The European Digital Divide During Covid-19 Experienced by Vulnerable Groups: A Scoping Review

Aishe Bingöl

Department of Behaviour Management and Social Sciences, University of Twente

MSc Thesis PSY, PCPT 2023/2024

First Supervisor: PhD Yudit Namer

Second Supervisor: Dr. PhD Jurrijn Koelen

June 24, 2024

Abstract

Introduction. Many people in Europe are still excluded from the digital environment and Information Communication Technologies (ICTs), which was exacerbated during the Covid-19 pandemic. Facing this Digital Divide (DD) has negative influences on vulnerable groups, such as lower well-being. This reveals an additional challenge for vulnerable groups (people with sociodemographic vulnerabilities and people with mental health disorders), who already suffered from the challenges of the Covid-19 pandemic. To provide a comprehensive overview of the DD and the Covid-19 pandemic, the research question of this paper is: *How do vulnerable groups in Europe (people with sociodemographic vulnerabilities and people with mental health disorders) experience the DD during the time of Covid-19, as reported in scientific literature?*

Methods. A mixed-methods scoping review was conducted by searching the Wiley Online Library, Scopus, PsychINFO, and Web of Science databases. 346 studies were screened and eleven met the eligibility criteria for the analysis, revealing insights into how vulnerable groups experience the barriers to ICTs within the Covid-19 context.

Results. The eleven articles found gathered data through quantitative surveys and semi-structured interviews. They revealed data of older people (N = 40.821) in five studies, representatives of youths (N = 31) in one study, people with mental health disorders (N = 858) in four studies, and those with low socioeconomic status (N = 16) in one study. Based on the findings, a thematic analysis was conducted. To grasp the context of the experiences, the Covid-19 context reveals two themes: the digitalisation of health services and everyday life. Next, the actual barriers to ICTs were analysed and revealed insights into the underlying levels of the DD, namely access, usage, and outcome.

Conclusion. During the Covid-19 pandemic, vulnerable groups are faced with similar to each other but also specific barriers related to the DD. Future research should focus on other suffering groups as well on positive experiences, to achieve a more complete overview. This can help to inform future interventions and to be prepared to face new pandemics while protecting the most vulnerable of society.

Keywords: Internet, Covid-19, digital divide, information communication technologies, sociodemographic vulnerabilities

The European Digital Divide During Covid-19 Experienced by Vulnerable Groups: A Scoping Review

1. Introduction

1.1 Unequal Chances of Internet Access and the European Context

According to the United Nations (2021), 2.9 billion people worldwide have never used the *Internet* once in their lives. Even though there was a boost in online activities due to the *Covid-19* pandemic and the number of people using the Internet increased from 4.1 in 2019 to 4.9 billion in 2021, this number is nevertheless high (United Nations, 2021). It includes about 37 per cent of the world population who are still offline and face unequal chances to access the online world (United Nations, 2021). People from lower-income countries and rural areas are more likely to get excluded from digital tools such as the Internet, even when already living in a wealthy continent (Eurostat, 2022). Despite sharing a close geography, Europe shows continental inequalities, such as households in wealthier countries like Finland, Luxembourg, or the Netherlands, having more access to the Internet compared to less wealthy European countries like Greece, Croatia, and Bulgaria (Eurostat, 2022), leaving Europe with a unique quality that deserves attention in research. Furthermore, it shows that some groups are more vulnerable by being excluded from the Internet, despite already living in a more wealthy continent. This *digital divide (DD)*, which can be defined as "a division between people who have access and use of digital media and those who do not" (Van Dijk, 2020, p. 1), holds when comparing urban and rural areas within a country, where more Internet access is recorded in bigger cities compared to rural ones (Eurostat, 2022).

A second reason why choosing the European context to study, is the way the countries were impacted during the Covid-19 pandemic. During this pandemic, regional differences in acceptance towards new policies were observed, such as southern countries like Italy being more in favour of those (Sabat et al., 2020). It has been shown that due to needs not being met or having no available contact points, vulnerable groups, defined as a "population within a country that has specific characteristics that make it at a higher risk of needing humanitarian assistance than others or being excluded from financial and social services" (Marin-Ferrer et al., 2027, as cited in Kuran et al., 2020), trusted the healthcare system less during the Covid-19 pandemic (Beller et al., 2022). Such groups included people of older age, lower socioeconomic status (SES), and people with unmet needs for the healthcare system (Beller et al., 2022). This shows that European citizens show a variety of responses towards policies during Covid-19, leading it to be of interest to further study these differences and whether they hold when taking the digital divide into account. Furthermore, 5.4 per cent of children in

Europe, between three and 17 years old, are excluded from digital devices and more so in less wealthier countries like Bulgaria than Iceland (Ayllón et al., 2023). These findings make clear that certain groups are more digitally divided than others.

1.2 The Relationship between the Digital Divide and Covid-19

Even though there are still many people who are digitally divided, operating in the digital environment is becoming more important in today's way of how society works. This was best shown by the recent Covid-19 pandemic, where education was the field in which the problem of the DD was most manifested (Lythreatis et al., 2022). In many countries around the world, education was mostly placed online (Ferri et al., 2020). As there were many benefits of online education, such as staying in contact with teachers and classmates despite the social distancing regulations, it was even more important to be able to access the new online environment for students, parents, and teachers (Ferri et al., 2020). However, not everyone was equally able to access these needed digital tools, due to the existing DD. During Covid-19, the challenges of the DD were seen more clearly, such as the aggravation of the gap between students from poorer and more wealthy households, when not able to attend the proper education facilities (Ferri et al., 2020).

Within the definition of the DD, the term 'digital media' first referred to devices such as computers but later, when technology became more advanced, also included mobile phones, analogue media such as television or game devices and, nowadays, even social media websites and other commonly used digital tools like online banking portals (Van Dijk, 2020). Studies refer to these types of digital media as Information Communication Technologies (ICTs) (Lythreatis et al., 2022). Access to these different ICTs can be dependent on different factors. Such factors include the skill level and individual motivation to use digital tools, as well as economic influences, such as low SES, and other demographic influences like age (Van Dijk, 2020). Moreover, the concept of DD can be seen as consisting of three underlying levels, namely 'access', 'usage', and 'outcomes' (i.e. benefits or consequences) of interacting with ICTs (Lythreatis et al., 2022). Next to the definition by Van Dijk (2020), these different levels will be addressed in turn, to assess related issues completely.

1.2.1 The First-Level Digital Divide: Access

The first conceptualisation of DD arose during the 1990s, where ICTs were much less advanced than in the present 21st century (Lythreatis et al., 2022). Therefore, the definition during this time stayed in binary terms, namely distinguishing people who either had physical and economic access to computers or the Internet, compared to those who did not, relating to factors such as infrastructure but also affordability (Dewan and Riggins, 2005,

as cited in Lythreatis et al., 2022). However, as time and ICTs progressed and became more complex, other aspects needed to be taken into account. It was realised that this binary concept was too narrow to grasp the concept sufficiently and, therefore, needed to be expanded.

1.2.2 The Second-Level Digital Divide: Usage

The broader definition included skills and usage of ICTs next to evaluating the access to it (Dewan and Riggins, 2005, as cited in Lythreatis et al., 2022). Thereby, 'usage' refers to "the accessibility of relevant content, the quality of the Internet connection, and the knowledge and skills of the Internet user" (Dewan and Riggins, 2005; DiMaggio et al., 2004; Hargittai, 2002; Van Dijk and Hacker, 2003, as cited in Lythreatis et al., 2022, p. 2). This definition is then able to account for factors related to DD, such as unequal skills and knowledge, of people concerning technical aspects, which is also referred to as 'digital inequality', as well as associated low self-efficacy or computer anxiety (Lythreatis et al., 2022). Next to the access and usage of ICTs, the consequences from those interactions had to be added to the definition of the DD to complete it.

1.2.3 The Third-Level Digital Divide: Outcome

The preferred outcomes (i.e. the consequences of the interaction with ICTs), hoped to be achieved through this interaction, is the final part added to the conceptualisation of DD. This level describes that even when people use ICTs, not everyone is equally able to benefit sufficiently from them (Lythreatis et al., 2022). This means, that the outcomes are not always beneficial for vulnerable groups when interacting with ICTs and can be related to privacy or support issues (Lythreatis et al., 2022). The outcome of such interactions is dependent on the user's capacities of digital skills (Ragnedda, 2017, as cited in Lythreatis et al., 2022). Therefore, not every user has the same opportunity to benefit from using ICTs and this should be kept in mind when evaluating the DD. This will prevent falsely assuming that everyone is equally able to make the best out of their usage, just because access to ICTs is generally available. By paying attention to these three underlying levels of the DD, its effects on certain population groups can be thoroughly evaluated also regarding the Covid-19 context.

1.3 The Effects of Covid-19 on Vulnerable Groups

Considering the aggravated effects of Covid-19 on the DD, it should also be considered how such vulnerable groups experienced the pandemic. It has been shown that youths from low-income countries and low-SES households experienced higher stress and anxiety as a response to the fear of the Covid-19 pandemic (Salameh et al., 2020). A reason for this is that youths from poorer households already face challenges due to their financial

situation and the Covid-19 pandemic exacerbates those and adds new and unique challenges for this group (Salameh et al., 2020). Thereby, people suffered from higher working poverty and relied on unemployment insurance, as well as from a lack of hospital access during Covid-19 (Mueller et al., 2020).

The older population was also confronted with the worsening of already existing difficulties (Pentaris et al., 2020). During Covid-19, they experienced an increase in loneliness, isolation, financial difficulties, as well as mental health challenges. These inequalities can be traced back to the social distancing regulations, which were widespread in Europe, to prevent older people from getting infected (Pentaris et al., 2020).

For people with mental health disorders, the Covid-19 pandemic was also associated with negative effects. As an example, people with previous mental health disorders were more likely to suffer from an increase in anxiety or get diagnosed with health anxiety during the Covid-19 pandemic than healthy individuals (Özdin & Bayrak Özdin, 2020). Overall, some groups suffering from mental health disorders faced challenges regarding the Covid-19 pandemic and attention should be paid to the reasons to understand their experiences, also in regards to the DD.

1.4 The Effects of the Digital Divide on the Well-Being of Vulnerable Groups

The DD affects many areas of society, as well as certain groups in it. In this paper, attention is paid to how vulnerable groups experience DD. Vulnerable groups suffer from DD as they are the ones who are digitally excluded despite needing more assistance from society to benefit from the opportunities of ICTs. In this paper, attention is paid to groups with *sociodemographic vulnerabilities* of low SES and age, as well as people with mental health disorders.

Low SES is defined by income or education and is another factor, which influences people's Internet and computer use (Pew Research Project, 2023, as cited in Yoon et al., 2018). Another detrimental effect on the physical health and well-being of this vulnerable group is the impact of the DD to access relevant health information, resulting in another barrier to accessing digital health care (Yoon et al., 2018).

Considering the effects of DD on youths (i.e. young adults up to the age of 24), Xin et al. (2022), found that students with no smartphone showed an increased negative effect on their psychological well-being. This increased distress, as well as depressive symptoms, compared to their peers who have smartphones, which resulted in lower supportive relationships and a lower positive sense of self (Xin et al., 2022). This shows how the DD can

aggravate and mediate between already existing difficulties, such as low SES and well-being, starting at a young age.

The DD is also affecting the older population, which is a group often overlooked in research. Even when the elderly have access to the Internet, the second level of DD is present, which is concerned with the different skills of using the Internet, making the interaction between low education and old age, a predictor of having fewer skills to use ICTs (Hargittai et al., 2018). This inequality affects their sense of staying connected to their social environment and, related to their age in general, are more likely to be without any access to the Internet when being hospitalised (Hargittai et al., 2018). To combat negative experiences from DD, more research and insights into this area are needed, as evidence in this regard is scarce (Hargittai et al., 2018).

People with mental health disorders are the last vulnerable group discussed in this paper. This group is confronted with digital exclusion, as more mental health tools are increasingly being offered online for providing care (Torous et al., 2021, as cited in Kozelka et al., 2023). However, the study by Kozelka et al. (2023) showed that many people with mental health disorders are still excluded from these interventions. Reasons are related to access barriers or missing skills to navigate and use their ICTs, such as smartphones, for the intended purpose. Hence, if people with mental health disorders are excluded from mental health care, this will negatively influence their well-being (Kozelka et al. 2023). This overview provides a first synthesis of how vulnerable groups experience the challenges of the DD.

1.5 Current Study

Until now, literature is mostly concerned with addressing the different relationships between vulnerable groups and DD, and vulnerable groups and Covid-19, separately. There exist scoping reviews of specific vulnerable groups and their experiences of the DD (e.g., Chen et al., 2020). Additionally, different reviews of the experiences of these groups during the Covid-19 pandemic are available, such as the experiences concerning the physical distancing policies (e.g., Li et al., 2023). Considering the short amount of time that has passed since the Covid-19 pandemic, one can find no reviews on the relationship between these concepts, namely the DD, Covid-19, and vulnerable groups.

So far, many editorials exist, which provide an overview of the current state-of-the-art, while suggesting relevant gaps in this field of literature. Zhai (2020) identified vulnerable groups, such as people who experience barriers when accessing required mental health care, which worsens already existing disparities. It is stated that only by fully understanding the

experiences of vulnerable groups, these barriers can be sufficiently addressed (Zhai, 2020). Another editorial suggests that delving into different DD barriers, such as the different levels underlying it, its impact on mental health in different population groups can be better understood (Cheshmehzangi et al., 2022). This further highlights the need for a consistent overview of the experiences of vulnerable groups towards the DD. Exploring these areas will gradually help to identify specific problems, which can help to conduct appropriate interventions in the future (Smith-East & Starks, 2021). These gaps make clear that a deeper understanding of the DD and vulnerable groups is needed.

The goal of this study is to fill the gap by providing the first clear overview of the emerging studies in the field of DD, while focusing on its consequences for vulnerable groups (people with sociodemographic vulnerabilities of age and low SES and people with mental health disorders), during the time of the Covid-19 pandemic in the European context. Therefore, the research question of this paper is the following: *How do vulnerable groups in Europe (people with sociodemographic vulnerabilities and people with mental health disorders) experience the DD during the time of Covid-19, as reported in scientific literature?*

2. Methods

2.1 Research Design

To address the research objective, a scoping review was conducted, which can be defined as an assessment of ongoing research to grasp already available research data (Grant & Booth, 2009, p. 95). This method was chosen as it provides an overview of what is already known in the chosen field of literature and identifies relevant gaps, which can inform future research and interventions (Peterson et al., 2017). This method is a fitting approach for this thesis, as it is a mixed-methods (both qualitative and quantitative) scoping review, which helps to point out a comprehensive picture of the existing literature (Grant & Booth, 2009). This includes reviewing diverse articles with different methods, meaning making no exclusion based on the method design and including methods such as longitudinal, observational and descriptive ones. As an example, observational studies have the strength to reveal associations between different constructs (Mariani & Pego-Fernandes, 2014), making it relevant to assess in this study. Focusing on these methods will help to answer the research question more sufficiently.

2.2 Search Strategy

The electronic databases Scopus, Wiley Online Library, PsychINFO, and Web of Science were searched for relevant articles between 2020 and 2024 with the following search string: ("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR

"mental disorder" OR "mental illness" OR "age" OR "socioeconomic status" OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*"). These databases were chosen as PsychINFO reveals insight into more narrowly psychological and mental health research, while Scopus and Web of Science provide a broader range of research in the social, medical, and psychological domains (van Lotringen et al., 2021). Wiley Online Library is another database with a broad variety of research studies and was chosen as a matter of institutional access. The search query was used to find records relevant to answering the research question by focusing on searching through the title, abstract, and keywords of the records in Scopus while using the 'All-Text' function for PsychINFO, Wiley Online Library, and Web of Science. Furthermore, Boolean operators, nesting, and truncation were used to ensure a well fit of the papers for the research objective. Table 1 provides an overview of the search process, and the pilot search was completed on January 19th, 2024. After a revision of the pilot search, to make the search as comprehensive as possible, the search strategy was repeated with a modified search string, meaning that terms were added, which can reveal more fitting studies. The new articles were screened and included in the selection (see Table 1). Moreover, the process of piloting and finalising the search string was done in consultation with the supervisor of this thesis assignment. The second and final search was completed on February 11th, 2024.

Table 1

Search Queries and Amount of Hits per Database

Date	Database	Search String	Searched Domain	Hits
17.01.2024	Scopus	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR "age" OR "socioeconomic status" OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	Article title, abstract, keywords	85
11.02.2024	Scopus	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR “psychiatric illness” OR “psychiatric disorder” OR "age" OR “elder*” OR “old*” OR "socioeconomic status" OR “low income” OR “poverty” OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	Article title, abstract, keywords	104

17.01.2024	Wiley Online Library	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR "age" OR "socioeconomic status" OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	All-text, also called 'Anywhere'	428
11.02.2024	Wiley Online Library	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR "psychiatric illness" OR "psychiatric disorder" OR "age" OR "elder*" OR "old*" OR "socioeconomic status" OR "low income" OR "poverty" OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	All-text, also called 'Anywhere'	449
17.01.2024	PsychINFO	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR "age" OR "socioeconomic status" OR "SES") AND ("digital	All-text	117

		divide" OR "DD" OR "digital exclusion" OR "internet access“) AND ("covid" OR "pandemic" OR "covid-19" OR „corona*")		
11.02.2024	PsychINFO	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR “psychiatric illness” OR “psychiatric disorder” OR "age" OR “elder*” OR “old*” OR "socioeconomic status" OR “low income” OR “poverty” OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	All-text	159
19.01.2024	Web of Science	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR "age" OR "socioeconomic status" OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access“) AND ("covid" OR "pandemic" OR "covid-19" OR „corona*")	All-text, also called ‘Topics’	447

11.02.2024	Web of Science	("vulnerable groups" OR "demographic vulnerabilities" OR "mental health" OR "mental disorder" OR "mental illness" OR “psychiatric illness” OR “psychiatric disorder” OR "age" OR “elder*” OR “old*” OR "socioeconomic status" OR “low income” OR “poverty” OR "SES") AND ("digital divide" OR "DD" OR "digital exclusion" OR "internet access") AND ("covid" OR "pandemic" OR "covid-19" OR "corona*")	All-text, also called ‘Topics’	560
Total				**2349**

2.3. Eligibility Criteria

To ensure that the articles found apply to the research objective, several eligibility criteria were established before the search. First, the articles should be full-text, empirical studies and published in peer-reviewed journals, ensuring the quality of the analysed articles. Next, they had to be published in English between 2020 and 2024. The language was chosen due to convenience and to suit the authors' language competency. Additionally, the time frame ensures that the articles were published within the context of the Covid-19 pandemic. As mentioned before, Europe presents a diverse context not only in terms of acceptance of the Covid-19 policies but also shows continental inequalities related to the DD. To make use of this variety of experiences, the studies should take place in the European context to ensure a fit for this research question. Another criterion is that the record focuses on all three domains: vulnerable group(s), Covid-19, and DD. As many articles cover only two of these domains, they do not yield a comprehensive overview useful for this research objective. Mixed-method studies, as well as only qualitative or quantitative studies, are eligible for use. However, grey literature is not included, as the scope is too broad for the authors' resources. One missing resource is the support of a second reviewer to agree on the content and quality of the grey literature. Therefore, peer-reviewed studies should take precedence in this review, as reviewing grey literature is extensive and might not yield detrimental benefits (McDonagh, 2013). As grey literature and peer-reviewed studies frequently overlap, focusing on the latter will yield a sufficient overview of the field, which can inform the research objective (McDonagh, 2013).

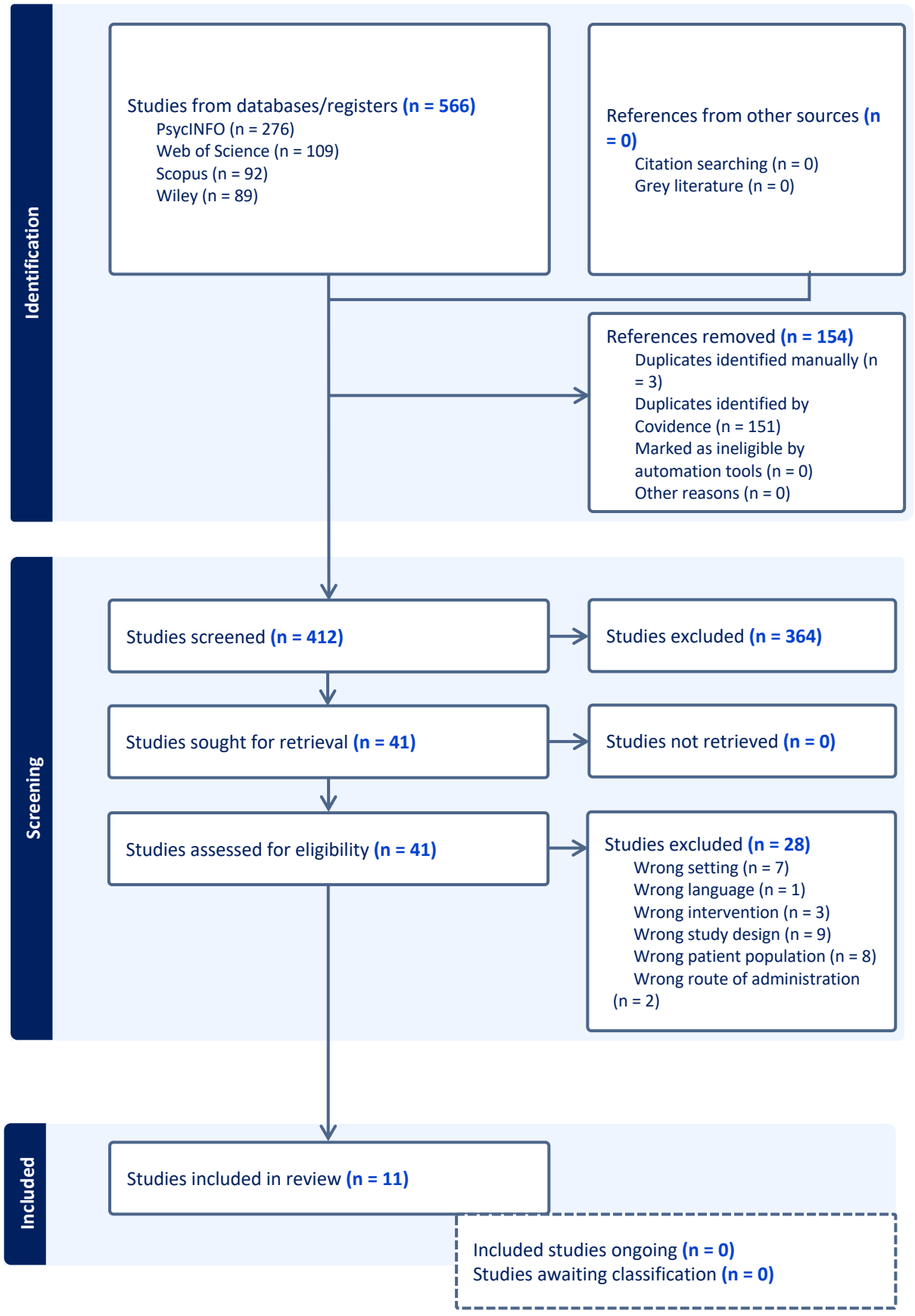
2.4 Selection of Studies

To make the selection procedure as efficient as possible, a free trial account for the online tool Covidence was used. By sorting the titles with the use of artificial intelligence (AI), screening large numbers of studies is made more efficient. Reports found on the aforementioned databases were imported into Covidence. However, the records found on Wiley Online Library and Web of Science were first screened by hand for their title and abstract manually on the databases themselves. This was done as on these two databases, a large number of articles was found (449 on Wiley Online Library and 560 on Web of Science, also see Table 1) but the free trial account on Covidence only allows screening 500 records in a review. In the end, the remaining 346 relevant articles were ready for review in Covidence with their full text, after the tool removed 43 duplicates automatically. Additionally, these articles were also sorted by hand by the researcher going through all the papers without using a stopping rule tool in the process. Afterwards, the records were scanned for their usability by

screening the title and abstract to assess the type of study, as well as the content, and useful records were marked as relevant. In the end, a full-text review was conducted on the remaining records by focusing on the method and results section. This should ensure the quality of the review, as the method section provides insight into the study's design with participant information and data collection, while the results provide an overview of its findings in more detail (Higgins et al., 2019). However, a further quality assessment of the articles was not done. After the screening process, a flow diagram according to the PRISMA guidelines (Moher et al., 2010) was provided by Covidence and can be seen in Figure 1.

Figure 1

Overview of the Screening Process according to the PRISMA Guidelines



2.5 Extracted Variables from the Included Articles

First, a descriptive analysis in the form of data extraction was conducted to get an overview of the study. Information such as the study design, the sample, as well as the data collection method, was obtained (see Table 4). Next, the specific variables of interest were analysed. One such variable was the Covid-19 context. This section should clarify which ICTs were important to use during the Covid-19 pandemic and why being excluded from them can harm people's health and overall well-being (see Table 4).

Other extracted variables are concerned with the key findings related to the most prominent characteristics of the vulnerable group. Thereby, it was first extracted which vulnerable group (age, low SES, mental health disorder) is the focus and afterwards, the specific barriers that this group experiences, when it comes to using ICTs, were identified (see Table 4).

2.6 Data Analysis

While analysing the found articles, attention was paid to two factors from which the themes emerged, which were further analysed by a deductive thematic analysis. First, the studies were scanned to analyse the Covid-19 context. This should make the results more coherent by giving clear identifications of the relevant themes (Watson et al., 2008, p.91) and placing the experiences of vulnerable groups into context. Furthermore, it is suitable for integrating quantitative and qualitative data, which is especially relevant in this scoping review. Additionally, it can be conducted by establishing themes from scanning the literature, also called theory-driven, making it a deductive approach (Watson et al., 2008, p.91). The thematic analysis is done to grasp the experiences of barriers to ICTs from vulnerable groups, making it a more specific analysis and the second step of analysing the studies. While the factors of the Covid-19 pandemic and the barriers were analysed in different steps, they are still related. The essence of the thematic analysis lies within the experienced barriers, while the Covid-19 pandemic resembles the context in which these barriers are experienced. Additionally, an approach suitable to combine quantitative and qualitative data was used to construct the themes. A meta-narrative synthesis is an appropriate approach to transforming quantitative data into qualitative ones (Zeng et al., 2021). These new qualitative findings can then be used to address the key findings related to the experiences of the individual groups. The thematic analysis was conducted by scanning the found articles and the specific context or barriers were marked by hand, without a specific tool, and grouped into overarching themes, which can summarise these many different findings.

To further report the experiences of barriers from the thematic analysis, a narrative

synthesis is conducted. The references of the included studies can be found in Table 4. The synthesis does not include any citations to the articles as it serves as a comprehensive and concluding synthesis. This is in line with Peinemann et al. (2008), who mention different styles of narrative syntheses that use a non-citation method throughout the process.

3. Results

The aim of this mixed-methods scoping review was to synthesise how vulnerable groups, such as people with demographic vulnerabilities and mental health disorders, experienced the DD during the Covid-19 pandemic in Europe. The eleven included articles answered the research question by focusing on the Covid-19 context and the experiences of vulnerable groups. Most articles examined the experiences of one specific group, such as older people, while some articles focused on more groups. All the included studies were conducted in Europe, while most of them come from the UK (see Table 4).

3.1 Study Characteristics

Studies with different methodologies were found. Thereby, qualitative ($N = 4$), and quantitative ($N = 6$), as well as one study using a mixed-methods approach, were found to answer the research question. The descriptive analysis reveals insight into the countries where the studies were conducted, and a clear trend can be observed. Thereby, most studies were done in the UK or England specifically ($N = 7$), followed by Finland ($N = 1$), Austria ($N = 1$), Spain ($N = 1$) and one study observing over 20 different countries across Europe, such as the Netherlands, Hungary, and Norway. Three prominent data collection methods were commonly used in the articles. Mostly, quantitative surveys ($N = 7$) were used to gather the data from larger samples or were used qualitatively with additional space for open questions (e.g. Morata et al., 2022). Next, semi-structured interviews ($N = 3$) were mostly used for the qualitative studies, while one study combined interviews with focus groups to assess the experiences of people with severe mental illness (SMI), who would otherwise be uncomfortable in group settings (Middle & Welch, 2022).

3.1.1 Participant Characteristics

In total, it was possible to assess the experiences of the different vulnerable groups according to the research aim of this scoping review. However, the results show a clear trend toward specific groups being more assessed than others. In total, in the eleven articles, older adults were the most researched group ($N = 40.821$) in five studies. The age component of the demographic vulnerabilities was studied with people older than 55 years and in one article, these people needed to be also non-users of technology ($N = 15$) (Köttl et al., 2021).

In the articles found, only one study indirectly assessed the experiences of younger

people, namely through directors of After-School-Programmes (ASPs). ASPs provide support for underserved children between three and 18 years old. Support can be shown through counselling, socio-emotional learning, or supporting the whole family when it comes to navigating education, health care, or other social support services (Morata et al., 2022). Directors of these ASPs ($N = 31$) revealed information about the experiences of these families, as they are working with children who are at risk for poverty or exclusion and have an overview of the different experiences.

The search strategy revealed mixed-methods articles concerned with the experiences of people with mental health disorders ($n = 858$). Most prominent was the group of people with severe mental illness (SMI), which was the focus of four studies ($n = 802$). In these articles, SMI was defined as either being diagnosed with a disorder from the psychotic/schizophrenic spectrum or a bipolar disorder (e.g. Middle & Welch, 2022). Other groups within the category of a vulnerable group with mental health disorders consist of mental health service users, which includes diverse mental health disorders in one study ($N = 12$) and people who experienced mental health problems before the Covid-19 pandemic, also including other disorders than SMI ($N = 44$) as assessed in one other study.

The last group of interest for this scoping review were people with low SES. They were, similar to the younger age group, the least studied group in the European context in the found articles, with only one study assessing their experiences. However, their experiences were assessed as a part of a study, which focused on different groups in general, leading to only one finding. In conclusion, this resembles the exclusion that people with low SES face not only from ICTs but also from research about this topic, showing another gap in the literature and exclusion criteria for this vulnerable group. In the article, unemployed people could share their insights in a qualitative manner ($N = 16$) (Kaihlanen et al., 2022). While other articles related people with low SES in their results, this was the only found article which directly assessed their experiences first-hand, which is why only these insights will be analysed in this scoping review.

3.2 Main Findings of the Thematic Analysis

The thematic analysis was conducted by using a theory-driven approach. Table 2 provides an overview of the themes related to the Covid-19 pandemic and should make clear, how this theme was derived from the articles. Table 3 provides this information for the specific barriers vulnerable groups encounter related to the DD.

Table 2

Main Findings of the Thematic Analysis Related to the Covid-19 Context

Theme	Description and Example of the Theme
The digitalisation of health services	The health care system switched its services from in-person contact, or face-to-face (f2f), to remote services. Examples include video calls with doctors, health applications or the increased use of wearables, such as smartwatches
The digitalisation of everyday life	Activities, which were performed f2f were also placed in the digital environment. Examples include remote learning in schools, friends and family contact through video calls or online booking systems for public transportation

Table 3

Main Findings of the Thematic Analysis Related to the Experienced Barriers and Levels of the DD for Vulnerable Groups

Theme	Examples
First level: experiences with access	Old and dysfunctional devices, no (stable) Internet connection, no available health interventions for a specific group
Second level: experiences with usage	Lack of interest, complicated websites, fear of making mistakes
Third level: experiences with outcome	Privacy issues, no support, negative experiences in the digital environment

3.2.1 The Covid-19 Context

To understand the experiences of vulnerable groups fully, it must first be clear in which context these experiences are being made. The Covid-19 context can be thought of as the outer circle, embedding the actual experiences of the vulnerable groups and placing those in the context of time and circumstances. For the Covid-19 context, clear trends toward the digitalisation of different areas of life emerged.

3.2.1.1 Covid-19 and the Digitalisation of Health Services

The first theme that emerged related to the Covid-19 pandemic is the Digitalisation of Health Services. During the Covid-19 pandemic, more service tools were presented online. Tools can be remote visits with professionals via video calls, chat messages, or health applications (Kaihlanen et al., 2022) but also tools for personal use, such as wearables, were more frequently recommended (Middle & Welch, 2022). This reliance on Internet access increased also for people with SMI, due to the increase in telemental health services, such as video calls (Vera San Juan et al., 2021). For older people, the reliance on technology was apparent when it comes to technology-based health interventions, which should allow them to better cope with adversities resulting from the Covid-19 pandemic (Lee, 2023).

3.2.1.2 Covid-19 and the Digitalisation of Everyday Life

The second theme derived from the data is the Digitalisation of the Everyday Life. This was important during the Covid-19 pandemic to maintain activity, health, and well-being (Köttl et al., 2021) but also contact with family and friends (Spanakis et al., 2021). More specifically, this relates to increased online banking and shopping (Köttl et al., 2021) or phone- and video calls over the Internet to reach fellow acquaintances (Spanakis et al., 2021). Moreover, the transport system was more digitalised due to online booking systems or e-hailing applications (Carney & Kandt, 2022). For students, everyday life was changed due to remote learning, meaning online classes instead of regular school classes (Morata et al., 2022).

3.2.2 Experienced Barriers Reported by the Groups

The actual experiences of the different groups were indicated in the form of specific barriers they encountered when interacting with or trying to access ICTs. For these barriers, as reported in the scientific literature, clear trends toward the three levels of the digital divide emerged.

3.2.2.1 First Level of the DD: Experiences with Access

Barriers experienced by all groups were reported. These barriers include having no suitable devices to access the Internet because they are too old or dysfunctional. People with SMI mentioned that when being in crisis care “the WIFI is non-existent” (Vera San Juan et al., 2021, p. 10). Children and unemployed people also mentioned having no stable Internet connection, making it difficult to use ICTs. Another experience reported was the lack of skills and support that prevents these groups to access ICTs and learn how to use them afterwards. However, for elders, it has been shown that the most vulnerable were also the most willing to learn to access ICTs. For children, this includes the skills of their caretakers as well, while for

people with low SES, their lack of skills to access ICTS prevents them from reaching out to service providers.

An experience shared by older people and people with mental health disorders was the perception of not being welcomed in the digital environment. Older people describe it as normal to be more lonely and less connected, as they assume that this is what ageing is about: changing and not keeping up with new developments of the youth. This leads to more dependence on others when trying to access ICTs. On the other hand, people with mental health disorders mentioned that the online space is not for them but only for healthy people, leading to facing dependence on others as well, but also facing stigma because their peers are also not using ICTs, so they cannot rely on support. Another experience shared by two groups, namely older people and youths, is the lack of knowledge about the existence of, for example, digital health services or needs assessment, which prevents them from accessing them.

A barrier faced by older people specifically includes the shift of focus, which lies more on their physical health than on keeping up with technology. People with low SES experienced that some digital health interventions were not available for them, making it impossible for this group to access them. People with mental health disorders described that cognitive difficulties inhibit them from accessing ICTs, which can be traced back to their disorder, such as concentration difficulties when being in a depressive episode.

3.2.2.2 Second Level of the DD: Experiences with Usage

The experiences of barriers relating to the use of ICT differed between the groups. However, people with low SES and older people described a lack of interest in using and learning about digital devices. People with low SES described finding information on websites as a strong barrier to using them, as the build-up is too complicated for easy use. For older people, the lack of interest derives from age-related difficulties, such as hearing disabilities or haptic and vision problems, which interfere with the ability to use ICTs. This lack of interest then leads to a decline in learning to use them in the future as well.

Additionally, older people experience fear when using ICTs, which presents itself in worrying about making detrimental mistakes when using them. This fear stems from experiences older people went through when making the effort to learn more about it. They described being insulted by younger family members, who do not have the patience to teach them. When talking about younger family members, some older people mentioned, “They never have patience or expect more than what an older person can grasp” (Köttl et al., 2021, p. 5). This feeling of incompetence leads to avoiding the use altogether.

For people with SMI, the loss of digital skills is described as a greater issue than the lack of access to ICTs. This group mentioned that using ICTs is difficult when they feel mentally more unwell. This leads to a worsening of symptoms, such as more problems concentrating when being in a depressive episode. Specific barriers in this state are then experiences with handling passwords or dealing with official governments while, for example, making online appointments. These platforms are experiences as complicated, making their use even more difficult.

3.2.2.3 Third Level of the DD: Experiences with Outcome

A difficulty experienced by most groups is the lack of private space to interact with remote ICTs. This goes along with privacy issues and feeling unsafe to discuss personal matters. Therefore, older people, people with SMI and those with low SES, prefer f2f-communication. For people with SMI, another aspect of why f2f-communication is preferred, is the incentive to leave the house, which is missing in remote counselling. This makes it feel unusual and communication is perceived as poor, as body cues are missing, leading to decreased engagement. This prevents these groups from benefiting from ICTs, even though they are using them. Moreover, distrust towards the quality of ICTs and a hesitant attitude also prevent gaining any benefits from the interaction.

Older people and people with SMI mention that they receive no training or support on how to take advantage of ICTs, leaving them with inadequate skills to gain positive consequences from these tools. Furthermore, older people and people with low SES describe that health services are either not applicable to their specific needs or that the information transfer between tools is not functioning well. This is experienced as another barrier to benefits from ICTs, formerly designed to help them.

People with SMI explained that they experienced negative encounters when engaging in the digital environment. Coping with these experiences, or with technology and its problems, is then not possible for them when feeling mentally unwell, such as when being in a state of paranoia. All these findings can be seen in Table 4, which also provides concrete conclusions in the form of themes given from the specific articles and barriers found.

Table 4

Results of Studies Investigating the Challenges of the Digital Divide Among Vulnerable Groups During Covid-19 in Europe

Study & Year	**Country**	**Study Design**	**Sample**	**Data Collection Method**	**Key Findings Related to Age**	**Key Findings Related to SES**	**Key Findings Related to Mental Health**	**Covid-19 Context**	**Conclusion & Identified Themes**
(Kaihlanen et al., 2022)	Finland	Qualitative descriptive	Total: *N* = 74 Older adults (*N* = 16), mental health service users (*N* = 12), unemployed (*N* =16)	Semi-structured individual interviews by phone between October 2020 – May 2021	*Older adults:* lack of basic computer skills, suitable devices, support, training to take advantage of the device, hearing disabilities for using remote option; not applicable for all health care needs; fear of using & making mistakes, distrust for quality; preferring f2f-services when living next to service provider, lack of interest to use smartphone, hesitant attitude; lack of awareness of available	*Unemployed:* usability issues challenge finding information on websites, dysfunctional, too old, or inappropriate devices, dysfunctional Internet connection; lack of private spaces → privacy issues, poor concentration; easier	*Mental health service users:* inadequate digital skills to take advantage of services; interaction & communication perceived as poor, lack of private space complicates use; security issues, lack of incentive to go out of house when using it; remote feels unusual → preferring f2f; remote option not always available	Using digital health services (e.g. remote visits with professionals via video call, chat service or phone calls, health applications), → health care systems digital due to Covid-19 to maintain healthcare operations and reduce f2f contact	*5 determinants* evolved from interviews: access to digital resources, the use of digital resources for health-seeking, beliefs about potential of digital health to be helpful or harmful, values and cultural norms & preferences for use of digital resources, integration of digital resources into community and health infrastructure

					digital health services and their value	communication when f2f, lack of interest in using & learning digital devices; digital health consultation not always available, information transfer between systems not always function properly, not always possible to interact with service provider				
(Köttl et al., 2021)	Austria	Qualitative	Older technology non-	Semi-structured interviews	1. Low interest → performance	-	-		Everyday Information & Communicatio	Internalised ageism and its four subcategories:

users (*N* = 15, mean age = 79 years)	from May – June 2019	problems or age-related challenges with learning e.g. cognitive & physical decline (forgetting steps to use new ICT) leading to a decline in their ability to learn to use ICTs, fear of doing something wrong 2. Stopped trying to keep up, "normal" for older people to be less connected and more	n Technologies (EICTs) more important to maintain activity, health, and well-being such as using online banking or doing online shopping	competence & learning, relevance and use, technology design, intergenerational contact; internalisation of stereotypes leads to low EICT engagement through social environment and technology design

lonely, → less autonomy as they now have to ask others for help when everything is online, shift in priorities such as health, complex technology, expensive courses, lack of experience, motivation, social support

3. Failure when engaging: haptic and vision problems and

mirroring limitations (e.g. small keys)

4. Teaching older people requires patience → experience insults when doing something wrong and now they reply with non-use due to younger people's assumptions of incompetence, makes older people dependent on others to teach them

(Kung & Steptoe, 2023)	England	Quantitative longitudinal study	Adults aged 50 and above (*N* = 6.840)	Survey as part of a larger project (ELSA)	*Factors predicting use:* male, younger, living together, good physical & mental health, employed, well-doing neighbourhood, higher education, income & wealth, being less lonely or part of organisation → Older adults who already used the Internet before the pandemic did so during it daily	-	-	Increased digitalisation of services would predict that people use the Internet more during the pandemic for work, communication, searching for information or interacting with health services	*Daily Internet use*: No significant increase in daily Internet use from 2018/19 to 2020 for within-individual changes but overall from 72 – 74% for older adults Use increased for video calls & to interact with services from the Government but for finding health-related information
(Middle & Welch, 2022)	UK	Observational qualitative study	People with severe mental illness (*N* = 9)	Focus groups & interviews	-	-	Factors leading to digital exclusion: loss of digital skills when mentally unwell, negative experiences online, complicated digital platforms, perception 'not for us', lack of access to	More use of digital health and social care service tools during the pandemic, e.g. apps, wearables, or video	4 themes about impact of digital exclusion on health: reduced social connectedness (e.g. with family), impact on wider determinants of health (e.g. access

digital equipment & data, mistrust, lack of opportunity to learn, use or re-fresh digital skills, impact of mental health condition and associated cognitive difficulties (e.g. memory), social referents not digitally engaged ➔ Reliance on others, stigma, delayed/lack of access to services, reduced employment opportunities, feeling left behind, avoidance, less choice, 'cut off',	consultations → new findings may impact delivery of mental health care	to services, housing), negative perception of self (e.g. stigma), disempowerment (e.g. reliance on others)

							difficulty keeping in contact with family/friends		
(Vera San Juan et al., 2021)	UK	Qualitative	People who experienced mental health problems already prior to the pandemic (*N* = 44)	Semi-structured interviews	-	-	1. reliability of servers helped with health concerns but registering on apps & filling out complicated forms perceived as a barrier 2. negative experiences & reduced engagement due to reduced body cues, no necessary technology, Internet, knowledge, familiarity or private space not available, cannot cope with technology when feeling unwell e.g. paranoia	Telemental health increased due to the pandemic and its lockdowns and social distancing regulations e.g. videocalls with professionals to provide care	Emerging topics: 1. Varying settings for telemental health, 2. what works for whom: experiences and preferences, 3. patient safety and privacy, 4. views about the future

							3. lack of privacy or safety at home leads to feeling unsafe during online sessions, safety concerns due to clinicians missing out on non-verbal cues of distressed clients 4. f2f preferred but hybrid model could be preferred in the future e.g. combining therapeutic relationship and more flexibility and less travel		
(Spanakis et al., 2021)	UK	Quantitative	People with severe mental illnesses (SMI) (*N* = 367)	Survey available online & offline as part of a bigger project	-	-	Most common activities: access information or entertainment, staying in touch with friends or family, purchasing products other than food	Everyday life such as communicating with family or friends and health services more digitalised due	Over the pandemic, this group mostly consisted out of limited or non-users due to lack of interest and skills. Especially older

							Most common barriers: lack of interest, Internet too difficult, concerns about security of private data and privacy in general People who reported a decline in mental health since the start of Covid-19 used the Internet more (e.g. for covid-19 related information, which can increase depression & anxiety or by means of coping)	to Covid-19 restrictions	people with psychosis
(Spanakis et al., 2023)	England	Quantitative	People with SMI (*N* = 177)	Three surveys between 2020 and 2022 as part of a bigger	-	-	1. Lack of digital skills (greater issue than access) → dealing with official bodies e.g. local governments, making appointments, ordering repeated	Unpredicted increase in digital mental health services for people with SMI due to social distancing	1. 6 broad themes of digital exclusion that people with SMI were unable to

				project (OWLS)			prescriptions, dealing with financial matters, shopping online or paying bills 2. trouble concentrating, depressive episodes, easily tired eyes 3. higher digital health literacy when having outstanding or good self-reported knowledge of the Internet, bipolar instead of psychosis disorder, being female and younger	regulations of Covid-19 resulting in reliance on Internet access	do: Life Admin, financial tasks, shopping, social & learning, leisure, information seeking → 42.5% experience digital exclusion 2. Symptom-based barriers 3. Digital health literacy	
(Lee, 2023)	Europe	Quantitative	Older adults aged 65+ years (total *N* =	Three cross-sectional survey data from the	Increased need for adoption of digital tools for daily activities and social support	-	-	Technology use impacts health and quality of life due to more	Being a woman, older (85+), lower educated, widowed, in a household with	

			29.026 of around 29 countries across Europe)	project ESS (2016, 2018, 2020)	Five people in a household: not needed to interact as other people can take over this responsibility or no own devices or access			technology-based health interventions and social care services → allows older people to stay connected and cope with pandemic's difficulties	five or more people = lower Internet use Internet use = happiness, life satisfaction and better perceived general health Increase in Internet use and increase in Internet use for older people increased more in wealthier countries (Poland 15% - 16%, Norway 63% - 83%)
(Carney & Kandt, 2022)	England	Quantitative longitudinal	Older adults (55+) (*N* = 4.924)	Survey data from the ELSA project	Lack of IT skills, access to equipment, health problems as barriers to use technology Cluster of people who are the most vulnerable also want to use it more than others but need	-	-	Access to transport services became more digitalised due to Covid-19 such as online booking systems or e-hailing apps	More active older people increased their Internet use and used more public transport services during the pandemic Less healthy people followed fewer out-of-home activities

					specific support, which varies between different kinds of people				and used technology less
(Morata et al., 2022)	Spain	Mixed-methods	After-School-Programmes (ASPs) directors ($N = 31$) working with children at risk for poverty or exclusion defined as living below the federal poverty line	Survey with open and closed questions via e-mail in October 2020	*Young age, underserved children* 1. difficulties with Internet connection, lack of technical skills of caretakers/children and technological devices → school conducted needs assessment online, so people who need support the most were unable to apply for it	-	-	Remote learning due to lockdown Families experienced additional financial hardships because of the pandemic, which increased child poverty even further and lead to child abuse and domestic violence Reduced teaching time and disengagement	Needs can be categorised into the following themes: 1. digital divide, risk of social exclusion, educational disparities, socioemotional & behavioural problems, challenges navigating pandemic-related information & services

								from school, decreased socialisation and sport activities Difficulties concentrating, anxiety, irritability, less physical activities, and sleep difficulties	
(Spanakis et al., 2022)	England	Quantitative	Adults 18 years or older with SMI (=schizophrenia, delusional/psychotic disorder, or bipolar disorder	Survey completed online or offline as part of the OWLS study	-	-	Most common lack of skills: handling passwords (updating/changing it), using device settings to use it easier (e.g. changing brightness), online problem-solving In general: motivated to learn	Digitalisation of different services, such as those related to health care, due to pandemic	People most likely to lack Foundation Skills (i.e. basic prerequisite knowledge such as connecting with a safe Wi-Fi): older, unemployed, psychosis, no Internet access (total: 42.2% or 105 participants)

	(*N* = 249)	If Foundation Skills = most also have Skills for Life & Skills for Work

4. Discussion

This study aimed to synthesise the diverse experiences of vulnerable groups, such as people with demographic vulnerabilities of age and low SES, and people with mental health disorders, regarding the DD during the Covid-19 pandemic. This was done by conducting a scoping review and thematic analysis. This study adds knowledge to the existing literature, as evidence in this domain is still lacking since most scoping reviews either focus on Covid-19 and the DD or vulnerable groups and DD separately. Additionally, it provides insights into how the different levels of the DD are represented in this domain, providing a deeper reflection on the experiences of these groups, and filling another research gap.

The scoping review first indicates, which specific barriers the vulnerable groups encounter and how they relate to the digital divide's different levels. Specific barriers were narratively synthesised, and the thematic analysis provides insights into the Covid-19 context and the levels of the digital divide. Overall, the groups experience similar to each other but also unique barriers related to their own needs.

4.1. How Vulnerable Groups in Europe Experience the DD During the Time of Covid-19

This study synthesised the experiences of different vulnerable groups. To answer the research question comprehensively, the Covid-19 context and the three levels of the DD are considered.

4.1.1 Covid-19 Context

Due to the Covid-19 pandemic, vulnerable groups were faced with different challenges added to the already existing difficulties they experienced. Domains that changed were the digitalisation of health services and everyday life. In terms of health services, changes were made to ensure contact with professionals while reducing f2f contact (Kaihlanen et al., 2022). The increase in digital health service tools would predict an increase in Internet use and also how mental health care will be delivered to people with SMI (Kung & Steptoe, 2023; Middle & Welch, 2022). These findings are in line with research analysing the difficulties that emerge for people with SMI, due to this sudden change within the healthcare setting and the new strategies they have to learn to use ICTs (Noori et al., 2022).

The Covid-19 pandemic also had an impact on the digitalisation of everyday life. Especially vulnerable age groups were impacted. For younger people, their school system was changed to remote school, coming with its challenges to participate in school (Morata et al., 2022). As a result, younger people suffered from disengagement from school, anxiety, less physical activity and sleep difficulties, which is in line with previous literature pointing out

the challenges younger people experience during the Covid-19 pandemic (Salameh et al., 2020).

4.1.2 Three Levels of the Digital Divide

Different vulnerable groups have diverse experiences of the DD. Related to the Covid-19 pandemic, the found articles suggest that the DD can be experienced as being a cause for exclusion, due to circumstances such as having no access to ICTs (Kaihlanen et al., 2022) or actively excluding oneself from it (Köttl et al., 2021). One article describes this finding as the 'digital inverse care law', where vulnerable people who need the support of technology the most are also the ones, who get the most excluded from it (Middle & Welch, 2022). Vulnerable groups are confronted with DD in three different areas.

Access: Not having access to ICTs or an Internet connection was mentioned by all vulnerable groups assessed in this paper, excluding them from the benefits of ICTs (Kaihlanen et al., 2022). Even though the definition of the DD was expanded, this insight shows that the first level of the DD (Van Dijk, 2020), access, is still relevant to assess. Moreover, it is in line with different literature, pointing out that many people from vulnerable groups get excluded from the first instance, namely not having physical and economic chances to benefit from ICTs (Eurostat, 2022; Dewan and Riggins, 2005, as cited in Lythreatis et al., 2022). This should raise concerns for policymakers and interventions to first address this level of DD in the future.

Usage: When accessing ICTs, vulnerable groups mentioned experiencing barriers related to the use of those. This study found that older people experience failure when engaging with ICTs (Köttl et al., 2021). This confirms previous literature, pointing out this inequality and how it affects older peoples' social lives while considering education as one factor that influences this relation (Hargittai et al., 2018). Another study suggests that if people with mental health disorders cannot use online interventions due to not being able to handle their devices properly, this will result in even less well-being (Kozelka et al., 2023). This study revealed various experiences, which are in line with this literature and show that this level of the DD is still a prominent issue for vulnerable groups.

Benefit: Even when being provided with access and support to use ICTs, it can still be difficult to gain positive consequences from interaction with other people. Thereby, people with mental health disorders described negative experiences when interacting online (Middle & Welch, 2022), which is conflicting, considering that previous literature points out that more mental health tools are being offered digitally (Torous et al., 2021, as cited in Kozelka et al.,

2023). This shows that the DD manifests itself in different forms and different vulnerable groups share similar barriers but also deal with individual ones.

4.2. Implications of Findings

Being excluded from ICTs can have various consequences. This study revealed that such consequences, for vulnerable groups, can be increased health deterioration and a larger exposure to Covid-19, if necessary ICTs cannot be accessed (Kaihlanen et al., 2022). People who show demographic vulnerabilities are then socially isolated (Kaihlanen et al., 2022). More concretely, people with SMI already have a shorter life expectancy due to long-term illnesses and loneliness, resulting in low engagement with health services and fewer online socialisation opportunities, especially during the Covid-19 pandemic with its social isolation restrictions (Spanakis et al., 2023).

The risk of being affected by negative consequences due to the exclusion from ICTs might be relevant to consider for new pandemics in the future. Due to this study, insight was gained on how vulnerable groups were treated during the Covid-19 pandemic. To be prepared for any new pandemic, the implications, such as inclusively designing websites or establishing policies for easier access, should be taken into account to protect these groups from negative experiences in the future. This is of importance as literature has shown so far that a pandemic as an event itself is not enough to establish enough knowledge to be prepared for future pandemics (Bikmen, 2023). Therefore, more interventions need to take place now to ensure that a learning process takes place to combat negative experiences, especially for vulnerable groups, in future pandemics (Bikmen, 2023). Considering and implementing the implications can be challenging but it might be sustainable in the future, considering the positive effects it can gain for different groups, such as participating in the work field again.

This review shows why it is important to grasp the specific barriers, which vulnerable groups encounter. Insight into the different levels of the DD is still lacking in research, so this study fills another gap by taking them into account. The different levels make clear, that focusing only on getting access to ICTs does not solve the problem of the DD. Even when vulnerable groups have an Internet connection, when support in using ICTs sufficiently is missing, they are still confronted with the DD. With this understanding, interventions and other practical implementations can add to this knowledge by considering those in their research. One such intervention that was reviewed included the focus on homework and routines for children, which also focused on the use of technology within this domain (Morata et al., 2022). By this, children get to learn how to use ICTs on their own for later. Furthermore, this depth of insight into the specific barriers can guide the focus to target

the problem of the DD more effectively. This study fills the gap in the literature and advances the field for future studies to draw from and implement it in their research regarding interventions.

4.3. Strengths and Limitations

One strength of this paper is the insight it adds to relevant gaps in the literature, which is of importance to address the often overlooked challenges of vulnerable groups. Especially insight into the different levels of DD is missing so far to understand the barriers of vulnerable groups sufficiently (Zhai, 2020). Thereby, the experiences and barriers can now be understood more comprehensively, to understand their impact when designing interventions (Cheshmehzangi et al., 2022). Another strength is the method of this paper regarding the thematic analyses. Thereby, this scoping review did more than summarise the results of other studies. It actively adds more knowledge to the field by establishing higher-order categories, such as applying the levels of the DD or clarifying the Covid-19 context (Watson et al., 2008, p. 91). This allows this scoping review to inform other studies and interventions without just summarising what is already out there but by providing a greater level of insight. Most studies were conducted in wealthier countries like England and even this country shows a lot of inequalities and poverty. However, it still grasps the context well since when comparing the Gross Domestic Product (GDP), Europe is already a wealthier continent compared to, for example, Asia, Africa, or South America (Statisticstimes, 2024). Another strength is the heterogeneity of samples found in this paper. This provides the study with a comparative element, allowing it to consider the different vulnerable groups when accounting for their different experiences and barriers they face.

However, the last two strengths can also be viewed as limitations. The heterogeneity of samples allows the assessment of many different groups but does not allow for a large generalisability when considering only one of those groups. It might be too homogenous in terms of SES when considering the European context since less wealthy countries were not examined. This limitation might be due to searching for English literature only and stating that some countries are already excluded at this research stage.

A clearer limitation of this study is the exclusion of grey literature during the search process. Including grey literature can decrease publication biases, meaning that not only studies with positive results can be found but a clear picture of the field of interest can be identified and synthesised (Martin et al., 2005 as cited in Mahood et al., 2013). While this paper provides a large overview of the field, this should be kept in mind, since not all people from vulnerable groups might be excluded or suffering from the DD. Another limitation of

this paper is the method of the narrative synthesis being conducted in a non-citation manner. This reduces the transparency of the narrative synthesis, which can impact the replicability of this paper for future studies in this field (Campbell et al., 2019). This might lead to biases, such as those related to selective reporting if only findings benefitting this paper are reported (Campbell et al., 2019). Therefore, interpreting the results should be considered reflectively even though this type of analysis makes them easier to interpret.

Another limitation concerns the number of reviewers. In this review, one reviewer was responsible for the decisions throughout the methods. More explicitly, only one reviewer did the screening for the excitation analysis. Ideally, two reviewers are recommended to make decisions and to prevent any biases that might occur when not considering all the information at hand (Grant & Booth, 2009). A second independent team reviewer can ensure the quality of the to-be-included articles (Mahood et al., 2013). Furthermore, by not having enough time, as determined by the thesis assignment, the risk of biasing the review is high as only parts of this broad field of DD could be included (Mahood et al., 2013). This time constraint bias then leads to missing out on relevant reports for this topic, which could skew the results of this paper (Mahood et al., 2013). This reflects another reason why examining grey literature was not possible, as there was no other person to agree on the quality of such additional literature. As this review is part of a university module, the time and resources were not available to include a second reviewer in the process. The last limitation is concerned with the quality of the studies. A lot of studies during Covid-19 were done rapidly and without quality control to yield faster insights to help society (Jung et al., 2021). Studies that compared quality found that points for quality were lower for Covid-19 studies than others across all study designs and even suggested for some to be revisited (Jung et al., 2021). Quality assessment was also not part of this study, which should be noticed. Keeping these strengths and limitations in mind should help to objectively evaluate the findings.

4.4. Recommendations for Future Research

Based on the findings from the synthesis of the found articles, several recommendations can be concluded. The first one relates to people with mental health disorders. This is one vulnerable group, which was studied in this paper. However, this group was mainly researched with a focus on SMI (e.g. Spanakis et al., 2023). Future studies should include other groups as well to get an overview of the broader general population of vulnerable groups. Such groups might then include people with depression. This is needed since the majority of people are diagnosed with depression and anxiety disorders, and compared with that, only a small number of people are dealing with SMI (World Health

Organization (WHO), 2022). This should also consider the age group to focus more on young children and youths as for now, mostly older people are researched when it comes to technology and the DD. Due to the increased deprivation of resources they experience due to the DD and Covid-19 pandemic, people with low SES should be the focus of future research too. Including more diverse groups in research enables intervention designs to be tailored to their specific needs by understanding their experiences thoroughly. This might also include intersectionality, which is about focusing on different but related traits since vulnerable groups can sometimes not be put in one clear category. As an example, this includes examining the high unemployment rates for people with mental health disorders because they are digitally excluded when most job advertising is being done online (Spanakis et al., 2022).

Another point of focus for future empirical research and later reviews should be the positive side of technology use among those groups. While it is important to understand the barriers related to ICTs, it is equally important to understand factors that promote engagement with ICT, such as programs that successfully coordinate access to resources (Morata et al., 2022). This study clarified that the inequalities of vulnerable groups are already exacerbated due to Covid-19 and the DD. Nevertheless, positive experiences need to be taken into account as well to understand what is already helping or what benefits can be built upon, such as the connectedness to local communities through events, which people with mental health disorders can more easily access (Middle & Welch, 2022). Moreover, vulnerability is usually discussed concerning deficits, traits or resources that vulnerable groups are missing (e.g. Spanakis et al., 2023). However, dealing with vulnerability can also be associated with resilience to deal with deficits or resilience can build up during times of hardship (Noriega et al., 2023). Focusing on this aspect would help to capture the whole experience of vulnerable groups within this context.

Lastly, to prevent the aforementioned risk of biases, less wealthy countries and studies in languages other than English should also be the focus of identification throughout the research process. This should make sure that vulnerable groups are not excluded from the research field. Additionally, it will reveal a clear picture of the different experiences to tailor interventions and future policies as specific as possible.

4.5. Conclusion

This study focused on how vulnerable groups experienced the DD during the Covid-19 pandemic. It was found that this pandemic brought the digitalisation of health services and everyday life with it, while the specific barriers of the DD are related to its underlying levels, namely the access, use, and benefits of ICTs. More studies are needed that focus on other

countries and pay attention to vulnerable groups like people with low SES, which are often overlooked in the literature. Additionally, attention should be paid to enhancing factors that promote the use of ICTs. This will ensure that these experiences can be understood comprehensively to successfully inform future interventions and policies. This paper serves as a first review to synthesise not only the experiences of vulnerable groups related to the DD but also implementing it in the Covid-19 context and the changes it brought. In the future, this might bring the focus of attention towards this field to establish practical applications of this literature.

References

Ayllón, S., Holmarsdottir, H., & Lado, S. (2023). Digitally deprived children in Europe. *Child Indicators Research*, *16*(3), 1315–1339. https://doi.org/10.1007/s12187-022-10006-w

Beller, J., Schäfers, J., Haier, J., Geyer, S., & Epping, J. (2022). Trust in Healthcare during COVID-19 in Europe: Vulnerable Groups Trust the least. *Journal of Public Health*, *31*(9), 1495–1504. https://doi.org/10.1007/s10389-022-01705-3

Bikmen, N. (2023). Pandemics past: Collective memories for a global community? *Group Processes & Intergroup Relations*, *27*(4), 779–801. https://doi.org/10.1177/13684302231187261

Campbell, M., Katikireddi, S. V., Sowden, A., & Thomson, H. (2019). Lack of transparency in reporting narrative synthesis of quantitative data: A methodological assessment of systematic reviews. *Journal of Clinical Epidemiology*, *105*, 1–9. https://doi.org/10.1016/j.jclinepi.2018.08.019

* Carney, F., & Kandt, J. (2022). Health, out-of-home activities and digital inclusion in later life: Implications for emerging mobility services. *Journal of Transport & Health*, *24*, 101311. https://doi.org/10.1016/j.jth.2021.101311

Chen, X., Östlund, B., & Frennert, S. (2020). Digital Inclusion or digital divide for older immigrants? A scoping review. *Human Aspects of IT for the Aged Population. Technology and Society*, 176–190. https://doi.org/10.1007/978-3-030-50232-4_13

Cheshmehzangi, A., Zou, T., & Su, Z. (2022). The digital divide impacts on mental health during the COVID-19 pandemic. *Brain, Behavior, and Immunity*, *101*, 211–213. https://doi.org/10.1016/j.bbi.2022.01.009

Eurostat. (2022, December). *Statistics explained*. Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Digital_economy_and_society_statistics_-_households_and_individuals

Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. *Societies*, *10*(4), 86. https://doi.org/10.3390/soc10040086

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, *26*(2), 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Hargittai, E., Piper, A. M., & Morris, M. R. (2018). From internet access to internet skills: Digital Inequality Among Older Adults. *Universal Access in the Information Society*, *18*(4), 881–890. https://doi.org/10.1007/s10209-018-0617-5

Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (2019). Cochrane Handbook for Systematic Reviews of Interventions. Wiley-Blackwell.

Jung, R. G., Di Santo, P., Clifford, C., Prosperi-Porta, G., Skanes, S., Hung, A., Parlow, S., Visintini, S., Ramirez, F. D., Simard, T., & Hibbert, B. (2021). Methodological quality of COVID-19 Clinical Research. *Nature Communications*, *12*(1). https://doi.org/10.1038/s41467-021-21220-5

* Kaihlanen, A.-M., Virtanen, L., Buchert, U., Safarov, N., Valkonen, P., Hietapakka, L., Hörhammer, I., Kujala, S., Kouvonen, A., & Heponiemi, T. (2022). Towards Digital Health Equity - A qualitative study of the challenges experienced by vulnerable groups in using digital health services in the COVID-19 ERA. *BMC Health Services Research*, *22*(1). https://doi.org/10.1186/s12913-022-07584-4

Kozelka, E. E., Acquilano, S. C., Al-Abdulmunem, M., Guarino, S., Elwyn, G., Drake, R. E., & Carpenter-Song, E. (2023). Documenting the digital divide: Identifying barriers to digital mental health access among people with serious mental illness in community settings. *SSM - Mental Health*, *4*, 100241. https://doi.org/10.1016/j.ssmmh.2023.100241

* Köttl, H., Gallistl, V., Rohner, R., & Ayalon, L. (2021). “but at the age of 85? forget it!”: Internalized ageism, a barrier to technology use. *Journal of Aging Studies*, *59*, 100971. https://doi.org/10.1016/j.jaging.2021.100971

Kung, C. S., & Steptoe, A. (2023). Changes in internet use patterns among older adults in England from before to after the outbreak of the covid-19 pandemic. *Scientific Reports*, *13*(1). https://doi.org/10.1038/s41598-023-30882-8

Kuran, C. H., Morsut, C., Kruke, B. I., Krüger, M., Segnestam, L., Orru, K., Nævestad, T. O., Airola, M., Keränen, J., Gabel, F., Hansson, S., & Torpan, S. (2020). Vulnerability and vulnerable groups from an intersectionality perspective. *International Journal of Disaster Risk Reduction*, *50*, 101826. https://doi.org/10.1016/j.ijdrr.2020.101826

* Lee, S. (2023). Internet use and well-being of older adults before and during the COVID-19 pandemic: Findings from European Social Survey. *Journal of Gerontological Social Work*, *67*(1), 96–113. https://doi.org/10.1080/01634372.2023.2217682

Li, L., Taeihagh, A., & Tan, S. Y. (2023). A scoping review of the impacts of covid-19 physical distancing measures on vulnerable population groups. *Nature Communications*, *14*(1). https://doi.org/10.1038/s41467-023-36267-9

List of continents by GDP per capita. Statisticstimes. (2024, April 22). https://statisticstimes.com/economy/continents-by-gdp-per-capita.php

Lythreatis, S., Singh, S. K., & El-Kassar, A.-N. (2022). The Digital Divide: A Review and Future Research Agenda. *Technological Forecasting and Social Change*, *175*, 121359. https://doi.org/10.1016/j.techfore.2021.121359

Mahood, Q., Van Eerd, D., & Irvin, E. (2013). Searching for grey literature for systematic reviews: Challenges and benefits. *Research Synthesis Methods*, *5*(3), 221–234. https://doi.org/10.1002/jrsm.1106

Mariani, A. W., & Pego-Fernandes, P. M. (2014). Observational studies: Why are they so important? *Sao Paulo Medical Journal*, *132*(1), 01–02. https://doi.org/10.1590/1516-3180.2014.1321784

McDonagh, M. (2013, February 20). *Avoiding bias in selecting studies*. Methods Guide for Effectiveness and Comparative Effectiveness Reviews [Internet]. https://www.ncbi.nlm.nih.gov/books/NBK126701/

* Middle, R., & Welch, L. (2022). Experiences of digital exclusion and the impact on health in people living with severe mental illness. *Frontiers in Digital Health*, *4*. https://doi.org/10.3389/fdgth.2022.1004547

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2010). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. International Journal of Surgery, 8(5), 336–341. https://doi.org/10.1016/j.ijsu.2010.02.007

* Morata, T., López, P., Palasí, E., Hodges, J. C., & Calvo, R. (2022). After-school programmes response to the COVID-19 pandemic: Lessons learned from Barcelona, Spain. *Child & Family Social Work*, *27*(4), 783–794. https://doi.org/10.1111/cfs.12925

Mueller, J. T., McConnell, K., Burow, P. B., Pofahl, K., Merdjanoff, A. A., & Farrell, J. (2020). Impacts of the covid-19 pandemic on Rural America. *Proceedings of the National Academy of Sciences*, *118*(1). https://doi.org/10.1073/pnas.2019378118

Noori, S., Jordan, A., Bromage, W., Fineberg, S., Cahill, J., & Mathis, W. S. (2022). Navigating the digital divide: Providing services to people with serious mental illness in a community setting during COVID-19. *SN Social Sciences*, *2*(8). https://doi.org/10.1007/s43545-022-00470-0

Noriega, C., Sánchez-Cabaco, A., López, J., Pérez-Rojo, G., Sitges, E., & Bonete-López, B. (2023). Protective and vulnerability factors of posttraumatic growth during the COVID-19 pandemic. *Current Psychology*, *43*(19), 17740–17750. https://doi.org/10.1007/s12144-023-05058-2

Özdin, S., & Bayrak Özdin, Ş. (2020). Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. *International Journal of Social Psychiatry*, *66*(5), 504–511. https://doi.org/10.1177/0020764020927051

Peinemann, F., McGauran, N., Sauerland, S., & Lange, S. (2008). Disagreement in primary study selection between systematic reviews on negative pressure wound therapy. *BMC Medical Research Methodology*, *8*(1). https://doi.org/10.1186/1471-2288-8-41

Pentaris, P., Willis, P., Ray, M., Deusdad, B., Lonbay, S., Niemi, M., & Donnelly, S. (2020). Older people in the context of covid-19: A European perspective. *Journal of Gerontological Social Work*, *63*(8), 736–742. https://doi.org/10.1080/01634372.2020.1821143

Peterson, J., Pearce, P. F., Ferguson, L. A., & Langford, C. A. (2017). Understanding scoping reviews. *Journal of the American Association of Nurse Practitioners*, *29*(1), 12–16. https://doi.org/10.1002/2327-6924.12380

Sabat, I., Neumann-Böhme, S., Varghese, N. E., Barros, P. P., Brouwer, W., van Exel, J., Schreyögg, J., & Stargardt, T. (2020). United but divided: Policy responses and people's perceptions in the EU during the COVID-19 Outbreak. *Health Policy*, *124*(9), 909–918. https://doi.org/10.1016/j.healthpol.2020.06.009

Salameh, P., Hajj, A., Badro, D. A., Abou Selwan, C., Aoun, R., & Sacre, H. (2020). Mental health outcomes of the COVID-19 pandemic and a collapsing economy: Perspectives from a developing country. *Psychiatry Research*, *294*, 113520. https://doi.org/10.1016/j.psychres.2020.113520

Smith-East, M., & Starks, S. (2021). Covid-19 and Mental Health Care Delivery: A digital divide exists for youth with inadequate access to the internet. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(7), 798–800. https://doi.org/10.1016/j.jaac.2021.04.006

* Spanakis, P., Heron, P., Walker, L., Crosland, S., Wadman, R., Newbronner, E., Johnston, G., Gilbody, S., & Peckham, E. (2021). Use of the internet and digital devices among people with severe mental ill health during the COVID-19 pandemic restrictions. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.732735

* Spanakis, P, Lorimer, B., Newbronner, E., Wadman, R., Crosland, S., Gilbody, S., Johnston, G., Walker, L., & Peckham, E. (2023). Digital Health Literacy and digital engagement for people with severe mental ill health across the course of the covid-19 pandemic in England. *BMC Medical Informatics and Decision Making*, *23*(1). https://doi.org/10.1186/s12911-023-02299-w

* Spanakis, P, Wadman, R., Walker, L., Heron, P., Mathers, A., Baker, J., Johnston, G., Gilbody, S., & Peckham, E. (2022). Measuring the digital divide among people with severe mental ill health using the Essential Digital Skills Framework. *Perspectives in Public Health*, *144*(1), 21–30. https://doi.org/10.1177/17579139221106399

United Nations. (2021, December 7). *ITU: 2.9 billion people still offline*. United Nations. https://www.un.org/en/delegate/itu-29-billion-people-still-offline

van Dijk, J. (2020). *The digital divide*. Polity. December 9, 2023, https://books.google.nl/books?hl=en&lr=&id=6DvKDwAAQBAJ&oi=fnd&pg=PT7&dq=digital+divide&ots=6BjJsFZbqw&sig=Wn8IA5OeEfXLSCHIPzP61GfOWbE&redir_esc=y#v=onepage&q=digital%20divide&f=false

van Lotringen, C. M., Jeken, L., Westerhof, G. J., ten Klooster, P. M., Kelders, S. M., & Noordzij, M. L. (2021). Responsible relations: A systematic scoping review of the Therapeutic Alliance in text-based Digital psychotherapy. *Frontiers in Digital Health*, *3*. https://doi.org/10.3389/fdgth.2021.689750

* Vera San Juan, N., Shah, P., Schlief, M., Appleton, R., Nyikavaranda, P., Birken, M., Foye, U., Lloyd-Evans, B., Morant, N., Needle, J. J., Simpson, A., Lyons, N., Rains, L. S., Dedat, Z., & Johnson, S. (2021). Service user experiences and views regarding telemental health during the COVID-19 pandemic: A co-produced Framework Analysis. *PLOS ONE*, *16*(9). https://doi.org/10.1371/journal.pone.0257270

Watson, R., McKenna, H., Cowman, S., & Keady, J. (2008). *Nursing research: Designs and methods e- book*. Churchill Livingstone.

World Health Organization. (2022, June 8). *Mental disorders*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/mental-disorders

Xin, M., Mo, P. K., Li, J., Liu, X., Jiang, H., Chen, Y., Ma, L., & Lau, J. T. (2022). Smartphone non-users experience disproportionately higher psychological distress than their counterparts: Mediations via Psychosocial Resources in a large sample of college students in China. *Journal of Affective Disorders*, *296*, 41–48. https://doi.org/10.1016/j.jad.2021.09.058

Yoon, H., Jang, Y., Vaughan, P. W., & Garcia, M. (2018). Older adults' internet use for health information: Digital Divide by Race/ethnicity and socioeconomic status. *Journal of Applied Gerontology*, *39*(1), 105–110. https://doi.org/10.1177/0733464818770772

Zeng, L., Lytvyn, L., Wang, X., Kithulegoda, N., Agterberg, S., Shergill, Y., Esfahani, M. A., Heen, A. F., Agoritsas, T., Guyatt, G. H., & Busse, J. W. (2021). Values and preferences towards medical cannabis among people living with chronic pain: A mixed-methods systematic review. *BMJ Open*, *11*(9). https://doi.org/10.1136/bmjopen-2021-050831

Zhai, Y. (2020). A call for addressing barriers to telemedicine: Health disparities during the COVID-19 pandemic. *Psychotherapy and Psychosomatics*, *90*(1), 64–66. https://doi.org/10.1159/000509000