

A Quantitative Survey About the Interest of Digital Natives in Second Opinion and Quality/Trust in Online Health Information

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Abstract— Growing access to qualified medical information triggers interest and helps patients with their medical conditions, get second opinions, or just share some experience with others. To explore the thoughts of digital natives - what information is accepted and sought after and what information is considered irrelevant or unnecessary - in health information systems, a quantitative survey, from the end users' point of view, with 56 people was conducted. The sample consisted of semi-digital natives aged between 18 and 35. The main results show that a large number of people (78.6%) do an online research after a doctor's consultation. In terms of second opinion, only 33.9% would in principle consider taking a second opinion from online health consulting.

Keywords-survey; second opinion; user opinion; information system; quality of information.

I. INTRODUCTION

Nowadays, the Internet and modern media are constantly integrated into our daily lives. Web 2.0 and social networking services in general have been experiencing a boost during recent years. 67% of Internet users (n=860) are on Facebook, Pinterest accounts for 15% of Internet users (n=1,802), the percentage of people using Twitter is twice as high as in November 2010 [1]. The primary purpose of these sites ranges from social to professional networking, content production and sharing, to making recommendations and/or location-based services [2]. Sharing information with friends or peers in one's community has seemingly become a societal "norm".

A. Health-related information seeking

The dissemination of health-related data and usage of online support groups in the medical sector, however, remains rather unobtrusive. Survey participants were found to be quite reluctant when it comes to sharing information about their health [3]. Difference in means showed that people who work in a technical field are more likely to share data about a disease (t-test: $T=2.071$; $df=46$; $p=0.044$; $1 - \beta=0.90$). However, users overall do acknowledge benefits by other people's health disclosure. This ambivalence in opinion is mainly attributed to awareness of data security and privacy [3].

B. Social media for health

Only 3.8% of Internet users (n=3,244) reported to use online support groups dealing with similar diagnoses or medical conditions in 2005 [4]. PatientsLikeMe, CureTogether, TuDiabetes, CaringBridge are a few examples

of such social networks that provide support by and for patients [5][6]. In fact, a much higher percentage of 58.5% of Internet users explored the Web for information about their health [4]. Other reported uses of social media in healthcare are professional education, patient - doctor communication [2], patient education [7] or even behavior change. The options available are ample, at least in theory. Social media is perceived positively in the health sector [3], especially cancer patients are actively educating themselves [2]. Nonetheless, security aspects, data privacy and access remain crucial in deciding whether or not to disclose health-related information.

On the bright side, investigating and sharing health data paves its way for obtaining, respectively, providing second opinions. A recent report on social media in healthcare revealed that 45% of the participants in a survey (n=1,060 adults altogether) denoted social media to "affect their decisions to seek a second opinion" [5]. Commonly referred to as the process of consulting another person about a matter of interest, the authors add the aspect of looking up health-related information to the definition of second opinions. These are, in general, not limited to a specific field. In here, we focus on second opinions in medicine.

C. Second opinions in healthcare

Underlying motives why people want to get a second opinion are differing. Anxiety disposition, dissatisfaction with the first specialist, desire to have a say in the decision, need for more information, hopes and expectations that the second opinion differs from the first one were revealed as key factors that drove the need to consult a second physician among patients in the Netherlands [8].

A survey among the six US states Florida, Indiana, Louisiana, Missouri, New Hampshire and New York revealed that one out of five patients consulted a second specialist after having visited a doctor the year prior to the study [9]. Perception of being treated badly, affiliation with ethnical groups, among others, were identified as motives to get consults. It was, however, not investigated which disease was the driving force one wanted to get a second opinion on.

Regarding the way these are provided, literature even reports that remote second opinions exist [10]. One example is the Johns Hopkins University [11].

It seems that second opinion is not that widely spread among medical professionals. Hence, the authors' approach is to investigate quality and trust of digital natives in online

health information as a starting point before such systems get implemented. Presumably, more general topics like recording/administration and processing of data intertwined with social media may have an impact on one's viewpoint regarding second opinion (or how it may be delivered) as well. The authors strongly believe that the perspective of digital natives thereupon may reveal certain trends and help figure out key aspects to consider when building an information system handling second opinion. To the authors' knowledge no such study targeting digital natives has been conducted.

This paper starts with a description of related work (Section II), followed by the methodology used from acquiring to analyzing the data (Section III). Afterwards, the results are presented (Section IV). Section V, then discusses results and contributions. Finally, a conclusion is given in Section VI and some future work is presented.

II. RELATED WORK

Related work dealing with online health information and social media is manifold. The authors are well aware that each diagnosis yields different treatment options. We acknowledge that one's medical history or background also affects the attitude towards second opinion and online health information. However, covering all types of diagnoses is impossible. Also, to the authors' knowledge, publications handling results as they are outlined in such detail in this paper are not existent. Related work presented in this section makes no claim to be complete and aims to look at a broad perspective in online health information and second opinions. Research is divided into three general categories (which have been defined and explained in the introduction): *health-related information seeking*, *social media for health* and *second opinions in healthcare*. Then, our approach in this paper is to build on and to enrich the literature presented here.

A. Health-related information seeking

KHRESMOI, which is a project of the European Union, undertook a survey about health search among the general public [12]. Participants (n=385) answered a questionnaire about their Internet use in relation to health information. Most contributions were recorded in France, Spain, and the USA with 23%, 14%, and 10%. They found that 24% of the sample population look for health-related information at least once a day, whereas the largest focus (68%) was attributed to general information about health issues. The second most important topics for health search were long-term chronic diseases (59%), directly followed by healthy lifestyle and nutrition (50%).

A study among Swiss citizens (n=1,075) found that during the previous 12 months the primary sources for health-related matters were newspapers and magazines (70%), followed by talking to family and friends (47%) [13]. The Internet was consulted by 41% of the respondents. Another question related to the kind of information sought upon in general (n=4,049). The four top candidates mentioned were treatments,

illnesses/diseases, alternative therapeutic approaches and measures for health protection.

On the downside, Gualtieri argues that using "Dr. Google" as one's proxy for a medical first opinion may likely yield serious (negative) consequences [14]. Especially, if people are not adequately equipped with health literacy skills and do not disclose information found on the Internet with their health care provider. Hence, she proposes to strengthen the doctor-patient relationship to possibly reduce non-disclosure and rule out misleading information. This could be done by directing patients to appropriate health websites or specifically asking about a patient's Internet search prior to the appointment.

B. Social media for health

A social network targeting people suffering from amyotrophic lateral sclerosis (ALS) - a neurodegenerative disease - is specifically designed to enable health information sharing and support by peers [7]. That is, current treatment information is shared with others, as well as diagnoses and alike. One of the study's main findings was that the revelation of symptoms, treatment and health, respectively, disease progress triggered targeted messaging, like recommendations to others, requests for advice, or simply building relationships with patients sharing similar experience. Among 123 postings that were selected for analysis 23% (n=29) referred to treatment, whereas 7% (n=9) referred to symptoms or outcomes.

A study among Australian health professionals (n=935) investigated trends of social media adoption for healthcare [15]. It was found that 9.5% used social media for (professional) health purposes, whereas 19.1% reported personal usage only. The majority (71.3%) reported to not use social media at all. Not comprehending how social media can be used for the health sector was the most common reason for non-adoption of social media (83%), followed by face-to-face communication preferences (53.1%). Other factors were attributed to lack of time (50.9%) and reasoning that social media fosters addiction (49.6%).

C. Second opinions in healthcare

Vashitz et al. [17] found out that, in a survey with 332 participants (orthopedic surgeons: n=172; neurologists: n=160) surgeons were more likely to be affected by a primary opinion than neurologists. The study group was given the information about the opinion itself, the control group had only revealed that the patient already had an opinion, without saying what it was. It was shown that interventional scores for study group surgeons were significantly higher than for control group surgeons (2.25 vs 1.97; p = 0.03). Also, significant difference was identified comparing study group surgeons in interventional scores in relation to their baseline interventional score. No significant differences were found among neurologists.

The possibility of obtaining a second opinion is listed as a reason to collect medical data at home by Austrian and German citizens [16]. Among a sample of 151 Austrians and

137 Germans, 13% versus 6% reported to do so. Much more common reasons were insurance issues (36% versus 17%) and understanding one's treatment (25% versus 23%).

A study at the Sydney Cancer Centre revealed that 123 out of 1,892 outpatients sought a second opinion [10]. Those whose motives were dissatisfaction (compared to others) reported that the second specialist helped with their concerns (92% vs 37%, $\chi^2_1 = 11.92, P = 0.001$). Other findings were that younger, more educated, female cancer patients are more likely to seek second opinions, maybe because they want to obtain more detailed information.

III. METHODS

The study design was divided into the three stages: research, construction, and realization (see Figure 1). First of all, a literature review was conducted to identify current research about content and functions of an information system in the health sector and second opinions in the context of telemedicine applications. After doing some brainstorming, the study setting was defined. The target population included individuals being older than 18 years of age, whose profession is not a medical one. In a next step, a questionnaire was developed, which was in turn evaluated and refined after having performed a pretest on it with 15 participants. Questions asked were of both open-ended and closed nature. Additionally, questions with four-level-based items were included to avoid a central tendency bias. A fifth point was provided in case a question was not applicable to a participant. The questionnaire was then administered to a sample population of the target group in different courses at the Vienna UT. 56 people returned it. To analyze the results, four-level-based question items were subsumed and transformed to yes/no, respectively, positive/negative answers.

IV. RESULTS

The questions asked can be looked up in Table I. Specific questions are represented as "Q <XX>" within all figures. Due to limited space, the percentage and actual number of people who indicated a specific answer is not depicted in the graphical charts, if it is less than 5%. Instead, the exact numbers are given in the textual description. The categorization of the question was done afterwards to have a

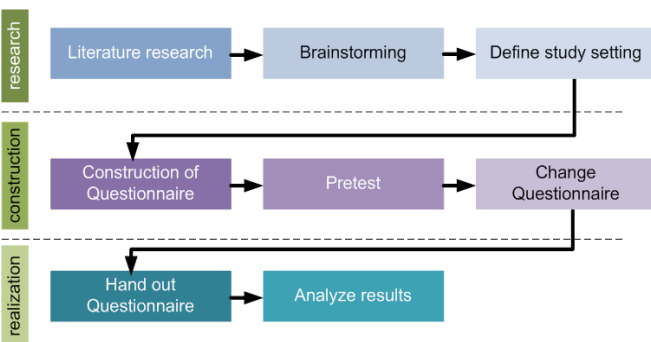


Figure 1. Methodology

better overview.

The participants were separated into four age groups: age 18-25 (61%, n=34), age 26-35 (29%, n=16), age 36 – 49 (5%, n=3), 50 and older (5%, n=3). To check if a person is used to a PC or not, a control question was asked. The threshold was two hours daily in front of the PC. Only 16.1% spend less than two hours working with it, so most of the participants are computer affine.

TABLE I. QUESTIONS

Nr	Question
01	What's your age?
02	How much time do you spend in front of the PC?
03	What do you associate with the term health?
04	How important are the above stated points?
05	How important is healthcare for you?
06	How important is the security of medical data for you?
07	Would you use electronic devices to measure your sport activities? (mp3 player, cell phone, pulse monitor, software etc.)?
08	If "yes" - which devices and appropriate programs? If "no" - why not?
09	Would you like to administrate and collect your complete training progression online?
10	Do you look up possible diseases before a consultation?
11	Do you look up possible treatments before a consultation?
12	Do you inform yourself about diagnosed illnesses after a consultation?
13	Do you inform yourself about diagnosed treatments after a consultation?
14	Would you inform yourself about a disease and its treatment on a website?
15	Imagine you need a nonacute appointment with your doctor, how would you like to arrange it?
16	Would you prefer to use an information system (website) to make a nonacute appointment regarding your last answer?
17	Could you imagine to schedule appointments via a website?
18	Do you keep old diagnostic findings?
19	Would you use a website, where you can securely administrate old diagnostic findings?
20	A second opinion is an independent diagnosis of a different doctor. Have you ever had a second opinion?
21	How would you like to get a second opinion? (in person from a different doctor, internet research, etc.)
22	Would you use the opportunity to get a second opinion over the PC?
23	Would you do a whole medical consultation virtually over the PC, if possible?
24	Would you like to get a second opinion in the course of a consultation over the PC?
25	Would you transmit medical data for the use of an online consultation?
26	What would you like to have online via PC from a doctor? Please choose at most 3 answers.
27	Which of the following functions within an information system (website) would you use? Please choose at most 5 answers.
28	What should an information system have or which functions should it cover for you to use it? You can also choose functions stated above, if they are true.

A. General Information

Obtaining general information from respondents is covered by questions 1, 2, 26, 27 and 28.

For question 26 the participants had the possibility to choose up to three answers. The majority of the asked participants wants information about diseases (n=28) and food (n=28) from an online doctor. The answer with the highest credit was giving a prescription (n=29) via PC. A significant number of people (8 out of 56) do not want anything from an online doctor. See Table II and Table III for all answers.

Only 25 people addressed the question of what an information system should cover (Q 28). Six out of 25 people (24%) stated that security of their (medical) data is very important and that they want to be in full control of the data. Four people (16%) only desired a personal doctor's consultation. One person wrote that the system should not require user's personal data. Another one fancied a translation of medical data in case of emergency while being in a foreign country. Further answers noted were allergy information, administration of old diagnostic findings, information/rating of a doctor, reservation system, easy access, reminder of upcoming consults, having more than one online profile, newsfeeds about medical/sports innovations/knowledge, and a friend finder to get in contact with people who share the same disease.

B. Diagnostics and Security

One of the most important questions is one about data security (Figure 2). For more than half (60%) of the respondents security of medical data is very important, for 21% it is important and only for 17% it is less or not important (Q 6). Unsurprisingly, 76% of the asked participants keep their old diagnostic findings (Q 18). Only 40% would store their old diagnostic findings online on a secure website (Q 19).

C. Health-Related Questions

One of the first questions was about participants' associations with the term health (Q 3). More than one item could be chosen from a list of answers. In addition, respondents could frame their own answers.

TABLE II. ANSWERS FOR Q 26

Answers	Count
Issue a prescription	29
Dietary information	28
Information about different diseases	28
Establish a training schedule	20
Nothing	8
Do online consults	7
Diagnose someone based on virtual consults	6
Diagnose someone based on previously transferred health record	6
Sign someone off sick/healthy	1

Healthy food and sports activities are topmost chosen answers that are associated with health. A great number of 37 people think that drug abuse, too much smoking and alcohol consumption are not healthy. 28 times people mentioned that

preventive medical check-ups are also related to the term health.

TABLE III. ANSWERS FOR Q 27

Answers	Count
Consultation on refreshing vaccinations	28
Schedule appointment with any doctor	28
Evaluating a doctor and their performance	23
Archive/manage old diagnostic findings	22
Dietary consults	19
Consultation on different diseases	16
Consultation on treating a disease using home remedies	13
Consultation on pollen flight regarding allergy sufferers	13
Consultation on treatment/therapy of specific diseases	12
Graphically represent training success with charts	12
Manage allergies and antibiotics intolerance	11
Establish a training schedule	11
Online transfer of medically relevant data to one's respective doctor	6
Documentation of performance/achievements in sports	6
Archive/manage one's health record respectively one's relatives' health records	6
Nothing at all	6
* check for antibiotics intolerance	1

In question 5, the importance of health protection is shown. 14% (n=8) thought of it as very important, while 66% (n=37) said it is important. 13% (n=7) felt it as being less important, while 7% (n=4) indicated it is not at all important for them.

D. Sports activities

The majority (73%) wants to use or still use a device to measure their sports activities. Only 14% do not want to use a device and the last 12% gave no answer to this question (Figure 3 Q 7). Looking at the number of people who want to use a device to measure their sports activities, only 14% strongly agree and 23% agree that they want to administrate and manage their complete training progress online. 30% do not want this and 26% of the asked people strongly disagreed on that. Furthermore, 5% (n=3) were not sure what to answer

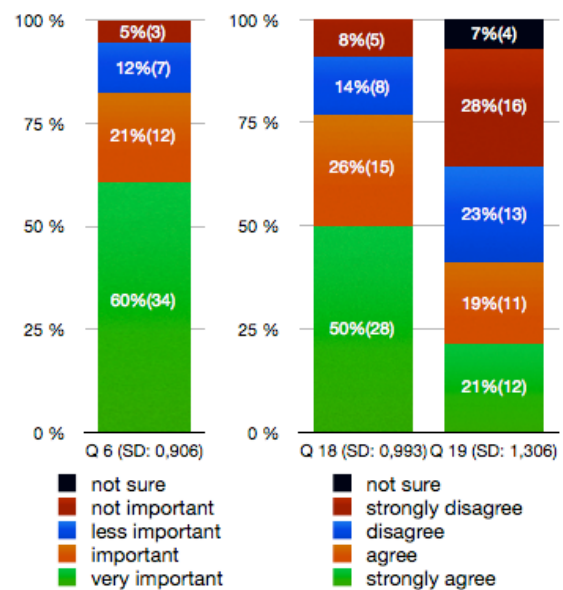


Figure 2. Diagnostics and security

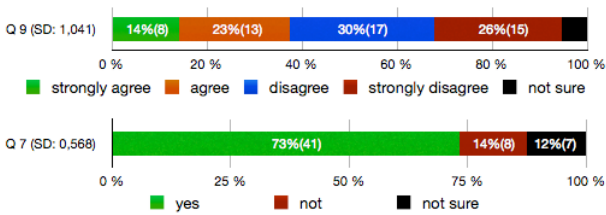


Figure 3. Using device during sport

to this question (Figure 3 Q 9).

E. Consultation and Diseases

Prior to seeing a medical professional, potential treatment options are investigated by 23%, who agree and 16%, who strongly agree, compare Figure 4 Q 11. 41% do not agree to inform themselves before a doctoral visit, 20% indicate strong disagreement. Similar but more positive feedback is given for question 10. 16% (n=9) strongly and 25% (n=14) still agreed on that question, whereas 23% (n=13) strongly and 35% (n=20) disagreed which is shown in Figure 4 Q 10.

Furtheron, 41% reported strong agreement towards informing themselves about their diagnosis after they had seen a medical professional, whereas 38% agreed to doing so, compare Figure 4 Q 12. Disagreement and strong disagreement was found in 19% respectively 2% (n=1) of the total number of respondents.

A similar tendency can be observed once asking about suggested treatment by medical professionals and if patients educate themselves after their doctoral visits (see Figure 4 Q 13). The majority of the respondents indicated to do inform themselves about treatment options. 15 people strongly agreed (26.79%), 24 people agreed to doing so (42.86%). 14 people disagreed (25%) upon answering this question and 3 people strongly disagreed (5.36%). Conform to the findings above, nobody chose the neutral answer of being unsure.

Looking up information about one's conditions and available treatments at designated websites was perceived rather positively by respondents, compare Figure 4 Q 14. 19 persons strongly agreed to educating themselves (33.93%),

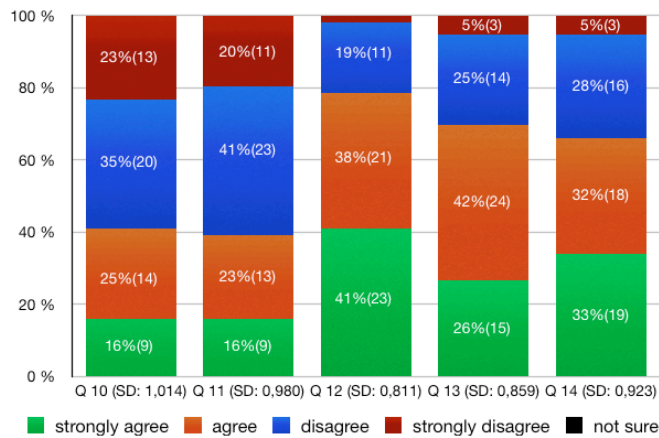


Figure 4. Consultation and diseases

whereas 18 people agreed (32.14%). Only 19 people disagreed to taking responsibility as in informing themselves about their options (28.57%), whereas three of them strongly disagreed (5.36%). Nobody indicated to not being sure about this topic.

F. Doctoral Appointment

Questions 15-17 focus on different ways to schedule appointments with one's doctor. Answers for question 15 were cell phone (66.04%, n=35), face-to-face (13.21%, n=7), email (11.32%, n=6), online web form (1.89%, n=1), online reservation system (1.89%, n=1), online calendar of doctor (1.89%, n=1) and online website (1.89%, n=1). Questions 15 and 16 show that most people will use their cell phone for contacting a doctor for a nonacute appointment rather than an online platform (39%). One person gave no answer to this question.

In general, 36% would strongly agree and 30% agree to schedule an appointment via a website. A number of 32% would not do this and only one person was not sure what to answer. All values regarding question 16 and 17 are in Figure 5.

G. Second Opinion and Virtual Consultation

Exactly 50% of the sample population indicated they had obtained a second opinion before. 43% had never done so and 7% could not remember or were not sure (question 20). Upon responding to question 20 the participants were asked how they want to get a second opinion (Q 21). It was possible to choose more than one answer. Most people (n=40) obtain their second opinion from another doctor in person. The second most common answer was the web research and only three people would get a second opinion from a friend. A great number of 13 people (23%) gave no answer to this question. Answers for question 21 were personally (n=40), web research (n=10), friends (n=3) and no answer (n=13). To follow up, respondents were asked if they would use the opportunity to obtain a second opinion via their PC (question 22), see Figure 6 Q 22. 30% agreed and 5% strongly agreed. Among the majority of 33 people who disagreed, 21% had a strong disapproval regarding this topic. 5% indicated to not being sure about electronically consulting a doctor other than one's primary choice. 61% strongly denied using an opportunity to do an entire medical consultation virtually over the PC, compare Figure 6 Q 23. Only 9% were in favor of such an opportunity and 25% disagreed to use it. 5% felt unsure about their answer to this question and no one would strongly agree.

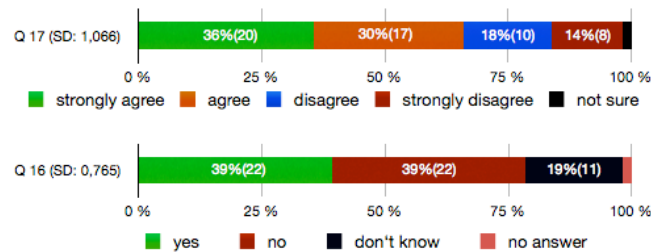


Figure 5. Doctor appointment

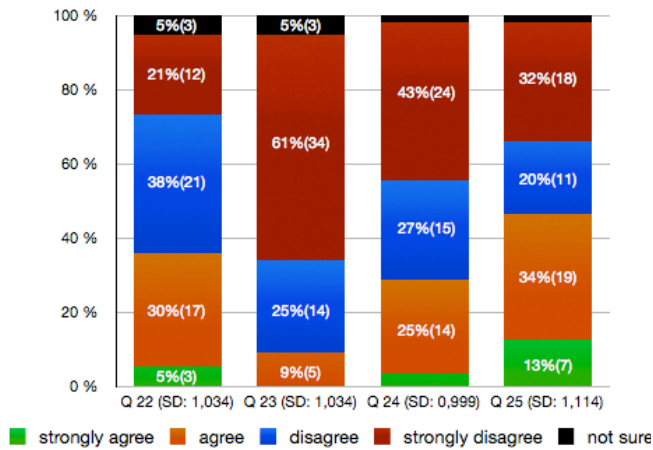


Figure 6. Second opinion and virtual consultation

Respondents were asked if they would obtain a second opinion by the use of online, i.e., virtual, consultation hours via the PC, see Figure 6 Q 24. Results show a tendency towards disagreement: 27% versus 43% disagreed respectively strongly disagreed. 25% seemed rather positive towards this topic, whereas 4% (n=2) strongly agreed. Only one person (1.79%) indicated to be not sure about what they would do.

Although most people would not use a second opinion via PC and would not store their diagnostic findings online (question 19), 47% would forward their medical data during an online consultation. This is shown in Figure 6 Q 25.

V. DISCUSSION

The work presented here gathers information about second opinion and the usage of modern media for health-related topics. Although the sample size of 56 is not the biggest, it can be seen as a good starting point for further research. The results show that security is very important when it comes to health-related data. In terms of health and diet, people want to have more information about diseases regarding nutrition, which might be associated with the wish of a healthy lifestyle and the support of the doctor to help them. Another interesting aspect is that the skepticism for a virtual doctor consultation is very high. This might also be associated with security issues, but needs to be clarified within further research. Another bias of this research is that the majority of returned questionnaires was answered by younger people (age <35), only a few came from people older than 35. But the authors consider younger people as a target group for second opinion and the usage of modern media, which makes this age group very important. Further research should include a larger sample size as well as a quantitative study and a comparison between different countries and different educational aspects, which were also not taken into consideration within this work.

VI. CONCLUSION AND FUTURE WORK

As a final result, people do want to have additional information through other channels rather than from the doctors themselves. The results suggest that a virtual consultation or second opinion without direct patient contact will never be a full alternative to the normal doctor's visit. To prove this, additional data must be acquired. Follow-up studies

are necessary to support the trends presented here. A study with a larger sample size as well as more heterogeneous age distribution is taken into consideration.

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