Health Technology Access and Peer Support Among Digitally Engaged People Experiencing Homelessness: A Qualitative Analysis

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Abstract

Background: Although the effects of digital health are getting wider scientific attention, very little is known about the characteristics of digitally engaged people experiencing homelessness, especially in Central and Eastern Europe. Our previous research revealed a considerable level of Internet use in the homeless population of Budapest, Hungary for general (52.9% - 350/662) and for medical purposes 34.6% (229/664), moreover, a digitally engaged subgroup was identified (19.5%, 129/662).

Objective: This exploratory research aimed to map out the resources, attitudes, and behavior of digitally engaged homeless individuals in relation to digital technology to set the ground for potential health policy interventions, enabling better access to health services by strengthening the digital components of the existing healthcare system.

Methods: Between 18 August and 27 October 2022, a total of 12 in-depth semi-structured interviews were conducted in 4 homeless shelters in Budapest, Hungary. Upon first analysis of three independent evaluators, 2 interviews were excluded. The interviewees were chosen based on purposive sampling with pre-defined inclusion criteria. Thematic analysis of the transcripts was conducted.

Results: In the thematic analysis, four main themes (attitude, access, usage patterns and solutions for usage problems) emerged. Health-related technology use mostly appeared in health information seeking behavior. Online search for prescribed medication (5 interviews), their active ingredients (4 interviews), medical herbs believed to replace certain pills (2 interviews) or foods, natural materials (1 interviews) were present, as well as mobile health application use (3 interviews). The intention to circumvent or check on mainstream healthcare solutions was grounded mainly on previous negative experiences in the healthcare system. Several gaps to the daily use of technology were identified by the interviewees, however, more than half of them turned out to be contact points for their peers for digital problem-solving or basic digital literacy skill enhancement in the homeless shelters (6 interviews). Also, the lack of institutional support or special programs targeting senior clients was noted.

Conclusions: Digitally engaged homeless individuals might become mediators between their peers and any comprehensive digital health program. They have the trust of their peers, recognize and harness the benefits of digital technology, and are able to provide meaningful help in technology- and usage-related issues as an expert by experience. Results show that digital health services could have great promise in community shelters for managing and preventing health issues, and digitally engaged individuals might be a key to their success.

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Keywords: digital health; homelessness; digital technology; internet; access; health equity

INTRODUCTION

The digital health paradox

By the end of 2022, the number of mobile service subscribers climbed to over 5.4 billion people globally, including 4.4 billion people who also used mobile internet; and the usage gap has narrowed markedly in the last five years – from 50 per cent in 2017 to 41 per cent in 2022 on average[1]. As of October 2023, around 5.3 billion people use the internet worldwide, equivalent to 65.7 percent of the total population of the world; and in the last year, 189 million new members joined the global community of internet users[2]. These are unprecedented numbers. Digitization, especially the adoption of digital health technologies at scale, has been boosted by the COVID pandemic since 2020, promising access to healthcare systems and beneficial health outcomes.

However, there is a growing body of evidence that is saying that greater reliance on digital tools has the potential to widen the gap between those who have digital skills and access to digital tools and those who do not, thereby also increasing already existing health inequalities[3]. Although digital solutions might be designed following guidelines such as the World Health Organization (WHO) Global strategy on digital health 2020-2025, saying that *"Digital health should be an integral part of health priorities and benefit people in a way that is ethical, safe, secure, reliable, equitable and sustainable*," certain groups are unintentionally left out of the digitization boom[4]. Paradoxically, these groups often represent patients with complex psychosocial needs, specific sociodemographic characteristics, and multiple chronic conditions, and they would benefit the most from the use of digital health technologies[5-8]. This is what is called by van Kessel et. al. as the digital health paradox[6].

Vulnerable groups, homelessness, and health disparities

These groups might represent vulnerable populations that are already experiencing negative health outcomes due to their detrimental social determinants of health. That is defined by the World Health Organization (WHO) as "the forces and systems shaping the collective conditions in which people are born, grow, work, live, and age, as well as the conditions of their daily lives",

[9] and are shaped by the distribution of money, power, and other resources[10]. Emerging research shows that there is a strong relationship between socioeconomic factors, geography, demographics, and health: poverty, housing problems, food insecurity, abuse, gender and/or ethnicity create chronic stress, which leave the human organism with maladaptive mechanisms resulting in damage to the body's functioning systems[11, 12]. These have been linked to hypertension and premature aging, cardiovascular disease, Type 2 diabetes, stroke, cancers, pulmonary diseases, kidney disease and many other health problems[10, 13].

In the case of people experiencing homelessness, a complex set of social determinants of health are at play, which amplify each other's impact and leave this vulnerable group at the extreme low end of health outcomes, healthcare access, and health literacy. According to previous research, living without adequate housing options is associated with significantly higher rates of bacterial and viral infections, diabetes, hypertension, cardiovascular disease, mental health issues or problematic substance use compared to populations with adequate housing options [14-16]. The COVID pandemic has also increased vulnerabilities and health risks of people experiencing homelessness[17].

Life expectancy data for people experiencing homelessness compared to the general population also supports these findings: in their systematic review, Aldridge et al. found that socially excluded populations have an eight times higher mortality rate for men and 12 times higher for women than the average population[18]. In Western, high-income countries, studies have also shown that homelessness is an independent risk factor for mortality, and life expectancy varies between 50-65 years on average[19].

When considering healthcare access, homeless populations frequently experience structural barriers to obtain healthcare, including lack of health insurance in countries without universal health insurance, as well as competing interests in healthcare settings to their detriment alongside their own financial difficulties and competing priorities, which might lead them to secure food and accommodation before healthcare[17, 20]. Research also shows mistrust of healthcare systems and experiences of discrimination in care settings. Poorer health literacy measured among people experiencing homelessness compared to the general population might also lead to poor self-rated health status and less adherence to medical recommendations and prescription medicine[21].

Digital health and people experiencing homelessness

Previous research shows that people with lower socioeconomic status are slower to adopt new technology, and the rates of smartphone and internet use of people experiencing homelessness were lower than for those with similarly low socioeconomic status but more stable housing[22]. Von Holtz et al also found that while experiencing homelessness, study participants experienced a 68% reduction in their likelihood to access the Internet, compared to when they were housed[23]. However, in terms of preferences, it turns out that low-income populations, including people experiencing homelessness, rely on smartphones rather than computers for internet access, due to cost considerations, portability and storage issues[24]. Populations at risk for limited health literacy, as indicated in case of the homeless populations above, are also at risk for having challenges with digital technology[25].

Although previous research also says, that it would have ample benefits to equip people

experiencing homelessness with the necessary tools to get them involved in digital health ecosystems, as the costs of inclusion are significantly lower than the treatment of health conditions, while the overall benefits show significance and persistence[3].

Digital health and homelessness – Research in Hungary

While the associations of people experiencing homelessness and health status are well-researched, especially in English-speaking countries, such as Canada, the UK, and the US, a lot less is known about the access of people experiencing homelessness to digital health tools, their digital health literacy, their attitudes towards digital technologies, or their overall characteristics in different local settings, such as Hungary, and regarding specific groups existing within homeless populations[26, 27].

These are the reasons why the Digital Health Research Group at Semmelweis University and the Hungarian Charity Service of the Order of Malta (HCSOM) have undertaken an overarching research agenda aiming to uncover the relations between digital health and homeless populations in Hungary. Digital health technologies are defined as '*technologies which use computing platforms, connectivity, software, and sensors for health care and related uses.'[5]* Previous research mapped out the attitudes of people experiencing homelessness in Budapest, Hungary, towards telecare services with the main finding that trust in the general healthcare system is the central issue when it comes to the decision of homeless populations whether they have trust in telecare services as well[28]. This study served as a starting point for a pilot project assessing the viability of a telecare system for homeless populations[29].

Access to digital tools and digital health literacy was measured in another survey (n=661), where the results have demonstrated that a significant amount of people experiencing homelessness in Budapest, Hungary, have been using the internet (52.9 per cent), while that is 81.3 percent in a representative sample of the Hungarian population used as a reference group, 69.6 percent of people experiencing homelessness reported mobile phone ownership with 39.9 percent adding their phone had a smartphone function, and 34.6 percent reporting to have already used the internet for medical purposes. In terms of self-rated digital health literacy, 24.5 percent rated themselves as experienced or very experienced when it came to Internet use, while 21.5 percent self-reported mediocre experience[30].

Based on these access and skill-related characteristics, we were able to filter out a broadly defined, digitally engaged group (n=129, 19.5 percent). This subgroup possessed their own digital tools, some level of digital health literacy, and was partly utilizing it for health-related reasons. When we analyzed the group and run chi-square tests for gender, age, education, frequency of medical visits, prevalence of chronic illnesses, and shelter type and social services, the prevalence of chronic illness (P=.047) proved to be an associative factor in this subgroup for the likelihood of using the internet frequently for health-related reasons. However, the quantitative survey could not discern more relevant information[30].

Thus, the main aim of the present study was to map out the characteristics of this specific subgroup to be able to respond to the questions (1) to what purposes and (2) how are they using digital health technologies in the framework of an exploratory, qualitative analysis.

METHODS

Our methodology is based on the *consolidated criteria for reporting qualitative research* (COREQ) checklist as well as the methodological framework of Győrffy et al. (see Supplementary Material 1) For data collection, 12 semi-structured interviews were conducted[31]. In case of all the interviews, written informed consent statements were obtained, and ethics approval for the study was issued under TUKEB: 133/2020 and IV/10927/2020/EKU by the Scientific Research Ethics Committee of the Medical Research Council of Hungary. In terms of analytical framework, thematic analysis was chosen.

Recruitment

Purposive sampling was based on the following criteria: (1) client in the social care system of the Charity Service of the Order of Malta, (2) uses the Internet every second week or more frequently, (3) accesses the Internet with their own smartphone or computer or tablet or another device with data contract, pay as you go facility, or free WIFI, (4) rates themselves average or more competent Internet-users, (5) has ever used the Internet for health-related reasons. However, the sampling criteria of this research and the filtering criteria for the broadly defined digitally engaged subgroup in our previous research match, the latter was performed as anonymous data collection and the present purposive sampling did not use the previous data pool as a starting point, thus there may or may not be an overlap between the two groups.

Malterud et.al. theorizes that information power can determine the ideal sample size for qualitative studies so that the more information the sample holds, the lower number of participants is necessary to involve[32]. They enlisted five criteria for analysing information power, namely (a) the aim of the study, (b) sample specificity, (c) the use of established theory, (d) quality of dialogue, and (e) analysis strategy. In this case, the aim of the study was to assess the specific characteristics of a subgroup of people experiencing homelessness with a digital skillset and usage patterns (see Supplementary Material 2 for the interview guide), thus creating a very specific sample, with limited prevalence in the overall population as measured in our previous study[30]. As a result, a smaller sample size was chosen.

In the research process, 12 interviews were conducted, but in the final analysis, 10 interviews were included, which presented all the criteria of the purposive sampling specified above. 2 interviews did not contain any reference to digital health usage. At this point, this might seem as a contradiction but people experiencing homelessness may experience literacy issues, may have somewhat limited understanding due to health issues, have a risk to social desirability bias in relation to interview situations which all may result in self-contradictory statements, opinions, and behaviors, in line with previous methodological findings in relation to this vulnerable population.[33]

Data collection

Interviewees were contacted by social workers or institutional assistants at four shelters in the social care system of HCSOM or their partner institutions. These shelters either served as a night shelter (n=1) or provided accommodation on a 24/7 basis (n=3) in Budapest, Hungary.

Based on the recommendations of the social workers or institutional assistants, one-on-one, semi-structured interviews were conducted between 18 August and 27 October 2022.

The interview guide was developed from experiences of the previous research, the specific study aims and literature review. The interviews were conducted in Hungarian with a trained interviewer. The interview guide was checked on a smaller sample of the specific subgroup (n=2), and modified based on their initial feedback.

The interview guide is based on the following topics: access and attitude towards the healthcare system in general, access to and attitude towards digital tools in general and usage patterns of the internet and digital tools, access to and attitude towards digital health and usage patterns of the internet and digital tools for health-related reasons (See Supplementary Material 2 for the complete interview guide).

Interviews were audio recorded in person, with an average interview length of 30 minutes. All audio recorded interviews were transcribed verbatim and each transcript was anonymized and attributed a unique code. The interviewer checked the transcriptions for accuracy. They were not sent back to the interviewees for the reason that people experiencing homelessness struggle with literacy challenges, and due to the findings of Thomas et al., who argue that evidence does not support the idea that member checking increases credibility or trustworthiness of qualitative data[34].

Analysis

Thematic analysis as described by Braun and Clarke was chosen as an analytical and theoretical framework[35]. In coding, we followed the ‘theoretical’ technique in an essentialist or realist method, driven by the analytic interest to report about the experiences and realities of the study participants in relation to their engagement in a digital health ecosystem. In coding, we followed the deductive technique, i.e. we worked with predetermined assumptions and themes, which followed the interview guide, however, clearly characterizable subthemes emerged around the previously identified main themes. Three independent researchers (Zs.Gy, S.B, R.N) read and analysed the data and discussed their findings.

A theoretical thematic approach was used to analyse the data and identify patterns of themes based on the checklist elaborated in Braun and Clarke: (1) familiarizing with the content of the data, taking notes and making ideas for coding based on previous assumptions and following the interview guide, (2) generating initial codes manually, (3) identifying and indexing different codes across the data set manually, (4) creating relationships between the themes and subthemes, (5) defining, mapping and naming themes and (6) interpreting our results[35].
The 3 researchers discussed and developed all themes and subthemes and clarified any discrepancies during the coding. Afterwards, they laid out the final thematic map in mutual agreement. Results were supported by participants’ anonymized quotes.

For an overview of the themes see Figure 1.

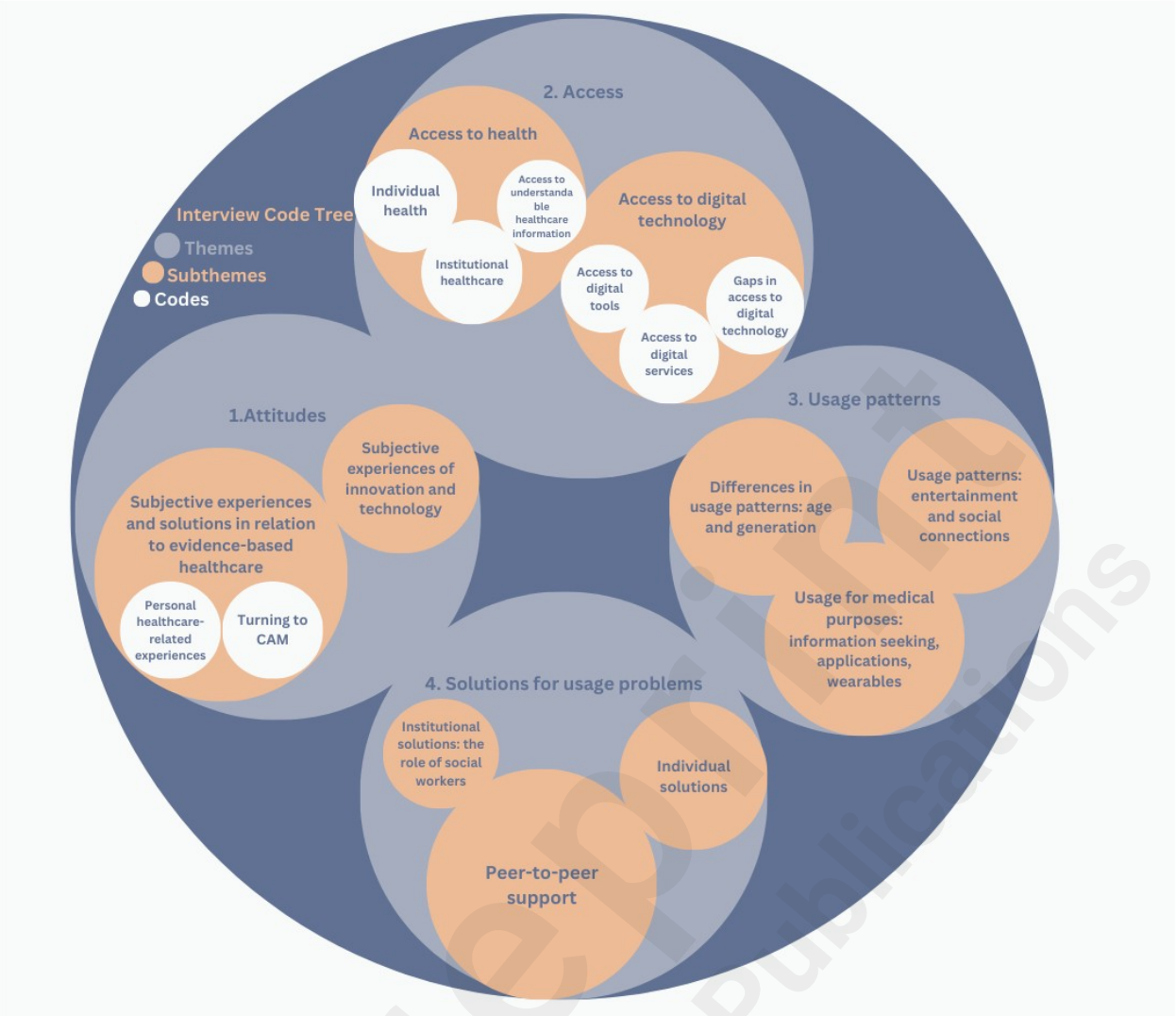

Figure 1. Interview Code Tree

RESULTS

Demographic characteristics

General demographic characteristics of the sample is specified in Figure 2. In terms of gender, 6 males and 4 females were interviewed. The older age groups were overrepresented in the sample: 1 person belonged to the category of under 40-year-olds, 4 people represented the 40-49 age group, 2 people were included in the 50-59 age group and 3 people were over 60 years old. In terms of education, high school (4 people) and vocational school (3 people) were overrepresented, while one person had a university education, and 2 people completed primary school or below.

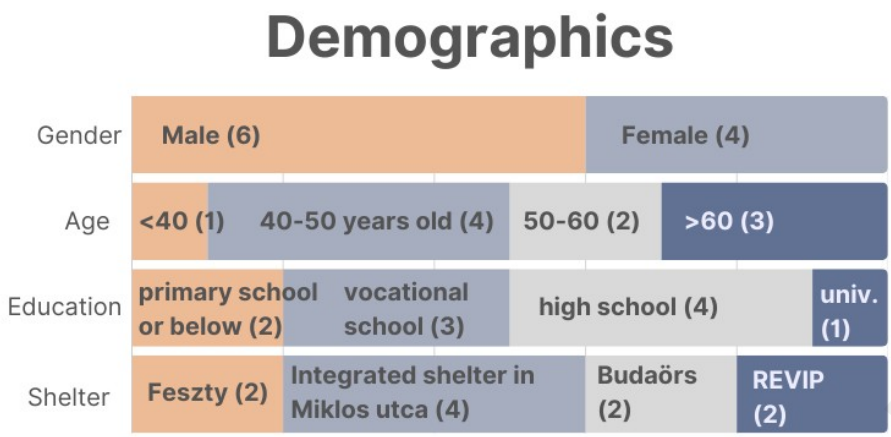

Figure 2. Demographic composition of the sample.

Theme 1: Attitudes

Subtheme 1: Subjective experiences and solutions in relation to evidence-based healthcare

Code 1: Personal healthcare-related experiences

Experiences with mainstream healthcare system (hospitals, doctors, nurses, pharmacists, other medical personnel, prescription medicine, pills) were mixed. In a minority of the interviews (2 interviews), a positive experience with regards to access to care, quality of care and how one was treated by the medical personnel was seen. However, the majority reported negative experiences largely due to a negative attitude, stigmatization and mistreatment coming from the medical staff, as well as due to the inadequacy of care. These signaled an overall negative attitude towards the general healthcare system.

'I'm completely okay to be honest, I experienced that there are differences between the hospitals, I can only say that.' (Interview M05)

'(...) ...they notice where they have to go and then they have a completely different stance. Also, the emergency medical doctor, who is here, or if the ambulance services come. They behave completely differently. (...) They are condescending. Okay, we'll do it later. Okay, come back later. And another one: do pack your stuff already, we are set to go. So, they (...) are not helpful.' (Interview B09)

'The problem is that there are also departments in the local hospital, as in any other hospital, which work perfectly, but the majority is such that if I were a Yakuza, I would definitely stab myself in the stomach.' (Interview F01)

Code 2: Turning to complementary and alternative medicine

In a minority of the interviews (3 interviews), turning to complementary and alternative medical solutions (CAM), medicinal herbs or Chinese medicine appeared, which they considered as an equivalent alternative of traditional Western medicine. In parallel, in 2 interviews, a negative stance towards drugs and medicines (mentioned within the same textual context) appeared.

These shaded a light on the fact that interviewees sought out different potential solutions to their medical problems as some of them experienced that the healthcare system and traditionally produced drugs cannot and have not so far provided them with appropriate solutions: they took medical herbs or trusted ingredients, which were recommended by a trusted person or they found it online.

'I am aware of that, I looked up the side effects, the medicines, I will not take what they prescribe. I have already played along for long. I rather drink an herbal tea.' (Interview F01)

'I can feel if something's off in my body, and then I look up certain things, but to be honest, I always start with medicinal herbs, and not with pills. I go to the pharmacy, and I look up on the internet what is recommended for example for lower abdominal pain or for a story with joints.' (Interview M07)

Subtheme 2: Subjective experiences of innovation and technology

Subjective experience and attitude towards novelties, as well as for technology are mixed. In almost half of the interviews (4 interviews), openness towards trying new programs and applications appeared, while in 2 interviews, a complete lack of interest was reported.

Attitude towards the use of digital tools and the internet was also mixed. In part of the interviews, lack of trust and negative experiences were reported, for example the risk of data misuse (1 interview), risk of making mistakes due to autocomplete function and the speed of digital tools (1 interview), or the inaccuracy of step counting (2 interviews). In another set of 4 interviews, openness towards trying new programs and applications appeared, while in a minority of interviews (2 interviews), lack of interest in this area was reported.

'As I'm homeless at the moment, I don't have enough (money) on my pay as you go facility that I could use the internet unlimited. Where there is free Wi-Fi, I certainly search for things I think of or what I gather from my environment, or from my godchildren. So, I want to keep up with today's world in spite of the fact that I'm now a little bit on the brink of it. (Interview M07)

'you can really misuse data. I had that now, as well. Someone tapped into my bank account, abroad. I had to block access to my debit card, and I will have it done at some point.' (Interview F01)

'As this device (tablet) works so that if my hand starts to shake just a little bit, and it gets close to it, it pulls in. And then, it writes something that I don't want to. So, I don't think that it is so reliable.' (Interview R12)

Theme 2: Access

Subtheme 1: Access to health

Code 1: Individual health

The majority of interviewees self-evaluated their health status as average or worse. Chronic diseases (cardiovascular and heart problems, Type 2 diabetes), cancerous tumors, and lasting harm from injuries were characteristic for the group. In 4 interviews, managed alcohol problems were reported. Drug abuse was not mentioned, in 2 interviews, aversion to drugs surfaced. Diagnosed mental health problems were not mentioned.

Some interviewees regularly took medicine or mentioned that their doctor prescribed them certain types of medications, which they did not take. It also happened that some interviewees made decisions in medical matters based on their own opinions and beliefs without any professional evidence.

'My troubles look like heart, liver, kidney, arterial obstructions. I had deep vein thrombosis in both legs but I carried that for long. I have a very high tolerance for pain. I usually operated on myself. I froze both of my legs and I cut the ulcer out as deep as I could. Then I put herbs into the wound. It recovered within 2 weeks.' (Interview F01)

Code 2: Institutional healthcare

Interviewees were clients of four homeless shelters in Budapest, meaning that they had institutional access to basic health care. Their legal social security status could be provided by social institutions on the grounds of homelessness under Hungarian law. Accessible healthcare services included primary care (prescription and dispensing of medicines, referral to specialists, care work), publicly funded, specialized outpatient care, inpatient (hospital) care, and rescue in case of emergency.

'If I have any problem, the Maltesers (HCSOM) has a doctor's office. And if I can go there on my own feet, then I go there. If you can't, then you will be transported to the hospital by default. There are decent people who help or call an ambulance. In the doctor's office, they refer you to any specialist, no matter whether it's dermatology or cardiology. Thus, they can get you to any kind of specialist.' (Interview F03)

Code 3: Access to understandable healthcare information

In at least 1 interview, a lack of access to understandable healthcare information was reported, and several interviewees pointed out that they were seeking out medications, ingredients online with the help of digital tools in order to understand what impact those materials had on

their body. The need of understanding health-related information was present in at least half of the interviews in certain forms, for example they looked up prescription medicine (5 interviews) and their ingredients (4 interviews) online. And in at least one case, they did that for their family member as well.

'(….) most of the time, physicians use such Latin words in general, as lawyers do. Make it simple! No one is that much overeducated to know these. For example, laboratory tests. They should include what does this mean, sodium was X. There are some apps where you can look that up.' (Interview F01)

Subtheme 2: Access to digital technology

Code 1: Access to digital tools

Overwhelming majority of interviewees used smartphones (7 interviews), notebook usage was reported in one case, and tablet use in further two. One interviewee reported power bank usage to charge their device.

In a minority of interviews (2 interviews) it was reported that in times of need, phones, tablets, computers were sold, thus these were not permanently accessible tools.

'in this living situation, people get such digital devices much easier off their hands, if they are not in such a whacking need of them, simply to be able to make money out of it.' (Interview F04)

Code 2: Access to digital services

In homeless shelters, interviewees had access to the computers in possession of the shelter, and via those devices, they could get access to the internet. In certain shelters, free Wi-Fi and the option to charge their phones was also available.

The majority used free Wi-Fi also inside and outside of the shelters, and looked actively for options of free Wi-Fi (6 interviews). They could afford subscription (3 interviews) or pay as you go facilities (5 interviews) less frequently. In some cases, the interviewees reported that they visited cafés in order to be able to charge their phones or to use the internet.

'(…) the Wi-Fi is so strong that you don't have to go in and consume something, or if you go in and drink a cup of coffee or water, you get the Wi-Fi password, then sit in front of it on a bench, and it has such a strong signal that you can use it there as well, until it is open.' (Interview M07)

Code 3: Gaps in access to digital technology

The interviewees reported both on tool supply and network coverage as existing problems. Several interviewees mentioned the need for securing a device (smartphone) or whether there was potential for decreasing the price of subscriptions and pay as you go facilities. Smart benches in public spaces or free Wi-Fi on trams and busses in Budapest were both mentioned

in 1-1 interviews.

The computer park and the Wi-Fi network coverage was not mentioned as a problem in the majority of interviews, the idea of having more connectors in the building to allow easier charging surfaced in one interview.

'Some support would be great so that a basic device could be ensured for them. And a separate health network, which is for free. For people who are ill. As there are these crisis helplines and these have green numbers.' (Interview F01)

'... prices could be reduced (...) and for example such benches could be installed where phones can also be charged. And then you could use the Wi-Fi there.' (Interview F03)

'It's very difficult, I would say there could be more charging stations. The bigger shopping malls are covered, that's fine, but what if you suddenly notice your phone is dead and you cannot go into any such places, or you are far (from the charging station), and a homeless cannot buy a ticket... How do you go there? (Interview M05)

'I would tell you the truth... I'm sure it would be feasible to have free Wi-Fi on busses and low-floor trams. So here, we have Wi-Fi, since this is a shelter but when we go 20 meters further, there isn't any, the network disconnects.' (Interview M05)

Theme 3: Usage patterns

Subtheme 1: Differences in usage patterns: age and generations

Every interviewee used the internet by a measurable frequency on their own device. Age of participants ranged from 35 to 69. The interviewer did not explicitly ask usage characteristics by age, the topic came up spontaneously in the case of several interviewees when talking about attitudes towards novelties.

In several cases, the interviewees mentioned generational differences in usage, characterizing the older generation as less involved in the digital world, less interested in novelties, while younger people were already born with digital devices, and their usage could seem as self-evident. In one interview, it appeared that if there was individual motivation, then age didn't pose a hindering factor with regards to usage.

'This is a fundamental thing, really, but many don't know, especially the older generation. (...) So, I'm quite digital, but I'm only 40 years old for that matter. We grew up on these devices more or less already.' (Interview F03)

'(...) I think this is age-dependent, thus generation-dependent. The elderly are okay with their basic phones. When it rings, they pick it up, then put it down. My generation already needs it more, we use it more often and the younger even more, they don't even put it down.' (Interview M05)

Subtheme 2: Usage patterns: entertainment and social connections

Interviewees mainly used the internet for entertainment and maintaining their social relationships. Watching movies, listening to music, reading e-books, playing phone-based games were also reported. In several interviews, Facebook, but in one case, also X (or with its former name, Twitter) were mentioned as frequently used social media sites. A minority of interviews mentioned information gathering, reading news, and online banking as use cases.

'I watch movies, and look up e-books, in a topic that I'm interested in. Mostly self-healing, quantum healing and such banalities.' (Interview F01)

'I had a smartphone, so not only the music, YouTube, Facebook page is important to me, but also Wikipedia, where I can look up everything, or for example, I read a lot about various things, and the disease that I had. This is very important to me.' (Interview M05)

'Interesting that I also keep in touch with my physician via e-mail. I had for example a CT scan, and then everything worked entirely online. I received my appointment and also the findings online. I also consider this a very positive thing, so that it is also in the cloud, and they can see it, the whole thing is much easier… I just give them my social security card (TAJ-card), and then I tell them what prescribed medication I want to have. So, I consider this absolutely positive.' (Interview M05)

Subtheme 3: Usage for medical purposes: information seeking, applications, wearables

In several interviews, information seeking for medical purposes was reported. For example, they looked up prescribed medication (5 interviews), their active ingredients (4 interviews), or medical herbs believed to replace certain pills (2 interviews) or foods, natural materials (1 interviews). One interviewee said that they bought a product believed to have medical values online based on a Facebook advertisement.

One interviewee in their 30s communicated with their doctors about their health problems via e-mail, they informed themselves about their illness and prescribed medicines online, used a health app and a step counter. The latter two is also mentioned by two other interviewees, but one of them stopped using the step counting option as they believed it was inaccurate.

'I look up the active ingredient of a pill, for example when before chemotherapy certain medicines were prescribed for me, and I looked up what kind of active ingredients they have, what side effects could they have, because a package leaflet is one thing and a real person who already had this experience and took the medicine, and what is their opinion, is another thing.' (Interview M05)

'I already had this step counting thing, this daily fitness thing. And I remember I had a heart rate monitor in my old Samsung S5, and now I really miss that my current phone doesn't have that anymore. (…) I also use a menstruation tracking app.' (Interview M05)

'I usually look up online for my partner what kind of cremes and medicines there are … if they are interested what kind of ingredients the pill has, and due to his blood pressure.' (Interview M06)

Theme 4: Solutions for usage problems

Subtheme 1: Individual solutions

We included interviewees in this study who previously stated that they frequently used digital tools, and self-evaluated their skills as at least average. The majority of the interviewees themselves did not mention usage problems, when they had problems, one interviewee asked their family members for help, but added that they prefer to solve their problems on their own.

Subtheme 2: Peer-to-peer support

On the other hand, it was frequently reported that the interviewees offered their help to another client who lived with them in the same shelter, if they had trouble around the usage of digital tools or the internet (6 interviews). They solved usage-related problems for their peers such as the registration of SIM cards, the activation of pay as you go facilities, anti-virus actions for devices, problems around online programs such as Facebook, Messenger, or questions around online purchases. These user troubles represented basic problems, and the majority of interviewees had the knowledge and the skill to solve them.

'last time they wanted to buy something online, and they asked my help in that. (...) Now one of the guys from the shelter came up to me how to activate the SIM card. And then I activated it for them. Such issues are always in need.' (Interview F04)

'There were some who asked me how to log in, how to register with an email address, how can they make a Facebook profile. Then I helped first to make an email account and then to register with that. (...) I was happy that I could help and they accepted it gladly. And then I saw that they were using it very well, they were glued onto their screens and were happy about it.' (Interview M05)

'Usually Facebook, Messenger, or when they cannot download a game. And there is an antivirus program on every smartphone with a broom icon but they don't know what that is. So, I tell them, pick it up and swipe with it. Clean it. And then they look at me confused. Okay, give it to me. So, then I do it, and they look. Wow, then they say, it went down to zero. Yeah, and then I say that's the point, not to have anything on it. So there are always things like this.' (Interview B09)

Subtheme 3: Institutional solution: the role of social workers

Interviewees did not report institutional solution aiming at the development of digital skills, in one interview, a social worker was mentioned who taught the client the basic knowledge with regards to tablet use. In this case, it was the individual initiative of the social worker and not an element built into the given institution's services.

'(...) then the social worker came up to me, and taught me the basics, and then they said that I should now keep pressing the buttons around nicely, and then I'll figure everything out by myself.' (Interview R12)

DISCUSSION

Digital technologies show a general potential in improving patient outcomes, e.g. Bruce et al. showed that both clinical and patient-centered care outcomes were significantly better by utilizing mHealth technology among 2059 orthopedic patients[36]. However, according to a systematic catalogue on digital health systematic and scoping reviews, there is less specific evidence on equitable healthcare (16.7%)[37].

In relation to the homeless population and digital technology, Heaslip et al. identified in their systemic review that mobile technology has a measurable health impact on homeless populations directly and indirectly[26]. In the latter case, maintaining relations with relatives and friends as well as the outside world through entertainment, movies and music, strengthened their social connectedness and elevated their self-esteem, which in turn can have a positive impact on their personal health[38]. In the former case, they found limited evidence, main areas being that of reminders for repeat prescriptions or healthcare appointments. However, Heaslip et al. remark that homeless populations appear to consider digital technology having potential health benefits, mostly in terms of online health information support and appointment reminding[26].

Our results partly strengthen these findings. The interviewees in our digitally engaged homeless subgroup use their digital tools primarily for entertainment purposes and to maintain their personal relationships. While, in terms of healthcare, they are using their devices as new channels to reach solutions for their health problems outside the conventional healthcare system and to search for health-related information. However, most interestingly and most importantly, the majority of interviewees shared that this subgroup is supporting their peers in taking up digital skills and helps them solve their usage and device-related problems, which behavior has a lot of untapped potential for widening digital health usage within the homeless population.

Healthcare needs and personal experiences

As the demographic characteristics show, older and predominantly male interviewees shared their experiences. Consistent with results from our previous studies[28-30], the majority of interviewees reported multi-morbidities[39, 40], and having chronic diseases such as cardiovascular diseases[41], as well as Type 2 diabetes, cancer, and permanent injuries. Older age (≥50 years) was associated with worse physical health in case of homeless populations, which appeared in the interviews as self-reported health status was regarded as average or worse[19].

In our small sample, there was no mention of mental health problems other than addictions. Previous research found that the ratio of serious mental disorders among people experiencing homelessness in Hungary is very high[42], in line with findings in Western countries[43]. Underdiagnosis and undertreatment of mental health problems caused by stigmatization and underperformance of the Hungarian care system might be prevalent among our interviewees as well[44]. Also, in line with previous studies, which estimate the prevalence of alcohol abuse in a range of 8.5-58.1 percent[45], treated alcohol problems appears in 4 interviews, however, illicit drug use or treated drug abuse problems were not mentioned. A systematic review found that in mainland Europe, alcohol abuse is more prevalent.[43]

Issues of access to healthcare and digital tools

Their access to primary care is resolved via the care settings of the Health Center of the HCSOM, which includes prescribing drugs and providing basic care services, and referring clients to specialists. In line with previous studies, their experiences with accessing healthcare are mixed.

When looking at access to digital tools and digital services, in line with previous research, the majority of the interviewees possesses smartphones, which are more accessible to people with low socioeconomic status[24]. The partial accessibility of digital devices and their treatment as assets in times of need as described in a minority of interviews was also mentioned by Heaslip et al[26]. As a need, device supply was primarily mentioned by the participants, in line with our previous study where 21.4 percent of respondents mentioned lack of smartphone as the main barrier for not using the internet and 24.1 percent mentioned that being given an appropriate device would help them use the internet more[30].

Digital services, such as using the computers of the shelters, are available to them, and in some shelters, free Wi-Fi or charging is also made possible. The majority is looking for free Wi-Fi options outside shelters, too, one interviewee mentioned the lack of free Wi-Fi on public transport services or the lack of installation of smart banks in Budapest as a hindrance of usage. Such infrastructural problems were mentioned as a cause of non-usage for 7.6 percent of respondents in our previous study[30]. On the other hand, several interviewees mentioned using the paid services of cafés in order to charge their phones or use Wi-Fi as a usual course of events.

Several interviewees also articulated the need for a potential decrease in internet service prices, or in device prices, which is also in line with our previous study where 18.4 percent said that better access to free Wi-Fi, pay as you go facilities or data contracts would help them use the internet more[30].

Problems around trust

Some interviewees articulated the feeling of being unwelcome in conventional health care settings, in line with previous research[41]. Some of them mention difficulties of getting appropriate treatment, and a negative attitude from healthcare personnel, which might negatively influence their desire to seek health care in the future, their overall trust in the health care system, and which might explain their turn away from mainstream health care solutions.

That might include a negative impact on medication adherence, and an overall mistrust in mainstream medical solutions, such as taking antibiotics and chronic disease drugs, and a turn to alternative solutions. From the interviews, it turns out that placing their treatment into their own hands instead of that of the medical personnel based on their own beliefs without medical evidences is such a solution, but turning to alternative and complementary medical solutions, such as homeopathy, herbal medicine, or Chinese medicine is a way of expressing mistrust in conventional care settings, and digital solutions open up a channel outside of the conventional healthcare system to reach such alternative solutions.

Overall mistrust and negative attitude towards the healthcare system coupled with the need for

understanding health-related language, prescription drugs and active ingredients resulted in the main health-related usage of digital tools and services in case of the majority of interviewees.

Age as a predictor for usage and openness

When asked about usage patterns, several interviewees spontaneously shared their view on how age differences matter in usage prevalence, outlining that older generations might be less involved and less interested in novel technologies. Several studies, including our previous quantitative research supports that age is a key socio-demographic variable with an impact on use[29, 30, 46, 47]. Our quantitative data showed that in access to technology, age did not seem to play a key factor, however, it might be considered as a significant factor when self-evaluating competence in digital literacy skills. This appeared in at least one of the interviews: the respondent explained their elevated technological skill-level with their age.

At least three interviews showed that age was associated with openness towards or willingness to try new technology, which might be in line with the findings of a representative questionnaire survey (n=1500) on digital health-related knowledge, attitudes, and needs was completed in 2021 that found that a quarter of 65-74 year-olds (26.5 percent) and a third of over 75 year-olds (31.9 percent) would not like to try digital technologies in the coming years[46].

Lack of systematic support results in peer support when it comes to skill-related problems

While interviewees recognized some support of shelters in solving infrastructural and service-related technology issues, there was a perceivable lack of systematic solutions when it came to usage-related problems and digital literacy issues. Only one interviewee mentioned that a social worker helped them set up their tablet and navigated through basic usage scenarios.

As we selected interviewees based on at least average self-reported digital health literacy skills, who showed aptitude towards digital technology and in certain cases demonstrated previous educational or professional background in IT services, it turns out that their less digitally skilled peers turned to them for help.

The majority of interviewees gave unintentional peer support in relation to technology usage issues, solved technology-related problems, and gave guidance for future scenarios. Peer support, also in this context, is defined in the literature as a process whereby individuals with lived experience of a particular phenomenon provide support to others by explicitly drawing on their personal experience[48]. Intentional peer support works as a formalized framework of this process fostered and developed by institutions, while unintentional peer support remains under the radar of institutions. As the literature recognizes the potential of peer support and peer support workers, who have the necessary training and give intentional support to their homeless peers by sharing their lived experiences in different areas of life, members of the digitally engaged subgroup might show potential for offering peer support in digital upskilling[48, 49]. Moreover, anyone who would consider a comprehensive digital health program for homeless groups in Hungary concentrating both on offering solutions to the infrastructural and skill-related problems should also take the untapped potential of members of the digitally engaged subgroup into account. These individuals, through their elevated trust

levels among their peers, might show better outcomes in digital upskilling than official and institutionalized digital health literacy programs. As a systematic review found, when working with homeless peers as mentors and educators, empowerment and self-esteem in the homeless population increased, but peer support in general facilitates acceptance of illness and recovery, increase efficacy, social skills and coping[50].

Strengths

Through the qualitative analytical framework, the characteristics of a unique subgroup of digitally engaged people experiencing homelessness could be explored in a less-studied area of digital health for equitable healthcare, where a systematic mapping of review studies shows notable gaps of evidence[37].

The study also aims to enrichen the still relatively small body of research concerning the characteristics, let alone digital health-related characteristics, of homeless populations in Central and Eastern Europe. In North America and Western Europe, where the majority of studies around homeless populations are conducted, the demographic composition of such populations, as well as the healthcare system may differ significantly from the Hungarian experiences, with different problems and solutions on individual and systemic levels.

Limitations

Our study had certain limitations. As a qualitative study using in-depth, semi-structural interviews, the sample size was small, which should be taken into account when drawing consequences. The participants of the study represented urban homeless populations from Budapest, Hungary, where socioeconomic conditions might differ from those living in the countryside. The recruited homeless people had a living connection to the social infrastructure, therefore rough sleepers and other people who were not connected to any social initiatives were not represented. The research team also exclusively relied on self-reportage of digital tool access, and use, and did not attempt in any way to verify these reports (e.g., via phone bills, direct observation, or other methods).

In relation to people experiencing homelessness, there is an increased risk of social desirability bias when conducting interviews, meaning that respondents tend to tailor their responses in the presence of an interviewer perceived to be in a different socioeconomic and overall social status than their own[51].

CONCLUSIONS

People experiencing homelessness can face many barriers when accessing digital technologies: lack of appropriate devices, lack of operating infrastructure (e.g., free Wi-Fi hotspots), some blind spots regarding digital skills, and a general lack of interest due to prioritizing other basic life-supporting drives. However, in spite of all these barriers, our previous research identified a digitally engaged homeless subgroup in Budapest, Hungary, whose behaviors, usage and access patterns this study aimed to map[30].

We found that the majority possessed a smartphone, utilized the often-scarce pool of free Wi-Fi availability as well as the infrastructural capabilities of the shelters. Based on their articulated needs, various policy recommendations might be formulated towards telco companies and government agencies or support services. Telco companies may consider subsidy programs to support mobile ownership and data services for this vulnerable population, as well as specific discount packages and more publicly available recharge options, as they would greatly support this group often in crisis and need. Government agencies may consider strengthening the infrastructural background of shelters, and making free Wi-Fi accessibility an option in more public places, such as busses or piazzas, that could greatly lessen access issues of this population. Institutional aid for accessing services and digital tools may also offer a viable option for people experiencing homelessness. The more digitally accessible an institution is both in terms of infrastructure and digital literacy, the more likely the number of digitally engaged people experiencing homelessness will increase.

In terms of usage patterns, it turned out that digitally engaged people experiencing homelessness use digital tools as an alternative information point beyond mainstream healthcare channels, which gives them access to doublecheck information stemming from mainstream healthcare personnel, as well as to seek out complementary and alternative medical solutions. These might be symptoms of lowered trust in mainstream healthcare solutions, which might be enhanced through appropriately tailored, comprehensive digital health programs. This could include awareness raising programs on trusted online health information sources, digital literacy as well as health literacy enhancing training programs and other steps to enhance their general trust in evidence-based health and the healthcare system.

However, our most important finding is that digitally engaged homeless individuals have an aptitude for technology, which they are ready and eager to share with their peers. This could elevate them to the role of a mediator between their peers and any potential comprehensive digital health program. Digitally engaged individuals have the trust of their peers, they recognize the benefits of digital technology, and are able to provide meaningful help in technology- and usage-related issues. Thus, with appropriate training, they might become tutors for upskilling people experiencing homelessness, building a bridge between their peers and digital technology, as well as digital health ecosystem. These well-informed, technologically able peers might also help enhance trust in the general healthcare system if their peer-to-peer support could be steered towards peer-to-peer recommendation of trusted health information sources via a specific institutional program, perhaps.

Overall, our previous research showed that digital health services could have great promise in community shelters for managing and preventing health issues, and this paper managed to find out that digitally engaged individuals might be another key for their success.

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Conflict of Interest

None Declared.

Abbreviations

HCSOM: Hungarian Charity Service of the Order of Malta

DHRG: Digital Health Research Group

WHO: World Health Organization

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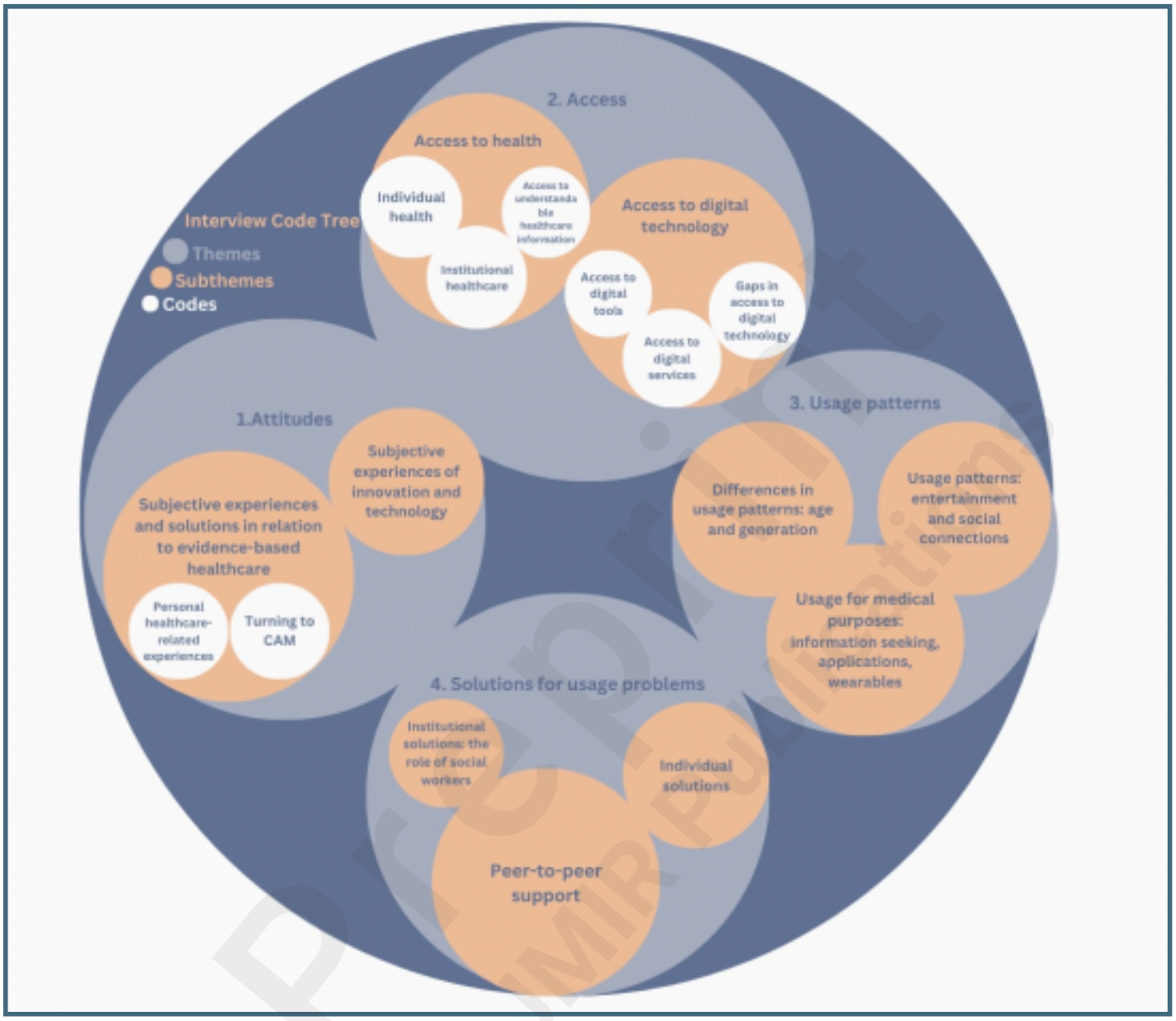
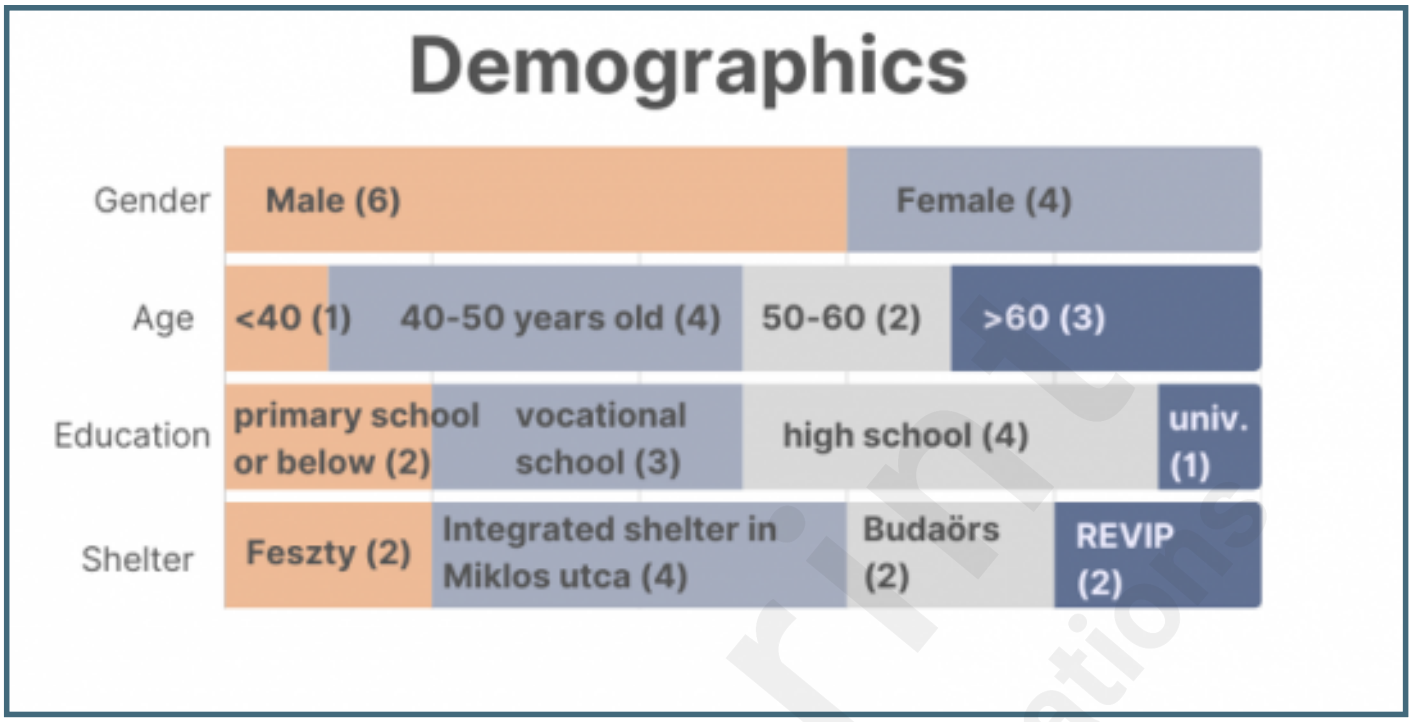
Supplementary Files

Figures

Interview Code Tree.



Demographic characteristics of the sample.



CONSORT (or other) checklists

COREQ checklist for reporting on qualitative research.
URL: http://asset.jmir.pub/assets/0852e3422161ed67b6e0a5b704281a49.pdf

TOC/Feature image for homepages

Sony Xperia Z3 Compact smartphone.