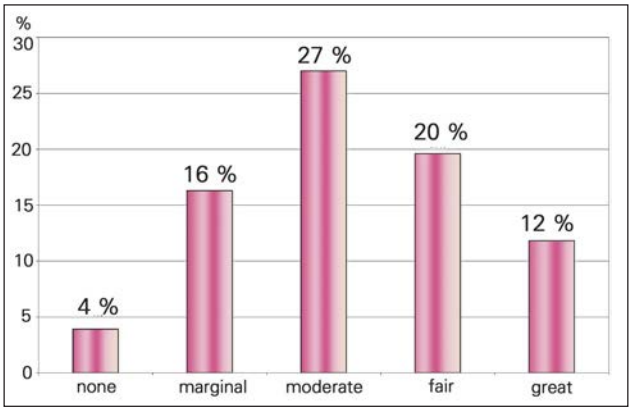

Figure 2. Frequency distribution: increase in the level of knowledge due to the online answer evaluated by the enquirers (n = 49, missing n = 10).

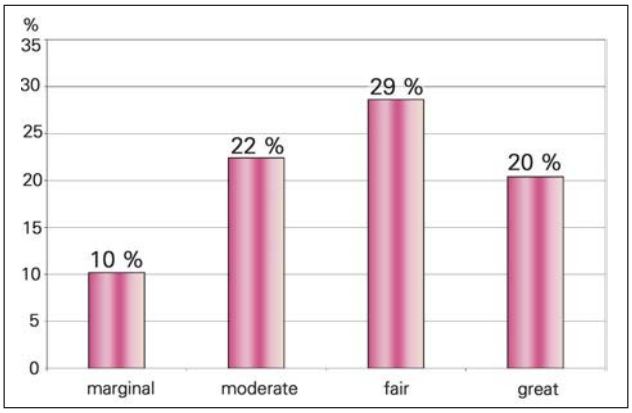

Figure 3. Frequency distribution: assessment of answers provided online with respect to being helpful (n = 49, missing n = 9).

Only 3 (6 %) respondents turned to a doctor for information regarding health subjects (Figure 1). 29 (59 %) reported that they had received new information using the online service of the University Hospital Zurich and most users evaluated the online answer as helpful (Figures 2, 3). Following the online information received, 13 (27 %) respondents did not turn to a doctor again. In 9 (18 %) instances, the physicians providing online consultation explicitly recommended a consultation *in personam*. The information and recommendations provided in the internet consultation did influence the following non-pharmacological measures: increase in physical activity (n = 13, 26 %), stress reduction (n = 10, 20 %), dietary change (n = 9, 18 %), weight reduction (n = 9, 18 %), and smoking cessation (n = 5, 10 %). Eleven (22 %) patients felt an improved state of health as a result of the suggestions provided by the online consultation service. In 4 (8 %) respondents, a change in medication was performed. 42 respondents (86 %) would recommend the online consultation service of the University Hospital Zurich.

Discussion

Since 1999, the online consultation service of the University Hospital Zurich has answered all enquiries regarding blood pressure and other medical conditions. In this survey, we examined the personality profile of enquirers and the effects of the online consultation. The return rate was clearly higher in comparison to a web-based survey regarding dermatological enquiries performed at our clinic in 2005 (53.3 % vs 27 %) [11]. This shows an active interest of enquirers with hypertension-related issues in the online consultation. The increasing acceptance of internet-based surveys during recent years has also possibly influenced the rate of return [9, 20–22]. Usually, younger people obtain information about health issues on the internet [10], with the average age of users of our online consultation service being 36 years [23]. An explanation of the higher average age in this survey could be that hypertension is more prevalent with increasing age as the residual lifetime risk for hypertension for middle-aged and elderly individuals is 90 % [24]. Usually, women are the most active internet health users [25]. The high rate of male enquirers in the present study is probably due to 2 reasons: with advanced age, more men than women use the internet and up to the age of about 55 years, more men than women are affected by hypertension [10, 26]. The majority of the enquirers had higher education. It has been previously shown that usage of the internet is not evenly distributed among different population groups and that primarily healthy people with higher education use this medium to gather information [10]. The respondents in our survey seemed to be very health-conscious as they took regular blood pressure readings, were physically active, and had on average had 3 consultations with their primary care physician within the last 12 months. Furthermore, almost ¾ of men and > 50 % of women rated their quality of life as good or excellent even though 40 % had complaints such as dizziness or headaches which they related to blood pressure. This is in line with another Swiss survey that showed a 1–4-% lower rate of women rating their quality of life as good or excellent compared to men [27]. Women assess their state of health by life-threatening and less severe illnesses, men significantly more by life-threatening illnesses [28].

Approximately half of all internet users regularly search the internet to get information on health topics [9, 10]. In our survey, half of the respondents regularly obtained information regarding health topics from the internet. Only a minority of respondents turned to a doctor for health information, although most of them had regular appointments with their physicians.

Most of the respondents reported that the online answer they received had helped them and that they received information that was new to them. All respondents would recommend the online consultation to others. The good evaluation and accept-

ance of the online consultation is partly due to the fact that the internet physicians focused in particular on the influence of cardiovascular risk factors, even if this subject had not been specifically addressed. Therefore, they could motivate a portion of the online users to optimise their lifestyles and thereby increase their sense of wellbeing [29].

The great advantage of online consultation is the establishment of contact independent of place and time. Furthermore, it gives the enquirers more time to formulate their concerns than is possible in clinical practice. Written presentation of the answer within the framework of an online consultation then enables the enquirers to read it carefully at a suitable time and to look at it again later, if necessary. The contents and advice are received consciously and therefore are followed by patients more often. Naturally, the asynchronous communication has restrictions in comparison to direct information as well: communication is limited to the dimension of written language and can lead to misunderstandings because the emotional communication level is absent [30]. However, even in direct physician-patient contact misinterpretations of nonverbal exchange can occur.

The number of consultations was hardly reduced. This confirms that telemedical consultations extend medical care and do not substitute direct contact between patient and physician [31].

Practical Relevance

Primarily older and well-educated males with a good quality of life used medical online consultations. There is evidence that online consultations have impact on knowledge, behaviour, and therapy and complement the traditional physician-patient relation and traditional healthcare significantly. Especially primary and secondary prevention issues can be prompted effectively. Therefore, the admittance of telemedical consultations as an inherent part of modern healthcare of hypertension is essential.

Relevanz für die Praxis

Hauptsächlich ältere und gut ausgebildete Männer mit einer guten Lebensqualität nutzten die medizinische Online-Konsultation. Es gibt Anhaltspunkte, dass Online-Konsultationen Einfluss auf Wissen, Verhalten und Therapie haben und die traditionelle Arzt-Patient-Beziehung sowie medizinische Versorgung ergänzen. Vor allem Themen zur Primär- und Sekundärprävention können effektiv abgefragt werden. Daher ist die Aufnahme von telemedizinischen Konsultationen as inhärenter Teil der modernen Gesundheitsversorgung bei Hypertonie essenziell.

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Conflict of Interest

None.

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PD Maria Christiane Brockes

Head of ehealth/telemedicine of the University Hospital Zurich with over 15 years experience in telemedicine.

Research interests: Online consultations and telemonitoring with a focus on the enhancement and establishment of this modern health care and improvement of patient empowerment.

Mitteilungen aus der Redaktion

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