Expectations and Fears of Urban Versus Rural Population Regarding the use of an Electronic Health Record

Qualitative Survey About Usage and Acceptance of an Electronic Health Record in Austria

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Abstract—**Nowadays electronic health records are evaluated and implemented worldwide. Future stakeholders, especially patients are not always integrated into all aspects of this process. An important problem with the rollout of a countrywide e-health project is the unequal distribution of the access to modern media, especially to computer and internet ("regional digital gap"), of people living in urban and rural areas - and if there are differences regarding the usage of an electronic health record between these two groups. Differences in these aspects between urban and rural areas where evaluated using an empirical trial. This qualitative survey was based on 20 interviews focused on the discrepancy between urban and rural areas regarding the opinion on the electronic health record in Austria. The results show that differences in some aspects regarding "personal data input", "health information", "own usage" and "data abuse" of an electronic health record exists.**

Keywords - electronic health record; patient empowerment; qualitative survey; medical informatics.

I. INTRODUCTION

The commonly used term for the country wide electronic health record in Austria is ELGA (which is a German acronym for electronic health record) and defined as followed: "ELGA consists of multimedia and health related data and information corresponding to a unique identified person. The data and information originate from different sources of the health sector and may also come from the patient himself and are stored in multiple information systems (virtual record). The data and information can be accessed by authorised people according to their roles and data privacy rules in a tailored way wherever the patient is treated (time- and location-independent)" [15].

The health reformation law, which defines the goal of a nationwide electronic health record, can be considered as a starting point for ELGA and was legislated in 2005 [16]. The next important step was a feasibility study [13] where the situation in Austria was analyzed and a few important concepts towards a nationwide ELGA were identified. It was stated, that one important part for the realization of ELGA is the acceptance of the Austrian citizens, which means, that opinions, wishes and fears of the population should be considered in the design and implementation process. For the realization of an electronic health record (EHR) several important aspects were identified: preliminaries (e.g., acceptance), basic components (e.g., patient portal) and core functions (e.g., exchange of lab reports) [14]. The patient portal includes some important functions for patients: "Health information", which allows the patient to get access to public accessible health information. The second function "result retrieval" allows patients to read all their results, which were created and stored at registered doctors - e.g., from general practitioners. The last function "personal data input" allows patients to store health related personal data in their EHR, e.g., blood pressure [14][17].

The latest implementation of an EHR related project in Austria is the patient portal (www.gesundheit.gv.at), which was released in 2010. At present other defined aspects (e.g., standardization and physician index) are investigated and looked into. More information about past and defined milestones toward an EHR in Austria can be found in [7].

This paper is structured beginning with a description of related work (Section 2), the methodology and the used tools within the study (Section 3). Afterwards the results are presented (Section 4) and discussed (Section 5). Finally some conclusions of the gained results are listed (Section 6).

II. RELATED WORK

A few interesting studies among patients and physicians concerning the above stated aspect about acceptance of an EHR were published [1][4][5][10] but none of them consider differences between rural and urban areas. The paper published by Hoerbst [1] describes attitudes and behaviours among Austrian and German citizens from urban areas. The results point out, that citizens have a positive attitude towards an EHR but also some concerns (e.g., data protection) including problems with information deficits. Another study with patients from London point out, that they are interested in accessing their records to improve the relationship with the clinicians [5]. Requirements for an EHR from the point of view of citizens, physicians and other relevant stakeholder were identified through an Austrian pilot project. Citizens want a secure access, to add own entries and to have control about the access privileges. Physicians wish to have a time- and location-independent

access to relevant information for the treatment in a short time, and the opportunity to write an electronic prescription [10]. The uncertainty among physicians in Austria as well as fears (e.g., additional workload and cost, data will be used by unauthorized people) was shown in another study [4].

People in Austria are spatially not homogeneously distributed, which results in differences between people and their characteristics, which have to be considered in terms of an EHR and its acceptance. The regional digital gap is one of these differences, which describes not only the unequal distribution of the access to modern media, but also considers social environment, education, finances and infrastructure aspects in urban and rural areas. And even though this digital gap is getting smaller over the years, studies can demonstrate that it is still existing [6][8][9][11].

III. METHODS

To gather the required information from the people from urban and rural areas, an empirical comparative study was used. The aim of the study was to gather relevant data covering different characteristics of people's opinion through interviews. The whole study setting was divided into four parts (see Figure 1 for a detailed methodology description). First we conducted some preliminary tasks. Afterwards the study population was acquired for the next step, in which the interviews were conducted. In the last step, the data was analyzed in terms of different aspects through a qualitative content analysis according to Mayring [3].

A. Preliminary tasks:

First a literature research was carried out to get fundamental information about current research in the topics EHR and qualitative surveys as well as state of the art publications about acceptance of EHRs. Afterwards this information was used to conduct 10 pre-interviews (5 people from urban and 5 people from rural areas). These interviews were used to get a baseline opinion of people from urban and rural areas. The interviews were open like a discussion and the relevant answers were noted. For a good validity of the results an equal distribution among the attributes "age", "gender" and "education" was used (which is also called parallelization [12]). The results of these pre-interviews as well as the literature research were used to define the

questions for an interview guideline and the definition of the study setting (e.g., which people form where should be asked).

The study population for the empirical study was constructed by choosing people living in Austria who belong to a rural or a urban area. For correctness of the study the sample had to be stratified. The stratification characteristics were "area" with the groups "rural" and "urban". The criteria for people belonging to these groups can be found in Table 1. Every person had to fulfil each criterion of one particular group to be considered as part of this group sample. Additionally everyone had to meet the definitions of rural or urban (see Table 2) according to their belonging group.

B. Acquiring test people:

At the beginning of this phase a flyer was created, which should be used to help finding participants from urban and rural areas. On this flyer the important facts of the study and their activities were clearly stated and contact addresses were given. Afterwards this flyer was given out using digital copies and on paper. After someone expressed interest in participating in this study, an appointment was made for conducting the interview. People who participated in the study were also found by using gatekeepers (people who help finding participants). These gatekeepers were informed about the content of the study and asked to find people matching the criteria in Table 1 and Table 2 and who like to participate in the study.

C. Realization:

Upon the defined questions and study settings in phase 1 an interview guide and a short questionnaire were created for conducting the (qualitative) problem centred interviews according to Witzel [2]. Before using the interview guide/questionnaire a few test interviews were conducted among friends and relatives of the study authors to see if the questions are understandable. A few adaptations were necessary before the interviews could be conducted. The interviews itself were held were the interviewee was comfortable, in most cases their homes or working places, only a few interviews were held in public places. The course of action was always similar - after a small talk the next steps were illustrated and the participants had to fill out the short questionnaire. Afterwards a tape recording was started and
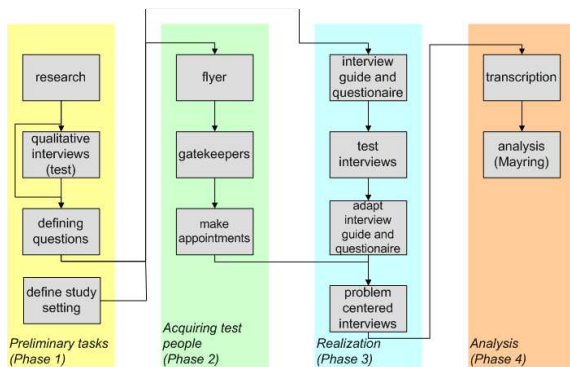

Figure 1.   Methodology used in the study setting

TABLE I.   CRITERIA FOR THE TWO STUDY GROUPS

criteria	characteristics	
	rural	*urban*
living & working	Person is now living & working in an rural area	Person is now living & working in an urban area
childhood	Person has grown up in an rural area (especially between the age 6 and 18)	Person has grown up in an urban area (especially between the age 6 and 18)
sense of belonging	Person feels related to a rural area	Person feels related to a urban area
place of residence	Person spent a big part of its live in a rural area	Person spent a big part of its live in an urban area

definition	characteristics	
	rural	*urban*
Population density	max. 200 residents/km²	min. 1.000 residents/km²
Agglomeration	no agglomeration	with agglomeration
residents	max. 2.000 residents	min. 20.000 residents

the interview began. Subsequently all questions were answered and the interview ended by stopping the tape recording.

D. Analysis:

After finishing all interviews the corresponding tape records were transcribed for further analysis. Then the interviews were analyzed in terms of different aspects through a qualitative content analysis by Mayring [3].

IV. RESULTS

The study population consisted of 20 participants – 10 from urban and 10 from rural areas. In each group (urban and rural) one female and one male person from each of the following age classes were asked: 18-30 years, 31-43 years, 44-56 years, 57-69 years and 70-82 years.

A. Planned EHR-functions

Three of the planned EHR functions in Austria were evaluated with regard to the frequency of utilization and a possible discrepancy between people from urban and rural areas.

1) personal data input

The results show that 60% (6) of the sample from urban areas in relation to 30% (3) of the sample from rural areas would like to use this function and preferring it over a paper-based documentation of their personal health data. Figure 2 shows the results for the planned EHR-function "personal data input".

The answers to this topic were divided into three categories:

- "utilization" – the participant would use the function,
- "utilization after demand" – the participant would use the function only when the doctor requests it,
- "no utilization" – the participant would not use the function and prefer a paper-based documentation of the personal health data.

In terms of age the results in Figure 3 show that 50% (3) of the interviewed people from urban areas older than 43 years would use the planned EHR-function "personal data input" after a request from their doctors. In comparison with the interviewed people from rural areas older than 43 years who would not use the planned function at all and prefer a paper-based documentation of their personal health data in case of need over an EHR.

The data was analyzed and is displayed in Figure 4 and demonstrate that 80% (4) of the interviewed women from urban areas would use the planned EHR-function "personal data input" after the request from a doctor. In contrast only 40% (2) of the interviewed women from rural areas would do likewise.
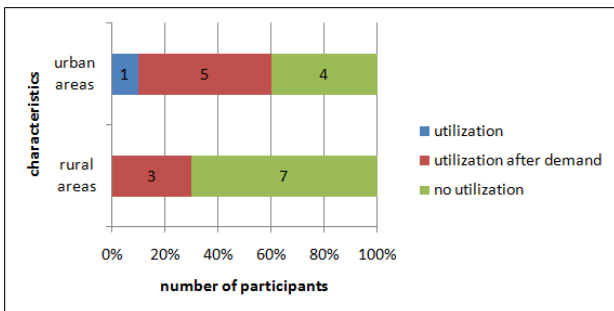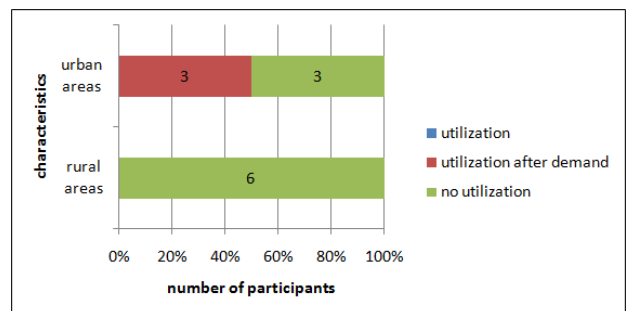

Figure 2.   Planned EHR-function "personal data input"

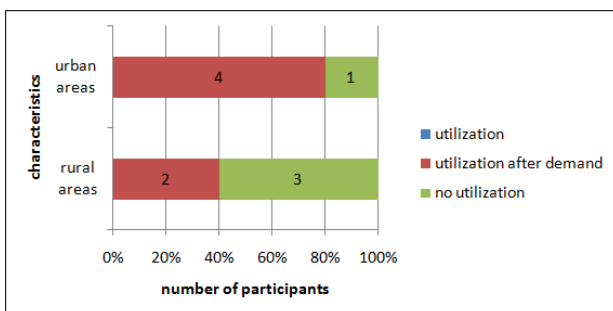Figure 3.   Planned EHR-function "personal data input" with focus on people older than 43 years

Figure 4.   Planned EHR-function "personal data input" with focus on women
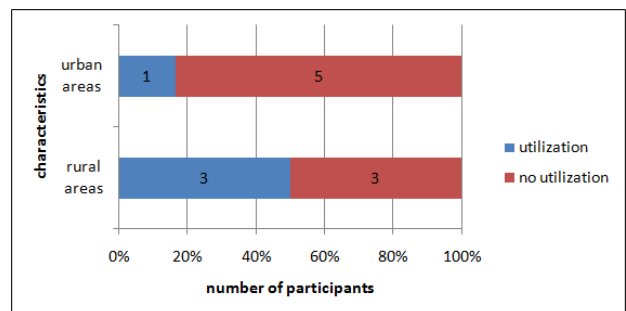

Figure 5.   Planned EHR-function "health information" with focus on people older than 43 years

2) health information

The general results for the second planned EHR-function "health information" shows no discrepancy between the participants from urban and rural areas. But with the focus on age (refer to Figure 5) 50% (3) of the participants from rural areas older than 43 years in comparison to 16,67% (1) of the participants from urban areas older than 43 years would use the offered function "health information" of the EHR in Austria.

Independent of the discrepancy, participants who said that they would probably not use the planned EHR-function "health information" explained their decision with the following arguments:

- Enough other information sources exist.
- Loss of anonymity.
- General practitioner is the only information source.

The other information sources were defined upon request as internet, media and institutions like health ministry, health insurance, etc.

3) result retrieval

The evaluation of the third planned EHR-function "result retrieval" shows no differences between the sample from urban and rural areas.

B. Utilization of an EHR and its related functions

During the evaluation of the results and the question if the participants trust themselves about using an EHR and its related planned functions with their own computer and internet skills, it turned out that the assessment was independent of the particular EHR-functions.

As shown in Figure 6, 90% (9) of the participants from urban areas estimate their own computer and internet skills good enough to handle an EHR and its functions on their own. As opposed to this only 50% (5) of the participants from rural areas would estimate their computer and internet skills good enough. The rest feels incapable about using an EHR on their own and would submit this task to somebody else (e.g., general practitioner, or relatives).

C. Fears and anxieties

In terms of fears and anxieties the results show some differences between people from urban and rural areas.

Table 3 shows how the answers from the participants regarding the topic of fears and anxieties about a possible data abuse when using an EHR were divided into three categories.
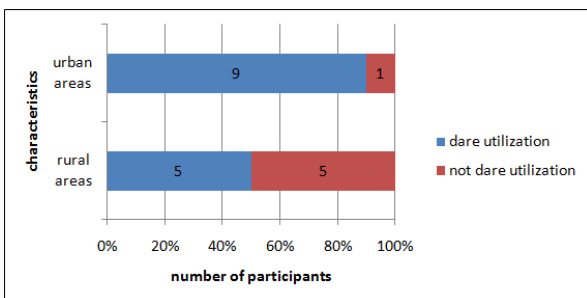
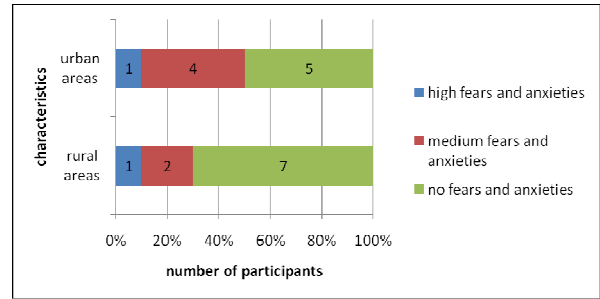

Figure 7. Fears and anxietiesabout using an EHR

TABLE III. CATEGORIES OF ANSWERS REGARDING FEARS AND WORRIES

category	characteristic			
	Data risk in comparison to the condition without an EHR		Concerns that the employer can get one's hands on the data stored in an EHR	
	increased	*steady*	*yes*	*no*
High fears and anxieties	X		X	
Medium fears and anxieties		X	X	
	X			X
No fears and anxieties		X		X

Figure 7 shows the results of analyzing the data and demonstrates a discrepancy: 70% (7) of the sample from rural areas indicate that they have no fears and anxieties about a misuse of data through the utilization of an EHR. They don't believe that the risk of data fraud is increased by using an EHR in contrast to the condition without an EHR.

They also have no concerns that the employers can get one's hands on the data stored in an EHR. In the contrary only 50% (5) of the sample from urban areas think about this topic in the same way.

D. Confidence in the general practitioner

The answers from the interviewed people regarding the issue of confidence in their general practitioner were divided into four categories dependent on the approval to the

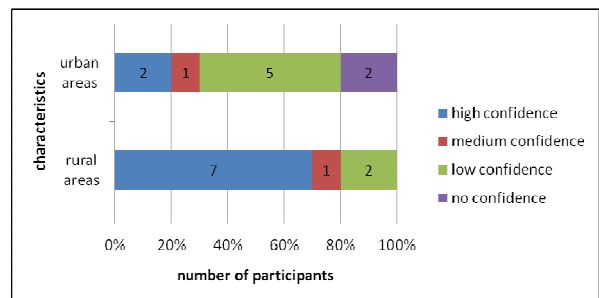Figure 6. Dare of utilization of an EHR and its related functions

Figure 8. Confidence in the general practitioner

following statements:
- Satisfaction with the general practitioner.
- General practitioner as first contact point for all health problems.
- Provision of information by the general practitioner.

Depending on the amount of approvals to the statements, the four categories were characterized as follows:
- "high confidence": approval to all three statements
- "medium confidence": approval to two of the three statements
- "low confidence": approval to one of the three statements
- "no confidence": no approval to any of the three statements

As shown in Figure 8, 80% (8) of the participants from rural areas have confidence in their general practitioner, which can be classified from medium to high. In comparison to this only 30% (3) of the participants from urban areas who classify their confidence in their general practitioner equally. Furthermore 20% (2) from the participants from urban areas in relation to 0% (0) from rural areas have no confidence in their general practitioner at all.

E. Information needs

The participants were asked if they estimate that they have enough information about the upcoming introduction of an EHR in Austria and about the EHR itself or if their information needs about the current situation are satisfied yet.

Figure 9 shows the results and demonstrates that 100% (10) of the sample from urban areas still need more information about an EHR in Austria beyond the information they received by now through media (e.g., newspaper, TV, radio) and/or physicians. In the contrary only 70% (7) of the sample from rural areas who also still have information needs. The rest is satisfied with the information they have about an EHR and don't need more details.

F. Attending a course in using an EHR

The interviewed people were asked if they would embrace the opportunity if a course of learning how to handle an EHR provided for instance by the health ministry. The general results show no differences between the interviewed people from urban areas and those from rural areas. But in terms of age (shown in Figure 10) 50% (3) of the
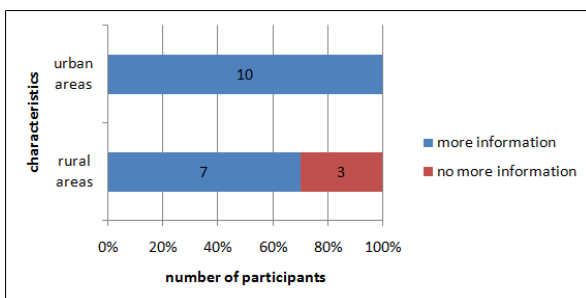

Figure 9.   Information needs about the introduction of an EHR in Austria
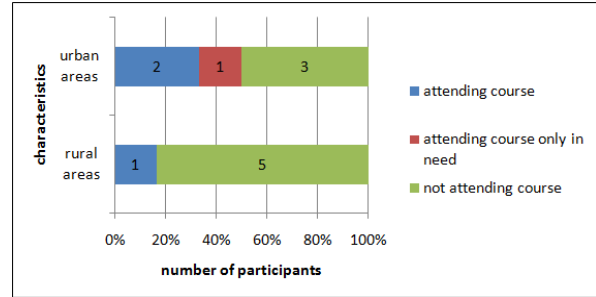

Figure 10.   Willingness of attending a course about using an EHR

participants from urban areas older than 43 years would attend such a course. As opposed to this only 16,67% (1) of the participants from rural areas older than 43 years would also attend a course of learning how to handle an EHR.

Those participants who said that they would attend a course were also asked if they would pay for it: 66,6% (2) of the sample from urban areas and 100% (1) of the sample from rural areas would pay a small amount. The rest thought that such a course has to be offered for free.

Independent of the discrepancy, participants who said that they would not attend a course assume that an EHR can be handled with average computer and internet skills. As a result they would use tools like online help, hotline and/or user manuals.

G. Bias

During the implementation the following points may have influenced the results:

The sample size (20 people) is small and the results should be only considered as a trend. During some interviews other people like husband/wife or children were present: Some of them were only listening to the interview. But some of them were interrupting the interview many times and/or wanted to answer for the participants. Therefore the answers of the participants could be influenced in a way and/or the participants receded from their opinion.

V. DISCUSSION

The trial pointed out differences in the acceptance and the utilization of an EHR between people from urban and rural areas, although there is no direct connection regarding EHR in terms of membership to one of these areas. One deciding factor of this discrepancy can be the "regional digital gap", which could influence people from rural areas for a lack of motivation in using an EHR compared to people from urban areas, because fewer opportunities for access, low frequency of use and poor skills in handling computer and internet may exist. Also the utilization of the planned EHR-function "personal data input" might be associated with these reasons: The computer and internet is more part of the daily living by people from urban areas than from those from rural areas. Therefore people from urban areas are possibly more willing to use this EHR-function than people from rural areas who use computer and internet less.

Furthermore there might be a relation between the regional digital gap and the attending of a course about using

an EHR: People from urban areas older than 43 years are more willing to attend such a course because they own more often a computer with internet access in comparison with people from rural areas older than 43 years. People from rural areas older than 43 years may have less experience with using a computer and/or with utilizing the internet and think that they are too old for these things and that such a course would be useless for them.

People from rural areas have less fears and worries about a possible data abuse when using an EHR. One reason for that could be that more people from rural areas work in family businesses and therefore may not have issues, that their employer – who is at the same time a family member – is informed about their personal health data.

For quite a lot of people from rural areas the only contact point for questions about health topics might be their general practitioner: Commonly general practitioners have a more important role for patients in rural areas than in urban areas. As a consequence people from urban areas may have apparently more sources where they get the needed information about health topics and do not have to use the planned EHR-function "health information".

More information about an EHR and its introduction in Austria is needed probably by people from urban areas because they are very critical and want to know all about it before they decide to use it or not. As opposed to this people from rural areas seemingly trust their general practitioner and would probably follow their attitude according to their statements.

VI. CONCLUSION

Based on the results different actions could be taken to support the introduction of an EHR and to improve its acceptance for people from urban areas and rural areas:

- It is important that people from urban areas are informed about the introduction of an EHR through media or corresponding institutions (e.g., health ministry) to dispel concerns about data abuse. Whereas people from rural areas should be informed via the general practitioner: Therefore it could be useful to inform the general practitioners who are working in rural areas in detail about an EHR so that they can pass the information to their patients.
- The planned EHR-function "health information" should be promoted more to people from urban areas. People from urban areas will use this function hereafter as an equal or better substitute for their previous sources.
- Establishing an online help, hotline and user manual is a crucial measure to support the potential user with problems.
- People from rural areas might get trust in themselves about using an EHR on their own if they will be shown how an EHR can be handled.

Follow up studies are necessary because of the small sample size. However this trend can act as a starting position for a quantitative trial with a large sample size. The objective of such a trial should be to gain more comprehensive results.

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