Impact, mutual benefit and perceived outcomes of second opinions acquired through app-based doctor-to-doctor consultations on initial diagnosis by example of Diagnosia

Master Thesis

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Declaration

I declare that I have developed and written the enclosed Master Thesis completely by myself, and have not used sources or means without declaration in the text. Any thoughts from others or literal quotations are clearly marked. This work was not used in the same or in a similar version to achieve an academic grading or is being published elsewhere.

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Preface

Initially motivated by topics regarding children's health, the opportunity to evaluate a digital consultation platform by example of *Diagnosia* presented itself while searching for an appropriate thesis subject. Knowing the importance of a good paediatrician and the challenge one can face in finding one, especially outside of big cities, digital consultation platforms hold great potential.

As I could not find any current publications about Austrian teleconsultation platforms nor publications addressing potential tele-medical solutions regarding an undersupply in primary-/paediatric care in rural areas in Austria, the topic drew my attention and passion and curiosity drove my motivation. Furthermore, no qualitative survey about the existent digital expert consultation has been published. It is therefore highly desirable to highlight the advantages of the implementation of tele-consultations for the purpose of influencing future practice and its potential advantage.

I could not have achieved my current level of success without a strong support group. Therefore, I would like to express my appreciation and gratitude to several people, without whom this thesis may not have been a reality.

Firstly, my most sincere thanks to my main supervisor Dipl.-Sporting. Dr. Mario Heller for his unwavering support and guidance throughout the project. His advice and detailed comments on previous drafts of this thesis undoubtedly improved its standard substantially.

Also, I am thankful to the team of *Diagnosia*, especially Corinna and Michael, who supplied me with resources fundamental for this paper and the opportunity to have access to their resources and network.

Another “thank you” deserves my colleague Gerald Wagner, who always had an open ear for me, no matter when.

I am extremely grateful to my wonderful husband David who not only took the best care of our two beautiful children, Zoé and Jaiya but also supported me in a myriad of ways. Their love and energy kept me going.

Abstract

Background: The increasing comprehensive paediatric healthcare provision by general practitioners in Austria comes with big challenges for all parties involved. Teleconsultations, which in this work describe the digital exchange of professional opinions between two medical professionals, hold the potential to facilitate the communication and knowledge exchange between physicians and provide an advantage in treatment quality and patient comfort.

Objective: This research aims to evaluate the current use and attitudes towards a teleconsultation platform for doctors by example of *Diagnosia*, focussing on the paediatric teleconsultation chat. The influence of a second opinion obtained through the teleconsultation application on the initial diagnosis and intended therapy plan will be examined, as perceived by the users.

Method: An analysis of existing data regarding the geographical and professional distribution of the teleconsultation-users as well as a prospective, quantitative and qualitative evaluation regarding usage characteristics and experience through survey questionnaires and additional semi-structured interviews.

Results: 14 submitted surveys and 2 conducted interviews were analysed. The retrospective analysis of existing data showed that the majority of the users of *Diagnosia's* paediatric teleconsultation-chat are general practitioners, located in Austria. Dermatological and gastroenterological matters show the highest demand for inquiries. The influence of the acquired second opinion was perceived greater on the intended therapy plan than on the initial diagnosis. With an average response time of 3.89 hours, most of the users were satisfied and the evaluation of a clinical and communicational benefit of teleconsultation-chats was described as positive. Most expected outcomes are an improvement of the quality of care and a shorter diagnosis time. The establishment of teleconsultation-chats would be highly welcome and a reimbursement by social insurance agencies appreciated. The use of the teleconsultation application was rated as very easy and very safe.

Conclusion: An overall positive attitude towards digital teleconsultation-chats for experts as well as an existing potential regarding improvements of quality in paediatric primary care, shorter diagnosis time and counteracting a paediatric undersupply can be stated. Political and legal structures for an appropriate monetary compensation regulation have to be developed.

Kurzfassung

Hintergrund: Die zunehmend umfassende pädiatrische Gesundheitsversorgung durch AllgemeinmedizinerInnen in Österreich stellt sämtliche Beteiligte vor große Herausforderungen. Telekonsile, die in dieser Arbeit den digitalen, professionellen Meinungsaustausch zweier MedizinerInnen beschreiben, verbessern potenziell die Kommunikation und den Wissensaustausch zwischen ÄrztInnen sowie die Behandlungs- und Versorgungsqualität der PatientInnen.

Ziel: Ziel der vorliegenden Arbeit ist es, die aktuelle Nutzung von und Einstellung zu digitalen ExpertInnenkonsilen am Beispiel von *Diagnosia* zu bewerten. Der Einfluss einer Zweitmeinung innerhalb des digitalen Konsils auf die Initialdiagnose sowie den Therapieplan soll untersucht werden.

Methode: Eine Auswertung existierender Daten hinsichtlich der geographischen und professionellen Verteilung der Nutzer, sowie eine prospektive, qualitative und quantitative Bewertung der Nutzungscharakteristik anhand einer Onlinefragebogenerhebung und ergänzenden Interviews.

Resultate: 14 Fragebögen wurden übermittelt und 2 Interviews geführt. Die Mehrheit der NutzerInnen des pädiatrischen Telekonsils von *Diagnosia* sind AllgemeinmedizinerInnen in Österreich. Die höchsten Werte erzielten dermatologische und gastroenterologische Anfragen. Der bewertete Einfluss der Zweitmeinung auf die angedachte Therapie war höher als jener auf die Initialdiagnose. Mit einer durchschnittlichen Antwortzeit von 3,89 Stunden waren die meisten BenutzerInnen zufrieden und der klinische und kommunikative Nutzen von Telekonsilen wurde als durchaus positiv bewertet. Die erwarteten Auswirkungen sind eine Verbesserung der Versorgungsqualität sowie eine kürzere Diagnosezeit. Die Etablierung von Telekonsilen wurde befürwortet und eine Erstattung durch Sozialversicherungsträger wäre zu begrüßen. Die Anwendung des Konsils wurde als sehr einfach und als sehr sicher eingestuft.

Fazit: Eine insgesamt positive Einstellung gegenüber digitalen ExpertInnenkonsilen, sowie ein bestehendes Potenzial hinsichtlich Qualitätsverbesserungen in der pädiatrischen Grundversorgung, kürzere Diagnosezeiten und die Bekämpfung einer pädiatrischen Unterversorgung konnten festgestellt werden. Politische und rechtliche Strukturen hinsichtlich finanzieller Abgeltungsregulierungen müssen entworfen werden.

Table of Content

1 Introduction

In Austria, as in other European countries, the future of ambulatory paediatric treatment is currently unclear. The current paediatric medical care is based on a dual principle consisting of paediatricians (mostly in cities) and general practitioners (mainly in rural areas) [1]. As the comprehensive paediatric healthcare provision by general practitioners appears to be an inappropriate option, a digital consultation could serve as an alternative solution.

In rural areas, paediatric care is largely provided by general practitioners, who do have some paediatric knowledge [8]. In particular, so called "family doctors", who have been practicing and providing all-round care for decades have acquired considerable paediatric expertise in some cases and have thus become indispensable for paediatric primary care.

Due to social changes and medical developments the established outpatient care systems and their physicians are facing enormous challenges regarding diagnoses and therapy accompaniment. Delayed expert consultation results in increasing healthcare costs, impaired healing and other health related problems for the patient [2]. Economic aspects as well as social values favour an oversupply of paediatric care in urban centres, while the supply in rural areas is rather limited [5].

Especially in remote areas the general practitioner represents the first person of trust in health matters and the first point of contact for health-related problems. From the billing data (2006/2007) of the Basic Services Group, 71 percent of the contacts are billed by general practitioners. In the subproject "Child Health" it is shown that the health of children and adolescents is mostly the responsibility of the general practitioners [3]. The digitization of medical care is therefore of considerable importance for paediatricians and teleconsultations are an easy and safe way to obtain expert opinions [2].

Telemedical interaction models are increasingly used amongst medical practitioners of all disciplines. Teleconsultation services provide a great opportunity for interdisciplinary collaboration, to exchange professional opinions, to discuss cases and treatment plans.

Since the availability of highly specialized medical experts is limited in practices and clinical settings, patients often endure long journeys and considerable waiting times for an appointment. Not infrequently, the recovery rate is impaired by a delayed diagnosis and a delayed or incorrect treatment approach at home. A digital teleconsultation enables easy and quality-assured solicitation of external expertise. Furthermore, the supervising paediatrician can obtain advice from a specialist of his / her choice in a simple and safe manner on site having access to the expertise that is no longer tied to the location of the practice or clinic [4].

The purpose of this thesis is to examine the issue of whether teleconsultations can accelerate and verify uncertain diagnoses, reduce diagnostic errors and enhance the structural paediatric care through an immediate second opinion. The study is designed to evaluate the diagnostic safety, consistency and efficiency by using the teleconsultation chat as well as to investigate, if an additive value of a second opinion can be stated as perceived by the physicians. Thus, the thesis aims to assess if a second opinion results in change in treatment plans, referral or change in diagnosis, accelerated decision making or simply confirming the initial diagnosis. Furthermore, data concerning the numeric and geographical usage distribution will be analysed.

One goal of the present paper is to evaluate the usage characteristics and effectiveness of a digital consultation platform by example of *Diagnosia*. The quality of use should be evaluated in order to determine adaptation suggestions and thus to increase the acceptance among the users. Moreover, the weight and relevance of a second opinion within the tele-medical doctor's chat on the initial diagnosis will be examined.

General practitioners and paediatricians participating in the study will be asked about their experiences, expectations and usability regarding the existing experts chats. The results of the quantitative and qualitative examination should be used to ascertain and show the benefit of the chat for physicians, especially general practitioners.

Initially motivated by topics regarding children's health, the opportunity to evaluate a digital consultation platform by example of *Diagnosia* presented itself while searching for an appropriate thesis subject. Knowing the importance of a good paediatrician and the challenge one can face in finding one, especially outside of big cities, digital consultation platforms hold great potential.

To the author’s knowledge, there are neither current publications about Austrian teleconsultation programmes nor publications addressing potential telemedical solutions regarding an undersupply in primary/paediatric care in rural areas.

Furthermore, no qualitative survey about the existent digital expert consultation by *Diagnosia* has been published. It is therefore highly desirable to highlight the advantages of the implementation of teleconsultations for the purpose of influencing future practice.

The benefit of this thesis is to get a better insight of the current situation of teleconsultation services in paediatric healthcare in Austria, hence it illustrates the urge for a sustainable healthcare for children and adolescents and new and faster ways of communication in between medical practitioners and the exchange of expertise. The provided findings intend to sketch a user profile of the teleconsultation feature in the *Diagnosia* application and elicit suggestions for improvement and will therefore contribute to a potential customization of the current version. By stating the perceived benefit of the use and potential implementation of teleconsultation in the daily practise of general practitioners propose the promotion of telemedical communication channels.

Starting out by issuing the current situation of paediatric healthcare in Austria and related problems within the system, chapter 3 will give an overview and definitions of telemedicine and teleconsultation programmes in particular as well as present international examples of paediatric teleconsultation programmes. Chapter 4 will focus on the methodology, study design and topics involved. Results will be presented and illustrated in chapter 5 and elucidated and concluded in chapter 6 and 7.

2 Paediatric healthcare in Austria

The health care of children and adolescents in Austria takes place in different structures, depending on the region and the supply situation, which differ in terms of their provision of services (primary, secondary and tertiary care) [4]. The current provision of primary medical care for children and adolescents in Austria is based on a dual principle. In cities and conurbations primary paediatric care is mainly covered by doctors for paediatric and adolescent medicine while in rural areas frequently general practitioners, or so called family doctors, are responsible [4], [5].

Especially in densely populated areas, care is provided by specialists in paediatric and adolescent medicine, who are either practicing as panel doctors or private doctors who work under very different conditions:

a. panel doctors or § 2 doctors: fixed appointment times, place binding, pension commitment / obligation, fix cash tariffs (different depending on the federal state), capping of certain services.

b. private doctors: freely selectable ordination seasons, free establishment, no provision, free definable tariffs (with 80 % of the cash tariffs being recovered from the health insurances), no cap [5].

§ 2 doctors are contractors of the § 2 funds which are listed in § 2 of the total contracts between the social security and medical association. They are specific to the federal state and include the respective regional health insurance funds (GKK), the state health insurance funds (BKK) and the Social Insurance Institution of the Peasants (SVB) [6].

Most parents prefer to attend physicians who are under contract with their social insurance, so their provision of healthcare is free of charge. However, because the remuneration paid by insurance funds for care services provided is relatively low and patient numbers of 60-90 and more per day are the norm [7]. Thus, the number of private doctors of paediatric and adolescent healthcare has been increasing in recent years. If a private doctor is attended, parents pay doctors directly and are refunded a certain percentage (80% of the contract-based charge) by their social insurance.

Not only the number of doctors of paediatric and adolescent medicine is decreasing, also the number of general practitioners declined in recent years,

counting 13,745 in 2017[1] (Figure 1). In 2018, 68 positions for general practitioners were vacant[2] (Figure 2). Figure 3 shows the development of general practitioners and doctors of paediatric and adolescent medicine and the division in § 2-contractors and private doctors from 2005 to 2015[3].

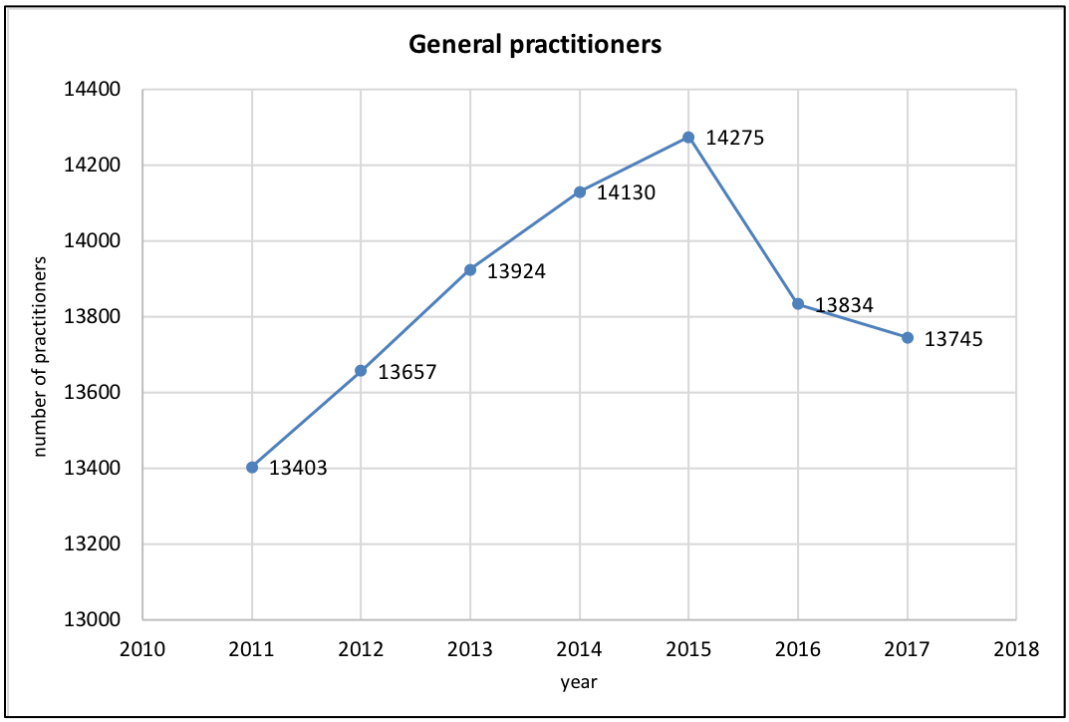

Figure 1 Declining number of general practitioners in Austria (2011-2017)3

1 https://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/gesundheitsversorgung/personal_im_gesundheitswesen/index.html

2 https://www.aerztekammer.at

3 https://www.parlament.gv.at/PAKT/VHG/XXV/AB/AB_09691/imfname_568754.pdf

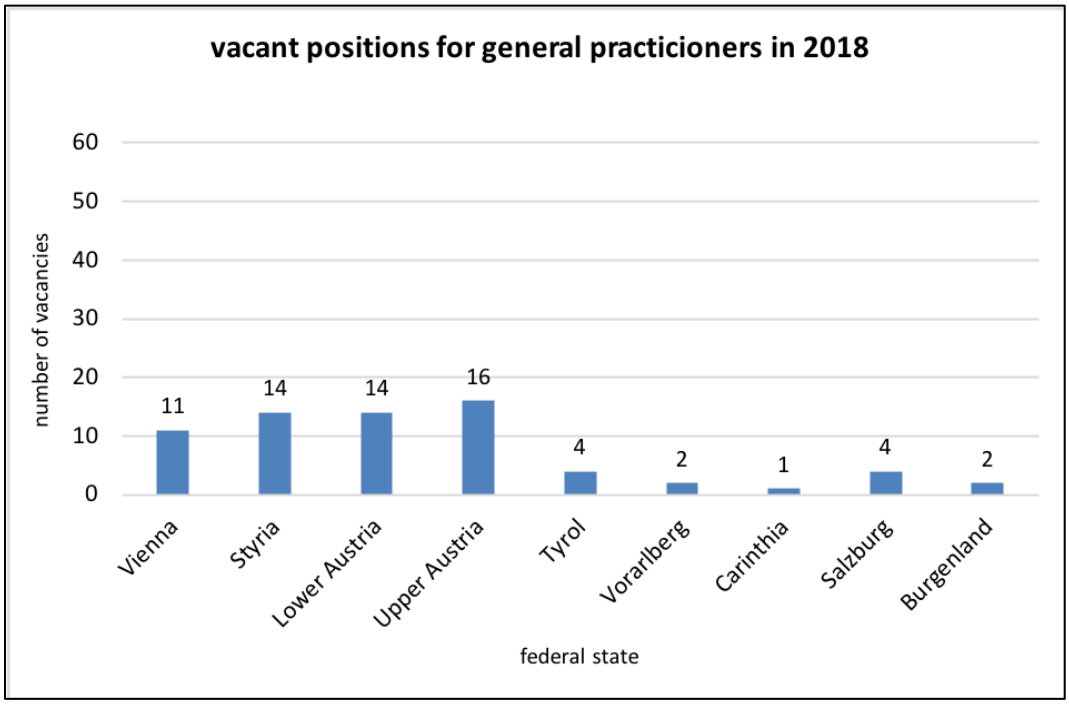

Figure 2 Vacancies for general practitioners in Austria per federal state in 2018[4]

[4] https://www.aerztekammer.at

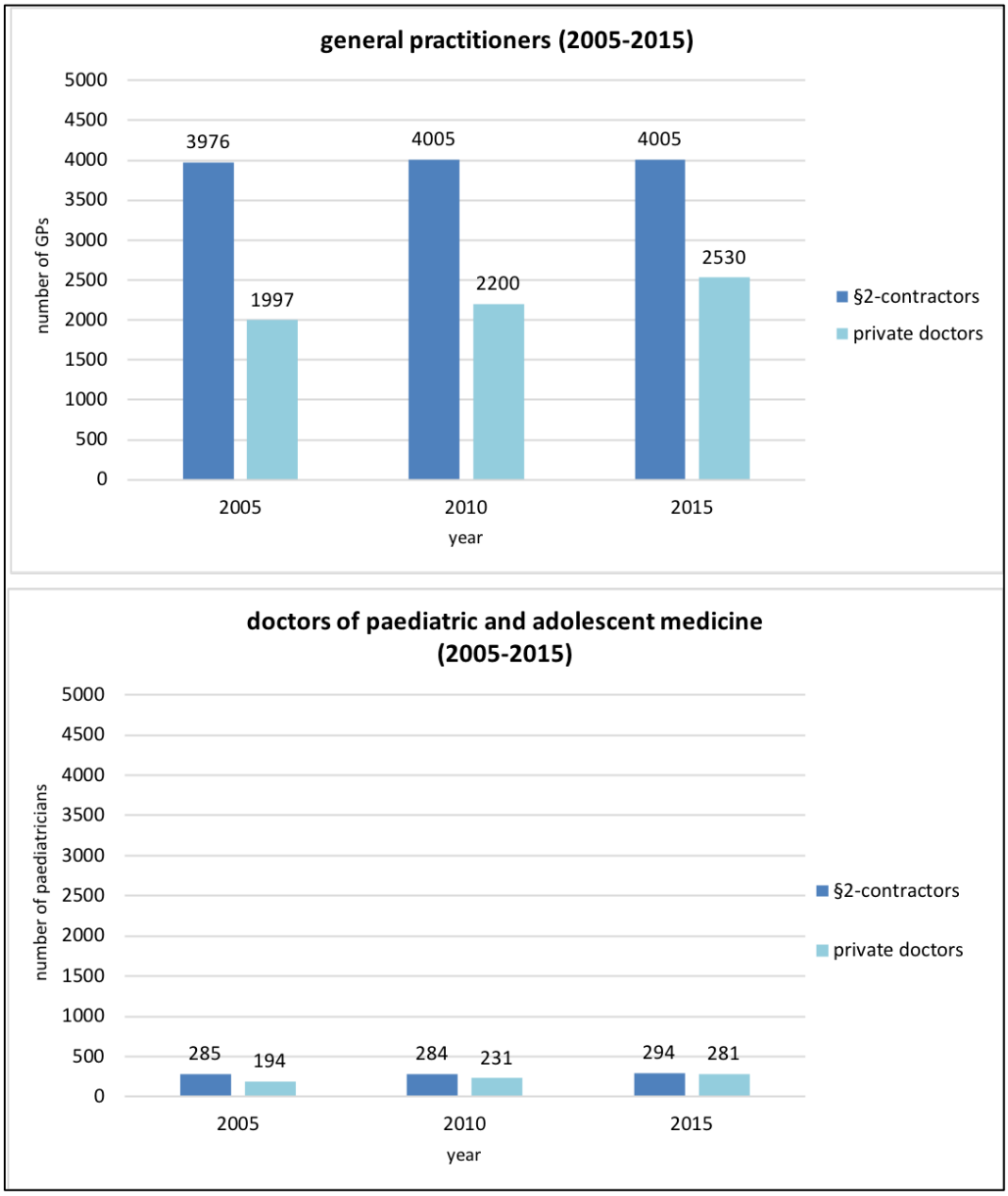

Figure 3 General practitioners and doctors of paediatric and adolescent medicine: development of § 2-contractors and private doctors from 2005-2015[5]

This is an alarming observation since nowadays many general practitioners lack of sound paediatric education and training. Currently, the ratio of the training for specialists in paediatric and adolescent medicine vs. the one for general practitioners is 42 months vs. 3 months (21 : 1!) [5]. With regards to training

[5] https://www.parlament.gv.at/PAKT/VHG/XXV/AB/AB_09691/imfname_568754.pdf

programmes in paediatrics, a tremendous difference between general practitioners and paediatricians can be found. While future plans intend to shorten paediatric training for general practitioners from an overall education period of 42 months to 3 months, paediatricians complete 6 years of training in paediatric and adolescent medicine [8]. Possible consequences and risks of such “paediatrics light” training are diagnostic and treatment errors, frequent hospital admissions, unnecessarily high prescriptions of antibiotics, insufficient vaccination coverage to mention a few [9].

Based on the enormously differing training period, the Austrian Society of Paediatric and Adolescent Medicine and Political Child Medicine are requesting a separate primary healthcare provision for children in Austria [10]. Therefore, efforts have to be undertaken to guarantee an adequate primary paediatric care by paediatricians. The attractiveness to act as general practitioner has to be increased by allowing paediatric group praxis, time sharing models, reduction of administrative burden, simpler/better charge systems and valorisation of the mother-child-passport fees (which have remained unchanged since 1994) [9].

Especially for young doctors a paediatric specialization seems less attractive due to worse coverage of service. Services requiring a certain specialisation in paediatric and adolescent medicine are not covered by the insurance funds and therefore limit doctors of paediatric and adolescent medicine to settle with their own practice as some do not want to be restricted to primary care [11].

Uncertainties in coverage and funding lead to further problems like overcrowded outpatient departments in hospitals and unequally distributed capacity. Non-existing financial liabilities of the health insurances and the General Medical Council (ÄK) lead to further problems and lacking primary healthcare for children and adolescents in particular. Necessary and important auxological examinations of pubescents are not included in the collective agreements of § 2 contractors [11].

The Austrian Society of Paediatric and Adolescent Medicine (ÖGKJ) and the Initiative Political Paediatrics have repeatedly approached Austrian healthcare authorities to avoid the imminent deficit in primary paediatric care, so far without success. Alternatives to a comprehensive paediatric healthcare provision by general practitioners must be considered and developed [5].

The situation in outpatient primary care in Austria is becoming critical as well, based on an increasing shortage of resident doctors for paediatric and adolescent medicine over the last few years, coupled with limited practice opening hours [6]. Currently, Linz and Vienna cannot refill § 2 contractor positions for months or years [12]. Outpatient departments are heavily overloaded, especially seasonally, as

they are the only facilities accessible around the clock. This often leads to long and onerous hours of waiting for children and parents. Some hospitals make an attempt to counter these situations with outpatient primary care units [7].

To improve medical care on the weekends, Vienna established a paediatric emergency service to counteract over-crowded outpatient department of the children's hospital of the Vienna General Hospital (AKH Vienna) and another children's hospital (KFJ) [1]. The Viennese model acts as an upstream outpatient department in the hospital. For this purpose and critical times, two rooms were leased for a specialist emergency service. The remuneration is paid by the health insurance fund (GKK) without a separate contract from the placement plan of the established area with a fixed hourly rate. Primary health care centres (PHCs) could provide a broad range of care and could pose a necessary and useful supplement to both inpatient and outpatient care [1].

It therefore urgently needs a reorganization of the paediatric primary care. In order to reduce the load of currently overcrowded outpatient care centres, the federal states of Vienna, Lower Austria and Vorarlberg introduced the »telephone health advice 1450« as a pilot project in April 2017[6]. A telephone and web-based initial contact and counseling service (TEWEB) provides 24/7 information about so-called “Best Points of Service” [12].

Another step towards the improvement of primary paediatric care has been taken in Vienna. Since January 5th, 2019, paediatric medical practices are open every weekend. For detailed information regarding opening hours and locations, you have to visit the website of the Vienna Medical Association [7].

2.1 Paediatric healthcare in numbers

Per, 1st January 2018, 1,722,096 children and adolescents under the age of 20 years (0 – 19 years) lived in Austria, as shown in Figure 4 [13]. That equals roughly 20 % of the total population of the country with a total population of 8.76 million people as of April 2019[8]. In comparison, the figures for health expenditure for children and adolescents, which are directly linked to the purpose of the health of children under the age of 15 years, amounted 1.97 billion Euros in 2014, equalling 6.2 % of the spending for all age groups. The annually average

6 http://www.1450.at/1450-die-gesundheitsnummer/

7 https://www.aekwien.at/ihr-kind-ist-krank

8 http://www.worldometers.info/world-population/austria-population/

proportion of under 15-year olds in Austria is 14.3 %. Thus, the annual expenditure per capita in this group at € 1,613.5 was well below that of all inhabitants of Austria at € 3,744.8 per capita [14].

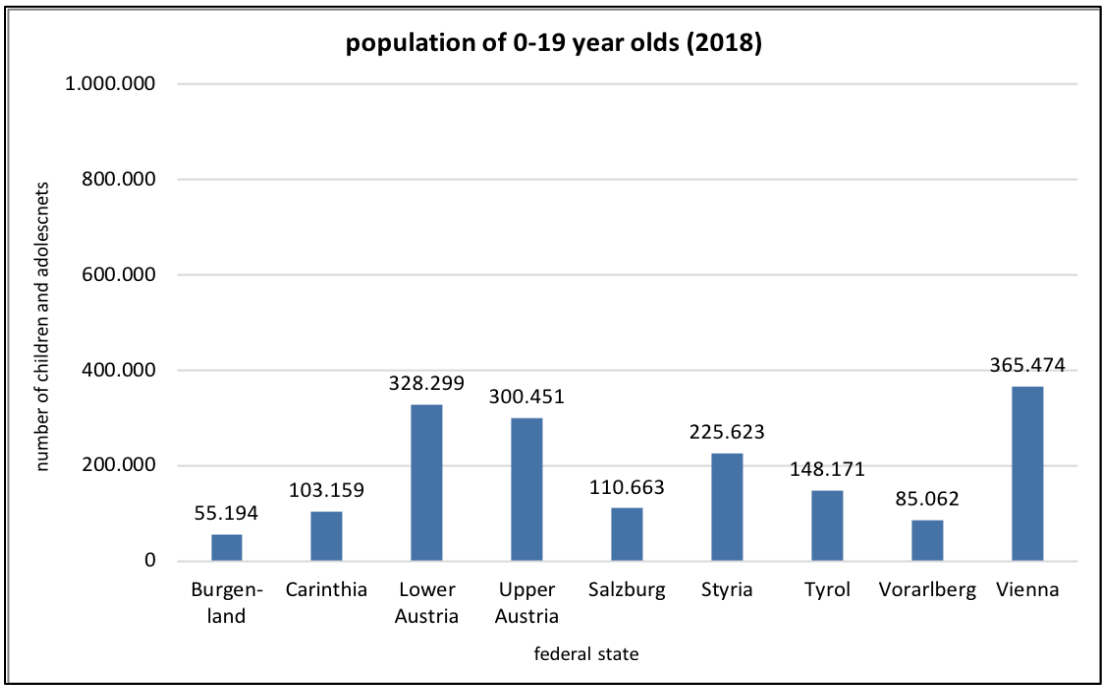

Figure 4 Population of 0-19-year-olds per federal state per thousand inhabitants (status as of 1st January 2018), Resource: Statistik Austria [10]

In 2017, there were 1,501 paediatricians (Figure 5) for 1,717,725 children and adolescents, aged 0-19 years old[9]. That results in a ratio of 1 doctor for 1,144 children.

9 https://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/gesundheitsversorgung/index.html

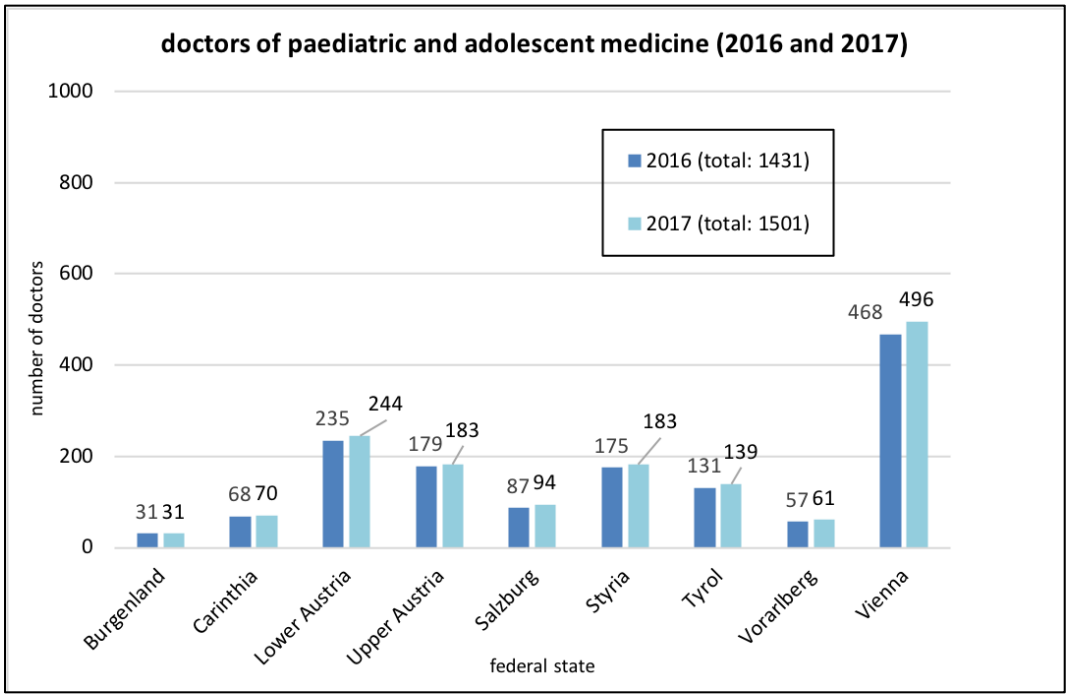

Figure 5 doctors of paediatric and adolescent medicine by federal state in 2016 and 2017[10]

Figure 6 shows the disproportional distribution of § 2 contractors and private doctors in paediatric and adolescent medicine. Roughly 50 percent of doctors of paediatric and adolescent medicine in Austria are resident doctors, whereas the other half is employed by a hospital (see upper part of Figure 6). A disproportion of private doctors and § 2-contractors is shown in the lower part of Figure 6. Only Styria holds the balance of both private doctors and § 2-contractors. In Vorarlberg, Tyrol and Salzburg, private doctors overtook doctors with § 2-contracts. Thus, data do not show a shortage of doctors, rather a problem of distribution.

10 https://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/gesundheitsversorgung/index.html

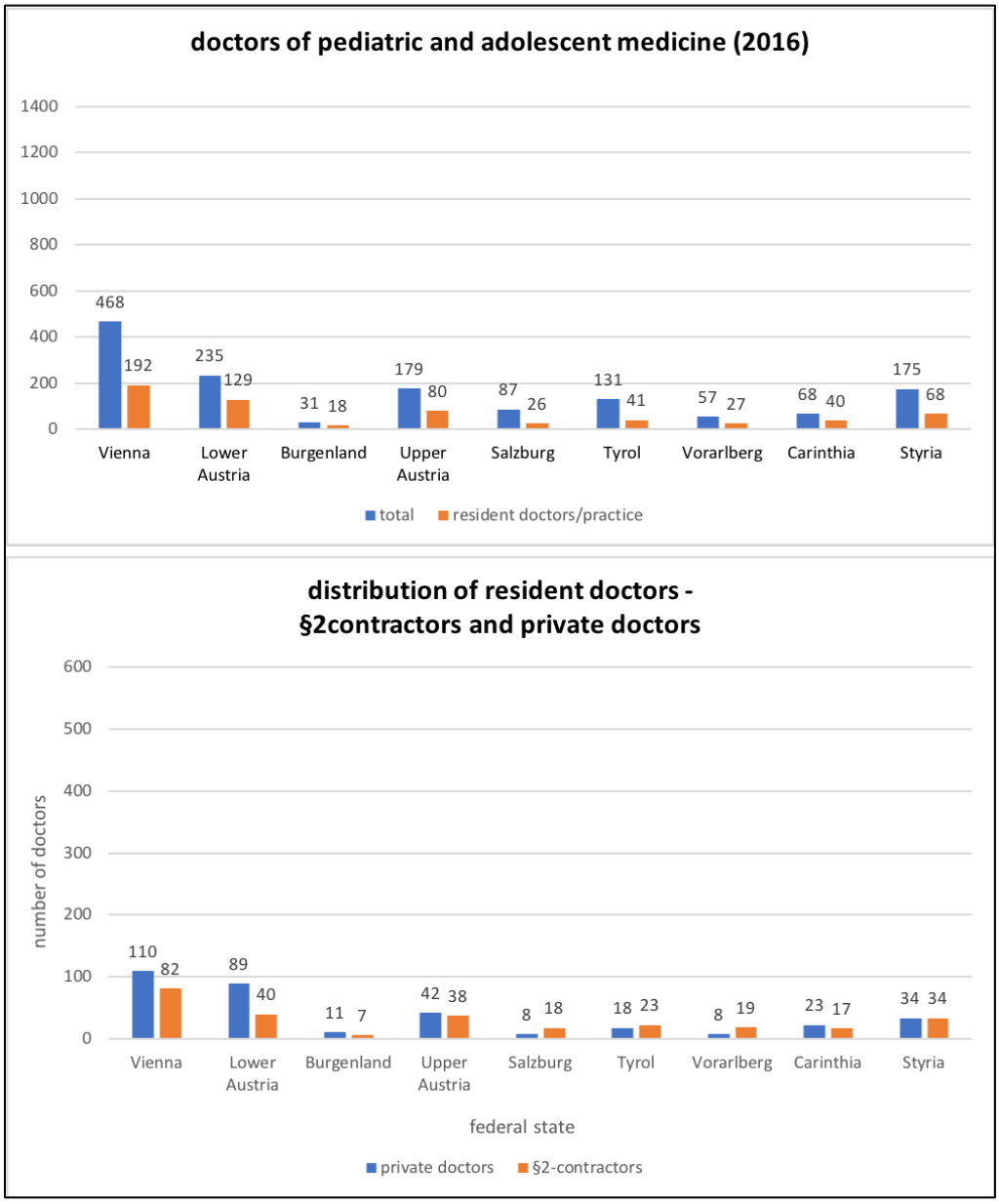

Figure 6 number (top) and distribution (bottom) of doctors of paediatric and adolescent medicine by federal state and contract (2016) [1]

In 2017, 162,705 hospital stays were recorded among the 0-14-year olds in Austria[11]. A total of 1,263,740 children were counted that year[12]. The main reasons for hospital treatment of 0-14-year olds were diseases of the respiratory

11 http://www.kaz.bmg.gv.at/ressourcen-inanspruchnahme/stationaere-aufenthalte.html

12 https://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bevoelkerung/bevoelkerungsstruktur/bevoelkerung_nach_alter_geschlecht/index.html

system, injuries and poisonings, infectious and parasitic diseases, and diseases originating in the perinatal period (Figure 7)[13]. Data related to diseases treated in outpatient settings or outside of hospitals are not systematically documented in Austria, and therefore are limited. Data regarding the age group of 15-19-year olds are included in data of 15-29-year-old only and therefore cannot be extracted.

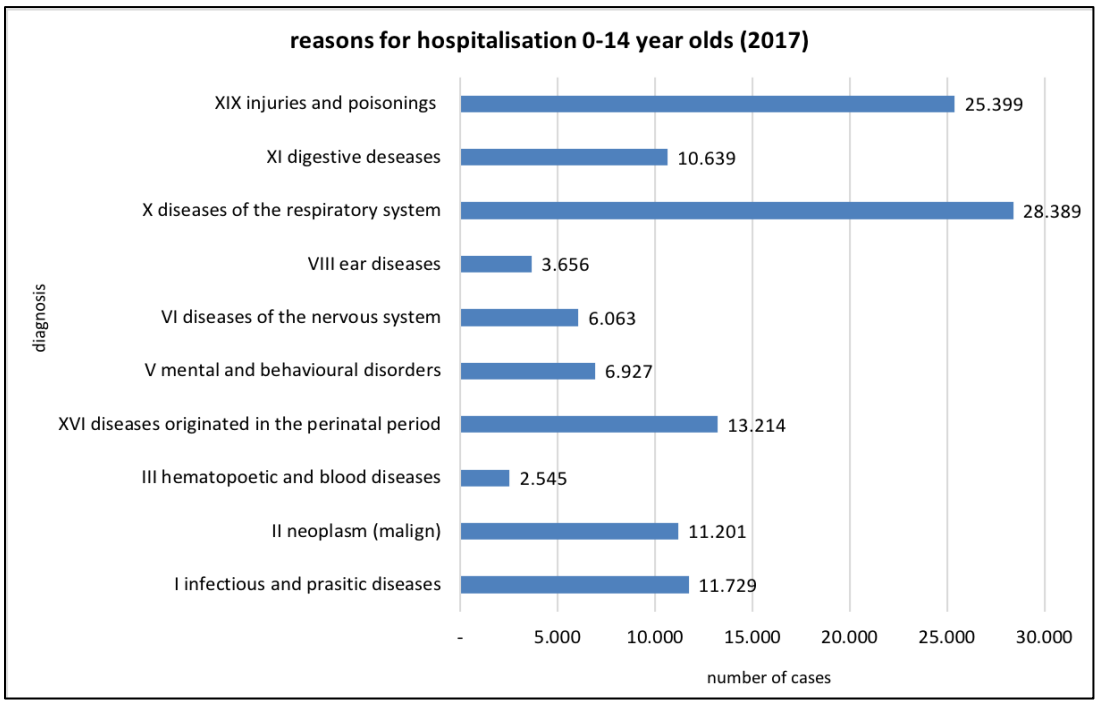

Figure 7 reasons for hospitalisation of 0-14 year olds in Austria 2017[14]

A study by SIPCAN from 2016, conducted in cooperation with the Provincial School Board for Tyrol, the Medical University of Vienna (Institute for Social Medicine) and the private university UMIT in Tyrol, showed that 30% of 14-15-year-old children are overweight or obese[15]. In the Austrian Nutrition Report published in 2012, only 24 % of 7-14 year-olds were classified as overweight or obese [15]. This shows a concerning trend of an increase of overweight children and adolescents. It is widely known that overweight and obese children have a higher long-term risk of

13 http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/stationaere_aufenthalte/spitalsentlassungen_nach_ausgewaehlten_diagnosen/index.html

14 http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/gesundheit/stationaere_aufenthalte/spitalsentlassungen_nach_ausgewaehlten_diagnosen/index.html

15 https://www.adipositas-austria.org/1610-jeder-dritte-jugendliche-in-tirol-uebergewichtig.html

developing secondary conditions such as high blood pressure and type 2 diabetes mellitus. Psychosocial symptoms such as depression, feelings of inferiority and isolation through social exclusion are also common[15] and result ultimately in further need of medical treatment.

For all reasons mentioned above, telemedicine could offer a broad range of solutions to improve healthcare.

3 Telemedicine

Telemedicine counts as a multidisciplinary, dynamic, and continually evolving tool in medicine. Therefore, various definitions exist, depending on the meaning and context in which the term applies. Sood, Mbarika et al. collected 104 peer-reviewed definitions and suggested to define telemedicine as a "branch of e-health that uses communications networks for delivery of healthcare services and medical education from one geographical location to another" [16]. It is deployed to overcome issues like uneven distribution and shortage of infrastructural and human resources [16]. Rather than being a single technology, telemedicine is part of a wider process or chain of care. It has been assumed that telemedicine can improve this chain and thus enhance the quality and efficiency of health care [16].

The Austrian Ministry of Health defines "Telemedicine" as: "provision or support of health services through the use of information and communication technologies (ICT), where the patient or healthcare provider (in particular doctors, pharmacies, hospitals and nurses) or two health care providers are not present in the same place. The prerequisite for this is the secure transmission of medical data for the prevention, diagnosis, treatment and follow-up on patients in the form of text, sound and / or image"[16].

Telemedicine has been practiced since at least the 1960s. The first experiment in telemedicine was conducted in 1971 with ATS-1 satellite [17]. For further reading, Banshur and his colleagues from the 1970s provide valuable papers for an historical perspective on telemedicine [18]. Although, the technology of the 1960s and 1970s has long been obsolete, many of the policy and social issues addressed then remain current [19]. Thus, telemedicine became an efficient way of improving healthcare, especially in remote areas, and is expected to increase the equality and fairness of the distribution of services [16].

NASA has long used telemedicine for its astronauts [20] and in the 1980s the agency has established telemedicine links with former Soviet republics for disaster relief. Teleconsultation was used for medical assistance and diagnostic for incidents at sea and in isolated regions [17].

16 https://www.sozialministerium.at/site/Gesundheit/Gesundheitssystem/E_Health_ELGA/Telemedizin/Telemedizin

Modern telecommunication methods have considerably expanded the field of telemedical services and is used where the task is to deal with the distance of experts with the assessment of image documents, such as difficult-to-assess x-ray images [17].

Telemedicine includes a wide variety of applications like “telemonitoring” as the remote medical monitoring of the health of patients, “teletherapy” in which a healthcare provider actively intervenes in the treatment of patients from a distance, the “teleconsultation”, in which the treating healthcare provider obtains a second opinion of another healthcare provider (for example for remote diagnosis in radiology), or the ”teleconference”, in which a remote healthcare provider is consulted with a current healthcare provider treatment by another healthcare provider[17].

The two pillars of telemedicine are the interactions between physicians, physicians and other service providers as well as between physicians and patients. The teleconsultation between doctors is a great help for doctors, where the evaluation of images plays a decisive role. Naturally, disciplines in which findings are collected and communicated in electronic form, such as x-ray, computed tomography or ultrasound diagnostics, have proven to be most suitable. Dermatological concerns are suited as well, to discuss or ascertain the diagnosis of the attending physician. The advantage lies in the ability to access the expertise available worldwide relatively quick. In special cases, this can be decisive. Furthermore, physicians can increase their treatment range [18].

According to a WHO[18] survey, telemedical applications in Europe are most common in the fields of teleradiology, telepathology, teledermatology and telepsychiatry. A study by the European Commission, conducted in 2013 in hospitals – therefore only inpatient care is respected –, showed a pioneering role in the area of use and availability of e-health in Estonia, Finland and Sweden. Austria ranked 12th out of 30 states (EU-28 including Iceland and Norway) [17]. A different picture appears regarding general practitioners, where only one percent uses telemedical applications. Hungary, Finland, Turkey and Estonia were the highest ranked countries in this area [19].

17 https://www.sozialministerium.at/site/Gesundheit/Gesundheitssystem/E_Health_ELGA/Telemedizin/Telemedizin

18 https://www.who.int

3.1 Telemedical services in Austria

In telesurgery, an increasing number of medical centers are currently using the “Da Vinci” surgical robot. This predominantly in the fields of cardiac, prostate and orthopedic surgery, where here - as already in 1876 with Graham Bell - the “tele-operating” surgeon only a few meters, usually in the same room, via “surgical robot” minimally invasive tele-surgically operated on the patient [20].

As an example of teleradiology counts the 2001 ISO-9001 certified teleradiological care of smaller specialized hospitals, such as the district hospital Reutte (Tyrol) by radiologists of the medical university clinic Innsbruck (MUI). Thus, a specialist diagnosis and triage of emergency patients around the clock, 365 days a year, could be secured and, on the other hand, the number of actually necessary patient transports to key hospitals, such as MUI, could be reduced to about 5 % of the original scope. This ensured rapid and adequate teleradiological specialist care for peripheral hospitals and more efficient use of the emergency beds at the MUI. Due to the increasing shortage of specialists, increasing emergency radiological services at the MUI and other reasons not specifically mentioned, this formerly Tyrol-wide teleradiological service was largely ceased on the part of MUI and Tyrol clinics. Smaller Tyrolean hospitals are now tele-radiologically supervised from abroad (e.g. district hospitals in Reutte, Schwaz or Lienz) [20].

Case studies of the commission for tele-health services according to § 8 BMG on the BMFG homepage[19] show ,that scientific investigations into medical relevance for “tele-medical” projects in Austria have almost exclusively been conducted for patients with diabetes mellitus or heart failure [20]. For the numerous other fields of telemedicine, such as emergency medical fields or the tele-education sector, little or no data from the recent past could be found.

Since August 2015, the telemetric transmission of ECG data has been in use across all emergency ambulances and emergency ambulance helicopters in the province of Salzburg. The faster care of heart attack patients has been stated as the main advantage [21].

As mentioned in the previous chapter, the »telephone health advice 1450 (TEWEB)« has been introduced as a pilot project in April 2017[20] to provide 24/7 information about so-called “Best Points of Service” [12].

[19] https://www.bmf.gv.at

[20] http://www.1450.at/1450-die-gesundheitsnummer/

According to a study by the European Commission in 2013 for inpatient care [22], Austria ranked 12th out of 30 states (EU-28 including Iceland and Norway) in the area of use and availability of e-health [17], pioneering roles go to Estonia, Finland and Sweden.

The ICT Development Index (IDI)[21], which has been published annually since 2009, is a composite index that until 2017, combined 11 indicators into one benchmark measure. It is used to compare and monitor developments in information and communication technology between countries and over time. The IDI value used for the ranking, contains 11 indicators on the use, access and skills of the population regarding information and communication technologies. Countries in the leading position within Europe and the world are Iceland, Denmark, Switzerland, the United Kingdom and Sweden. Globally, Iceland ranks first, followed by Korea. 2017, Austria ranked 14th in Europe and 21st in the world.

Particularly for resident doctors, monetary incentives are missing in Austria to contribute to integrated telemedicine care networks. In the catalog of benefits of the social security funds, the reimbursement of telemedicine services is not yet provided. In 2013, the former minister of health, Alois Stöger, set up the Commission (TGDK) with the aim to develop recommendations for the introduction and implementation of concrete telemedical services into standard care in Austria. The main focus was on areas of application for the care of chronically ill people. Questions about financing, quality standards, data protection and ethical requirements of telemedical services should be answered[22].

To sum up, Austria is placed in the upper half in terms of tele-medical developments in healthcare and has the potential for more. The expected retirement wave of medical practitioners with § 2-contracs, partly forced by the new age limits, introduced on 1st January 2019 by the Austrian Medical Association[23] could increase the call for more tele-medical supplements in healthcare as well. Another step forward could be done if legal and financial frameworks would be developed.

21 http://www.itu.int/net4/itu-d/idi/2017/index.html

22 https://www.sozialministerium.at/site/Gesundheit/Gesundheitssystem/E_Health_ELGA/Telemedizin/

23 https://www.aekstmk.or.at/507&articleId=6442

3.2 Teleconsultations

The term “teleconsultation” refers to the consultative communication between two or more physicians, concerning the diagnostic and therapeutic procedure in a specific case of treatment by means of modern telematics [23]. The goal of teleconsultation is to omit geographical and functional distance between two or more geographically separated clinicians and can therefore facilitate the communication between primary care clinicians and specialists. General practitioners who use telemedicine for consultation (teleconsultation) may be able to practice more independently and reduce the number of formal referrals to specialists [24], [25].

The medical dictionary defines “teleconsultation” as “a general term for any consultation between doctors or between doctors and patients on a network or video link (e.g. Facetime, intranet, Skype, etc.)”[24]. This thesis will only focus on teleconsultation for doctors. Teleconsultation services for the communication between doctors and patients will not be addressed in this paper.

The most helpful telemedical application in primary care is the possibility to provide specialist consultation, usually known as teleconsultation, to general practitioners [26]. Especially in remote areas, it represents an outstanding solution for improving access to General practitioners and is currently well accepted by both health professionals and citizens [27].

In Italy, the TELEMACO project was aimed at supporting small rural communities in mountain valleys and to prevent rural to urban migration as a result of socioeconomic and infrastructural problems, subsequently to overcome the difficulties in accessing secondary care in rural areas. In fact, in Italy, in-hospital visits and admissions to emergency departments are often unnecessary and could be avoided [25].

3.2.1 The importance of a second opinion

In 2006, Germany initiated the ‘National Second-Opinion Project on Testicular Cancer’, with the aim to optimize the flow of evidence into clinical practice and to maximize the accessibility of cutting-edge clinical knowledge [28]. In a nationwide study the congruence between the first and second opinion, conformity of applied therapy with the corresponding recommendation and progression-free survival rate of the introduced patients was assessed and reveal a 40 % discrepancy between

[24] https://medical-dictionary.thefreedictionary.com/teleconsultation

the first and second opinion and nearly one third of the pertinent therapies were not in accordance with either the second opinion or the initially intended therapy [28].

It suggests that physicians appreciate the possibility to request a second opinion if it does not take much time and does not involve referring the patient to another physician. Even there were no financial incentives the high acceptance rate demonstrates the evidently high level of responsibility taken by the participating advice seekers shall be stated [28].

3.2.2 Legal situation regarding telemedicine in Austria

At present, there is no legal regulation that deals specifically or exclusively with telemedicine. Therefore, in the legal assessment of the admissibility of telemedicine, reference to existing legal principles such as the Austrian Physicians Law (ÄrzteG), the Federal Hospitals and Convalescent Homes Act (KAKuG) must be made, as well as references to the Data Protection Act, the Health Telematics Act and the E-Commerce Act [23].

§ 49 (2) of the Austrian Physicians Law (ÄrzteG) [22] stipulates that the doctor must practice his profession personally and directly. However, the decision as in which way the attending physician has to be convince of the condition of the patient results exclusively from the rules of medical art. This means, that the provision of a medical service does not necessarily presuppose the personal contact with the patient under the applicable Austrian law [12].

It must be respected, that in the context of the practice of telemedicine, all professional provisions and ethical rules of the Austrian Physician Law, like the duty of confidentiality remain valid. This also includes § 45 (4) of the Austrian Physician Law, which stipulates that the self-employed pursuit of a medical profession without a specific professional residence is prohibited. Thus, physicians are restricted to their practice or place of employment for the provision of telemedical services. In addition, the doctor is gem. Further, physicians are obliged under § 51 of the Austrian Physician Law to keep records of every person taken for consultation or treatment or the medical services that he / she performs on him / her. This documentation obligation also includes the participation of a remote doctor, whose instructions must be documented, in particular due to reasons of liability [23].

3.3 Diagnosia

Diagnosia is an Austrian digital health startup, founded in 2011 by Dr. Lukas Zinnagl and his team of medical professionals, software developers and business administrators, aiming to simplify the professional lives of physicians [29].

The *Diagnosia* application is best known for its feature as a drug and indication compendium. With the application, doctors can scan the drug's barcode and get information about dosage, equivalents or interactions. The application also offers e-learning services and a teleconsultation feature; these integrations can sponsor pharmaceutical or medical technology companies. The paid "Enterprise Version" can be integrated into existing Hospital Information Systems (HIS) or Patient Data Management Systems (PDMS)[25]. Diagnosia application services are used in more than 70 hospitals and healthcare facilities, both public and private. The mobile application is the most used doctor's application in Austria [29].

The *Diagnosia* application is available both on Google Play Store and iOS App Store. The current version, state February 2019, is 3.10.3 with the last update on 25th January 2019. For Android OS, it requires at least version 4.2. In February 2019, the application was installed more than 10,000 times. The application has been reviewed 198 times via star ratings from 1 to 5 stars. 158 people gave 5 stars, 27 people chose 4 stars, 4 people 3 stars, only 1 person gave 2 stars and 8 people selected the 1-star option.

In the APPdoctor-check[26], a cooperation between netdoktor.at [26], Austria's biggest health portal, and the Vienna Medical Association, *Diagnosia* received best scores (five stars) for all three categories been tested. The categories were medical content, data security and usability.

3.3.1 The Digital Consultation feature

The Digital Consultation feature in the *Diagnosia* application was launched on 15th March 2018 and offers physicians the – cost free – opportunity to seek a second opinion from other experts. The in-app chat feature, which is accessible by verified physicians only, gives timely and reliable feedback from colleagues. The medical practitioner, with a patient or its case present, can request a second opinion

[25] https://www.trendingtopics.at/diagnosia-wiener-aerzte-app-bekommt-hohes-sechstelliges-investment-von-hansmann-und-speedinvest/

[26] https://www.netdoktor.at/projekte/appdoktor

through the in-app chat. Depending on the medical field, the question is assigned to a specific specialist who is available and verified as a consultant doctor.

Currently, the feature covers the medical fields of anesthesia, ophthalmology, dermatology, surgery, gynecology and reproduction medicine, infectiology and tropical medicine, cardiology, paediatrics, paediatric and adolescent surgery, neurology, orthopaedics, radiology and rheumatology.

The Digital Consultation feature does not only provide the opportunity to obtain a second opinion, it is also possible to discuss certain cases because photo uploads are possible.

3.4 International examples of paediatric teleconsultation

3.4.1 Djibouti

In the Republic of Djibouti, paediatric orthopaedics is among the many medical and surgical specialties that are lacking. While simple cases can be easily managed by adult orthopaedic surgeons, complex cases raise major challenges for patients linked to transferring them to another country, flying in specialised surgeons, or having a local adult orthopaedic surgeon manage the patient after receiving expert advice. The extreme poverty precludes the first two solutions and constitutes a limitation to the obligation of means. Therefore, telemedicine and teleconsultation can help the local surgeon to better meet this obligation [30].

An assessment study by Bertani et al. [30] evaluated the influence of teleconsultation on patient management and its influence on the diagnosis and therapeutic management. Therefore, they compared management suggestions of two independent orthopaedic surgeon consultants and assessed the clinical outcome in the patients in a two-year study period. Out of 158 teleconsultations overall, 48 occurred in paediatric orthopaedics for 40 patients addressed 13 with diagnostic problems and 35 with therapeutic problems. Results have shown that the teleconsultation resolved diagnostic uncertainties in 90 % of the cases. Based on the advice from a consulted expert the management was modified in 37 (77 %) teleconsultations; the change was related to the surgical indication in 18 cases, the surgical technique in 13 cases, and both in six cases. The accordance between the advice from the independent consultants and the treatment delivered by the local surgeon was 2.2/3 and clinical outcomes of the 38 treated patients were good

or very good in 31 (81 %). Mean time to the response was 6 hours (range, 0.1-24 hours) [30].

The findings of this study illustrate clearly the usefulness of seeking advice from another paediatric orthopaedic surgeon. That ratio for diagnostic agreement and therapeutic agreement between the two consultants support the reproducibility of the teleconsultation and the 81 % rate of good and very good outcomes among treated patients prove of the good performance of teleconsultation.

Djibouti has a total land area of 23,180 km^2 and a population of 982,401 people which results in a population density of 42 people per km^2 [27] The physician density in Djibouti counts 0.23 physicians per 1,000 inhabitants[28].

3.4.2 Somalia

In war-torn Somalia, expatriate healthcare staff faces high security risks and are therefore no longer physically on site. As Médecins Sans Frontiéres (MSF), who runs a district hospital supporting a limited number of Somali clinicians, is responsible for the hospitals quality of care, they introduced a teleconsultation and tele mentoring programme between clinicians in Somalia and specialist paediatricians in Nairobi to address this issue [31].

As such technology is limited and new to the healthcare system in Somalia, MSF conducted a study to assess the impact of telemedical interventions on the quality of care and the added value as perceived by clinicians. A study, executed in the paediatric ward of the Guir'el district hospital in the Galgadud region of Somalia showed, that due to the use of telemedicine on paediatric case management was significantly changed in more than half of all teleconsultations and the capacity of local clinicians to handle potentially complicated cases improved progressively. The study therefore showed, that the introduction of telemedicine significantly improved quality of paediatric care in a remote conflict setting and was of perceived high added value to distant clinicians [31].

27 http://www.worldometers.info/world-population/djibouti-population

28 https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Ärztedichte

Somalia has a total land area of 627,340 km^2 and a population of 15.5 million people which results in a population density of 23 people per km^2 [29] The physician density in Somalia counts 0.3 physicians per 1,000 inhabitants[30].

3.4.3 Germany

In 2011, the Augsburg paediatrician Martin Lang developed the telemedical programme PädExpert®[31], with the aim to provide a network for paediatricians and specialist paediatricians in order to be able to help patients with chronic or rare diseases as fast as possible and with low threshold. More than 100 experts are participating to the programme nationwide and more than 900 paediatricians took advantage of the possibility of consultation. PädExpert® is supported by the AOK Bayern and the Barmer Ersatzkasse[31].

Based on a guideline-compliant anamnesis sheet a paediatrician describes the symptoms and creates a case file which is then forwarded to the specialist - via a secure connection. A specialist answers within 24 hours and can not only specify a diagnosis but also suggest or confirm a therapeutic accompaniment.

After a trial period of two years (2013-2015), the system has been available nationwide since 2016 as part of a selective contract of the Professional Association of Paediatricians. Several health insurances offer the expert programme in their selective contracts. PädExpert® is designed for intersectoral use. The teleconsultation areas are not limited to paediatric and adolescent medicine only and other specialist groups, such as dermatologists with paediatric dermatological expertise or child and adolescent psychiatrists.

Between March 2014 and December 2015, 433 PädExpert® teleconsultation cases were evaluated by 30 general practitioners [13].

In 81 % of the cases it was possible to make a reliable, virtually across all indication areas. The duration of the diagnosis could be shortened by more than two weeks (15.4 days) compared to the conventional referral procedure. With PädExpert®, the diagnosis was made on average 9.2 days, in the classic referral procedure after 24.6 days [2].

Therefore, PädExpert® not only offers physicians the advantage of a fast, safe and professional communication and the exchange of knowledge, but also brings

29 http://www.worldometers.info/world-population/somalia-population/

30 https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Ärztedichte

31 www.paedexpert.de

benefits to the patients. Especially children and adolescents living far from metropolitan areas can take advantage of the fact that the primary care paediatrician operates locally [32].

Germany has a total land area of 348,560 km^2 and a population of 82,4 million people which results in a population density of 237 people per km^2 [32] The physician density in Germany counts 4.14 physicians per 1,000 inhabitants[33].

3.4.4 Norway

The teleECG initiative in Norway, a telemedicine service used to facilitate early diagnosis and treatment of suspected myocardial infarction in patients not in hospital, is one of the first major telemedical programmes in Norway [33]. What started in 1995 after initial pilot projects is now available in over 100 ambulances and throughout the country with plans for all districts within the next 5-10 years [33].

The teleECG system has helped decrease call time to treatment time, resulting in faster treatment and better patient outcomes. Cardio patients' outcomes have improved by 15-20%. Having the ability to connect and consult with a cardiologist remotely has improved the quality of service and care from ambulances and paramedics [33].

The teleECG initiative has also improved cooperation between health professionals. Through experiences and challenges while participating in the teleECG system, general practitioners, paramedics and cardiologists benefited from co-working in terms of efficacy and inter-professional exchange [33].

3.4.5 Australia

In November 2000, a novel tele paediatric service for selected regional hospitals in Queensland was established, with the aim to deal with referrals to specialists via videoconference instead of travelling to specialists in Brisbane [34].

Queensland is the second largest state in Australia with a total land area of 1,730,648 km^2 and a population of currently 5 million people, over 2 million living in Brisbane[34]. Considering Queensland's population density of 2.50 people per

[32] http://www.worldometers.info/world-population/germany-population/

[33] https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Ärztedichte

[34] http://www.population.net.au/population-of-queensland/

square kilometer, people living outside the outer circle of Brisbane have to travel up to 2,500 km to see a specialist. This is a very expensive and time-consuming way to seek a medical opinion or to get a diagnosis.

The tele-paediatric service offers families the opportunity of a specialist consultation, without the need for extensive travels to Brisbane. 1,499 consultations have been carried out for a broad range of paediatric sub-specialities including burns, dermatology, cardiology, child development, diabetes, oncology, endocrinology, gastroenterology, nephrology, neurology, orthopaedics, paediatric surgery and psychiatry. A total of 545 hours was spent providing clinical consultations via videoconference [34].

Comparing the total cost of providing these 1,499 consultations with the estimated potential costs of an outpatient service at the Royal Children's Hospital in Brisbane resulted in a net saving of approximately AUD 600,000 to the health department, mainly because of reduced patient travel costs [34].

Australia has a total land area of 7,682,300 km^2 and a population of 25 million people which results in a population density of 3 people per km^2 [35] The physician density in Australia counts 4.14 physicians per 1,000 inhabitants[36].

Previous international examples illustrate that teleconsultations are beneficial in terms of making healthcare provision more available and in terms of facilitating the communication and exchange of knowledge between physicians, especially in remote areas. The author's research for Austrian solutions in terms of second opinion platforms for medical practitioners could not gain any alternatives to the teleconsultation-chat provided by *Diagnosia*.

[35] http://www.worldometers.info/world-population/australia-population/

[36] https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Ärztedichte

4 Methodology

This chapter describes how the study was conducted, study population, research questions, method, design and techniques. The rationale for the combined use of the qualitative and quantitative methods is given.

4.1 Study population

The survey was conceptualized for medical practitioners. The group of study participants included general practitioners, doctors of paediatric and adolescent medicine and specialists in the paediatric subdisciplines who are either active users of the *Diagnosia* application and its teleconsultation feature or at least have been using it once. Other healthcare professionals were excluded (Table 1).

For this study, a sample size of 70 participants of the paediatric teleconsultation chat was projected but only 14 participated.

Table 1 Inclusion and exclusion criteria for the study

Inclusion criteria	general practitioners, doctors of paediatric and adolescent medicine and specialists in the paediatric subdisciplines
Exclusion criteria	all other professions

4.2 Research questions

The first hypothesis claims that the number of consultation requests initiated in rural areas is higher than in cities.

H1: Consultation requests are more often placed in rural areas than in cities.

The second assumption focusses on the professional specialisation and contends that the majority of the paediatric teleconsultation-chat-users are general practitioners.

H2: The majority of the paediatric teleconsultation-chat-users are general practitioners

The third hypothesis addresses the impact of a second opinion gained through the teleconsultation chat on diagnoses and therapy plans. The purpose is to check whether the impact of second opinions requested through teleconsultation chats on the initial diagnoses is the same as on therapy plans and therefore can improve diagnostic and therapeutically decisions.

H3: A second opinion requested through a Digital Expert Consultation has the same influence on both, diagnosis and therapy plan.

Hypothesis four states that teleconsultations can stimulate the cooperation between physicians of all specialties. The assumption implies that this particular telemedical interaction model can contribute to a better collaboration and interprofessional exchange of information between general practitioners, doctors of adolescent and youth medicine and those practicing in paediatric areas of expertise as perceived by the study participants.

H4: The cooperation between general practitioners, paediatricians and paediatric specialists can be stimulated and improved.

4.2.1 Quality of use and acceptability

The quality of use should be reviewed in order to determine adaptation suggestions and thus to increase the acceptance among the users. Furthermore, the survey aimed to examine the weight and relevance of a second opinion within the telemedical doctor's chat on the initial diagnosis or therapy plan.

Acceptability was assessed through Likert scale ratings examining five dimensions: ease and safety of use, satisfaction with response time, desire to use again and likelihood to recommend to others.

4.3 Study design

For this study a combined approach of quantitative and qualitative as well as a combination of a retrospective and prospective analysis was chosen. Starting out with a retrospective analysis of existing data provided by *Diagnosia* via Intercom[37],

[37] www.intercom.com

regarding geographical and professional usage distribution and reasons for inquiries, subsequently a mixed method was used to examine the research questions. Therefore, a prospective, quantitative and qualitative evaluation through an online survey questionnaire and follow-up interviews was made to analyse the research questions as well as the acceptance, usage characteristics, user-friendliness and quality of the digital consultation feature in the *Diagnosia* application.

4.3.1 Retrospective analysis of existing date

Diagnosia uses Intercom to track, support and retain their users. Existing data from 15th March 2018 until 21st March 2019, regarding user location, medical specialisation and direction of requests were analysed retrospectively to be able to present the geographical and professional usage distribution. Therefore, data had to be filtered regarding the user platform “teleconsultation chat users” first. Only data of users and requests tagged with the paediatric and paediatric surgery teleconsultation chat were taken into account and further refined by country, city and professional medical specialisation. Those data were extracted and exported to a Microsoft Excel spreadsheet for further processing. Information that would allow the identification of a specific person has been removed. This examination shall illustrate the geographical distribution of users of the paediatric teleconsultation-chat as well as the distribution of inquiries. Results will be displayed in charts for a better depiction.

4.3.2 Prospective analysis through a survey questionnaire and interviews

The second part of this study contains the prospective analysis of data gathered through survey questionnaire and interviews.

Participants were asked about their experiences, expectations and usability regarding the existing paediatric expert chats. The aim was to investigate the influence of a second opinion, obtained through the teleconsultation-chat, on the initial diagnosis and treatment plan on one hand, and to ascertain the benefit of the teleconsultation for physicians, especially general practitioners, and the added value of an implementation of teleconsultations into daily practise as perceived on the other hand. Following in this chapter, the survey questionnaire inventory and interview methodology are described.

4.4 Survey questionnaire

Survey questionnaires are a popular instrument of quantitative methodologies and count as the most widely used method. A study that reviewed 1,893 articles published between 1991 and 2001 in eight major Information Systems publications, showed that 60 % of the methods used were performed quantitatively and 41 % of the used techniques were surveys [35]. The present study will use survey questionnaires.

The content of the questionnaire was built into a survey and used to explore and evaluate the usage characteristics and effectiveness of a digital consultation platform by example of *Diagnosia*. It was created with Google Forms and distributed by a generated link via e-mail, Intercom and social media.

The survey questionnaire designed for this study covers the areas of query direction in terms of paediatric specialisation, the impact of a second opinion on the initial diagnosis as well as on the intended therapy plan, the usability, a potential clinical benefit, the personal opinion on the implementation of teleconsultation in daily practise, remuneration and improvement. Current users of the *Diagnosia* application were invited to participate to the survey. General practitioners, doctors of paediatric and adolescent medicine and specialists in the paediatric sub-disciplines in Austria (inpatient and outpatient), who gave their written consent were asked to fill out the online survey questionnaire, using a mobile device (smartphone, tablet computer, etc.) or a desktop computer / laptop. The survey was published in German, as the participants were German speaking.

The survey contained seventeen closed and half-open questions with a point for users' supplements as well as open questions (Table 2). Each question was defined as a mandatory question to prevent participants from skipping questions within the survey and to ensure fully completed questionnaires. To complete the questionnaire, it took five to ten minutes.

Questions 1-3, 7, 8, were multiple-choice questions. All multiple-choice questions had the option to add "other" than the given choices and therefore gave the respondent the opportunity to answer themselves. Thus, it lowers the chances to leave out any potentially important answers.

Questions 4, 6, 12-15, regarding the usability and potential clinical benefit were of five-level Likert scale type.

Questions 9-11 are yes/no-option-responses with a third option of either "no answer", "irrelevant" or "I do not know" as an alternative.

Questions 5, 16, 17 are open questions where the respondent is asked to answer according to his personal opinion, experience and expectations regarding response time and suggestions for improvement and time in terms of being available for a follow-up interview.

Table 2 Overview of the questions. German version, see Appendix

No.	**Question (translated from the German version)**	**Question type**	**Research area**
1	My questions so far are directed towards paediatric …(specifications)	Multiple choice	Query distribution
2	If you have contacted a doctor though the teleconsultation chat because of an equivocal diagnosis, how did this affect your initial diagnosis?	Multiple choice	Clinical utility
3	If you have contacted a specialist due to an equivocal therapy, what impact did this have on your intended therapy plan?	Multiple choice	Clinical Utility
4	How satisfied are you with the response time in the teleconsultation chat?	Linear scale	Usability
5	How long was the response time in hours?	Open question	Usability
6	How do you grade the clinical benefit of the teleconsultation?	Likert scale	Clinical utility
7	Are you of the opinion that through the implementation of a teleconsultation in the daily practice, the cooperation between general practitioners, specialists in paediatric and adolescent medicine as well as physicians in paediatric sub-disciplines, especially in structurally weaker areas can be …	Multiple choice	Clinical utility
8	Do you think that with the implementation of a teleconsultation …	Multiple choice	Clinical utility

9	Would you appreciate the establishment of teleconsultation services?	Likert scale	
10	Do you think it would be good if benefits were reimbursed by social security funds?	Option yes/no	
11	Would you use the consultation more often in case of a reimbursement by social insurance agencies?	Option yes/no	
12	Please rate the ease of use of the teleconsultation chat?	Likert scale	Usability
13	How safe do you feel when using the teleconsultation chat?	Likert scale	Usability
14	How satisfied are you with the communication within the consultation?	Likert scale	Usability
15	How likely is it that you would recommend the *Diagnosia* app?	Likert scale	Acceptance
16	Do you have any suggestions for improvements for the teleconsultation chat?	Open	Acceptance
17	Would you be available for a short follow-up interview?	Open	

The survey was open from December 20th, 2018 until March 20th, 2019. The ethics committee of Lower Austria and the Sankt Pölten University of Applied Sciences approved the study.

4.5 Interviews

For this thesis, interviews seem to be a suitable method to generate more detailed information, perceptions, opinions and experiences about digital consultation services and the teleconsultation feature in the *Diagnosia* application in particular,

because they allow asking open ended questions to a small sample and exploring individual experiences or opinions.

An advantage of additional interviews is being able to provide respondents with a more convincing explanation of the purpose of the study. Interviews can also enhance the quality of the collected data by offering clarification and explanation of any potential uncertainties arising in the course of the interview [36].

Semi-structured and unstructured interviews typically focus on the interviewee's experience and opinion, aiming to get rich and in-depth data [37]. Thus, they rather have the characteristics of conversations [38]. In a study with a relatively small sample size, like the present thesis, where the focus is not on comparing the cases, the questions do not need to be very standardised and can be rather open [39]. Therefore, the semi-structured interview seemed to be a suitable method because its structuring through an interview guide made it possible to keep orientation during the interview [38]. On the other hand, the fact that the interview was not completely structured permitted to talk about the individual opinions and experiences in a non-constraining way. Furthermore, the questions in the interview guide could be asked in an order that seemed most suitable for each interview.

To prepare a fluent interview, an interview guide was created, containing ten questions. However, during the interviews, the order of questions in the interview guide was not strictly followed and the interview partners could answer informally and even cover two or more questions in one answer.

For the purpose of this thesis, two medical practitioners were interviewed. Although, the initial aim was to conduct at least five interviews, that number could not be reached due to a lack of motivation in participation. Both interview partners were personal contacts of the author's network. Other potential interviewees were approached through different channels, inter alia, participants of the online survey were asked about their willingness to give an interview in the last part of the survey, further, to leave their contact details if willing. None of the provided contacts was ultimately reachable.

Both interviews have been conducted in German. The interviewees were promised anonymity and gave their permission to record the interview upfront. One interview took place at the interviewee's home and one at the interviewee's workplace. Each interview took between 15 and 25 minutes. Both interviews were transcribed and will be summarized in chapter 5.3.

The results of the interviews are presented in abbreviated form. A summarizing content analysis according to Mayring [40], in which the text material is

categorized, paraphrased, generalized and reduced to a short text while maintaining the essential content, will be waived due to the very small number of interviews omitted. Following the interview guide, the interviews are summarized with reference to the results of the survey and to points (A) in the interview transcript in the Appendix.

5 Evaluation and Results

This chapter represents the evaluation results from Intercom regarding geographical and professional distribution of inquiries, results from the online questionnaire survey as well as the results from the interviews. Data are evaluated and presented graphically, amended by additional commentary. Interview outcomes are summarized, a full transcription of the Interviews is provided in the Appendix.

The initial aim was to reach up to 70 medical practitioners with requested professionalism using the paediatric teleconsultation-chat. By 19th February 2019 eleven surveys were submitted. Therefore, the survey period was prolonged until 20th March 2019.

The planned survey period was November 2018 until February 2019 followed by an immediate data evaluation. A blogpost was published on the *Diagnosia*-Facebook-page on 21st December 2018 and an e-mail invitation was sent out via Intercom the same day. As the response rate was quite lean by the end of January 2019 another e-mail and Push-reminder was sent out on 12th February 2019.

5.1 Analysis of existing data from Intercom

The following figures will show the geographical and professional distribution of *Diagnosia* digital consultation users. Intercom uses the term of “general practitioners” and “primary care” interchangeably. Therefore, primary care refers to general practitioners in Figure 3 and Figure 6.

From 15th March 2018 until 20th March 2019 *Diagnosia* application had 11,608 verified medical practitioners signed up for their services. By 20th March 2019, the digital consultation feature counted 259 active users located in Austria, Germany, Switzerland, Italy, Spain, Thailand, Azerbaijan, and Croatia (Figure 8).

Figure 9 shows the distribution of the users of the paediatric teleconsultation chat.

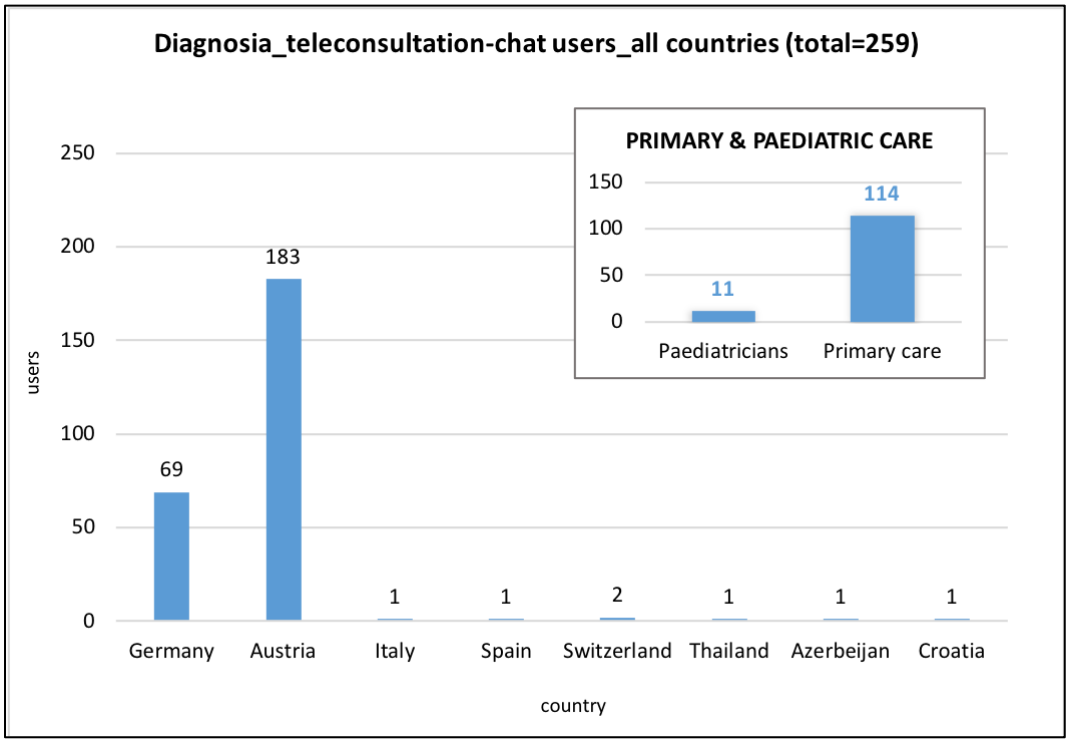

Figure 8 Geographical distribution of the total of the teleconsultation chat users and proportion of primary care doctors and paediatricians

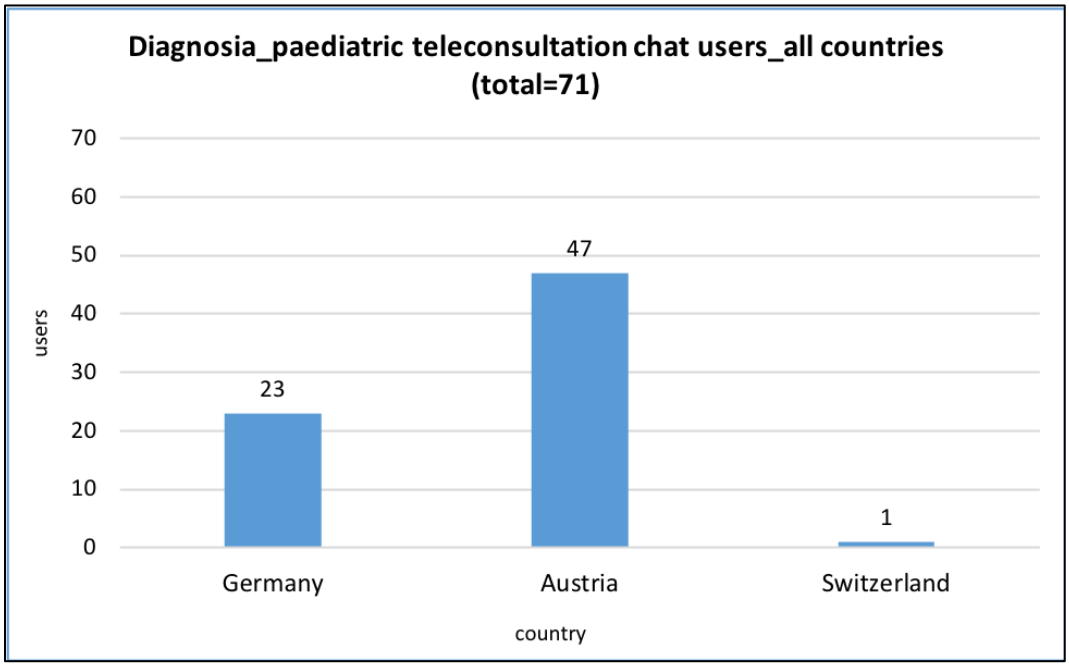

Figure 9 Geographical distribution of the paediatric teleconsultation chat users

Out of the 71 users of the paediatric teleconsultation chat in Austria, Germany and Switzerland, most users are general practitioners (Figure 10). It was hypothesized (research question H2) that the majority of users are general practitioners. Therefore, H2 can be certainly accepted. It was further hypothesized (research question H1) that the number of consultation request placed is higher in rural areas than in cities. Results show that 86 % of all users of the paediatric teleconsultation chat are located in cities (Figure 11). H1 can be rejected in that matter.

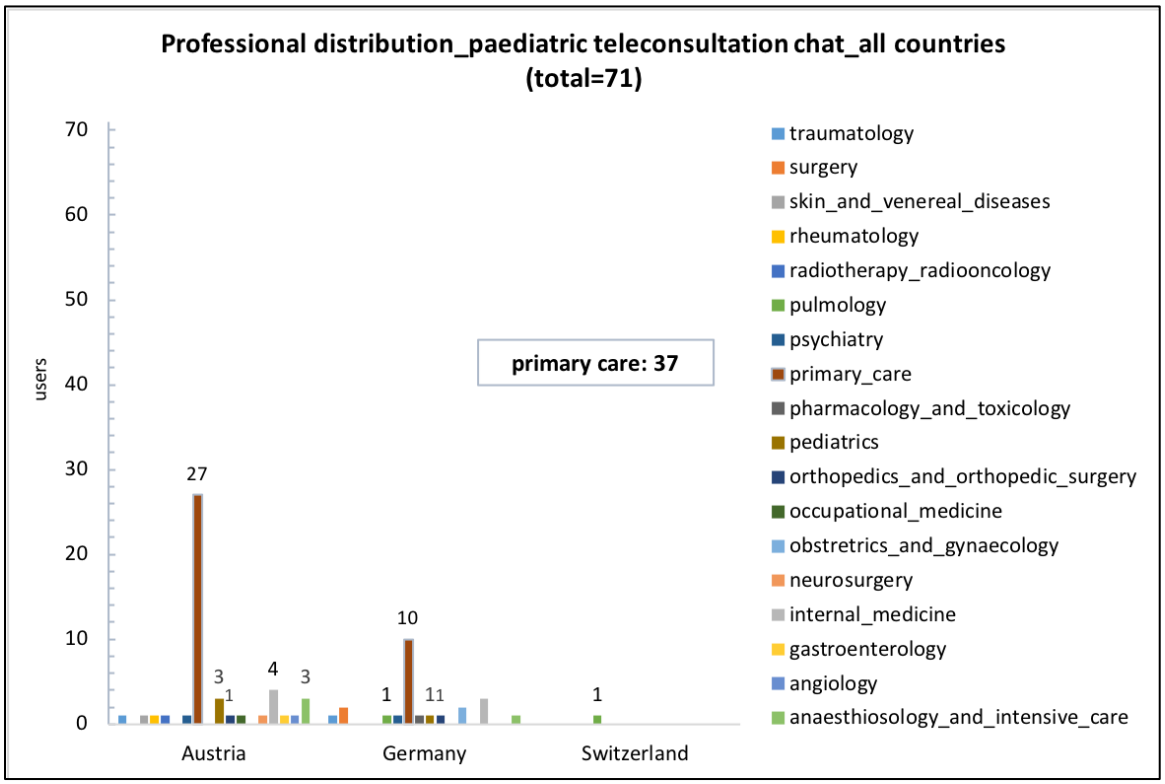

Figure 10 Professional distribution of the paediatric teleconsultation chat users in Austria, Germany and Switzerland and proportion of primary care doctors

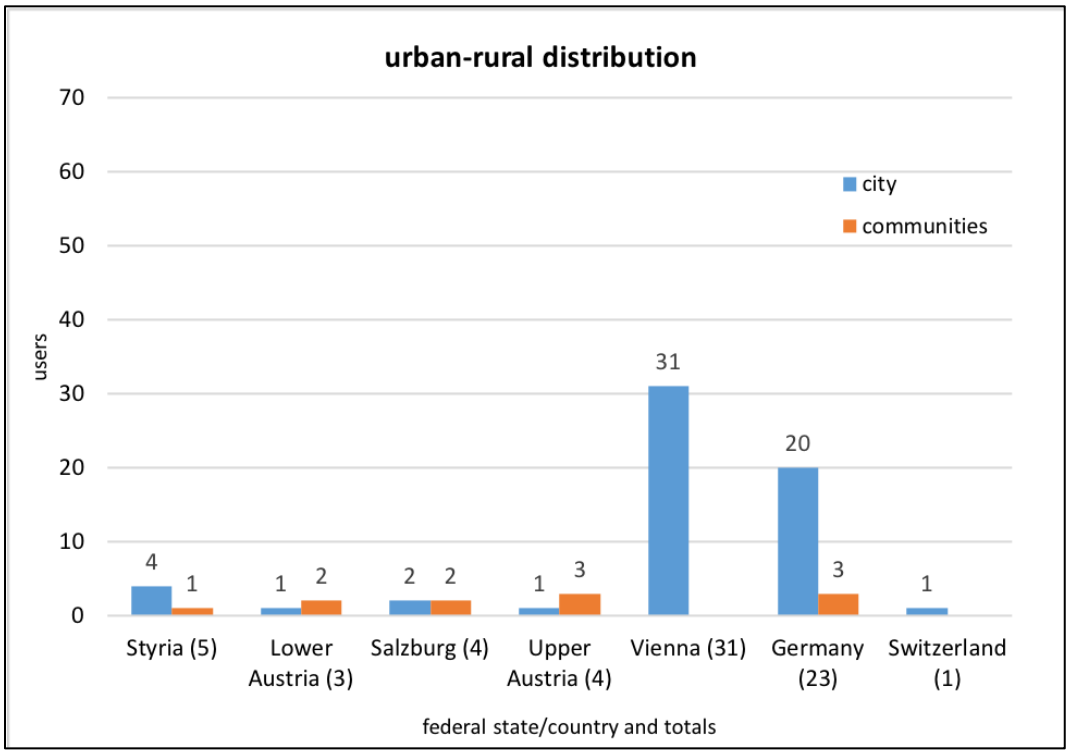

Figure 11 Urban-rural distribution of the paediatric teleconsultation chat users

5.2 Survey results

The following section will present the results of the online survey questionnaire and those of the two interviews. Survey results will be graphically displayed and accompanied by interview outcomes relevant to the question.

Overall, 71 healthcare professionals received an invitation to fill out the online questionnaire survey. 14 completed the questionnaire. This resulted in a response rate of 19.7 %. All questions were mandatory; thus all 14 submissions contain a fully answered questionnaire.

The survey period started on 21st December 2019 with a blog post on *Diagnosia*-Facebook-page and ended on 20th March 2019. Three e-mail invitations (7th January 2019, 4th February 2019 and 21st February 2019) and two push messages (14th February 2019 and 7th March 2019) have been sent out (Table 3).

Table 3 Overview of survey period and invitations sent to participate in the survey

21st December 2018	start of survey period
21st December 2018	Blogpost on Facebook
27th January 2019	e-mail invitation via Intercom
4th February 2019	e-mail reminder via Intercom
14th February 2019	Push message on Intercom
21st February 2019	new e-mail invitation via Intercom
7th March 2019	Push message on Intercom
20th March 2019	end of survey period

Individual results of the 17 survey questions will be presented and displayed in figures. Appropriate amendments from the interviews will be stated in the matching section.

Specialisations of consultation inquires

The responses of the first question ("*My inquiries so far went towards the paediatric specialization in …")* present a demand for second opinions in dermatological and gastroenterological matters, followed by those for infectiology and Gastroenterology (Figure 12). Pneumology, Diabetology and Endocrinology, Haematology and Oncology as well as Radiology were in less demand.

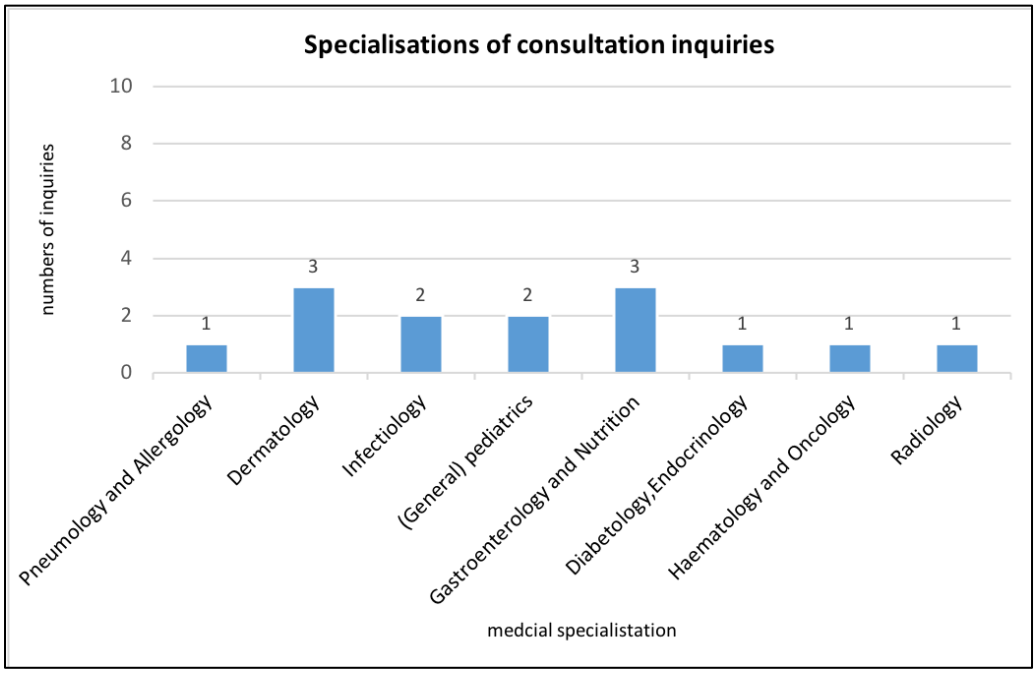

Figure 12 Paediatric specialisation of the consultation inquiries (SQ 1)

Influence on the initial diagnosis and intended therapy plan

Questions 2 and 3 were asked to evaluate the influence of the second opinion acquired on the suspected diagnosis and on the intended therapy plan. Most users had their suspected diagnosis confirmed as shown in Figure 13 versus the influence on the intended therapy plan shows almost equal results in confirmation and change (Figure 14). It was hypothesized that a second opinion requested through a Digital Expert Consultation has the same influence on both, diagnosis and therapy plan (H3). With regard to the 14 responses, the perceived influence on the initial diagnosis is lower than on the intended therapy plan. Hence, H3 has to be rejected.

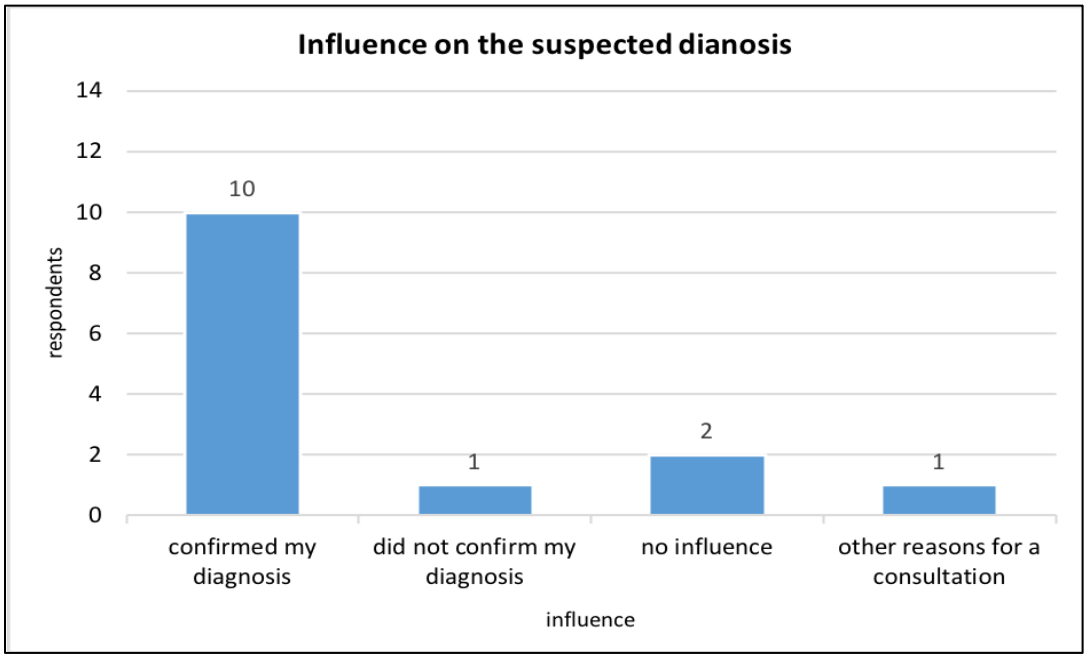

Figure 13 Influence of the consulted opinion on the initial diagnosis (SQ 2)

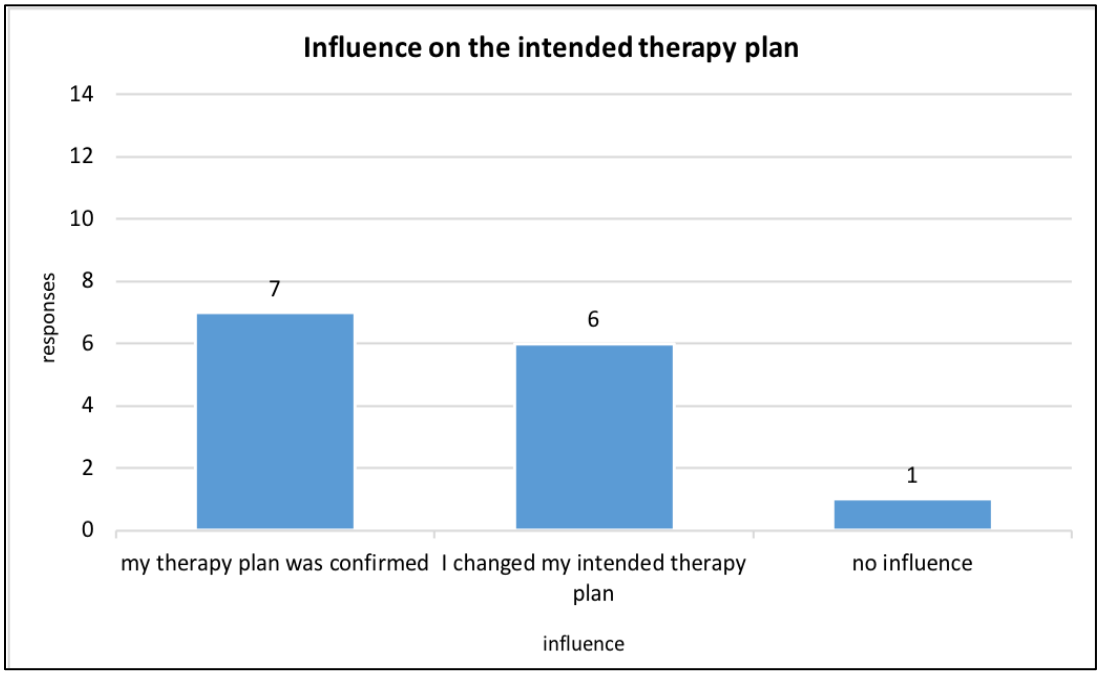

Figure 14 Influence of the consulted opinion on the intended therapy plan (SQ 3)

Satisfaction with the response time and average response time

Question 4 and 5 were asked to determine the level of satisfaction of the users regarding the response time of the teleconsultation chat as well to discover the

time between the inquiry and an answer. Overall satisfied responses (Figure 15) were given in hours (Figure 16).

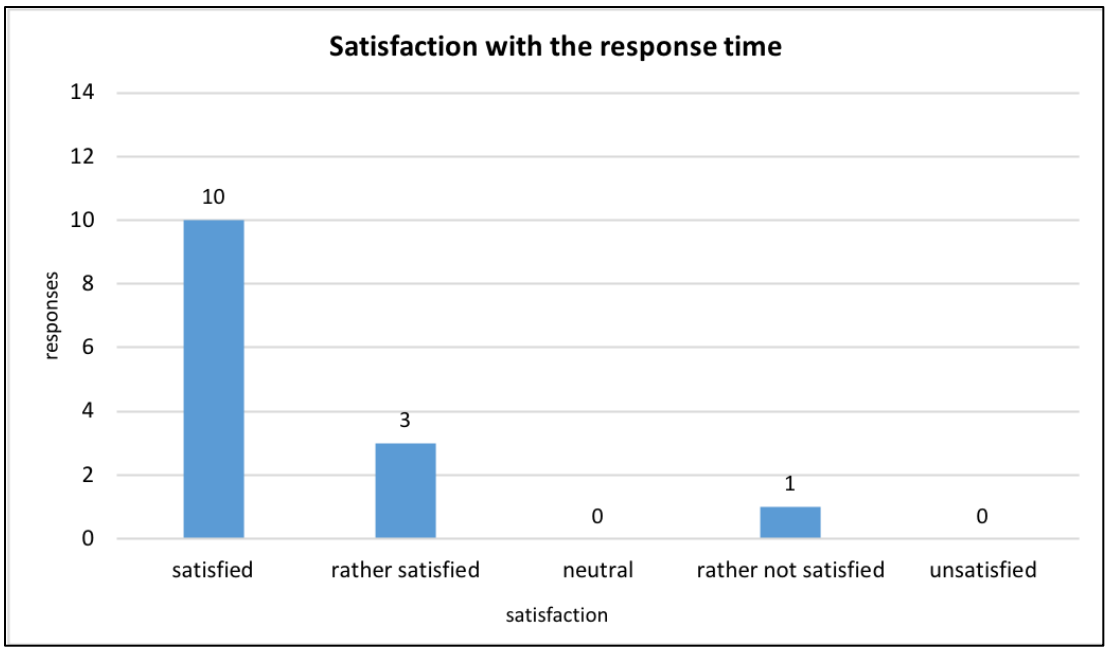

Figure 15 Satisfaction with the response time within the teleconsultation chat (SQ 4)

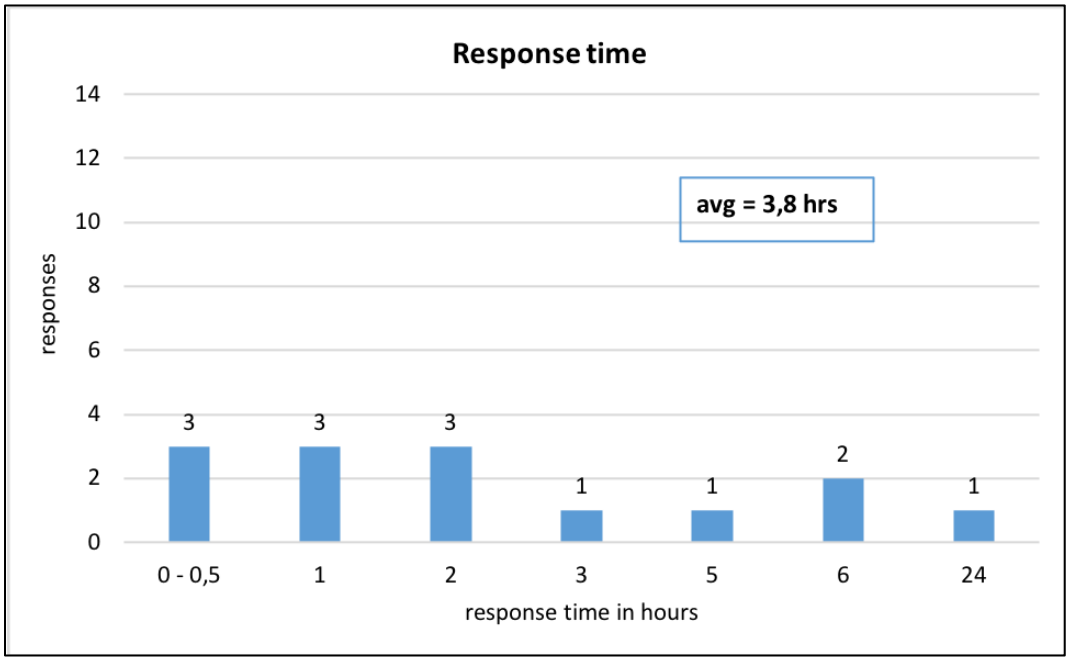

Figure 16 Average response time so far (SQ 5)

Clinical benefit, expected influence on the cooperation between physicians and expected outcomes of the implementation of a teleconsultation chat into daily practice

The evaluation of the clinical benefit of a teleconsultation chat, as perceived by the users was mostly beneficial (Figure 17). Survey question 7 asked study participants to rate the influence of the implementation of a teleconsultation chat into daily practice on the cooperation between physicians, especially in structurally weaker areas. Results show a consistently positive influence and value it as an addition to current communication practice (Figure 18). Hypotheses 4 assumes that the cooperation between general practitioners, paediatricians and paediatric specialists can be stimulated and improved, especially in structurally weaker areas. With regard to the results H4 can be accepted.

The aim of question 8 was to determine potential outcomes of an implementation of a teleconsultation chat into daily practice. Multiple answers were possible. In the opinions of the participants, an implementation could result in an improvement of the quality of care, in a shorter diagnosis time and a paediatric undersupply could be counteracted (Figure 19). Results show that almost all of the survey participants would welcome the establishment of a teleconsultation chat (Figure 20).

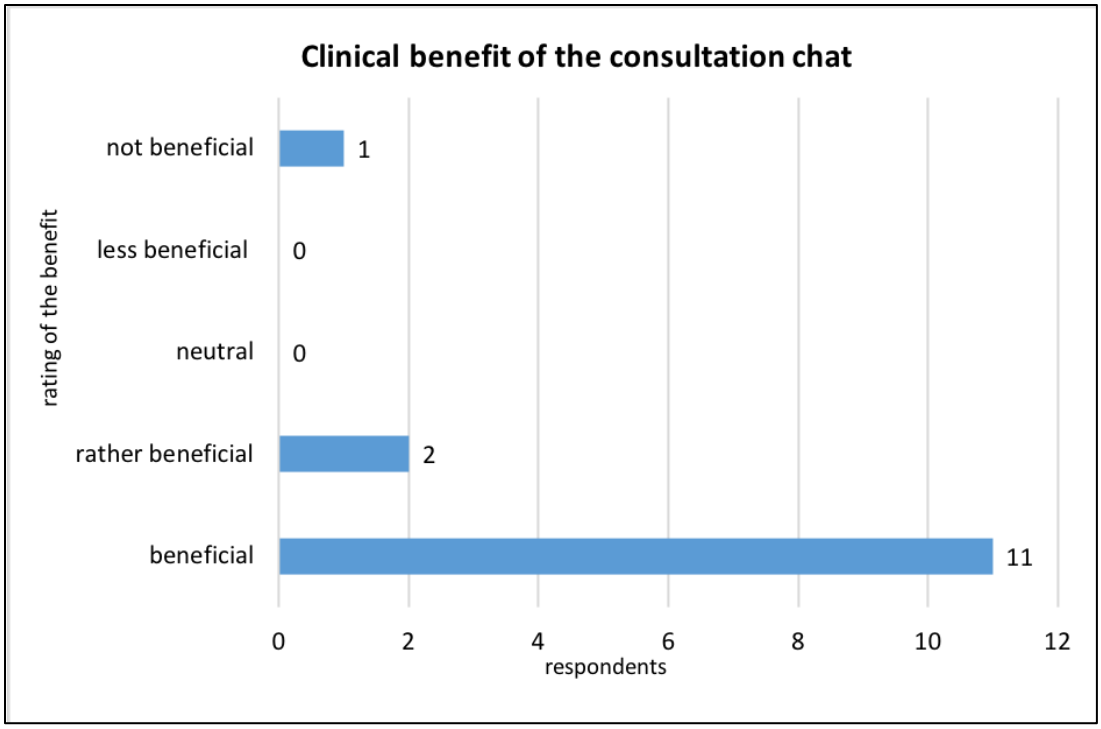

Figure 17 Evaluation of the clinical benefit of a teleconsultation (SQ 6)

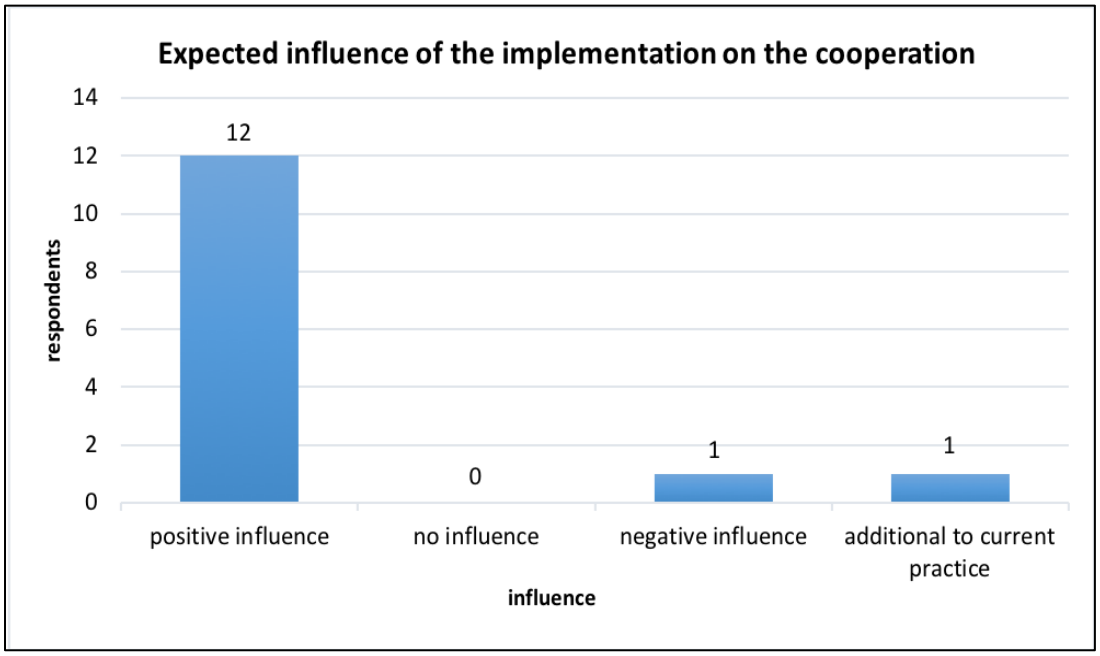

Figure 18 Expected influence of the implementation of a digital consultation chat into daily practice on the cooperation between physicians (SQ 7)

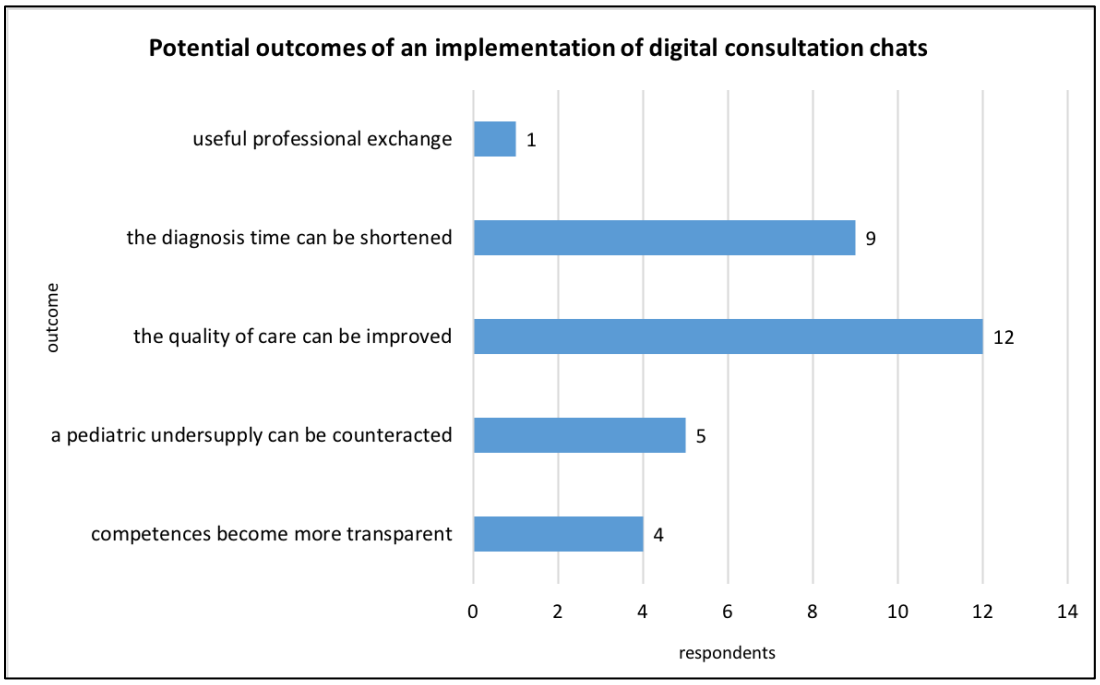

Figure 19 Potential outcomes of the implementation of digital consultations in daily practice (SQ 8)

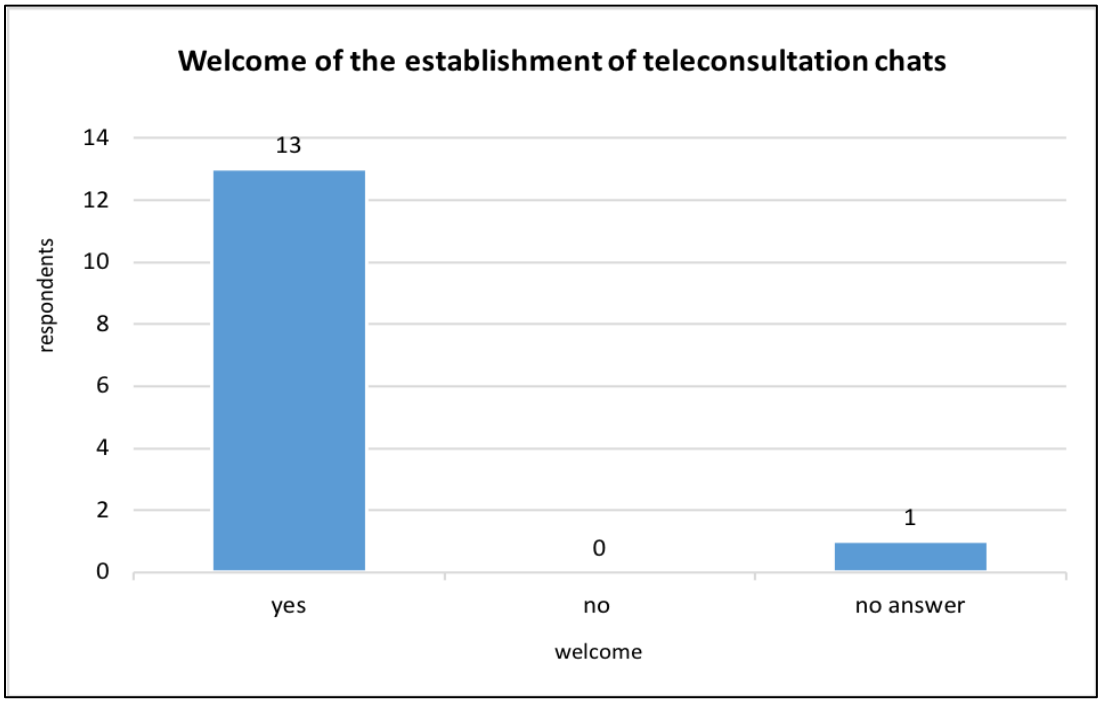

Figure 20 Welcome of the establishment of teleconsultation chats (SQ 9)

Reimbursement

Questions 10 and 11 were created to find out if the participants would appreciate a reimbursement of teleconsultation services by social insurance agencies and if, in that case, they would use the service more often. Results show that the participants would appreciate the reimbursement by social insurance agencies (Figure 21). Figure 22 shows the likelihood of an increased use and displays a degree of uncertainty.

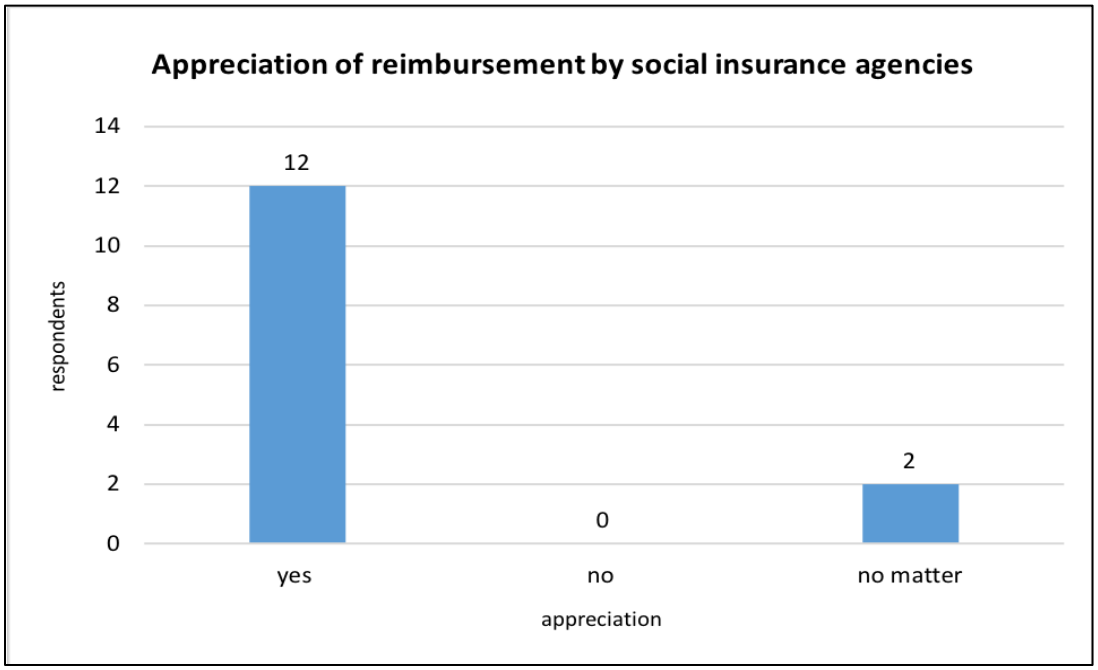

Figure 21 Appreciation of reimbursement of teleconsultation services by social insurance agencies (SQ 10)

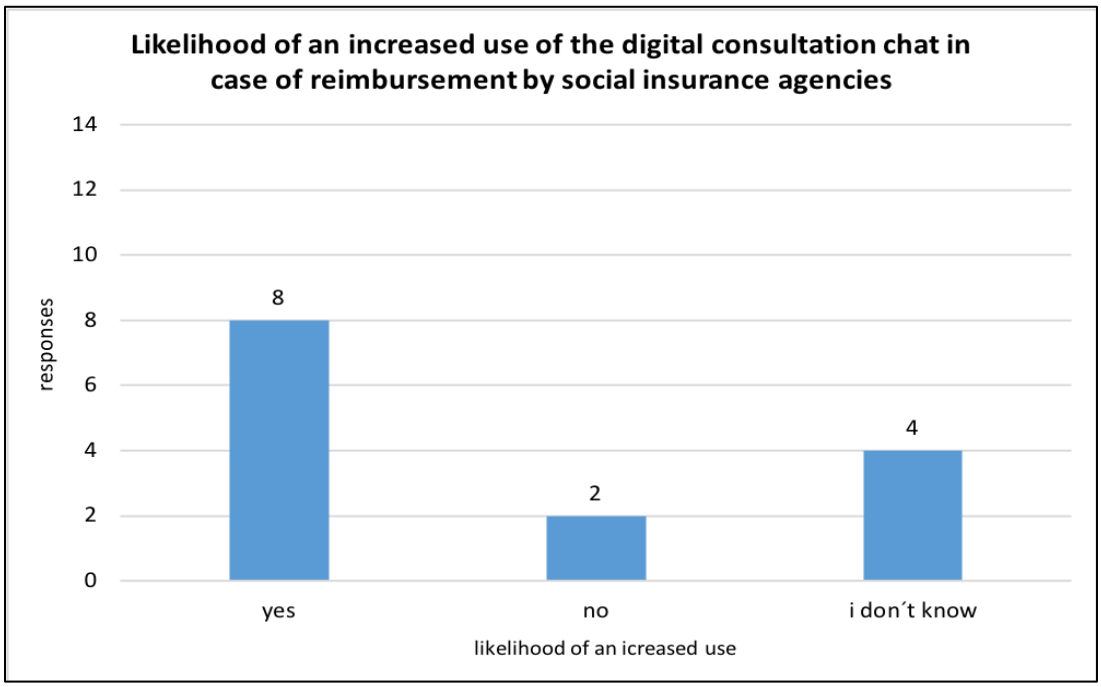

Figure 22 Likelihood of an increased use of the digital consultation chat in case of the reimbursement by social insurance agencies (SQ 11)

Ease of use, safety and satisfaction with the communication

Questions 12 and 13 were created to evaluate the ease and safety of use of the teleconsultation chat. Results display that the teleconsultation chat is easy (Figure 23) and safe (Figure 24) to use. Overall, users are satisfied with the communication within the teleconsultation chat of the *Diagnosia* application (Figure 25) and would recommend it (Figure 26). Little suggestions for improvement have been stated (Figure 27).

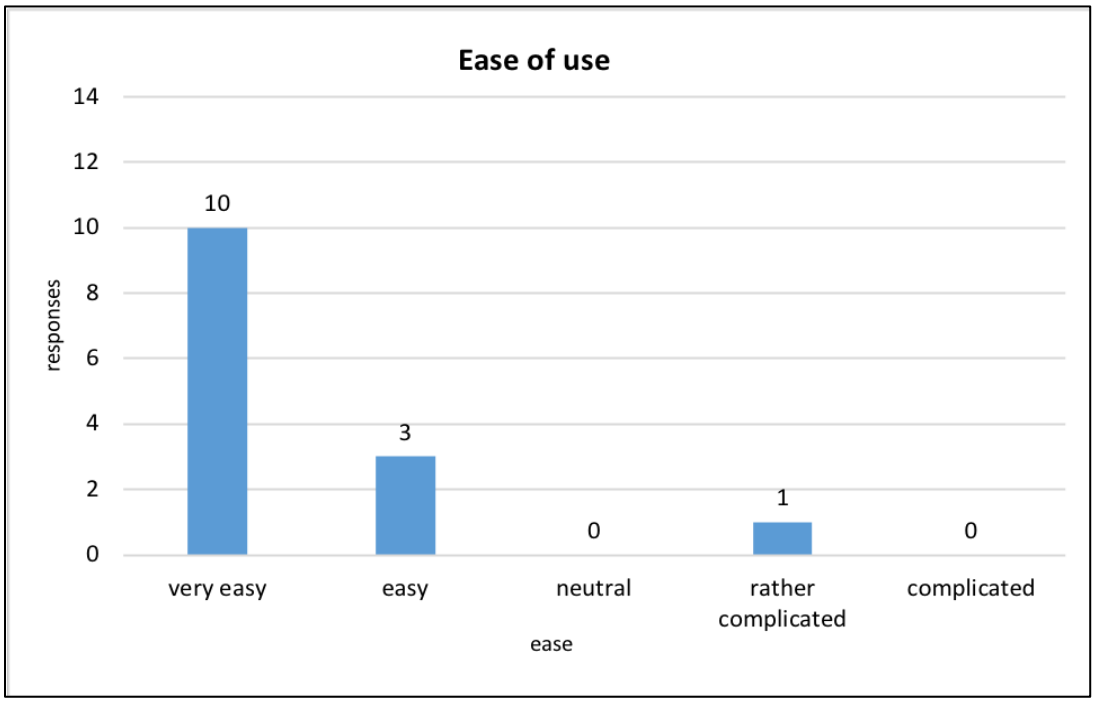

Figure 23 Ease of use of the current digital consultation chat (SQ 12)

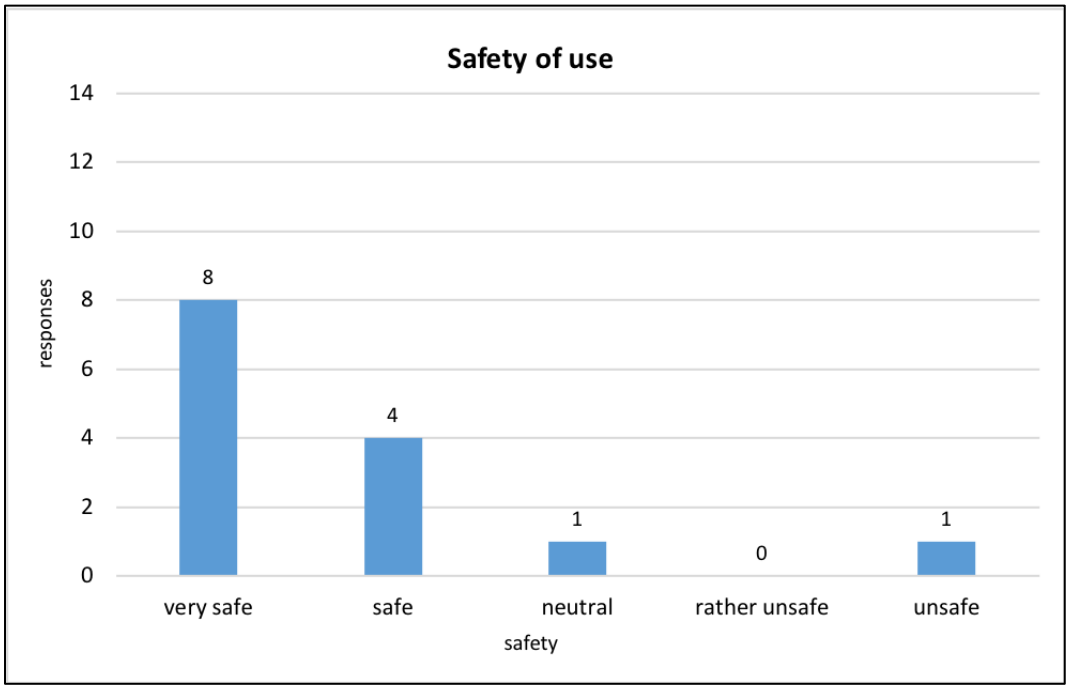

Figure 24 Safety of use of the digital consultation chat (SQ 13)

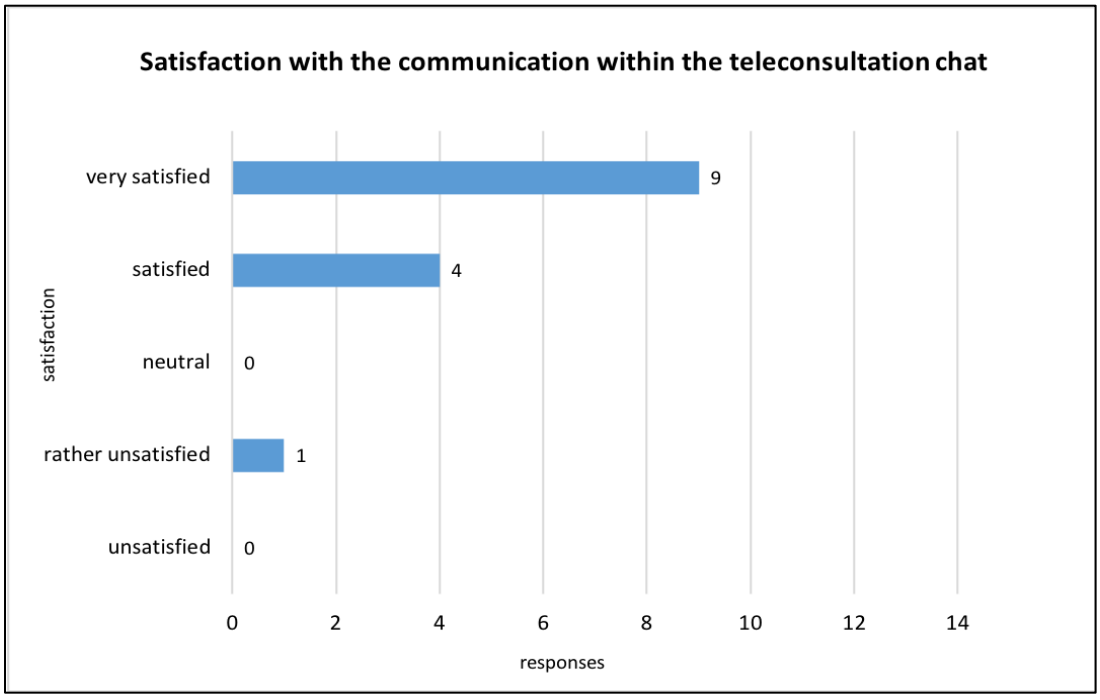

Figure 25 Satisfaction with the communication within the digital consultation chat (SQ 14)

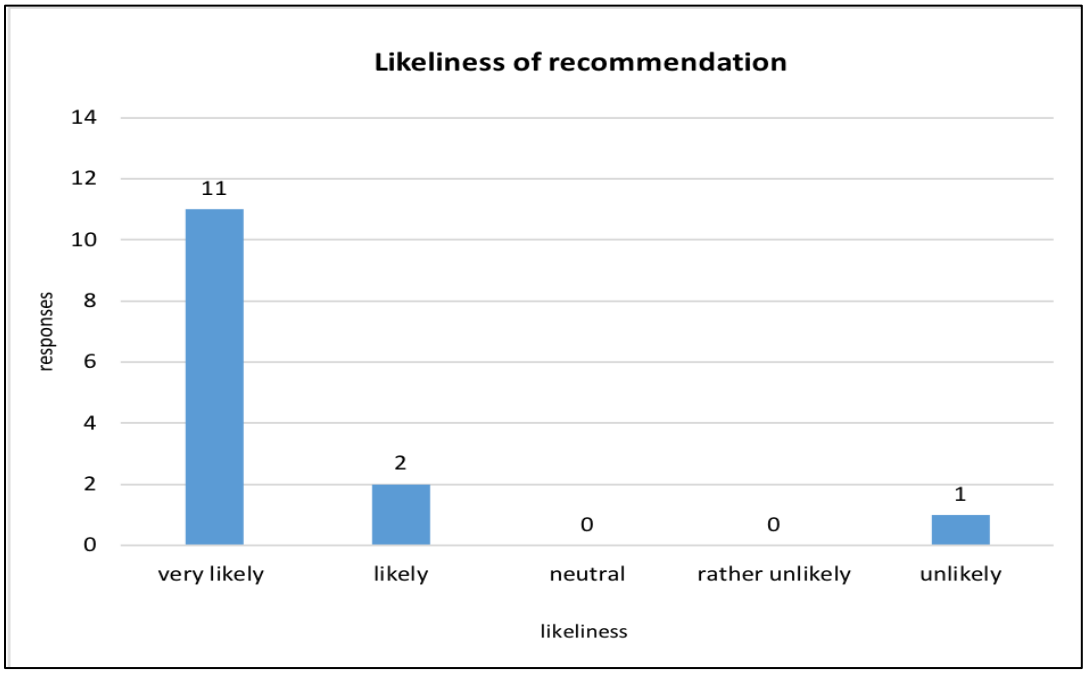

Figure 26 Likeliness of recommendation of the teleconsultation chat (SQ 15)

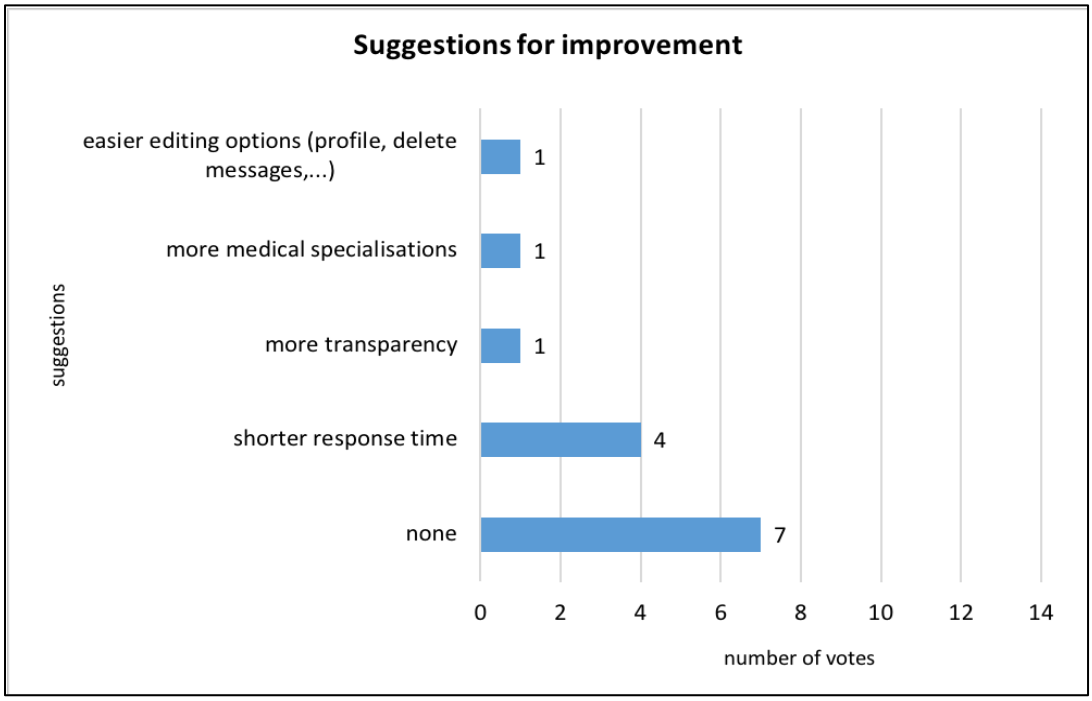

Figure 27 Suggestions for improvement for the current version of the teleconsultation chat (SQ 16)

Lastly, the participants were asked if they would be willing to give a short interview. Results show a quite low willingness (Figure 28).

Figure 28 Willingness of the study participants to give a short follow up interview (SQ 17)

5.3 Interview outcomes

The following part will present the outcomes of the two interviews been conducted, one on 8th February 2019 with a general practitioner (interview partner one (IP1 in the following)) and one on 5th March 2019 with a specialist doctor in paediatric and adolescent medicine (interview partner two (IP2)).

Both interview partners are active users of the paediatric teleconsultations chat. IP1 has been using the chat for about a year, frequently and only for requests and for questions regarding indications (IP1_#A1, #A2, #A3) IP2 has been using the teleconsultation since its launch in March 2015 and acts as a consultation doctor in paediatric matters. IP2 is also using the drug decision support feature in matters of indications on a regular basis (IP2_#A1, #A2).

In terms of requests (SQ No.1), as IP2 is the one who will answer incoming inquiries. IP2 states a broad range of questions, with a fair amount of inquiries regarding immunisation and dermatological matters. Uncertainties about treatment plans are also very common, he said (IP2_#A3).

Regarding the influence of a second opinion on the initial diagnosis and intended therapy plan (SQ Nr.2 and 3), IP1 revealed that in her case she experienced a

50/50 ratio. Once she got her initial diagnosis confirmed, once she had to change it (IP1_#A6). IP2 rated the influence on the initial diagnosis with a ratio of 70/30, estimating that in 70 % of the consultations the diagnosis is confirmed and 30 % might change or modify their initial diagnosis (IP2_#A6). Both interview partners were of the opinion that the influence on the intended therapy plan might lead to a change in therapy management equally or even more compared to a confirmation (IP1&2_#A6).

Both interview partners were of the opinion that the implementation of a teleconsultation chat would bring benefits for both sides, doctors and patients. IP1 pointed out the advantage of a "pool of specialists" to be "at hand" (IP1_#A3) and rated the chat as beneficial in terms of cooperation between physicians, especially advantageous for general practitioners and young doctors with less experience (IP1_#A4). IP1 saw a clear benefit of the consultation regarding medical issues beyond the individual expertise (IP1_#A5). IP2 stated, that it would be certainly beneficial for the communication between doctors, and resident doctors, in particular, especially outside regular working hours and during medical services on weekends (IP2, #A2, #A5 and A9). Due to a potentially better communication, patient care could be improved and result less travels for patients (IP1 and IP22_#A8). IP1 was convinced of the benefit, especially the potential to improve medical care in rural areas (IP1_#A8).

An overall satisfaction with the application was stated by both interview partners, but IP1 pointed out the potential disadvantage of teleconsultations in less patient contact and the eventuality of errors due to the non-holistically examination. Another concern arose in terms of the certainty of competence: "… *there is also the question how competent and experienced the other doctor is, the one who gets to answer the question asked and on which criteria the allocation of inquiries is based on* …" (IP1_#A9).

IP2 stated that he most likely would not be as engaged as right now if there would be no appropriate compensation by *Diagnosia* (IP2_#A7).

Regarding suggestions for improvement, IP2 suggested to implement a feedback option in terms of the impact of the consulted opinion (IP2_#A11), Interview partner 1 didn't have any suggestions (IP1_#A11).

6 Discussion

The main aspect of this paper was to investigate whether teleconsultation chats are useful and beneficial addition to current medical practice of general practitioners and specialists for paediatric and adolescent medicine and the impact of a second opinion acquired through the teleconsultation chat on the initial diagnosis and the intended therapy plan.

Considering that within one year, *Diagnosia* was able to mobilize 11,698 doctors, representing a quarter (25.66%) of all medical practitioners in Austria (45,596) [41], it seems that the openness towards the use of digital support for medical care is apparent. Results of this study show that the majority of the study participants felt very safe or safe while using the teleconsultation. Findings of Sharma et al., regarding user perceptions and acceptance criteria for new technologies among healthcare professionals showed that trust and sense of security are the two very salient aspects determining acceptance [42]. The success of any telemedicine project is at risk if the acceptance of the doctors cannot be achieved [18].

In terms of the impact on the diagnostic decision the agreement between the initiator of the inquiry and the responder the agreement was very high, thus reflecting a remarkable decisional utility. A similar outcome was achieved in an Italian study [25] where teleconsultations solved most of the patients clinical problems with a consequent high level of clinical utility and effectiveness of the service. The observed satisfaction with the training utility of the general practitioners in that same study resulted in a consequent improvement in knowledge concerning the medical specialisations in teleconsultations examined in the research [25]. A positive impact for future management of similar problems [25] can be assumed for physicians of this study, further and more detailed examination might be necessary.

Considering the results of a thesis from 2014 [43], which investigated tele-medical developments and services in Austria and Germany and subsequently aimed to estimate the direction of future developments, the development regarding telemedical applications and services has been rather slow.

Austria’s potential to improve its telemedical products and services is comparable to Switzerland, since the population structure as well as the structure of the medical profession are very similar [44]. Thus, appropriate legal framework conditions must be created. In Switzerland, telemedicine has established itself as since the 1990s

and legally corresponding structures were developed, partly thanks to the very federal cantonal legal framework conditions [44].

Although Austrian healthcare professionals seem to recognize the benefits of teleconsultations, uptake is slow. A rather restrained range of teleconsultation services in Austria may be linked to the reference in traditional practice of directly prescribing specialist visit or a hospital admission or even the geographical circumstances of the country and its not absolute necessity for teleconsultation services. Austria has a total land area of 82,409 km^2 and a population of 8.76 million people which results in a population density of 106 people per km^2 [38].With a physician density of 5.15 physicians per 1,000 inhabitants, Austria ranks 5th by global comparison[39]. However, Austria, like Italy, is a country where a teleconsultation service is mainly supplementary rather than specifically alternative. Benefits deriving from geographical access could be higher in countries characterised by a greater physical distance between primary and secondary care [25]. Furthermore, a low density of doctors and hospitals, such as in the United States of America, the United Kingdom, Australia, Israel and Nordic countries, is an argument for an increased use of telemedicine. Comparatively longer ways to a physician and fuller medical practices and hospitals increase the benefits and potential use of telemedical applications [17]. Also in Somalia and Djibouti, with a much lower physician density, advantages could be stated throughout by the implementation of telemedical applications [30], [31].

Another reason for a rather slow uptake in the implementation of teleconsultations in Austria could be due to the fact that no financial regulations regarding the remuneration of telemedical services have been established yet. It seems that since 2013 the discussion around regulations regarding telemedical remuneration has been ongoing, but results remain elusive.

The thesis represents the actual usage behaviour of and attitudes towards a teleconsultation feature of physicians in selected medical specialisations, in the present work the paediatric field in particular. Also, the benefit of the teleconsultation, the influence of the second opinion and potential outcomes of an implementation of a teleconsultation chat into daily practice from the perspective of only a small number of medical practitioners and the specific field of paediatrics were examined. However, this work had several limitations that legitimize discussion. The major limitations were the selection bias and the sample size. The

38 http://www.worldometers.info/world-population/austria-population

39 https://de.wikipedia.org/wiki/Liste_der_Länder_nach_Ärztedichte

primary limitation was the rather restricted area of examination and a therefore low response rate of 14 physicians who completed the survey. For a representative study of the Austrian health professionals' population, a higher number of participants must be achieved. Furthermore, studies and surveys regarding second opinions acquired through teleconsultation by the general practitioner from the perspective of the patients might be valuable for the development and proliferation. More meaningful and representative data could possibly be gained if all medical specialisations of the teleconsultation chat are taken into consideration A broad range of medically specialized teleconsultation chats is already available in the application provided by *Diagnosia*.

The study raises questions in the weighting of paediatric and adolescent care within the national health system and initiates to improve certain factors and appropriate and immediate action to assure an adequate supply of paediatric care.

Another urge occurs to appraise and provide current data regarding the health of children and adolescents in Austria. Further research should be conducted on the impact of teleconsultations as a common health service and frequently evaluated on a daily basis in order to define the possible daily application of the service.

7 Conclusion

The paper illustrates that the majority of the users of the teleconsultation application in Austria, attending this study, are general practitioners located in Vienna. Hypothesis 1 and its supposition that the number of consultation requests will be higher in rural areas than in cities had therefore been rejected. Hypothesis 2 on the other hand, could be accepted as the assumption was that most of the users are general practitioners. The paediatric specialization with the most inquires for a second opinion were dermatology and gastroenterology and infectiology. A broad spectrum of symptoms in dermatological and gastroenterological matters might justify the higher amount of inquires as well as issues related to immunization, which belongs to the medical field of infectiology might be explained through ongoing discussions about immunisations at a young age. The assumption of hypothesis 3, that the influence of the second opinion is the same on the initial diagnosis as on the intended therapy plan, had to be rejected as the influence on the intended therapy plan was modified far more often. Most users were satisfied with the response time and the communication within the teleconsultation chat and would recommend it, although almost a third of the suggestions for improvement would appreciate a shorter response time. Overall, the influence of a teleconsultation chat on the cooperation between physicians was perceived as predominantly positive and an establishment of teleconsultations would be welcomed. Based on the results, hypothesis 4 and its claim that the cooperation between general practitioners, paediatricians and paediatric specialists can be stimulated and improved can be accepted. The application is easy to operate, and users feel mostly safe using it. A reimbursement of teleconsultation services by the social insurance fund was clearly voted for and a fair part of the participants would use it more often if an appropriate remuneration would be assured. The preponderance of the users identifies a highest potential of the implementation of a teleconsultation chat into daily practice in the improvement of the quality of care and a shorter diagnosis time. Albeit the potential to counteract a paediatric undersupply is implied, further studies are necessary to analyse that potential in particular. In addition, teleconsultation chats offer the possibility of a professional exchange and to make competences more transparent

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List of Figures

List of Tables

Appendix

A. Interview 1

Interview zur Nutzung des Digitalen Konsils von Diagnosia

Experteninterview 1

Geführt am 08.02.2019 um 10.20 in Felixdorf

Interviewpartnerin: Allgmeinmedizinerin

I: Zunächst vielen Dank, dass Du Dir kurz Zeit nimmst für dieses Interview. Wie bereits angekündigt geht es um das Digitale Konsil von Diagnosia, dass ich im Rahmen meiner Masterarbeit an der FH St. Pölten evaluiere. Bevor wir beginnen – hast Du noch Fragen?

A: Nein, wir können starten.

I: Gut. Du bist bereits aktive Nutzerin der Diagnosia App bzw. des Digitalen Konsils ... wie hast Du von der Diagnosia App bzw. dem Digitalen Konsil erfahren?

A: Ja, ich habe die App ein paar Mal genutzt, derzeit eher weniger. Ich kann mich nicht mehr genau erinnert, ich glaube ein Kollege hat mir davon erzählt. #A_Frage1#

I: Wie lange nutzt Du die App in etwa schon? Und nutzt Du sie vorrangig als Konsiliarärztin oder für Anfragen?

A: Ich würde sagen, etwa ein Jahr. Und nur für Anfragen. Als Konsiliarärztin habe ich bislang noch nichts gemacht. #A_Frage2#

I: Wie sind deine bisherigen Erfahrungen mit dem Konsil?

A: Ich finde es eigentlich ganz praktisch. Vor allem wenn man sich nicht sicher ist bzw. noch nicht viele Fälle einer bestimmten Indikation hatte. Auch will ich nicht immer die gleichen Kollegen anrufen, um nachzufragen. Dann ist es schon super, wenn man einen Pool an Fachärzten quasi zur Hand hat. #A_Frage3#

I: Stellt das digitale Konsil Deiner Meinung nach eine sinnvolle oder gewinnbringende Kooperationsform zwischen Allgemeinmedizinern und Kinder- bzw. Fachärzten dar? #A_Frage4#

A: Ja, finde ich schon. Vor allem für Allgemeinmediziner oder auch Ärzte die vielleicht noch nicht so viel Erfahrung haben. Vor allem frische Fachärzte. Auch kennt man nicht in jeder Fachrichtung jemanden. Als ich damals in St. Anton war kamen echt viele Mütter zu mir. Da war ich manchmal schon an der Grenze zur Überforderung, was die Kompetenz in der Kinderheilkunde angeht. Da wäre das Konsil sicher hilfreich gewesen. #A_Frage5#

I: Wie würdest du den Einfluss der eingeholten Zweitmeinung auf die von Dir gestellte Diagnose bewerten?

A: Da hatte ich zwei unterschiedliche Erfahrungen; einmal hat es meine Diagnose bestätigt, einmal umgeworfen. Scharlach ist z. B. recht schwer zu diagnostizieren – für mich als Allgemeinmedizinerin zumindest. Da lag ich damals falsch. Aber es gibt ja so viele Kinderkrankheiten mit ähnlichen Symptomen, da ist es fast schon unverantwortlich auf das alleinige Wissen eines Allgemeinmediziners zu vertrauen und nicht einen Kinderarzt zu konsultieren. Auch bei Therapiefragen bzw. der Unsicherheit in Hinblick auf eine bestimmte Therapie finde ich das Konsil sehr hilfreich. #A_Frage6#

I: Warum beteiligst Du Dich an dem telemedizinischen Programm?

A: Puh, keine Ahnung was ich da antworten soll. #A_Frage7#

I: Welche Vorteile bringt das Digitale Konsil für ÄrztInnen und/oder PatientInnen Deiner Meinung nach?

A: Naja, für Ärzte, dass Sie nicht lange herumtelefonieren müssen oder im Internet suchen müssen um sich sicher zu sein, bzw. um eine zweite Meinung einzuholen. Da ist es schon hilfreich, wenn das schnell geht, vor allem wenn der Patient da ist oder der Fall recht dringend oder ernst ist. Für Patienten, dass sie nicht zu hundert Fachärzten tingeln müssen und sich dann erst recht nicht auskennen, wenn jeder eine andere Diagnose stellt. Und, die Patienten können bei Ihrem Arzt des Vertrauens bleiben. #A_Frage8#

I: Denkst Du, dass die Implementierung eines Digitalen ÄrztInnenkonsils Auswirkungen auf den Praxisalltag bzw. die Zusammenarbeit zwischen ÄrztInnen für Allgemeinmedizin, FachärztInnen für Kinder- und Jugendheilkunde und MedizinerInnen in pädiatrischen Subdisziplinen (besonders in strukturschwächeren Gegenden) hätte?

A: Ich denke, dass es schon vorteilhaft wäre. Vor allem Allgemeinmediziner könnten ihre Patienten besser versorgen, vor allem am Land. Was aber sicher auch der Fall ist, dass der persönliche Kontakt fehlt und das „eindeutige Bild" fehlt. Man muss alles genau beschreiben … und darf auch nichts vergessen. Dann stellt sich natürlich auch die Frage, wie kompetent der, den ich frage, wirklich ist bzw. anhand welcher Kriterien jemand die Frage zugewiesen bekommt. Worauf basiert das „Auswahlverfahren". #A_Frage9#

I: Hinsichtlich der Anwendung, bist Du generell zufrieden mit der App?

A: Ja, ist in Ordnung. #A_Frage10#

I: Gäbe es, Deiner Meinung nach, Verbesserungsvorschläge für das Konsil?

A: Nein, fällt mir jetzt nichts ein, um ehrlich zu sein.

I: Vielen Dank für das Interview.

B. Interview 2

Interview zur Nutzung des Digitalen Konsils von Diagnosia

Experteninterview 2

Geführt am 05.03.2019 um 15.00 in 1130 Wien, St. Josef Krankenhaus

I: Zunächst Danke, dass Du Dir kurz Zeit nimmst für dieses Interview, freut mich, dass wir es endlich geschafft haben. Wie bereits angekündigt geht es um das Digitale Konsil von Diagnosia das ich im Rahmen meiner Masterarbeit an der FH St. Pölten evaluiere. Bevor wir beginnen – hast Du noch Fragen?

A: Nein, frag einfach was Du willst.

I: Gut. Du bist ja bereits aktiver Nutzer der Diagnosia App bzw. des Digitalen Konsil … wie hast Du von der Diagnosia App bzw. dem Digitalen Konsil erfahren und wie lange nutzt Du sie schon?

A: Die App nutze ich von Anfang an, also seit es sie gibt. 2015 glaub‘ ich haben sie begonnen. Ich habe mit Lukas studiert und er hat mich gefragt ob ich als Konsiliararzt fungieren will. #A_Frage1#

I: Ich verstehe. Nutzt du die App vorrangig als Konsiliararzt oder auch für Anfragen?

A: Sowohl als auch, aber vorrangig als Konsiliararzt für Pädiatrie– was das Konsil angeht. Die App nutze ich sonst hauptsächlich für Indikationen, also den Medikamente-Check Bereich. #A_Frage2#

I: Welche Art von Anfragen kommen denn am häufigsten würdest Du sagen?

A: Gute Frage. Eigentlich quer durch die Bank. Bei manchen Fragen zweifle ich aber echt an der Kompetenz mancher Kollegen. Solche Fragen dürften eigentlich nicht kommen. Was häufig kommt sind Anfragen betreffend Impfungen. Auch dermatologische Fragen sind oft dabei. Und Fragen bzw. Unsicherheiten bei Therapien kommen oft. #A_Frage3#

I: Wie sind deine bisherigen Erfahrungen mit dem Konsil?

A: Wie gesagt, es sind viele „dumme“ Fragen dabei – da frage ich mich echt ob das Ärzte sind. Man muss aber auch sagen, dass einige dieser Anfragen von Ärzten kommen, die nicht aus Österreich sind bzw. nicht hier Medizin studiert haben. Aber im Allgemeinen ist die Erfahrung gut. #A_Frage4#

I: Stellt das digitale Konsil Deiner Meinung nach eine sinnvolle oder gewinnbringende Kooperationsform zwischen Allgemeinmedizinern und Kinder- bzw. Fachärzten dar?

A: Für die niedergelassenen Ärzte sicher. Da ist nicht gleich ein Kollege bei der Hand oder im gleichen Dienst. #A_Frage5#

I: Wie würdest du den Einfluss der eingeholten Zweitmeinung auf die von Dir gestellte Diagnose bewerten?

A: 70/30. Also in 70 % der Fälle bestätigt sich die Diagnose, in 30 % wird sie „modifiziert“. Vielleicht sogar weniger, deutlicher wird es glaube ich bei Therapiefragen. #A_Frage6#

I: Warum beteiligst Du Dich an dem telemedizinischen Programm?

A: Als Freundschaftsdienst für Lukas. Aber auch nur weil es entsprechend honoriert wird von Diagnosia. Gratis würde ich es vielleicht nicht in dem Ausmaß betreiben – als Konsiliar. #A_Frage7#

I: Welche Vorteile bringt das Digitale Konsil für ÄrztInnen und/oder PatientInnen Deiner Meinung nach?

A: Ärzte können sich absprechen und so die Patienten besser versorgen, denke ich. Für Patienten ganz klar, dass Sie keine unnötigen Zusatzwege auf sich nehmen müssen. #A_Frage8#

I: Denkst Du, dass die Implementierung eines Digitalen ÄrztInnenkonsils Auswirkungen auf den Praxisalltag bzw. die Zusammenarbeit zwischen ÄrztInnen für Allgemeinmedizin, FachärztInnen für Kinder- und Jugendheilkunde und MedizinerInnen in pädiatrischen Subdisziplinen (besonders in strukturschwächeren Gegenden) hätte?

A: Ich denke schon, dass eine bessere Kommunikation da wäre, vor allem auch außerhalb der Dienstzeiten oder bei Wochenenddiensten. Man ruft zwar meist die gleichen Kollegen an, aber so hat man eben mehr Auswahl. #A_Frage9#

I: Hinsichtlich der Anwendung, bist Du generell zufrieden mit der App?

A: Eigentlich schon #A_Frage10#

I: Gäbe es, Deiner Meinung nach, Verbesserungsvorschläge für das Konsil?

A: Eine Rückmeldung wäre super. Also im Sinne von „wie hat man sich entschieden“ – dann könnte ich auch Deine Frage mit dem Einfluss der Zweitmeinung besser beantworten. #A_Frage11#

I: Vielen Dank für das Interview.