Socioeconomic and behavioural factors associated with access to and use of patient Electronic Health Records: a cross-sectional analysis of four European countries.

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Research

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Socioeconomic and behavioural factors associated with access to and use of patient Electronic Health Records: a cross-sectional analysis of four European countries.

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**Abstract:**

(350 Words)

**Background:** Access to and use of digital technology are more common among people of higher socioeconomic status. These differences might be due to a lack of interest, not having physical access or having lower intentions to use this technology. By integrating the digital divide approach and the User Acceptance of Information Technology (UTAUT) model, this study aims to further our understanding of socioeconomic factors and the mechanisms linked to different stages in the use of individuals’ electronic health records (EHR):

**Methods:** A cross-sectional online and in-person survey was undertaken in the areas of Lorraine (France), Luxembourg, Rhineland-Palatinate and Saarland (Germany), and Wallonia (Belgium). First, exploratory factor analysis was performed to group items derived from the UTAUT model. Next, we applied linear and logistic regressions controlling for country-level heterogeneity, health and sociodemographic factors.

**Results:** A total of 829 individuals aged over 18 completed the questionnaire. We found evidence of socioeconomic inequalities in the access to and use of EHR. Education and income played a significant role in individual’s desire to access their EHR. Being older than 65 years, and migrant, were negatively related to the desire to access EHR. An income gradient was found in having a physical access to EHR, while for the subgroup of respondents who expressed desire to have access, higher educational level was positively associated with intentions to regularly use EHR. In fully adjusted model testing the contribution of UTAUT-derived factors, individuals who perceived EHRs to be useful and had
the necessary digital skills were more inclined to use their EHR regularly. Social support and lack of anxiety in using technology were strong predictors of regular use of EHR.

**Conclusion:** The findings highlight the importance of considering all stages in the use of EHR (desire, physical access, and regular use), while paying special attention to migrants and people with lower socioeconomic backgrounds who may not be able to exploit the potential of EHRs. As EHR use is expected to come with health benefits, facilitating access and regular use for those less inclined could lead to increases in health equity.

**Background**

Personal Electronic Health Records (EHR) have been championed as a way to improve the access, delivery and the quality of health care services. They are defined as “real-time, patient-centred records that provide immediate and secure information to authorized users” (1). EHRs are expected to play an increasingly important role in empowering patients by facilitating better health information exchange between patients and health professionals, and in turn enabling patients to be proactive and engage more effectively as partners in their care (2). It has been noted that the provision of EHRs will further help with self-care, facilitate the better coordination of healthcare services and improve health outcomes (3,4). In this context, the European Commission supports the adoption of EHR within and between its member states, with a strong emphasis on the safety and the security of patients’ health data. To date, most countries within the European Union, with the exception of Germany, have developed and to some extent implemented EHRs (1).
However, even though individuals have physical access to the electronic health portals and their EHRs, the uptake among certain socioeconomic and migrant populations has been rather slow and socially patterned (5–8). Health inequalities might thus be worsened by the fact that technologies that facilitate self-management and patient engagement are used more frequently by those who are already healthier and more socioeconomically advantaged (9,10). To date, EHRs have been studied through two different approaches. On one side, scholars are concerned with the digital divide, examining disparities in the use of digital technology across different groups (11–14). On the other side, research concerned with the use of digital technologies is rooted in the Unified Theory of Acceptance and Use of Technology (UTAUT) approach, predominantly used in the field of social psychology and which explores the individual intentions for the use of ICT (Information Communication Technologies) (15). The integration of these two approaches can provide a fresh perspective on the ways in which digital technologies may contribute to deepening health inequalities.

The notion of the digital divide has been described as a paradigm with two levels. The first level refers to disparities in actual access to digital technology, and the second level goes beyond access and explores the skills and abilities that are required to utilize these technologies (11,16,17). Previous studies have shown that individuals with a higher socioeconomic status are more likely to perform better on both levels of the digital divide. Those with a more advantaged socioeconomic position have a better access to digital technology and also more frequently have the skills required to used them, as compared to individuals from lower socioeconomic strata (7,12,18,19). Evidence, mainly from the United States, also suggests that racial and ethnic minority patients and those with lower incomes are less likely to have access to and to adopt patient EHRs (10,18). Indeed, it is most likely
that those with higher incomes will have earlier access to material goods such as computers, portable health devices or various health monitoring software. Additionally, those with a higher education level are more inclined to use some form of information technology, mostly through their job positions as compared to those from the lower occupational categories whose jobs do not necessarily required contact with ICT.

Van Dijk (2006) further distinguishes four broad categories in research on the digital divide: motivational access; physical access; skills and the actual use of digital technologies. He argues that prior to physical access to a digital tool, people need to wish to have access – “a much neglected phenomenon” in the digital divide literature (16). The disengagement with new technologies is explained as involuntary and related to possibilities and lack of opportunities – some people simply do not have access to an ICT or a certain digital technology (20), however, even in places where everyone has access, some people are still not utilizing ICT (21). This points to the need to look beyond physical access and examine more challenging notions of ‘choice’ and ‘cultural legitimacy’ linked to peoples’ social positions and lifestyles (22). Indeed, the notion of choice goes back to the sociologist Pierre Bourdieu (1984) who argues that people from more affluent social-economic backgrounds make strategic choices that oftentimes lead to a long-term benefit (23). In the context of the choice as to whether to access their EHRs or not, we can assume that individuals who are more motivated to use this digital tool could exploit its potential and turn it to their health advantage. Conversely, individuals from lower socioeconomic background express a feeling of cultural illegitimacy about using digital devices and generally feel that “the use of ICT oversteps their social position” (24:9 ). Although some of Bourdieu’s concepts such as “choice of necessity” and “cultural illegitimacy” has been evidenced in the utilisation of
healthcare services and digital self-tracking apps (24, 25) they have not been studied in the field of use and access to EHR. Thus, while the digital divide approach is useful to understand which groups are disadvantaged in the use of new digital technologies and why, it is important to identify specific behavioural processes that lead to individuals’ acceptance and intention to adopt the EHR. This type of approach its best represented by the UTAUT model.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model by (15) integrates behavioral elements of eight different models and which aims to explain the intention to use digital technologies through six main constructs, known as:

1. Performance acceptancy: the degree to which individuals believe that the digital technology will improve their performance;
2. Effort expectancy: the ease of use of the digital technology;
3. Social influence: the degree to which an individual knows someone who uses that technology;
4. Facilitating conditions: the degree of perceived support to use the technology;
5. Personal attitudes towards using digital health technologies;

Proponents of this theory argue that digital technologies, even if available, are not always accepted by individuals for various reasons, such as: devices that are hard to use, lack of training and computer skills, not seeing the added value in the technology and low self-efficiency and social support (26). However, results show multiple discrepancies in explaining the factors that contribute to the use of digital devices. Hoogenbosch B. et al.,
found that effort and performance expectancy were the only constructs that significantly influence patients’ use of a health portal (27). Drawing on the UTAUT model, Hoque R and Sorwar G (2017) revealed that, with the exception of facilitating conditions, none of the constructs were associated with the use of a health technology (28). In addition, researchers that used this model have also argued that the use and the adoption of digital technologies is moderated by sociodemographic variables, especially age and gender (15,29). However, literature on the digital divide has shown that there is also a socioeconomic dimension to these disparities that has to be considered.

In this context, the focus of this paper is therefore to integrate the digital divide literature with the UTAUT concepts to provide a better understanding of the socioeconomic and behavioural determinants linked to individuals’ motivations, intentions and access to patients EHRs. Indeed, as van Dijk (2006) highlights that there is a lack of interdisciplinary research, as well as a need to incorporate social psychology into the digital divide research. We believe that UTAUT can shed light on important mechanisms that determine the higher acceptance and use rates among those from more affluent backgrounds. Hence, this study goes beyond the socioeconomic circumstances of individuals by incorporating the UTAUT model.

In particular, we are interested to know:

- Which sociodemographic and socioeconomic factors determine different stages of EHR use: desire to access, physical access and intention to regularly use EHR?
• What behavioural factors linked to the use and acceptance of technology are associated with the intention to regularly use EHR, and are these determined by the socioeconomic characteristics of the individual?

Methods

Study design and population

The study was undertaken as part of a cross-country, collaborative project (INTERREG-APPS) in the Greater Region (30), a cross-border region consisting of the areas of Lorraine (France), the whole of Luxembourg, Rhineland-Palatinate and Saarland (Germany), and Wallonia (Belgium) (Appendix 1: figure of the map of the Great-Region). It served also as a tool to raise awareness on the existence of the EHR in the Greater Region (with the exception of Germany where as mentioned above EHRs are not yet available).

A self-administrated questionnaire was developed with a small group of patients’ representatives of each country. The participants (above 18 years) were recruited online and also via various patients’ associations, hospitals and health clinics. The survey was piloted among 24 people across the regions to ensure the validity and reliability of the questions, and to check completion time and participant comprehension. Following the pilot study, a minor adjustment was made to reflect participant comments. The final version of the survey included questions on demographics, socioeconomic and health status, desire and intention to use their EHR, and current access and use of EHR. After translate and back-translate by native experts, the questionnaire was offered in four different languages: French, German, Luxembourgish and English.
Outcome Measures

The main three outcome variables in this study were:

1. Having physical access to EHR (“Do you currently have access to your Electronic Health Record?”) measured as a binary indicator (yes, no). Those who answered by the negative on this question were directed to the next outcome.

2. The desire to access EHR (“Would you like to have access to your Electronic Health Record?”). It is important to mention that if respondents indicated that they do not wish to access their EHR, they were automatically re-directed to the demographic and socioeconomic questions and did not respond to the third outcome of interest in order to limit missing data.

3. The intention to regularly use their EHR (“I intend to use my EHR on a regular basis”) was assessed using a five-point Likert scale from “strongly disagree” to “strongly agree”. This is one of the most used dependent variables in the UTAUT model and a very strong predictor for actual use of digital technologies (31,32).

Independent variables

As previous studies show disparities in the use and access to digital health technologies, we used income, education and country of origin as the main socioeconomic status indicators. When possible, these sociodemographic and socioeconomic questions were drawn from established surveys. As educational systems vary across countries, we used the ISCED-2011 educational levels classification to harmonise the educational levels across countries. Household income was measured by self-assessed comfort with participant household
income. The question asked respondents to rate their income from: being comfortable on present income; coping on present income; finding it difficult; and finding it very difficult on present income. Furthermore, we also looked at the association of the technology adoption constructs measured through the six items mentioned above: performance and effort expectancy; social influence; facilitating conditions; anxieties; and personal attitudes towards digital technologies using the UTAUT model by Venkatesh et al. (2003).

Covariates

A number of confounders were thought to be associated with both access to and intention to use EHR, as well as the socioeconomic characteristics of the participants, such as age, gender, employment and partnership status. Previous studies have shown that poor health status and the presence of disease is also associated with the increased probability of using digital health technology (33,34). Hence, we also controlled for self-reported chronic disease (yes/no). To account for country-level heterogeneity and differences in the health care systems we accounted for countries-fixed effects (35).

Data analysis

We used descriptive statistics to analyse the characteristics of the sample. To answer what factors are associated with having access to and the desire to access their EHR, we used logistic regressions. For the third dependent variable that measures the degree to which individuals intend to use their EHR, we used linear regressions. However, to facilitate interpretation of the UTAUT six-item components, we utilised explanatory factor analysis with orthogonal rotation to group similar items into broader concepts. Explanatory factor analysis groups together interrelated items in order to reduce the dimensions of variables.
by clustering items that are highly correlated into a factor which can then be included in the regression analysis (36). To ensure that all the variables in the UTAUT construct are correlated in the same direction i.e. positively correlated, before performing the factor analysis we reversed the scale that measured the anxiety levels, and named it lack of anxiety. Internal consistency among the different factors across the UTAUT, was tested using Cronbach’s alpha.

**Results**

**Sample characteristics**

A total of 829 individuals completed the questionnaire. The majority of the sample was female (60%). Its mean age was 44.4 years. While a total of 615 respondents (83%) expressed that they want access to their EHR, 62 respondents (7.5%) said they already have access, and of those only 22 (35%) have already used their EHR. The majority of the respondents were born in one of the countries represented in the Greater region (87%), with 13% were born outside these four countries. Further participant characteristics are presented in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Description of the sample</th>
<th>%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40.07</td>
<td>331</td>
</tr>
<tr>
<td>Female</td>
<td>59.93</td>
<td>495</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mean, SD)</td>
<td>44.4</td>
<td>16.84</td>
</tr>
<tr>
<td><strong>Country of residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luxembourg</td>
<td>27.26</td>
<td>226</td>
</tr>
<tr>
<td>Belgium</td>
<td>50.78</td>
<td>421</td>
</tr>
<tr>
<td>France</td>
<td>14.60</td>
<td>121</td>
</tr>
<tr>
<td>Germany</td>
<td>7.36</td>
<td>61</td>
</tr>
</tbody>
</table>
Results from the exploratory factor analysis

The factor analysis pointed to the existence of three key dimensions among the eight questions asked to represent the six dimensions of the UTAUT. The first factor grouped the perceived usefulness and ease of use in one common factor, the second factor grouped the variables that describe social capital, including social support, and the last one grouped the two items that measure an individual’s anxiousness in the use of digital technology. The table from the detailed results from the factor analysis can be found in Appendix 2.

Cronbach’s alpha coefficient confirmed the reliability of the factors ($\alpha = 0.79$), with the set of items being closely related with a relatively high internal consistency. The three factors
Multivariate regression

Table 3 shows the associations of the demographic and socioeconomic factors with whether individuals want to access their EHR at all, and the likelihood of respondents reporting access.

Desire to access EHR and actual access

After controlling for country fixed effects and demographic variables, the results indicate that a higher educational level (OR=2.35, 95% CI = 1.36-4.05) and living comfortably on income (OR=1.87, 95% CI = 1.11-3.13) are positively associated with the desire to have access to their EHR in the expected direction. However, being over the age of 65, and being a migrant, i.e., born outside of the Greater Region, was negatively related to the desire to access their EHR. Women were more likely to report the desire to access their EHR (OR=2.14, 95% CI = 1.36- 3.37). In this sample, the presence of a chronic disease, partnership status and number of individuals in one’s social network were not associated with having a physical access and to desire to access EHR.

Looking more closely at the interplay between the sociodemographic and socioeconomic indicators, being a migrant and living comfortably on present income was significantly associated with the desire to access EHR, with however large confidence intervals, likely due to the small sample size. We thus report the descriptive statistics (not presented in this
article): firstly, compared to 16 percent of non-migrants, 24 percent of migrants reported that they do not wish to access their EHR. Of migrants who do not wish to access their EHR, the majority (71%) stated that it is difficult or very difficult to live on their present income. On the other hand, 76 percent of those migrants who wish to have access to their EHR stated that they are comfortable or coping on their present income.

Exploring the relationship between those who have physical access to their EHR and the different sociodemographic variables, we found that those born outside of the Greater Region and those who reported that they are living comfortably or coping on present income were more likely to have physical access to their EHR (OR=2.59, 95% CI = 1.087-6.158), (OR=2.56, 95% CI = 1.060-6.188), respectively.

<table>
<thead>
<tr>
<th>Outcomes:</th>
<th>Desire to access their EHR</th>
<th>Have physical access to EHR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR  95%CI</td>
<td>OR  95%CI</td>
</tr>
<tr>
<td>Country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ref. group: BE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>0.915 0.319 2.623</td>
<td></td>
</tr>
<tr>
<td>FR</td>
<td>1.746 0.676 4.510</td>
<td>4.444 0.157 12.57</td>
</tr>
<tr>
<td>LU</td>
<td>3.014 1.557 5.834</td>
<td>1.263 0.554 2.878</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ref. group: Male)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2.139 1.357 3.372</td>
<td>0.705 0.342 1.451</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ref. group: 18-15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36-65</td>
<td>.911 0.525 1.581</td>
<td>1.784 0.717 4.443</td>
</tr>
<tr>
<td>over 65</td>
<td>0.487 0.240 0.987</td>
<td>3.000 0.873 10.31</td>
</tr>
<tr>
<td>Partnership status</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the first step, we explored the contribution of demographic and socioeconomic variables to the intention to use EHR. The first model, adjusted for country-fixed effects, shows a clear gradient when considering regular use of EHR: higher educational level was positively associated with the intention to regularly use EHR. After additionally including the UTAUT-derived factors in Model 2, education was rendered insignificant. However, we found a strong relationship between the UTAUT constructs and the intention to regularly use EHR. Individuals who perceive the EHR to be useful and those who have the necessary digital skills were more inclined to use the EHR regularly. The results further demonstrated that social support and lack of anxiety of using technology were strong predictors of the regular
use of medical records. As we were particularly interested in the interplay of the UTAUT
behavioural variables with socioeconomic factors we also modelled an interaction between
the education level and the UTAUT factors (not presented), however the pairwise
interaction was not significant, and therefore not included in the model.

Table 4: OLS regression, relationship between intention to regularly use EHR and demographic, socioeconomic
and behavioural factors

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef. 95% CI</td>
<td>Coef. 95% CI</td>
</tr>
<tr>
<td><strong>Country (Reference group: BE)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE</td>
<td>0.130 -0.241 0.502</td>
<td>0.174 -0.268 0.615</td>
</tr>
<tr>
<td>FR</td>
<td>0.172 -0.086 0.430</td>
<td>0.151 -0.086 0.388</td>
</tr>
<tr>
<td>LU</td>
<td>0.429 0.196 0.662</td>
<td>0.394 0.202 0.586</td>
</tr>
<tr>
<td><strong>Gender (Reference group: Male)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.140 -0.041 0.321</td>
<td>0.098 -0.066 0.261</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>0.005 -0.001 0.011</td>
<td>0.004 -0.001 0.009</td>
</tr>
<tr>
<td><strong>Partnership status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living in a couple</td>
<td>0.036 -0.208 0.281</td>
<td>0.000 -0.214 0.214</td>
</tr>
<tr>
<td><strong>Migration status</strong></td>
<td></td>
<td></td>
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<tr>
<td>Not born in the GR</td>
<td>-0.189 -0.494 0.115</td>
<td>0.023 -0.260 0.305</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
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<td></td>
</tr>
<tr>
<td>Not employed</td>
<td>-0.026 -0.271 0.219</td>
<td>-0.023 -0.224 0.178</td>
</tr>
<tr>
<td><strong>Chronic disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-0.174 -0.369 0.021</td>
<td><strong>-0.225 -0.387 -0.063</strong></td>
</tr>
<tr>
<td><strong>Perception of income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coping/comfortable</td>
<td>0.211 -0.002 0.423</td>
<td>-0.011 -0.213 0.191</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ref. group: secondary and less)</td>
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</tr>
</tbody>
</table>
Discussion

This study contributes to the literature on EHR access and adoption in two ways. The study explores different stages in the adoption of EHR, mainly desire to access, physical access and intention to regularly use patient EHRs, and integrates both socioeconomic and technology related factors. The findings suggest that although closely related, each of the three stages of EHR use is determined by different factors. While education plays a larger role in the desire to have access to EHR, the effect of income operates through the possession of the material factors needed to have physical access to EHR. On the other hand, for respondents’ intentions to regularly use their EHR, socioeconomic factors were supplemented by the perceived usefulness and ease of navigation of the EHR, as well by an individual’s level of social support. Some of the main findings is that there is a clear gradient in the desire to access EHRs and in actual access, with those more educated and living comfortably on present income showing a stronger desire to obtain access to their EHR. This is in line with previous research indicating that those from lower socioeconomic backgrounds show lack of interest in digital devices (24,37). Migrants and those living more comfortably on present income are more likely to have an actual access to their EHR compared to those living less comfortably. As some studies highlight this might be linked to the ability to own technologies or broadband internet, or a higher awareness of their existence (10,16,38). Migrants may be also more likely to possess digital devices and internet as a mean of communication with their families and friends in the country of origin. However, when it
comes to the desire to access EHR, the results demonstrate that being a migrant, male and of older age is negatively associated with the desire to access EHRs. Some scholars point out, that the desire to access to EHR might be linked to the issue of trust in health professionals, anxieties and technophobia (9,16,39). Stronger anxiety, feelings of cultural illegitimacy, reluctance or even rejection of ICT has been also shown to act as a barrier of use and adoption of health digital technologies among the lower socioeconomic cohorts (24).

The study further highlights the importance of perceived income among migrants when looking at issues of desire to access EHR. Income comfort among migrants was an important determinant of whether they want to access their EHRs, with those feeling in a difficult financial situation not wishing to have access to EHRs at all. On the contrary, migrants who are feeling more comfortable with their income were more likely to want to have access and to have an actual access to their EHR, which shows the disadvantages faced by migrants with a lower perceived income. Drawing on Bourdieu’s theory of practice, and his concept of ‘choice of necessities’ this could be explained through the fact that peoples’ lifestyle choices and attitudes are based on their socioeconomic circumstances (23). Those who are free of economic necessities are able to make long-term choices that are independent of their day-to-day circumstances. In this context, it could be argued that those who feel more financially comfortable can make more long-term strategic choices such as having access to their EHR in order to better manage their health. Therefore, health professionals play a vital role in showing the benefits of the EHR and in offering encouragement to individual to obtain access to their records. An alternative possibility would be to provide universal EHR access on an opt-out basis, with a possibility to close or permanently delete the EHR at any
time. At the moment, individuals who are aware of the existence of EHRs can voluntarily access or they are invited to access their records by their clinicians. However, as evidenced by Ancker et al., 2017, an opt-in policy of access to patient portals was associated with socioeconomic disparities (10). Of course, for this policy to be fruitful more structural factors have to be addressed such as access to a computer and the internet.

On the other hand, our results demonstrate that UTAUT provides a useful framework to uncover specific mechanisms through which individuals intend to use their EHR on a regular basis. In this sample, perceived usefulness and ease of use were the strongest predictors of EHR acceptance and use, followed by social support and anxieties related to the use of new technology or data security. Although in the first model we found that education was associated with the regular use of EHR, in the model where we included the UTAUT-derived factors, education lost its significance. This results are somewhat surprising as in the digital divide literature it has been noted that technical competence and digital literacy is a strong factor that influences the use of technology (11,16). However, we assume that with the current regression model it is difficult to disentangle the effect of education and the UTAUT derived factors. More complex mediation analysis is required to uncover the pathways through which socioeconomic factors play role in the specific UTAUT constructs. Finally, our findings confirmed results of other studies and showed the presence of chronic disease is closely related to the individuals use of EHR.

Although this study is based on a unique harmonised cross-country design, given the limitation of the sample and the nature of the convenience sampling technique, there could be selection bias due to selective enrolment into the project. Although in-person survey
promotion was undertaken in some countries, the answers might be biased towards those who already have access to a computer or the internet. However, prevalence of EHR use in LU in this study was in line with the prevalence of use in the general population. A comparison of EHR users in this study with EHR users in the general population of the four involved countries is unfortunately not possible due to a lack of registries. Lastly, our results are consistent with previous studies highlighting the importance of socioeconomic factors and migration when considering adoption and use of EHR.

One limitation of this study was the small number of patients who actually used their EHR (n=22). It was thus not possible to undertake multivariate statistical analysis on the characteristics of these participants, and on whether there are any socioeconomic differences in the purposes for which individuals used their EHR, and to fully understand the digital divide phenomenon. With increasing prevalence of use in the general population, further studies may be better able to provide insights into this facet of EHR use.

**Conclusion**

Our study highlights the importance of considering all stages in the use of EHR. If EHR are to be implemented successfully and among all socioeconomic groups, policy-makers need to take into consideration each stage of EHR use: desire to use EHR, make sure everyone is aware and has a physical access to EHR, and encourage adoption and regular use of EHR, though designing and promoting user-friendly records which are easy to navigate. Availability of EHR is not sufficient as such and must come along with appropriate training of individuals from lower socioeconomic background. At the same time health professionals need to explain the added value of the EHR to their patients. Special attention needs to be
payed to those who are not motivated or who do not wish to have access to their EHR. As our results demonstrated, these are the most disadvantaged groups who may not be able to grasp the benefits they could derive from the regular use of their EHR. Failing to do so could exacerbate already existing health inequalities.

**Abbreviations:**

- EHR – Electronic Health Record
- ICT – Information Communication Technologies
- UTAUT - User Acceptance of Information Technology
- INTERREG – Interregional
- APPS - Approche Patient Partenaire de Soins

**Declarations:**

**Ethical approval and consent to participate**

The study was granted ethics approval by all involved research institutions’ ethics review panels (ERP 19-040 APPS-EHR INTERREG). Informed consent was obtained by all survey participants.

**Consent for Publication**

Not applicable
Availability of data and materials

The dataset supporting the conclusions of this article is available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ Contributions

IP and AL conceptualized and designed the study. IP conducted and interpreted the statistical analyses and wrote the draft of the article. MB and BP acquired funding. MB, BP, and LC coordinate the research project APPS of which the study uses data. IP, ELB, BP, PB, and MB³ contributed to data collection. All authors revised the article for intellectual content. All authors approved the final version of the article.

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Supplementary Files

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- Appendix1.pdf
- Appendix2.pdf