

Access and Use of Digital Rheumatology: Exploring “the social aspect”

Felix Muehlensiepen^{1,2,3}, Stefan Hochwarter^{1,3}

1 Center for Health Services Research, Brandenburg Medical School Theodor Fontane, Ruedersdorf, Germany

2 Faculty of Health Sciences Brandenburg, Brandenburg Medical School Theodor Fontane, Potsdam, Germany

3 Department of Computer Science, Norwegian University for Science and Technology, Trondheim, Norway

felix.muehlensiepen@mhb-fontane.de, stefan.hochwarter@ntnu.no

Abstract. This paper reports on the results of a secondary analysis of qualitative and quantitative research data focused on the socio-demographic and -economic dimension of digital health service and telemedicine use in German rheumatology care. The qualitative data analysis revealed that particularly age, place of residence and economic wealth are attributed a high relevance for the use of digital health through patients. Among physicians, age in particular was highlighted to influence digital services. Access to technical equipment is unequally distributed in society, leading to a wealth gap, which, according to participants, should find greater consideration. The quantitative data suggested correlation between the location of medical practice and telemedicine use, which might indicate poorer infrastructure in rural areas in Germany. These results are transferred to Bourdieu's theory of social space (1979) and types of capital (1986). The individual positioning in social space is associated with health-enhancing privilege and opportunities to parts of society. This may also include digital health use, which according to our data depends in particular on the individual economic capital of each person. The influence of social, cultural and symbolic capital on digital health has yet to be explored, based on further primary data research.

Introduction

Digital services and telemedicine have made their way into health care delivery. In fact, the COVID-19 pandemic has further accelerated the digital transformation of global health systems (Soto-Acosta, 2020). Studies suggest that digital services could improve care in several medical areas (Hewitt et al., 2020).

One of these areas is rheumatology care (McDougall et al., 2017). The potentials of digital health and telemedicine also face risks (Krusche et al., 2020). A hazard of particular relevance is the exclusive power and divisive potential of digital health regarding socio-economic status and further demographic characteristics. We understand socio-economic status as the combination of the characteristics of education, income and occupation (Baker, 2014). With demographic characteristics we refer to age, race (Stevens et al., 2021), gender, religion, home ownership, place of residence, health and disability status, and psychiatric diagnosis (Salkind, 2010). Those powers and potentials in turn might accord health-enhancing privilege and opportunities to sub-sections of society (Veenstra, 2007), including the access and effective use of digital health – which again is closely intertwined with the concept of digital divide:

“[T]he gap between demographics and regions that have access to modern information and communications technology and those that do not or have restricted access. This technology can include the telephone, television, personal computers and the Internet.” (WHO, 2021)

The influence of socio-demographic and -economic characteristics in relation to access to parts of society is also reflected in Pierre Bourdieu's theory of social space (Bourdieu, 1979; 1982). Each person's position within social space is determined by the dimensions of capital volume, capital structure and social career. Capitals are resources used by individuals and groups to maintain and enhance their positions in the social space (Bourdieu, 1986; Veenstra & Abel, 2019). According to Bourdieu, capital not only refers to economic capital, but also includes social, cultural and symbolic capital, which are interconnected and partially convertible into each other (Bourdieu, 1986). The notion of capital interplay refers to the intertwining of several forms of capital in the production of health (ibid.) and could also influence health care practitioners on whether digital services and telemedicine are used and offered to patients at all.

This work was inspired by previous research that related Bourdieu's theory to the distribution of health opportunities and equity (Paccoud et al., 2020; Veenstra & Abel, 2019; Veenstra, 2007; Xu & Jiang, 2020; Dragano, 2012), as well as previous CSCW research within this theoretical framework (Ludwig et al., 2017). We thrive to complement this knowledge with an empirical application of Bourdieu's capital approach to digital health use in rheumatology, thus exploring the possibilities and limitations of our recent empirical data (Muehlensiepen et al., 2021 a,b,c). For this purpose, we reassessed and conducted a secondary analysis of quantitative and qualitative data under the question: How do socio-demographic and economic aspects influence digital health and telemedicine access and use in rheumatology care?

Methods

To gain an understanding of the association between socio-demographic and economic characteristics and digital rheumatology usage, we have re-assessed and analyzed quantitative and qualitative data that we gathered earlier in previous studies. These include 1) qualitative interview data with patients, physicians and stakeholders (Muehlensiepen et al., 2021a); 2) data from a fishbowl discussion at the annual German rheumatology meeting (Muehlensiepen et al., 2021b); 3) data of a survey with rheumatologists and general practitioners (Muehlensiepen et al., 2021c); and 4) data of a survey with rheumatology patients (Muehlensiepen et al., 2021a). Each of these investigations was methodologically distinct and included separate groups of participants:

1) In the time span between November 2017 and July 2019 we conducted expert interviews (n=28) with patients, providers, and stakeholders (digital health developers; representatives of the statutory health insurance system, and others) engaged in rheumatology care. The used interview guide was designed to explore perspectives on telemedicine, as well as barriers and potentials of telemedicine use. Although the link between socio-demographic and economic factors and digital health in rheumatology was not specifically asked about, some of the interviewees raised these aspects by themselves in accordance to the openly designed interview guide. The interviews were recorded and transcribed verbatim.

2) A virtual fishbowl discussion on the question “How does the internet affect the doctor–patient relationship?” was held at the first virtual annual conference of the German Society for Rheumatology 2020 (September 9–12, 2020). Participants were patients, health care providers, and stakeholders. Apart from the initial question, the content of the fishbowl discussion depended on the participants, who referred to the relevance of socio-demographic and -economic aspects on digital health use. The discussion was recorded and transcribed verbatim.

3) A cross-sectional, self-completed, paper-based survey of German outpatient rheumatologists and general practitioners has been conducted from September to November 2018; to investigate acceptance, opportunities, and obstacles to the implementation of telemedicine. In order to be able to characterize the sample surveyed, the questionnaire included questions on socio-demographic data as age, gender, and clinical location, among others.

4) In collaboration with the patient organisation Deutsche Rheuma-Liga LV Brandenburg, we designed a second a cross-sectional, self-completed, paper-based survey on the use of telemedicine, this time targeting rheumatology patients. The questionnaires were distributed between 1 September and 30 December 2019 in different settings, including working groups of the patient organization and rheumatology care practices. In addition to questions about the personal perspective on telemedicine use in rheumatology, we also obtained socio-demographic data: Gender, age, health status, place of residence, etc.

In these studies, we have not yet sufficiently elaborated and presented the connections between socio-demographic and -economic factors and digital health usage in rheumatology, which is why we considered a complementary secondary analysis to be of further value in preparing future research activities. The

secondary analysis followed a deductive approach which aimed to detect information on the influence of socio-demographic and -economic factors on the use of digital health in the data.

1&2) For this purpose, we examined the qualitative material with regard to text passages in which socio-demographic or -economic aspects were addressed. The transcript passages were imported into the software MAXQDA 2020 and analyzed based on qualitative content analysis by Philip Mayring (2000). Codes were assigned by FM according to a deductive category system centered on characteristics: gender, age, income / wealth, education level, place of residence. SH performed an additional consistency check and inconsistencies were resolved. For the presentation of the results, representative quotes of the discussion transcript were selected, translated and included in the text.

3&4) We screened the quantitative data sets based on the qualitative results and assessed which socio-demographic and -economic data were available to verify or support the qualitative findings. In this context, we found that reliable data on age and location (place of residence / location of the medical practice) were available for both the physician and the patient survey in order to correlate them with the use of telemedicine and willingness to use telemedicine. The data sets were uploaded to SPSS and subjected to correlation analysis according to Pearson.

Findings

Qualitative Data

We identified several passages in the qualitative data in which socio-demographic- and -economic aspects were attributed a significance for the use of digital services or telemedicine in rheumatology. The attributions or contextual factors differed depending on the potential user groups. Among the physicians, age in particular was raised as a relevant individual factor for the implementation of digital health, respectively, as one fishbowl participant put it, the investment in digital infrastructure:

“My rheumatologist is like that; she tells me that she won’t invest in any digital infrastructure here and I know five, six, seven rheumatologists who are of the same age.” (Fishbowl, Patient representative I)

Digital infrastructure is described here as a, probably, financial investment that older physicians in particular do not want to undertake. Among patients, also the age and complementarily the place of residence were discussed as relevant determinants of access to and use of digital health services.

“With Skype and the whole thing- Who of the old people up there in Mecklenburg or so has the technical equipment? – I always ask myself.” (Interview 4, Patient)

At this point, the interviewee mentions SKYPE as a paraphrase for medical video consultation, which “the old people”, e.g. in the sparsely populated region

of Mecklenburg, may not use due to missing technical equipment. In addition, location also plays a role in terms of adequate internet access, which according to one GP interviewed is not available in rural areas.

“It is a paradox, that patients who would be most affected by it [telemedicine], patients who live far away from the city, (...) still have white spots in their surroundings, for example areas, residential areas where ISDN is available. They don't even have DSL 2000, they don't have anything. And it doesn't matter whether they want to or not, they simply can't hold a video conference.” (Interview 22, General practitioner)

The interviewee described that, people residing far away from the city would be most affected by telemedicine. However, according to him, these are precisely the "white spots", i.e. areas lacking an adequate internet connection for telemedicine usage, which he describes as a paradox. But not only location, in the sense of place of residence, but also place in society determines access to technical equipment and sufficient internet connection:

“In many parts of society, that not only include special circumstances, but also students and the general population, from patients to doctors, who simply do not have the technical equipment. And I don't even want to mention the 5G network, which is also not available in Germany.” (Fishbowl, Rheumatologist IV)

According to one fishbowl participant, access to technical equipment is unequally distributed, which excludes certain parts of society from digital health services. Following this line of thought, another fishbowl participant links the use of digital health to the economic resources needed to purchase technical equipment in order to be able to use digital services at all. According to him, those are unequally distributed and might lead to a wealth gap in the access and use of telemedicine and digital health, which has been given too little consideration so far:

“We also have to consider that digitization creates a wealth gap: people who cannot afford large contracts, good mobile phones, good tablets, do not have good access. And this is also evident in telemedicine and applications. (...) Thus, I believe that we also have to consider the social aspect.” (Fishbowl, Rheumatologist I)

He describes the wealth gap in terms of access to digital health services as the "social aspect" that has been given too little consideration so far.

While age, income / wealth, place of residence age, income wealth, and location were attributed an important role in access to and effective use of digital health in the qualitative data sets, education level was only mentioned marginally (s. quotation ‘Fishbowl, Rheumatologist IV) in the qualitative data sets. Furthermore, gender was not referred to at all as a determinant of digital health use and access.

Survey Data

A total of 485 physicians participated in the survey. Around 25% of the doctors surveyed reported that they used telemedicine. The majority of the surveyed

physicians (Table I) worked in provincial towns and towns. The correlation analysis indicated a minor negative correlation (-.12) between the location of the medical practice and telemedicine use. The smaller the population of the medical practice location, the fewer physicians indicated that they use telemedicine.

Circa half of the surveyed physicians were in the age between 51 and 60 years; 22% were older than 60 years; and 21% were between 41 and 50 years old. The correlation analysis indicated that the variables age and telemedicine do not correlate ($r=-0.02$).

Table I. Physician Survey: Telemedicine use, location of medical practice and age

Location	Telemedicine Use		
	No	Yes	Total
City	57 (12.10%)	27 (5.73%)	84 (17.83%)
Town	109 (23.14%)	45 (9.55%)	154 (32.70%)
Provincial Town	124 (26.33%)	34 (7.22%)	158 (33.55%)
Rural Area	62 (13.16%)	13 (2.76%)	75 (15.92%)
Total	352 (74.73%)	119 (25.27%)	471 (100%)
<i>r = -.12 (Sig., 2-sided = .009)</i>			
Age	Telemedicine Use		
	No	Yes	Total
<30 Years	2 (.42%)	0	2 (.42%)
31- 40 Years	29 (6.16%)	9 (1.91%)	38 (8.07%)
41 - 50 Years	74 (15.71%)	26 (5.52%)	100 (21.23%)
51 - 60 Years	165 (35.03%)	62 (13.16%)	227 (48.20%)
> 60 Years	83 (17.62%)	21 (4.46%)	104 (22.08%)
Total	353 (74.95%)	118 (25.05%)	471 (100%)
<i>r=-.02 (Sig., 2-sided = .675)</i>			

A total of 708 RMD-patients participated in the survey. Circa 38% of the participants do not want to try telemedicine; 32% of the participants do not know

whether they would like to try telemedicine; and the minority of survey participants (31%) would try telemedicine. The majority of the surveyed patients (Table II) lived in rural areas (34%) and provincial towns (25%) The correlation analysis indicated that the variables willingness to try telemedicine and the place of residence do not correlate ($r=0.02$).

Around 39% of the surveyed patients were in the age between 61 and 80 years; and 38% between 51 and 60 years. The correlation analysis indicated that the variables age and telemedicine do not correlate ($r=-0.05$).

Table II. Willingness to try telemedicine, place of residence and age

Place of residence	Willingness to try telemedicine			
	No	Yes	Do not know	Total
City	56 (8.46%)	42 (6.34%)	43 (6.50%)	141 (21.30%)
Town	46 (6.95%)	44 (6.65%)	44 (6.65%)	134 (20.24%)
Provincial Town	64 (9.67%)	54 (8.16%)	46 (6.95%)	164 (24.77%)
Rural Area	85 (12.84%)	62 (9.37%)	76 (11.48%)	223 (33.69%)
Total	251 (37.92%)	202 (30.51%)	209 (31.57%)	662 (100%)
<i>r = .02 (Sig., 2-sided = .545)</i>				
Age	Willingness to try telemedicine			
	No	Yes	Do not know	Total
<20 years	16 (2.32%)	5 (0.72%)	6 (0.87%)	27 (3.91%)
21-40 years	23 (3.33%)	42 (6.09%)	37 (5.36%)	102 (14.78%)
51-60 years	69 (10.00%)	105 (15.22%)	91 (13.19%)	265 (38.41%)
61-80	137 (18.86%)	52 (7.54%)	79 (11.45%)	268 (38.84%)
>80 years	6 (0.87%)	19 (2.75%)	3 (0.43%)	28 (4.06%)
Total	264 (38.26%)	210 (30.43%)	216 (31.30%)	690 (100%)
<i>r = 0.05 (Sig. .221)</i>				

Discussion

We conducted a secondary-analysis on qualitative and quantitative data following a data-related explorative and at the analysis level deductive approach which aimed to detect information on the influence of socio-demographic and -economic characteristics on the access and use of digital health and telemedicine in rheumatology care in Germany. The qualitative data revealed that age, wealth in terms of economic resources, and location - both place of residence as well as position in social space - determine access and use of digital health and telemedicine by patients in rheumatology care. Patients in peripheral locations have limited access to digital health services, leading to urban-rural and wealth disparities, which, according to study participants, should find greater consideration. With regard to physicians, age and location were primarily described as potential determinants of telemedicine use. The physician survey data revealed a slight correlation between the location of the practice and the use of telemedicine services. If practices are located peripherally, physicians use telemedicine less often. There appears to be no correlation between age and the use of telemedicine by physicians. The data of the patient survey revealed that there is no correlation between the place of residence or age of the patients and the willingness to use telemedicine.

Our empirical findings can be partly related to Bourdieu's types of capital (Bourdieu, 1986): Economic capital covers money, property and other financial assets. In the health sector, economic capital refers to the material resources required to access standard health services, pay in advance and acquire possibly better services (Paccoud et al., 2020), such as telemedicine or digital health apps. As economic capital is unequally distributed in social space, a wealth gap exists in relation to the use of digital health, as one fishbowl participant expressed. Cultural capital exists in three forms: the embodied state (through behaviors and dispositions learned over a lifetime), the objectified state (cultural goods possessed by the individual); and the institutionalized state (such as an educational qualification) (ibid.). For instance, digital (health) literacy could be attributed to the embodied and more rarely, as in school courses or even medical training, institutionalized state of cultural capital. Bourdieu defined social capital as the "aggregate of the actual or potential resources which are linked to the possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu, 1986, p.248). The individual's social network might support, accompany and speed up access and use of digital health services and telemedicine, e.g. for the elderly. This may imply that health care tasks are transferred to the home care setting, leading to a displacement of work to informal caregivers (Bratteteig & Wagner, 2013).

Individuals are distributed in social space based on the composition of the capital they possess (Bourdieu, 1986). Capital is unequally distributed and so is the availability of adequate technical devices and resources, as well as the required digital or health literacy, which are prerequisites for effective use of digital health approaches (Cornejo Mueller et al., 2020). As reflected in the qualitative data, the unequal distribution of capital is associated with parts of

society not having access to digital health services and telemedicine and thus potentially receiving poorer health care. Complementing Bourdieu's types of capital, our analysis shows that age and place of residence are also important factors influencing effective use of digital services, which in turn could be related to social space and capital endowment. Consequently, recent COVID-19 induced digital health uptake could lead to an increase in the unequal social distribution of health opportunities.

Limitations

This paper reports on an early approach to explore the socio-demographic and -economic impact on digital rheumatology access and usage in order to plan future research activities in this area. This approach has limitations, both methodological and theory-related. The data studied did not primarily target the influence of socio-demographic and especially education and economic factors on telemedicine use, which to this study is of particular relevance. For example, income or education level could have been assessed in the patient survey. Furthermore, the interview guides did not contain any specific questions on socio-demographic or -economic aspects. Plus, we did not perform statistical pooling due to the heterogeneous target groups in the surveys as well as partly different methodological approaches. Due to the limitations of the empirical material, we could only tentatively explore the relationships between cultural, social, and symbolic capital and digital health use.

Our paper contributed to existing knowledge by highlighting the socially exclusionary power and divisive potential of current digital health use, while providing another yet rare (Ludwig et al., 2017) application of Pierre Bourdieu's seminal theory, which we highly recommend to the community due its high declarative power with regard to social inequalities in (digital) health care use. As this is only the beginning of our research on determinants of digital rheumatology usage, we would like to expand our understanding and reach for further theoretical and empirical approaches at INFRAHEALTH 2021. We are especially interested in discussions and examples on how participatory design approaches as well as digital health in general can be used to overcome social barriers to access adequate healthcare. These aspects will be taken up in our follow-up projects to gain more insights into the socio-demographic and -economic determinants of digital health usage, specifically in rheumatology care.

Conclusion

The results of our analysis indicate that individuals' location in social space and capital resources shape access to and use of digital services in rheumatology, with economic capital, age and location being of particular relevance. The results of our secondary analysis are still limited in their explanatory power, but emphasize the area, where more detailed primary data research is highly needed.

References

- Baker, E.H. (2014). Socioeconomic Status, Definition. In *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society* (eds W.C. Cockerham, R. Dingwall and S. Quah). DOI: 10.1002/9781118410868.wbehibs395
- Bourdieu, P. (1979): *Critique sociale du jugement*. Les Editions de Minuit. Paris.
- Bourdieu, P. (1982): *Leçon sur la leçon*. Les Editions de Minuit. Paris.
- Bourdieu, P. (1986): The Forms of Capital. In Richardson J. (ed) *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood
- Bratteteig, T. & Wagner, I. (2013): Moving healthcare to the home: the work to make homecare work. *Proceedings of ECSCW*, Springer, pp. 143-162
- Cornejo Müller, A., Wachtler, B., & Lampert, T. (2020): Digital Divide – Soziale Unterschiede in der Nutzung digitaler Gesundheitsangebote. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, vol. 63, no. 2, pp. 185-191. DOI: 10.1007/s00103-019-03081-y
- Dragano, N. (2012): Soziales Kapital und Gesundheit im städtischen Raum. *Public Health Forum*, vol. 20, no. 2; 5.e1-5.e3. DOI: 10.1016/j.phf.2012.03.005
- Hewitt, S., Sephton, R., & Yeowell, G. (2020): The Effectiveness of Digital Health Interventions in the Management of Musculoskeletal Conditions: Systematic Literature Review *Journal of medical Internet research*, vol. 22, no. 6, e15617.
- Krusche, M., Mühlensiepen, F., Aries, P., Welcker, M., & Knitza, J. (2020): Telemedizin in der Rheumatologie. *Zeitschrift für Rheumatologie*, vol. 79, no. 9, pp. 883-892. DOI: 10.1007/s00393-020-00912-1
- Ludwig, T., Tolmie, P., & Pipek, V. (2017): From the Internet of Things to an Internet of Practices: Technology, Communications and Computing. *ECSCW Exploratory Papers*, vol. 10, pp. 33-47.
- Mayring, P (2000): Qualitative Inhaltsanalyse. *Forum: Qualitative Sozialforschung*, vol. 1, no. 2, Art 20.
- McDougall, J. A., Ferucci, E. D., Glover, J., & Fraenkel, L. (2017): Telerheumatology: A Systematic Review. *Arthritis care & research*, vol. 69, no. 10, pp. 1546–1557.
- Muehlensiepen, F., Knitza, J., Marquardt, W., May, S., Krusche, M., Hueber, A., Schwarz, J., Heinze, M. & Welcker, M. (2021a): Opportunities and Barriers of Telemedicine in Rheumatology: A Participatory Mixed-Methods-Study. *JMIR Preprints*. 17/03/2021:28794.
- Mühlensiepen, F., Kurkowski, S., Krusche, M., Mucke, J., Prill, R., Heinze, M., Welcker, M., et al. (2021b): Digital Health Transition in Rheumatology: A Qualitative Study. *International Journal of Environmental Research and Public Health*, vol. 18, no. 5, 2636. MDPI AG. DOI: ijerph18052636
- Muehlensiepen, F., Knitza, J., Marquardt, W., Engler, J., Hueber, A., & Welcker, M. (2021c): Acceptance of Telerheumatology by Rheumatologists and General Practitioners in Germany: Nationwide Cross-sectional Survey Study. *Journal of medical Internet research*, vol. 23, no. 3, e23742. DOI: 10.2196/23742
- Paccoud, I., Nazroo, J., & Leist, A. (2020): A Bourdieusian approach to class-related inequalities: the role of capitals and capital structure in the utilisation of healthcare services in later life. *Sociology of health & illness*, vol. 42, no. 3, pp. 510–525. DOI: 10.1111/1467-9566.13028
- Salkind, N. J. (2010): *Encyclopedia of research design* (Vols. 1-0). Thousand Oaks, CA: SAGE Publications, Inc. DOI: 10.4135/9781412961288
- Soto-Acosta, P. (2020): COVID-19 Pandemic: Shifting Digital Transformation to a High-Speed Gear, *Information Systems Management*, vol. 37, no. 4, pp. 260-266.

- Stevens, J, Mechanic, O, Markson, L, O'Donoghue, A, Kimball, A. (2021): Telehealth Use by Age and Race at a Single Academic Medical Center During the COVID-19 Pandemic: Retrospective Cohort Study. *Journal of medical Internet research*, vol. 23, no.5, e23905. DOI: 10.2196/23905.
- Veenstra, G. (2007): Social space, social class and Bourdieu: Health inequalities in British Columbia, Canada. *Health & Place*, vol. 13, no. 1, pp. 14–31.
- Veenstra, G., & Abel, T. (2019): Capital interplays and social inequalities in health. *Scandinavian journal of public health*, vol. 47, no. 6, pp. 631–634. DOI: 10.1177/1403494818824436
- World Health Organization. (2021): Global strategy on digital health 2020-2025. Geneva.
- Xu, P., & Jiang, J. (2020). Individual Capital Structure and Health Behaviors among Chinese Middle-Aged and Older Adults: A Cross-Sectional Analysis Using Bourdieu's Theory of Capitals. *International journal of environmental research and public health*, vol. 17, no. 20, 7369. DOI: 10.3390/ijerph17207369