

1 Does Therapy Always Need Touch? A cross-sectional study among  
2 Switzerland-based occupational therapists and midwives regarding  
3 their experience with health care at a distance during the COVID-19  
4 pandemic in Spring 2020

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## Abstract

*Background:* The COVID-19 pandemic impedes therapy and care activities. Tele-health, i.e., the provision of health care at a distance (HCD), is a promising way to fill the supply gap. However, facilitators and barriers influence the use and experience of HCD for occupational therapists (OTs) and midwives.

We identified use of services and appraisal of experiences of Switzerland-based OTs and midwives regarding the provision of HCD during the lockdown as it pertains to the COVID-19 pandemic in spring 2020. 1. Hypothesis: Profession, age in years, and area of work have a significant and meaningful influence over whether HCD is provided. 2. Hypothesis: Profession, age in years, area of work, possibility of reimbursement by health insurance, and application used have a significant and meaningful influence on the experience of HCD.

*Methods:* In a cross-sectional survey, 5,755 OTs and midwives were contacted to fill out an online questionnaire with 13 questions regarding demographic information, use of HCD, and experiences while providing the service. Eleven potential facilitators and barriers and areas where there was desire for support were identified.

*Results:* The questionnaire was completed by 1,269 health professionals (response rate 22.5%). 73.4% of responding OTs (n=431) and midwives (n=501) provided HCD during the COVID-19 pandemic lockdown. Profession and area of work had a significant influence on whether HCD was provided. Age only had a significant influence on the use of videotelephony, SMS, and chat services.

OTs experienced HCD significantly more positively than midwives (log odds=1.3;  $p \leq .01$ ). Videotelephony (log odds=1.1;  $p \leq .01$ ) and use of phone (log odds=0.8;  $p = .01$ ) were positive predictors for positive experience, while use of SMS (log odds=-0.33;  $p = .02$ ) was a negative predictor.

Among OTs, 75.7% experienced HCD as positive or mostly positive, while 13.9% experienced it as negative or mostly negative. Among midwives, 39.5% experienced it as positive or mostly positive, while 57.5% experienced it as negative or mostly negative. Most respondents desired support concerning reimbursement by health insurance (70.8%), followed by law and data protection (60.4%).

1 *Conclusions:* HCD during the early COVID-19 pandemic was generally perceived as positive by OTs and  
2 midwives. There is need for training opportunities in connection with HCD during the COVID-19  
3 pandemic.

4  
5 3–10 keywords:

6 Tele-health, tele-care, tele-rehabilitation, tele-monitoring health professions,  
7 videotelephony, technology acceptance, occupational therapy, midwifery

## 8 1. Background

9 Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2  
10 (SARS-CoV-2) infection. As SARS-CoV-2 is highly contagious, the World Health Organization (WHO)  
11 announced the spread of COVID-19 as a pandemic in March 2020. Most states worldwide decided in  
12 March 2020 to substantially lock down public life to prevent the spread of the disease (date of  
13 lockdown in Switzerland as communicated on March 13, 2020 began on March 16, 2020). Those who  
14 tested positive for COVID-19 and vulnerable persons (e.g., >65 years of age) were isolated.  
15 Unfortunately, those who require rehabilitation are often made vulnerable by the disease (e.g., 90%  
16 of stroke clients in Switzerland are 65 and above) (2). Making matters worse, the pandemic resulted in  
17 very early inpatient discharge and a suspension of rehabilitation services in outpatient settings which  
18 decreased the access to rehabilitation services and their availability (3,4). As a result, occupational  
19 therapists were faced with providing interventions for an increasing number of clients isolated for their  
20 own protection or the protection of others.

21 The COVID-19 pandemic caused additional strain through a high prevalence of disease, limited  
22 resources, and staff under pressure (5).

23 This being the case, birth dates could only be rescheduled to a limited extent. At the beginning of the  
24 pandemic, studies provided contradictory evidence whether pregnant and postpartum women were  
25 at increased risk during the infectious disease outbreak (6,7). The increased risk of infection for

1 postpartum women in hospitals and limited possibilities to receive visitors led to early discharge,  
2 consequently increasing the need for outpatient care. However, to avoid spreading the disease,  
3 midwives were challenged with quickly reducing in-person antenatal, intrapartum, and postpartum  
4 midwifery care, replacing it with remote care.

5 Tele-health, i.e., the provision of health care at a distance (HCD), might be suitable for continuing  
6 therapy under these circumstances (8). The use of HCD has been described in a number of areas of  
7 work, including the outpatient area, the inpatient sector, the home environment, and school settings  
8 (9). HCD reduces physical contact between vulnerable persons and the environment while enabling  
9 interaction with persons in strict isolation, therefore facilitating intense and long-term treatment (10).  
10 Communication technologies typically used include phones, short message services (SMS),  
11 videotelephony systems, and application software programs (apps). HCD allows for remote evaluation,  
12 assessment, monitoring, prevention, intervention, supervision, education, counselling, and coaching  
13 (9). In rehabilitation, there is evidence that remote interventions (“telerehabilitation”) have either  
14 better or equal salutary effects on motor, higher cortical, and mood disorders as well as quality of life  
15 compared with conventional in-person interventions (11–13). In midwifery, tele-care, mainly in the  
16 form of videotelephony, had already been successfully applied for different purposes. These included  
17 education (e.g., for childbirth and parenting antenatal), assessment (e.g., in early labor), clinical  
18 supervision (e.g., diabetes control), peer support, and case review (14–17).

19  
20 Although HCD may represent the first option for the treatment of people in isolation, most  
21 occupational therapists (OTs) and midwives were not adequately prepared to change therapy settings  
22 and care from in-person to remote during the rapid lockdown caused by the COVID-19 pandemic.  
23 Measures associated with the successful implementation of tele-health services such as education and  
24 training, as well as administrative and technical support could not be implemented in time. Little  
25 scientific literature exists to support health providers with information about the successful  
26 application of tele-health. To our knowledge, only Australia’s Nursing and Midwifery Federation has

1 developed HCD professional practice standards and guidelines written specifically for nurses and  
2 midwives which provide recommendations regarding communication, technology, consent, privacy,  
3 and confidentiality (18).

4 In the literature, facilitators and barriers for successful implementation of HCD have been described  
5 (19,20). These include infrastructure, knowledge about apps, law and data protection, reimbursement  
6 by health insurance, federal and cantonal ordinances, client needs, client requirements, suitable  
7 methods and their effectiveness, communication methods, and the examination and treatment  
8 processes.

9

10 To integrate HCD technology into routine practice during the COVID-19 pandemic and in the case of  
11 future pandemics, it is necessary to understand by whom, how, and in which areas of work HCD is  
12 provided, and to evaluate the experiences and perceptions of health care professionals regarding the  
13 appropriateness and meaningfulness of HCD. We were therefore interested in the experiences and  
14 attitudes of health professionals who normally have physical contact with their clients and regularly  
15 care for them in 1:1 settings. To gain a comprehensive impression, we chose OT and midwives. The  
16 work of OT and midwives in Switzerland before the pandemic has been predominantly  
17 performed in physical presence. Moreover, touch is an essential part of the work of OT and  
18 midwives, whether in guiding clients within therapies (indispensable for OT in particular) or in  
19 physical check-ups (midwives). Until before the pandemic, therefore, both professions offered  
20 only very limited HCD. The aim of the survey was to identify the use of services and to appraise the  
21 experiences of Switzerland-based OTs and midwives regarding the provision of HCD during the  
22 lockdown due to the COVID-19 pandemic in spring 2020. The study presented helps to understand  
23 facilitators and barriers for successful implementation of tele-health applications in occupational  
24 therapy and midwifery and facilitates the development of workshops and guidelines to support health  
25 care providers during COVID-19 pandemic (15).

26

1 The two professions differ in the type of services (e.g., tele-therapy, tele-counseling, tele-monitoring)  
2 they provide. Also, HCD may be seen as more appropriate for services typically provided in certain  
3 areas of work, e.g., in an outpatient setting or at clients' homes. Furthermore, it is reasonable to  
4 assume that health professionals are more likely to provide services they can be reimbursed for (19).  
5 It's also worth mentioning that younger professionals may be more competent in using a wider range  
6 of communication technologies (21).

## 7 2. Methods

### 8 Study Aim

9 We hypothesize that profession (i.e., OT or midwife), age in years, and area of work have significant  
10 and meaningful influence on the provision of HCD.

11 Furthermore, we hypothesize that profession, age in years, area of work, possibility of reimbursement  
12 by health insurance, and application used (i.e., phone, email, chat, SMS, videotelephony apps, and  
13 services) have a significant and meaningful influence on experience of a given HCD service by health  
14 care providers.

15

### 16 Study Design

17 In our reporting of the survey we follow the CHERRIES guidelines that were mainly designed for web-  
18 based surveys (1,22).

19

### 20 Study Setting

21 The cross-sectional survey was accessible from May 11, 2020 to May 26, 2020. The population of  
22 interest encompasses OTs (registered members of the Swiss Professional Association of Occupational  
23 Therapists ("ErgotherapeutInnen-Verband Schweiz", EVS, N=2454 members) and midwives (registered  
24 members of the Swiss Federation of Midwives "Schweizerischer Hebammenverband", SHV, N=3301  
25 members) professionally registered in Switzerland. We collected data by means of an online survey.

1 Representatives of the respective professional associations contacted OTs and midwives directly by  
2 email and provided them with information about the survey as well as a link to the online  
3 questionnaire. Participants received no financial incentives.

4 We used the survey creation platform *www.unipark.com* to compile an online questionnaire (23). The  
5 platform allows for the creation and testing of surveys and provides an online link where it can be  
6 accessed. A data center situated in Germany hosts the platform which is certified by the German  
7 Federal Cyber Security Authority BSI and compliant with the ISO 27001 data safety and protection  
8 regulations (24). Multiple participants were able to fill out the survey using the same IP-address. This  
9 was deemed necessary as the survey targeted health professionals who might share an IP-address or  
10 even an office computer in their places of work. To fill out the survey multiple times in the same  
11 browser, cookies had to be erased first. After the running time of the online survey had ended, we  
12 exported the e-data and imported it into SPSS.

### 13 Questionnaire

14 Before filling in the questionnaire, we informed potential participants about the purpose of the study,  
15 which stated:

16 *With the COVID-19 pandemic, the digital future has become the present. In the*  
17 *short term, examinations, treatments, and therapy with physical presence have*  
18 *been replaced by treatments at a distance. In doing so, health care professionals*  
19 *(i.e., OTs, midwives) must not only treat clients effectively, but must also observe*  
20 *the legal requirements. We would like to ask you a few questions about your*  
21 *experiences during the COVID-19 pandemic. Based on your answers, we would like*  
22 *to develop recommendations for you in cooperation with the professional*  
23 *associations.*

24 Potential participants were provided with information about the approximate length of time to fill in  
25 the survey (i.e., ten minutes). The function and contact information of the two main investigators were  
26 provided.

27 The questionnaire consisted of 13 questions. The demographic section asked for information about  
28 the following: age in years, work experience in years, profession (i.e., OT or midwife), the field of  
29 activity of the institution/organization of employment, specific outpatient area (e.g., practice)



1 inpatient sector (e.g., hospital, birth center, retirement home), the home environment, or school  
2 setting. Multiple answers were possible here.

3 If a participant confirmed that during the COVID-19 pandemic, he/she performed HCD (i.e., necessary  
4 urgent examinations, treatments, and therapies at a distance) rather than in his/her office or the  
5 client's home, the following questions concerning which media were used (phone, email, chat, SMS,  
6 videotelephony apps and services) as well as their respective suitability for examinations, treatments,  
7 and therapies at a distance (rated on a Likert scale from 1= negative, 2= rather negative, 3= rather  
8 positive, 4= positive, 5= I do not know). If he/she did not confirm this, the questionnaire skipped ahead  
9 to a question about perceived advantages and disadvantages of HCD. If participants confirmed that  
10 they had used videotelephony, they were then asked about which specific videotelephony apps and  
11 services they used when providing HCD. Possible answers were *Doxy.me*, *Skype*, *Viber*, *WhatsApp*, *MS*  
12 *Teams*, *FaceTime*, *Messenger*, *Zoom* or others. *Doxy.me* is a US-based videotelephony and instant  
13 messaging service geared especially towards telemedicine. *Skype* is a videotelephony service that also  
14 allows audio calls and instant messaging. *MS Teams* is a workplace-focused collaboration platform that  
15 includes instant messaging, video- and audio telephony, and file sharing services. Both *Skype* and *MS*  
16 *Teams* are owned and operated by Microsoft Inc. *FaceTime* is a VoIP (voice over internet protocol) and  
17 videotelephony service operated by Apple Inc. that exclusively runs on macOS and iOS devices. *Whats-*  
18 *App* and *Viber* are VoIP and instant messaging software applications that allow for video calls.  
19 *WhatsApp* is owned by Facebook Inc., while *Viber* is operated by the Japan-based multinational  
20 company Rakuten Inc. *Messenger* is a feature of Facebook's main platform and offers instant  
21 messaging as well as audio and video calls between the platform's users. *Zoom* is another US-based  
22 videotelephony service.

23 Participants were asked how 1. they, and 2. their clients, "experienced necessary urgent examinations,  
24 treatments, and therapies at a distance" (rated on a Likert scale 1= negative, 2= rather negative, 3=  
25 rather positive, 4= positive, 5= I do not know).

1 Participants were asked about the possibility of reimbursement of the HCD services they provided by  
2 health insurance (yes, no, I do not know).

3 Regarding desired training opportunities when carrying out HCD, participants could choose among  
4 multiple answers in terms of knowledge about 1. infrastructure, 2. applications (apps), 3. law and data  
5 protection, 4. reimbursement by health insurance, 5. federal and cantonal ordinances, 6. client needs,  
6 7. client requirements, 8. effectiveness, 9. communication methods, 10. the examination and  
7 treatment process, and 11. suitable methods. Similarly, participants could choose multiple answers  
8 with respect to the need for training opportunities within these twelve topics. Moreover, OTs and  
9 midwives reported with comments to open-ended questions what they perceived as advantages and  
10 disadvantages of HCD. Answers to questions that allowed for commentary on further desired support  
11 are not reported here.

12 The questionnaire was available in German, French, and Italian (the three languages spoken as a first  
13 national language by 63.5%, 22.5% and 8.1% of inhabitants in Switzerland, respectively) (25). All three  
14 language versions were translated and checked by a native speaker. The full questionnaires are  
15 provided in the annex. Skipping questions was not possible except for the last four questions  
16 concerning advantages and disadvantages of therapy at a distance and desired support/need for  
17 training opportunities.

18 The questionnaire was driven by the immediate need for survey data during the COVID-19-induced  
19 lockdown. As it is a new tool, psychometric properties regarding the construction, validity, and  
20 reliability of measurement could not be collected (26). Interview questions were formulated jointly by  
21 two OTs and two midwives and were proofread, commented on, and completed by members of each  
22 professional association. One OT and one midwife not involved in the study filled out a test version  
23 and had only some minor suggestions for changes (e.g., regarding response options for area of work).

24 As the data was anonymized, Institutional Review Board approval was not required.

## 1 Statistical Analysis:

2 We used descriptive statistics including frequency distributions and means and standard deviations to  
3 analyze sociodemographic data. We calculated frequency distributions to describe the respondents'  
4 use of media, their opinions of the media's applicability, their experience of HCD, reimbursement of  
5 services, and desired training opportunities. We performed chi-square tests of independence to  
6 examine differences in media use patterns between OTs and midwives.

7 We tested data for Gauss-Markov theorems 1 to 6. To test for the first hypothesis ("profession, age in  
8 years, and area of work have an influence whether HCD was provided") we performed a binary logistic  
9 regression analysis. To test the second hypothesis ("profession, age in years, area of work,  
10 reimbursement, and application used have an influence on experience of this HCD service") we  
11 performed an ordinal logistic regression. We calculated response and cooperation rates according to  
12 Smith (27). Missing data were deleted listwise. We performed statistical analysis with IBM SPSS  
13 Statistics 26®.

## 14 Analysis of qualitative data:

15 The analysis of answers to the open questions was based on the principles of the Quantitative Content  
16 Analysis according to Fröh (34). The category scheme was derived from the data itself. Based on the  
17 repeated review of all answers to the question about the advantages and chances of HCD (n=1,052),  
18 six clearly distinguishable categories were formed, each containing different topics/motives. The  
19 assessment of all answers to the question about the disadvantages and limitations of HCD (n=1,129)  
20 resulted in five categories, one of which comprised three sub-categories. We concentrated the analysis  
21 on the first points mentioned in the answers, since this is the most spontaneous reaction to the  
22 question and most likely reflects what is seen as most important for the respondents.

## 23 3. Results

24 The online questionnaire was completed by 1.269 health professionals, with OTs and midwives making  
25 up roughly half of respondents, respectively (OTs: n=639; midwives: n=630). Response rate (i.e., the

1 number of complete interviews divided by the number of eligible contacts) was 22.5%, cooperation  
2 rate (i.e, the proportion of complete interviews of all responding contacts) was 52.6% (27).

### 3 *Sociodemographic Information*

4 Respondents had a mean age of 45.5 years and a mean professional experience of 19.5 years. The  
5 subsample of midwives was slightly older (46.2 years) and had longer professional experience on  
6 average (20.5 years) than the subsample of OTs (44.7 and 18.5 years, respectively). The respondents  
7 were predominantly female (96.6%), reflecting the gender distribution in these professions. 73% were  
8 German-speaking, 22.4% were French-speaking, and 4.6% were Italian-speaking, roughly reflecting the  
9 distribution of languages in the general Swiss population of 62.2% German, 22.9% French, and 8.0  
10 Italian, with a slight overrepresentation of German-speakers, especially in the midwife subsample.  
11 More midwives than OTs worked in clients' home settings (87.1% and 39.4%) and in inpatient care  
12 (37.0% and 25%). In contrast, more OTs worked in outpatient care (76.8% and 52.9%) and in school  
13 settings (19.2% and 1.4%) compared to midwives.

### 14 *Provision of health care at a distance*

15 67.4% of all OTs (n=431) and 79.5% percent of midwives (n=501) provided HCD during the COVID-19  
16 pandemic lockdown (total sample: 73.4%, n=932). Seven respondents (six OTs, two midwives) who  
17 denied providing HCD nevertheless provided information on media they used for providing such  
18 services, bringing this subsample to a total of 940 respondents. Out of the forms of media that were  
19 used for HCD, the form that was used most was phone, followed by chat services, email,  
20 videotelephony, and SMS (see also Table 1)

21  
22 **Table 1**

1 **Media used for service provision at a distance.**

Chi-Square test						
	Occupational Therapists (n=437)	Midwives (n=503)	Total sample (n=940)	$\chi^2=$	$df=$	$p=$
Use of phone n(%)	397 (90.8%)	491 (97.6%)	888 (94.5%)	21. 37	2	<0.001*
Use of chat services n(%)	201 (46.0%)	382 (76.1%)	583 (62.1%)	91. 69	2	<0.001*
Use of email n(%)	303 (69.3%)	219 (43.6%)	552 (55.6%)	64. 31	2	<0.001*
used videotelephony n(%)	226 (51.7%)	275 (54.8%)	501 (53.4%)	2.6 20	2	0.270
Use of SMS n(%)	158 (36.2%)	333 (66.3%)	491 (52.3%)	87. 05	2	<0.001*

2 *Note:* the midwives subsample had one missing value for “use of phone” and two missing values for each other category.  $\chi^2=$   
3 Chi-Square value;  $df$  = degrees of freedom; \* = p-value is significant at 0.05 level.

4  
5 *Hypothesis 1: Profession, age, and area of work have a significant and meaningful influence on whether*  
6 *HCD was provided.*

7 HCD was more likely to be provided by midwives compared to OTs ( $OR=2.2$ ;  $p<.001$ ), and by those who  
8 worked in the home environment ( $OR=1.6$ ;  $p<.001$ ) and in the outpatient area ( $OR=2.4$ ;  $p<.001$ ). It was  
9 less likely to be provided by those who worked in inpatient settings ( $OR=.5$ ;  $p<.05$ ). “School setting” as  
10 area of work and age had no influence on whether HCD was provided or not. However, age correlated  
11 positively with use of SMS (standardized coefficient beta  $\beta_j=.16$ ,  $p\le .001$ ) and chat services ( $\beta_j=.09$ ,  
12  $p=.001$ ), and negatively with the use of videotelephony ( $\beta_j=-.14$ ,  $p<.001$ ). Use of phone was  
13 independent from age.

14 Accordingly, the areas of knowledge where most respondents desired support when providing HCD  
15 were reimbursement by health insurance (70.8%) followed by law and data protection (60.4%).  
16 Roughly a third of respondents desired support regarding knowledge about suitable methods (34.4%),  
17 applications (32.5%), effectiveness (31.6%), and cantonal and federal ordinances (31.4%), respectively.  
18 More than half of respondents voiced a need for training opportunities in the following areas:  
19 reimbursement (65.6%), law and data protection (64.4%), and effectiveness (52.2%). OTs seemed to

1 clearly voice a greater need for education about applications (51.5%) than midwives (31.4%). See also

2 *Table 2.*

3

4 **Table 2**

5 ***Desire for training opportunities.***

	Occupational Therapists (n=639)	Midwives (n=630)	Total sample (n=1269)
Education about reimbursement <i>n(%)</i>	430 (67.3%)	402 (63.8%)	832 (65.6%)
Education about law and data protection <i>n(%)</i>	425 (66.5%)	392 (62.2%)	817 (64.4%)
Education about effectiveness <i>n(%)</i>	368 (57.6%)	294 (46.7%)	662 (52.2%)
Education about suitable methods <i>n(%)</i>	338 (52.9%)	261 (41.4%)	599 (47.2%)
Education about applications <i>n(%)</i>	329 (51.5%)	198 (31.4%)	527 (41.5%)
Education about communication methods <i>n(%)</i>	256 (40.1%)	210 (33.3%)	466 (36.7%)
Education about cantonal and federal ordinances <i>n(%)</i>	207 (32.4%)	204 (32.4%)	411 (32.4%)
Education about client needs <i>n(%)</i>	171 (26.8%)	226 (35.9%)	397 (31.3%)
Education about examination/treatment process <i>n(%)</i>	188 (29.4%)	195 (31.0%)	383 (30.2%)
Education about client requirements <i>n(%)</i>	165 (25.8%)	142 (22.5%)	307 (24.2%)
Education about infrastructure <i>n(%)</i>	172 (26.9%)	124 (19.7%)	296 (23.3%)

6 Those who provided HCD were more likely to desire support regarding reimbursement by health  
7 insurance (OR=1.6;  $p<.001$ ) and regarding law and data protection (OR=1.5;  $p<0.001$ ). Desire for  
8 knowledge about the remaining topics had no influence on whether HCD was provided or not.

9 *Hypothesis 2: Profession, age, area of work, possibility of reimbursement by health insurance, and*  
10 *application used have significant and meaningful influence on experience of this HCD service.*

11 The question on how healthcare was experienced at a distance during the COVID-19 pandemic  
12 lockdown was answered by 933 respondents. Among OTs, 75.7% experienced it as positive or mostly  
13 positive (n=327), while 13.9% (n=60) experienced it as negative or mostly negative. Among midwives,

1 only 39.5% experienced it as positive or mostly positive (n=198), while 57.5% (n=288) experienced it  
2 as negative or mostly negative.

3 OTs experienced HCD significantly more positive than midwives (log odds=1.3;  $p \leq .001$ ). Furthermore,  
4 videotelephony (log odds=1.1;  $p \leq .001$ ) and use of phone (log odds=0.8;  $p = .011$ ) were positive  
5 predictors for positive experience of HCD, while use of SMS (log odds=-0.33;  $p = .022$ ) was a negative  
6 predictor. Age, area of work, use of email and chats had no significant influence on experience.  
7 However, there was a non-significant tendency (log odds = .43;  $p = .060$ ) for reimbursement by health  
8 insurance as a positive predictor.

9 The question concerning their ability to get reimbursed for HCD was answered by 933 respondents. Of  
10 these, 17% (n=159) stated that they were able to be reimbursed for these services and 55.4% (n=517)  
11 stated that they were partially able to be reimbursed, and 15.2% (n=142) stated that were not able to  
12 be reimbursed. Those numbers were similar for both professions.

13 The applicability of media used for HCD was rated only by those respondents who had used the  
14 media in question. Applicability was rated on an ordinal 4-point scale (well applicable, rather  
15 applicable, rather inapplicable, or inapplicable). Videotelephony was the medium deemed applicable  
16 or well applicable by the highest percentage of respondents (90.2%), followed by phone (59.9%), and  
17 chat (54.9%). While email was deemed well or rather applicable for HCD by 59.3% of responding OTs,  
18 only 19.1% of responding midwives chose these answers. The respondents' most used  
19 videotelephony apps were *WhatsApp* (67.5%), *Skype* (56.9%), *Zoom* (50.1%), and *Facetime* (41.1%),  
20 while only few used *MS Teams* (8.0%), *Messenger* (6.4%), or *Viber* (0.6%). *Doxy.me* was not used by  
21 any respondent.

22 *Figure 1 Applicability of different media for HCD*

23 **Please insert Figure 1 here**

24

1 *Perceived advantages and disadvantages*

2 We received 1052 comments about advantages and 1162 about disadvantages in relation to HCD from  
3 583 OTs and 578 midwives. The most frequently mentioned (39.3%) advantage of HCD is the possibility  
4 to maintain the relationship with clients and to carry out consultations under extraordinary  
5 circumstances such as the COVID-19 pandemic. Other advantages often named were the reduction in  
6 the (unpaid) workload through the simpler clarification of low-level questions from clients and through  
7 the elimination of the largely unpaid travel time (18.7%), as well as the fact that HCD gave certain  
8 clients easier access to health care (16.7%).

9 Several respondents stating advantages stressed that the benefits of HCD were limited and that HCD  
10 was no substitute for direct care. Some (12.7%) denied any advantages of HCD.

11 In the statements on the disadvantages, two themes predominated: First, OTs and midwives saw  
12 themselves as considerably restricted in their ability to recognize and assess the complexity of the  
13 situation as a whole due to the lack of physical presence (42.9%). Second, for OTs and midwives a large  
14 number of examinations, interventions, and therapies were hardly possible at a distance due to  
15 absence of direct physical interaction (31.9%). As a result, they would only have access to part of the  
16 available information, which could sometimes lead to situations that felt difficult for both sides. The  
17 importance of scent and touch for the intervention and care work was particularly emphasized:  
18 "Hands-on is an indispensable part of work", OTs typically noted, whereas a midwife emblematically  
19 remarked: "Smelling, touching do not work via videotelephony". The perceived limitations to  
20 relationship building, seen as an essential prerequisite for a successful intervention and care (10.1%),  
21 as well as the added value of presence for the instructional work (showing, guiding) were also  
22 repeatedly mentioned (6.7%). In addition, entire client groups were being disadvantaged from the  
23 perspective of the respondents (7.1%). They reported that this was especially true for clients with  
24 mental health and anxiety problems, clients who lack technical proficiency, clients without sufficient  
25 language skills, and/or who have a shy and inhibited demeanor.



1

## 2 4. Discussion

3 This was the first study investigating HCD among OTs and midwives in the context of the COVID-19  
4 pandemic in Switzerland. There is evidence that HCD is effective in assessing and improving  
5 clients'/patients' health conditions (19). However, to date, clinical studies have largely been conducted  
6 with complex telemedicine systems or stand-alone software programs. These were often explained to  
7 the users beforehand, i.e., to health care providers and clients/patients in order to familiarize them  
8 with the system, the system's equipment, and the treatment procedures (19). A lack of training might  
9 influence users' adoption and/or increase their resistance to HCD. The COVID-19 pandemic lockdown  
10 required health professionals to provide their services remotely without prior training or education.

11 Our first hypothesis that profession, age, and area of work had a significant and meaningful influence  
12 on whether HCD was provided, was partially proven. About two out of three OTs and four out of five  
13 midwives provided services remotely. Not surprisingly, HCD was used mainly for care in the outpatient  
14 and home environments. Our assumption that age has an influence on provision, as technological  
15 affinity may decrease with age, was not proven. However, the younger the caregiver, the more likely  
16 videotelephony was used. In contrast, older caregivers preferred SMS and chat services when  
17 providing services and care.

18 It has been described in the literature that the implementation of novel telemedicine solutions can  
19 pose difficulties (28). Chat services seem to be the most frequently used novel communication  
20 technology and deemed most applicable out of all these services, possibly due to their interactivity.  
21 Furthermore, they are common within private use, meaning users are more likely to be familiar with  
22 them, thus lowering the threshold when applying them in professional settings. However, chat services  
23 were not reimbursed by health insurances.

24 With the phone being the most ubiquitous and low threshold communication technology available, it  
25 is no surprise that it was the medium most frequently used for HCD by health professionals during the

1 COVID-19 pandemic lockdown. However, videotelephony was seen as being much more applicable.  
2 This may be the case as videotelephony more closely resembles in-person encounters contrasted to  
3 audiotelephony alone. Despite its apparent applicability, videotelephony was only used by about half  
4 of respondents who performed HCD. This may be due to a lack of familiarity with the relevant  
5 technology and/or data protection concerns on the part of the health professionals and/or their  
6 clients. In fact, law and data protection seem to be a concern among health professionals. Education  
7 and advocacy are described as central to the continued use of HCD (9). Legal issues (concerning laws,  
8 regulations, guidelines, and standards) regarding confidentiality, operational or contractual  
9 requirements, billing and coding processes, clinical and nonclinical documentation, licensure  
10 regulations, clients rights and responsibilities, and data protection and secure data storage are all  
11 concerns that must be addressed before implementing HCD (9).

12 Although OTs provided fewer HCD services than midwives, their experience of HCD was more positive.  
13 Interestingly, whether the remote service was reimbursed by the health insurance provider only played  
14 a minor role (non-statistically significant tendency) for the experience of HCD. The Swiss Federal Office  
15 for Public Health (FOPH) launched a factsheet on reimbursement of costs for HCD during the COVID-  
16 19 pandemic on April 6, 2020 which was valid until June 22, 2020 (29). The factsheet stated that a brief  
17 midwife consultation by phone could only be invoiced if services were provided within the scope of  
18 the FDHA Ordinance on Benefits in the Compulsory Health Insurance Scheme. During the lockdown,  
19 remote services replaced attendance services. Reimbursement was restricted to five short  
20 consultations by phone per client. Midwives' services that could be provided at a distance were limited  
21 to comprehensive advice during pregnancy, pregnancy-related complaints, care in the postpartum  
22 period, and breastfeeding advice. For OTs, HCD were reimbursed only following prior initial face to  
23 face consultation or treatment. Moreover, HCD could be provided if clients showed symptoms of a  
24 respiratory tract infection, belonged to the group of particularly endangered persons, or  
25 travel/transport could not be guaranteed while adhering to the necessary hygiene measures. Services  
26 had to be limited to what the client could do independently or with the support of a caregiver without

1 the use of unavailable aids and without physical interaction (such as touch for assessment) with the  
2 therapist.

3 HCD reimbursement appeared to be a major concern for health care professionals, as reflected in the  
4 open-response section of the survey and in the preferences selected regarding support and continued  
5 teaching. HCD were only reimbursed if they were carried out via videotelephony (a phone consultation  
6 alone was not reimbursed) and a maximum of 30 minutes a day were deemed billable. This restriction  
7 is not reflected in a greater use of videotelephony by OTs, but it may be reflected in their greater desire  
8 for education about applications.

9 Accordingly, the most desired topic for training opportunities in relation to HCD was education about  
10 reimbursement. About three quarters of respondents who performed HCD stated they could not be or  
11 could only partially be reimbursed for these services by insurers. This was the case for both OTs and  
12 midwives alike.

13 The convenience aspect of HCD, mainly concerning the elimination of travel and waiting times, and the  
14 ability to carry out consultations from the comfort of one's home at any time have been described in  
15 many earlier studies (19).

16 A considerable number of the responding OTs and midwives had concerns about the use of HCD. They  
17 associated HCD with restricted professional abilities and lowered effectiveness. This is in line with  
18 findings of other studies about health care professionals' perceptions of HCD (30, 31, 32). However,  
19 since the statements are founded on specific experiences with HCD during the COVID-19 pandemic,  
20 results should be interpreted with caution and cannot be generally related to HCD. In our study, OTs  
21 and midwives had not systematically received prior introduction and training to available systems nor  
22 technical or emotional support. Furthermore, during the pandemic HCD did not complement  
23 traditional care but often had to replace it, meaning that the primary aim was not only consultation  
24 but also therapy/care. Accordingly, most negative comments criticised the lack of physical interaction  
25 with HCD. The apparent discrepancy of rated experience (i.e., about half of respondents rated the

1 experience of HCD as positive or rather positive) and comments (i.e., predominantly negative) may  
2 reflect both the appreciation of HCD as a temporary solution during the extraordinary pandemic  
3 situation and concerns about efforts to replace traditional care in the long-term by HCD.  
4 Of particular interest was the scepticism noted in the comments. This conflicts with the attitude of OT  
5 and midwifery students who associate digital media primarily with the promise of efficiency (33).  
6 The questionnaire focused on the attitude of the health care professionals. As a next step, it would be  
7 important to ask patients and clients about their experiences with HCD during the pandemic to  
8 optimize HCD provisions.

9 The data provided is only a snapshot of how the situation was perceived by OTs and midwives at a  
10 certain time (the lockdown began in Switzerland on March 16, 2020; the survey was accessible from  
11 May 11, 2020 to May 26, 2020). Furthermore, the generalizability of the results is limited, as only about  
12 one in five of the contacted OTs and midwives filled out the survey completely within the short open  
13 time window of 16 days. We also cannot exclude the existence of bias, e.g., the probability that health  
14 professionals with a distinct opinion (either positive or negative) or those who had (or had not)  
15 provided HCD were more likely to answer the survey. Nevertheless, with more than 1,200 participants,  
16 the results provide valuable insights into the perceived experiences and challenges of HCD as a result  
17 of the COVID-19 pandemic.

18 The application of information and communication technologies (ICT) for remote health care is nothing  
19 new, with some initial efforts already dating back to the 1980's (30). Several national health sectors  
20 have been adopting technological innovations in telemedicine for years (31–33). The COVID-19  
21 lockdown triggered a wide use of HCD, and it is to be expected that application of HCD will grow beyond  
22 the time frame of the current pandemic. As the two professions (OT and midwifery) require physical  
23 interaction and touch for assessment and therapy of their clients, HCD will likely serve as a tool to  
24 complement conventional therapy and not act as a substitute. Going forward, we suggest offering  
25 workshops for OTs and midwives in which the representative barriers and facilitators and the desired  
26 support respective to HCD are addressed.

1

## 2 5. List of abbreviations

3 COVID-19 coronavirus disease 2019

4 HCD health care at a distance

5 OT occupational therapist

6

7

## 8 6. Declarations

9 Ethics approval was not applicable. The study was conducted according to the World Medical  
10 Association's Declaration of Helsinki. Written informed consent was obtained from the participants.

### 11 [Availability of data and materials:](#)

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

### 14 [Competing interests](#)

15 The authors declare that they have no competing interests.

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17 The study was financed by internal grants of ZHAW.

### 18 [Authors' contributions](#)

19 BG, SG-B, VKM, and JPB made substantive intellectual contributions to the design and planning of the  
20 study. TB, SG-B, and BG made outstanding contributions to the collection of data. VKM, TB, and MG  
21 analyzed and interpreted the participants' data. TB prepared tables and graphs. All authors worked  
22 iteratively on drafting and revising the manuscript for important intellectual content. All authors have  
23 read and approved the final manuscript.

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## 26 8. Figure legends

27

1 **Figure 1**

2 *Applicability of different media for HCD.* Numbers inside bars designate number of respondents.

3

4

1 **9. Tables**

Chi-Square test						
	Occupational Therapists (n=437)	Midwives (n=503)	Total sample (n=940)	$\chi^2=$	$df=$	$p=$
Use of phone <i>n</i> (%)	397 (90.8%)	491 (97.6%)	888 (94.5%)	21. 37	2	<0.001*
Use of chat services <i>n</i> (%)	201 (46.0%)	382 (76.1%)	583 (62.1%)	91. 69	2	<0.001*
Use of email <i>n</i> (%)	303 (69.3%)	219 (43.6%)	552 (55.6%)	64. 31	2	<0.001*
used videotelephony <i>n</i> (%)	226 (51.7%)	275 (54.8%)	501 (53.4%)	2.6 20	2	0.270
Use of SMS <i>n</i> (%)	158 (36.2%)	333 (66.3%)	491 (52.3%)	87. 05	2	<0.001*

2

3

4 **Table 1**

5 ***Media used for service provision at a distance.***

6 *Note: the midwives subsample had one missing value for “use of phone” and two missing values for each other category.  $\chi^2=$*

7 *Chi-Square value;  $df$  = degrees of freedom; \* =  $p$ -value is significant at 0.05 level.*

8

9

1 **Table 2**

2 ***Desire for training opportunities.***

	Occupational Therapists (n=639)	Midwives (n=630)	Total sample (n=1269)
Education about reimbursement <i>n</i> (%)	430 (67.3%)	402 (63.8%)	832 (65.6%)
Education about law and data protection <i>n</i> (%)	425 (66.5%)	392 (62.2%)	817 (64.4%)
Education about effectiveness <i>n</i> (%)	368 (57.6%)	294 (46.7%)	662 (52.2%)
Education about suitable methods <i>n</i> (%)	338 (52.9%)	261 (41.4%)	599 (47.2%)
Education about applications <i>n</i> (%)	329 (51.5%)	198 (31.4%)	527 (41.5%)
Education about communication methods <i>n</i> (%)	256 (40.1%)	210 (33.3%)	466 (36.7%)
Education about cantonal and federal ordinances <i>n</i> (%)	207 (32.4%)	204 (32.4%)	411 (32.4%)
Education about client needs <i>n</i> (%)	171 (26.8%)	226 (35.9%)	397 (31.3%)
Education about examination/treatment process <i>n</i> (%)	188 (29.4%)	195 (31.0%)	383 (30.2%)
Education about client requirements <i>n</i> (%)	165 (25.8%)	142 (22.5%)	307 (24.2%)
Education about infrastructure <i>n</i> (%)	172 (26.9%)	124 (19.7%)	296 (23.3%)

3

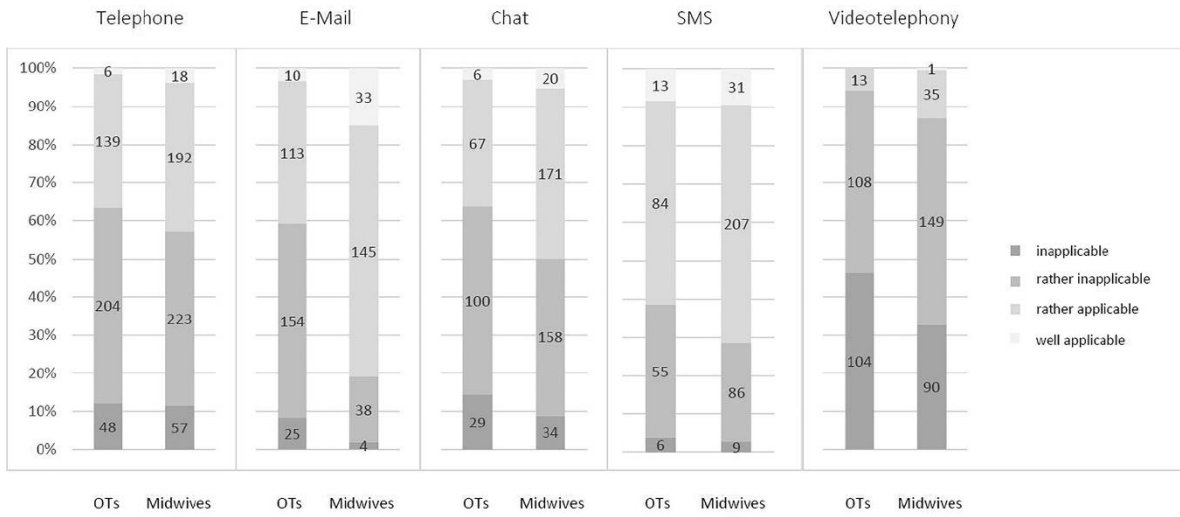
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# 1 10. Figures

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