

## Telemedicine as a Therapeutic Option in Gynecologic Cancer Care Management due COVID-19 Pandemics: Cross-Sectional Study among Physicians and Patients

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### Abstract

**Background:** The global incidence in the treatment of people with cancer is increasing. In the COVID-19 pandemic, many consultations had to be cancelled, postponed or converted to a virtual format. Telemedicine serves as a treatment option in other medical disciplines. This study analyses the use and perception of telemedicine as a therapeutic option in gynecologic cancer care management in Germany.

**Methods:** This prospective cross-sectional study was based on a survey of gynecological oncologists and patients in Germany during the COVID-19 pandemic. Descriptive statistics were calculated. Regression analyses were performed to show correlations.

**Results:** We analyzed the responses of 529 patients and 402 gynecological oncologists. Most believed that telemedicine is useful. Physicians as well as patients rated their knowledge of telemedicine as unsatisfactory. The majority of respondents said they do not currently use telemedicine, although would like to do so. Patients and physicians reported that their attitude had changed positively towards telemedicine and that their usage had increased due to COVID-19. The majority in both groups agreed on implementing virtual visits in stable disease conditions.

**Conclusion:** Telemedicine as a therapeutic option in gynecologic cancer care management finds limited use but high acceptance among physicians and patients alike.

**Keywords:** Health; Telemedicine; Health services research; COVID-19; Gynecological oncology

### Introduction

The global incidence of cancer is increasing. Approximately 15000 to 25000 persons in Germany are affected [1]. In Germany, the third wave of the COVID-19 pandemic has just begun. The number of infections is increasing every day. The health sector is affected enormously. In addition to the changes in the acute treatment of COVID-19 disease, many other changes have occurred in the day-to-day medical care since then. Planned operations have been postponed, non-life examinations and therapies have also been postponed. Due to pandemic containment measurements, many patient appointments had to be cancelled or were switched to telephone or video counseling. However, the clinical care of the patients had to be continued. New concepts and ideas were used. The topic of digitization was driven forward by the COVID-19 pandemic. Digital media and applications can positively influence patient care and open up new treatment paths. Many physicians believe that telemedicine has great potential for managing patient care [2]. Patients are willing to use mobile health technologies to improve their disease status and monitor symptoms and disease activity. The use of digital health applications has also increased in recent years [3]. The perspective of the patient and the gynecological oncologist is crucial for the successful development and implementation of telemedicine concepts for the management of gynecological patient care [4]. The central question is whether and how an adequate treatment can be performed digitally in the future. This study explored the use and perception of digital health applications in the form of telemedicine applications by gynecological oncologists and patients undergoing treatment in Germany. Changes

in these aspects were observed particularly during the COVID-19 pandemic.

### Methodology

The survey was conducted among gynecological oncologists (specialists and trainees) and patients with gyn-cancer on the situation of the use of digital health applications in the form of telemedicine in the age of COVID-19. The responsible ethics committee of the University in Jena was informed and did not object to the study (Reg.-No: 2019-1456-Bef). The two web-based surveys were conducted by members of the Working Group on Young Gynecology and Obstetrics of the German Society for Gynecology and Obstetrics (Arbeitsgemeinschaft Junges Forum der Deutschen Gesellschaft für Gynäkologie und

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Geburtshilfe(DGGG). In order to investigate the identified areas of interest, a panel of experts has conducted a questionnaire in two separate online meetings based on individual literature searches, similar to the EULAR recommendation working group Standard operating procedures drafted [5]. Four areas were investigated: (1) sociodemographic data, (2) basic use of Digital Health Applications, (3) Telemedicine: Knowledge and Use, (4) Telegynoncology: Barriers and benefits. The study questionnaires were designed in a web-based design according to published guidelines for questionnaire research [6-8]. The choice of questions for the questionnaire was based on both comparable work and on the quality criteria for online questionnaires [9]. The surveys were created in SurveyMonkey TM (SurveyMonkey, San Mateo, CA). The web-based survey (SurveyMonkey Inc.) was conducted from December 1, 2020 to April 20, 2021. The data were collected anonymously. The methodology and results of the study were reported according to the checklist for reporting the results of Internet e-surveys [10]. A 23-part, self-managed online questionnaire was developed for physicians and another for patients. Members of the Working Group Young Forum of the German Society for Gynecology and Obstetrics(DGGG) were asked to provide feedback on the format, completeness, clarity and procedure for the validation process [7]. Both surveys were pilot-tested. The survey for physicians was tested on 10 physicians and the patient survey on 10 patients to gauge the need to refine wording and format, and to check whether predefined response options were exhaustive. Minor revisions were made. Accordingly, the questionnaire was modified. A 23-part, self-managed online questionnaire was developed for physicians and another for patients. They consisted of binominal questions, questions in categorical Likert scales (6 levels) and open questions and was entitled "Telemedicine as a therapeutic option in the treatment of gynecological tumors".

#### The main sections were:

- Epidemiological data of respondents
- Basic Use of Digital Health Applications
- Telemedicine: Knowledge and Use
- Teleoncogyn: Barriers and benefits

The aim of the survey was to shorten the interview duration of a maximum of 15 minutes in order to keep the dropout rate as low as possible and to motivate the respondents to answer the questions as much as possible [11,12]. The physician's survey was sent to 1004 gynecologists in Central Germany (federal states of Thuringia, Saxony-Anhalt and Saxony, Germany). The contact details of potential participants in Central Germany were provided by the Association of Statutory Health Insurance Physicians. The questionnaire was distributed *via* e-mail addresses of the physicians. In an information letter, participants were informed that their data will be treated strictly confidential and anonymously. Access to the study was granted with a survey link. Patients who are undergoing gynecological-oncological treatment in our facility have access to the online questionnaire *via* a QR code or survey link. In an information letter, participants were informed that their data will be treated strictly confidential and anonymously. All participants gave their consent. There were no exclusion criteria. Only fully completed questionnaires were included in the subsequent analysis. The results were analyzed using SurveyMonkeyTM and the Statistical Package for the Social Sciences, SPSS (Version 27.0, SPSS Inc., and Chicago, IL, USA). Descriptive statistics included quantities, percentages, median scores, and ranges for ordinal variables. A p-value of less than 0.05 was considered significant.

## Results

### Overview

From December 2020 to April 2021, a cross-sectional, self-completed, web-based survey on telemedicine was filled in by gynecologists in Germany and patients with a gynecological disease. Of the 1005 physicians-questionnaires that were sent out, 432 (42.9%) were returned. Of the 432 responses, 30 were excluded from the analysis because fewer than half the questions were answered. The final response rate for physicians was 40% (402/1005). In the period from December 2020 to April 2021, 1533 patients were treated for gynecological cancer (inpatient, outpatient, oncological day clinic) in our facility. Of the 1533 patients, 582 participated in the study. Of the 582 responses, 53 were excluded from the analysis because fewer than half the questions were answered. The final response rate for patients was 34.5% (529/1533).

### Epidemiological data of respondents

529 patients completed the survey. Most patients were between 51 and 60 years old. The majority of patients were female (n=521, 98.4%). The majority of the participating patients had been on oncological treatment since 12 months. 402 doctors took part in the survey. Almost 63% were women (n=316). 20% work in a private practice, 52% (n=209) were clinicians in a university hospital, 28% in a non-university hospital. Details of the participants are given in Table 1. An overview of the individual gynecological diagnoses of the patients can be found in Figure 1.

### Basic use of Digital Health Applications (DHAs)

A percentage of 73.8% (n=390) of patients reported to use apps several times a day on a smartphone, 13.5% (n=71) used apps once daily and 9.4% (n=50) once weekly. Only 3.3% (n=18) of the patients stated to never use apps. Ninety-one percent (n=481) of patients are able to use digital health applications. In addition, almost seventy percent (n=370) say that the use of digital health applications can have a positive impact on their disease treatment, while almost thirty percent (n=159) disagreed. All physicians are able to use digital health applications. Seventy-two per cent (n=289) of gynecological oncologists described the use of DHAs for managing the patient's disease as useful, only 6.2% (n=25) disagreed. No significant difference in gender, age, degree of training and workplace was noted. Due to the COVID-19 pandemic, the attitude towards DHAs changed positively in 64.8% of patients (n=343) and 42.3% of physicians (n=170). Eighty per cent of patients (n=423) and 54.8% of gynecological oncologists (n=220) reported using

Gynecological oncologists, n=402(100%)		Patients n=529(100%)	
Women	316(63)		
<b>Age(years)</b>			
21-30	57(14)	58(11)	
31-40	76(19)	79(15)	
41-50	84(21)	122(23)	
51-60	137(34)	169(32)	
>60	48(12)	101(19)	
Consultant	330(82)		
Resident	72(18)		
<b>Working place</b>		<b>Treatment time</b>	
Privatepractice	80(20)	>12 month	312(59)
Universityhospital	209(52)	>24 month	217(41)
Non-university hospital	113(28)		

Table 1: Respondents characteristics (n (%)).

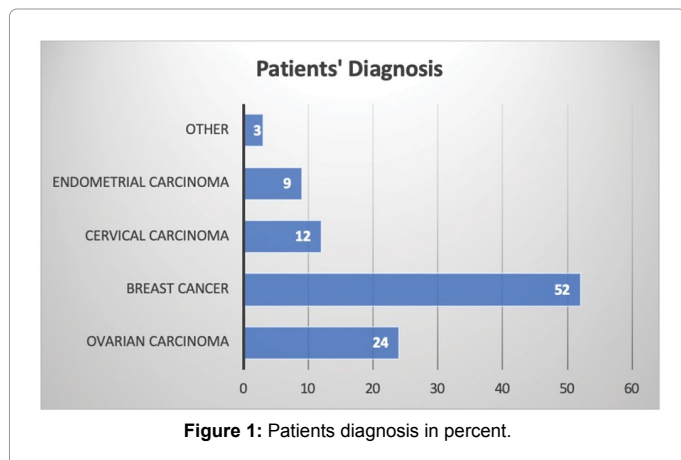


Figure 1: Patients diagnosis in percent.

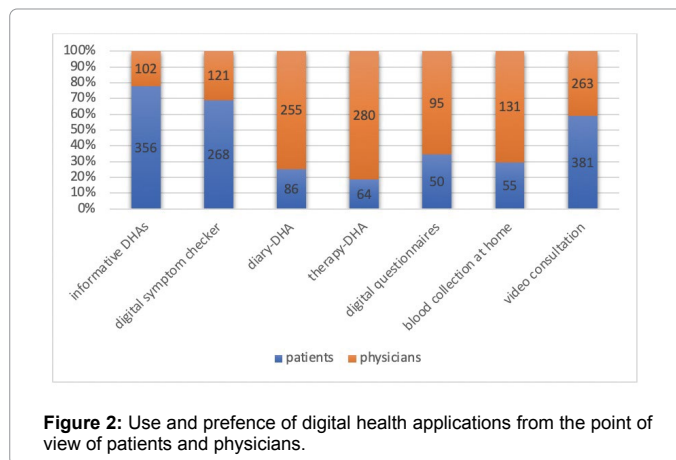


Figure 2: Use and preference of digital health applications from the point of view of patients and physicians.

DHAs more regularly (Table 2). At the time of the survey, patients were most likely to use video consultations (72%, n=381), informative DHAs (67.2%, n=356) and symptom checkers (50.7%, n=268). Digital disease-related questionnaires and diary DHAs should be used more frequently in the future. Therapy DHAs and self-taken blood samples with digital access to the results showed different levels of acceptance: 68.1% of patients (n=360) said they had no interest and 31.9% (n=169) could imagine a future application of this technique. Physicians were most likely to use therapy DHAs (69.7%, n=280), video consultations (65.3%, n=263) and digital diary (63.3%, n=255). Digital information DHAs and digital-related questionnaires should be used more frequently in the future. Self-taken blood samples with digital access to the results showed different levels of acceptance: 67.4% of physicians (n=271) said they had no interest and 32.6% (n=131) could imagine a future application of this technique. The majority of gynecological oncologists reject the use of symptom checker (69.8%, n=281). Patients were most likely to say that video consultations for aftercare (72.4%, n=383) and emergency appointments (52.9%, n=280) are possible. 65.8% (n=348) of patients said that time-synchronous digital consultation could complement physical appointments. In addition, 70.6% (n=374) of patients and 58.8% (n=236) of gynecological oncologists indicated that they should cancel an appointment on site if the patient's disease is stable and can indicate well-being by using a DHA (Table 2 and Figures 2 and 3).

### Telemedicine from a medical point of view: Knowledge and use

A total of 77.3% (n=311) of physicians rated their knowledge of telemedicine as 4 (unsatisfactory), 5 (bad) or 6 (very poor). The minority (91/402, 22.7%) rated their knowledge of telemedicine as 1 (very good), 2 (good) or 3 (satisfactory). the majority (360/402, 89.6%) currently does not use telemedicine, but 72.3% (291/402) said they would like to use it. A total of 79.1% (318/402) of the surveyed physicians pointed out that they do not use telemedicine due to barriers. The three main obstacles to the introduction of telemedicine According to the respondents: the purchase of technology equipment (267/402, 66.3%), administration (258/402, 64.2%) and poor reimbursement (251/302, 62.4%) (Table 3).

### Teleoncogyn in patient care management: Barriers and benefits

A total of 84.2% (338/402) of the respondents considered telemedicine to be useful in gynecological oncology due patient care management. When asked who should interact with telemedicine,

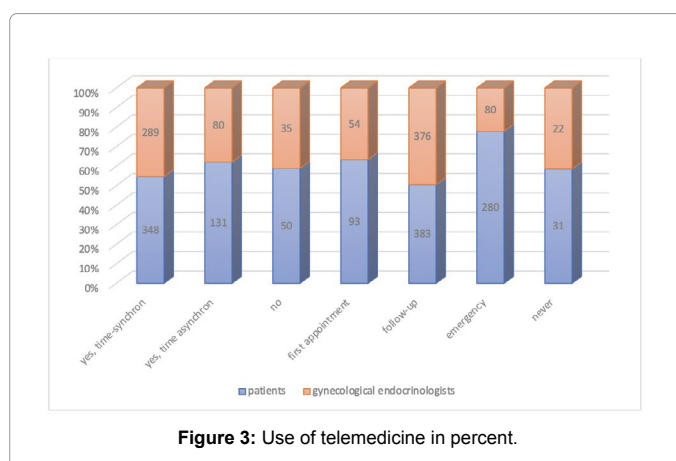


Figure 3: Use of telemedicine in percent.

Characteristics	Patients n=549(100%)	Gynecological oncologists n=402(100%)
<b>I believe using digital health applications (eg, medical apps, video consultation and online pharmacies) is useful for managing (my) disease, n(%)</b>		
Strongly disagree	38(7.1)	0(0)
Disagree	53(10.1)	25(6.2)
Neutral	68(12.8)	88(21.8)
Agree	270(51.2)	152(37.9)
Strongly agree	100(18.8)	137(34.1)
<b>Has your attitude towards digital health Apps changed due to the COVID-19 pandemic?, n(%)</b>		
It changed positively	343 (64.8)	170 (42.3)
It changed negatively	34 (6.5)	92 (22.8)
It has been unaffected	152 (28.7)	140 (34.9)
<b>Do you use digital health apps more regularly since the COVID-19 pandemic?, n (%)</b>		
Yes	423 (80)	220 (54.8)
No	106 (20)	182 (45.2)
<b>I feel able to use digital health apps, n(%)</b>		
Strongly disagree	7(1.2)	0(0)
Disagree	10(1.9)	0(0)
Neutral	31(5.9)	0(0)
Agree	408(77.2)	312(77.6)
Strongly agree	73(13.8)	90(22.4)

Table 2: Usage of digital health applications before and after COVID-19 pandemic, n (%).

Question	Responses gynecological oncologists n(%)
<b>How do you rate your own knowledge of telemedicine?</b>	
Total	402(100)
1(Very good)	17
2(Good)	41
3(Satisfactory)	33
4(Unsatisfactory)	122
5(Poor)	105
6(Very poor)	87
<b>Do you use telemedicine?</b>	
Total	402(100)
Yes	42(10.4)
No	360(89.6)
<b>Would you like to use telemedicine?</b>	
Total	402(100)
Yes	291(72.3)
No	111(27.7)
<b>Does anything prevent you from using telemedicine?</b>	
Total	402(100)
Yes	318(79.1)
No	84(20.9)
<b>What prevents you from using telemedicine? (multiple selections possible)</b>	
Total	402(100)
Purchase of technology equipment	267(66.3)
Administration	258(64.2)
Poor reimbursement	251(62.4)
Data security	195(48.6)
Lack of participation by colleagues	125(31.2)
Technical comprehension of patients	97(24.2)
Poor internet connection	87(21.7)

**Table 3:** Telemedicine: Knowledge and use.

81.0% (326/402) answered doctor-doctor, 62.1% (250/402) doctor-patient and 31.7% (127/402) physician-assistant (multiple answers were possible). The preferred therapeutic phases for the use of telemedicine in the treatment of patients were follow-up (299/402, 74.3%), first contact (85/402, 21.2%) and preventive examinations (82/402, 20.4%). Participants were asked to provide specific digital tools that could support oncological care management for patients. The most frequently selected topics were teleconsulting (294/402, 73.1%), video consultations (261/402, 64.9%) and telediagnosics (152/402, 37.9%). This was followed by online appointments (128/402, 31.9%), e-learning (105/402, 26.2%), patient apps (77/402, 19.2%), digital screening (49/402, 12.2%), portable devices (36/402, 8.9%) and other instruments (21/402, 5.1%) (Table 4).

## Discussion

This study was the largest nationwide survey on the use of telemedicine in Germany in the field of gynecological oncology for the promotion and implementation of telemedicine for the treatment of oncological patients. For this purpose, patients and gynecological oncologists that were interviewed. We report on the results of a joint survey that evaluated the perspectives of patients and gynecological endocrinologists during the COVID-19 pandemic. The survey contains the following main topics: 1. Epidemiological data of respondents, 2. Basic use of digital health applications, 3. Telemedicine: Knowledge and use and 4. Teleoncogyn: Barriers and benefits. In this survey study, patients and gynecological oncologists reported a positive attitude and increased usage of DHAs due to the COVID-19 pandemic in Germany.

Question	Responses gynecological oncologists n (%)
<b>Is telemedicine usable in gynecological endocrinology?</b>	
Total	402(100)
yes	338(84.2)
no	64(15.8)
<b>Which parties should establish communication via telemedicine? (multiple selections possible)</b>	
Total	402(100)
Physician-physician	326(81)
Physician-patient	250(62.1)
Physician-assistant	127(31.7)
Other participants and combinations	50(12.3)
No communication	32(7.9)
<b>At which stages can telemedicine support gyn-oncological patient care? (multiple selections possible)</b>	
Total	402(100)
Screening	82(20.4)
Initial contact	85(21.2)
Follow-up	299(74.3)
Other stages	50(12.4)
At no stage	26(6.4)
<b>Which tools could support gyn-oncological patient care? (multiple selections possible)</b>	
total	402(100)
Telecounseling	294(73.1)
Telediagnosics	152(37.9)
Video consultations	261(64.9)
Online appointment assignments	128(31.9)
e-Learning	105(26.2)
Patient apps	77(19.2)
Digital screening	49(12.2)
Wearable devices	36(8.9)
Other tools	21(5.1)
No tools	5(0.9)

**Table 4:** Implementation of tele-gynecology in patient cancer care management.

In line with previous patient surveys [13], the majority of the patients reported that they regularly used mobile apps on their smartphone and believe that they were able to use DHAs and the using of DHAs may be beneficial for one's own disease treatment. All physicians can use digital health applications. This is the basis for the use of telemedical applications in the field of gynecological oncology. Gynecological oncologists see the overall use of telemedicine as acceptable and more than two thirds of respondents want to use telemedicine in their daily practice and welcome the wide range of approaches to telemedicine. However, only a minority of doctors have already used telemedicine at the time of the survey. Barriers to introduction telemedicine in treatment of gynecology tumors, such limited knowledge, high costs for the purchase of technical equipment and insufficient financial refund, have been clearly identified by experts. The results shed light on how telemedicine can support oncological care for cancer patients from a medical and patient's perspective. Familiar communication formats, such as the direct exchange of information with patients and medical colleagues, are leading in the field. Various telecounseling tools are development. Their development for digital gynecological health applications is not as developed as in other disciplines for example, in intensive care and cardiology. This is reflected in the small number who used telemedicine at the time of the survey.

## Limitations

An online survey was deliberately used to increase the response rate and to achieve a reduced effort for data management. The aim was to obtain an increased return rate with the online questionnaire, to be able to complete the questionnaire within a short time, regardless of place and time, so that the return rate is as high as possible. However, it can be assumed that this online survey will in the sense of a positive distortion vis-à-vis users of telemedicine. To answer the questionnaire, knowledge of the field of telemedicine is required, e.g. preferences for specific tools have been requested. Given the limited knowledge of doctors in the field of telemedicine, distortions are likely. In addition, we expect rapid technological developments in the field of telemedicine, so that the predefined response categories may not have been exhaustive enough. The survey was conducted in the time of COVID-19, and pre-pandemic data are pending in this area, so further research on the development of the acceptance of telemedicine applications in general and in relation to tele-gynecology is urgently needed. The average age of our sample corresponds to that of German doctors as a whole [14]. Women were slightly over-represented compared to the average [15], which was also show that female doctors are more interested in telemedicine. This survey reflects only the opinion of gynecological oncologists. The survey was aimed at gynecological oncologists from all over Germany, especially doctors from Thuringia and Bavaria, who, due to the participated in the recruitment strategy. We assume a self-selection bias and a nonresponse bias, because the survey was probably answered predominantly by doctors and patients interested in telemedicine.

## Comparison with prior work

This work provides a first basic knowledge of the application of telemedicine in the treatment of patients with gynecological cancer and a first insight into the new field of tele-gynecology by providing detailed user settings, needs and barriers. We therefore believe that the results of this study in the development of telemedicine solutions can help integrate them into the clinical routine of patients in gynecological-oncological treatment. In contrast to the results of a recent study, which revealed a negative attitude towards digitalization in the healthcare sector among doctors and patients in Germany [16], our results have

shown that physicians and patients have a positive attitude towards telemedicine. A survey by the American Medical Association among nearly 3,500 doctors in the United States found that less than 15% of oncologists used telemedicine, which is significantly fewer than doctors from other medical disciplines, such as radiologists (43%) [17] and less than the proportion of gynecological oncologists using telemedicine according to our study. Although most respondents believe that teleconsultation can support the care of cancer patients, teleconsultation is rarely or rarely used. In a nationwide survey on digitization in the outpatient sector, the most common answers using e-mail and no digital communication at all [18]. The main obstacles from the point of view of physicians are security gaps in Information Technology(IT), which significant costs and effort involved in the introduction of digital media Technologies and an unfavorable cost-benefit ratio [18]. Respondents of our survey relatively little importance on security vulnerabilities in IT. Television consultations with patients appear to have considerable potential in gynecological oncology, especially in follow-up checks [14]. However, only a minority of respondents were in favor of the use of telemedicine for initial consultations. This finding confirms the results of a comparable study from the United States of America [19]. In addition, the absolute majority would like to the respondents use telemedicine in direct patient contact. This is comparable to total telemedicine developments in the health sector [13,17]. Previous studies have shown that patients use telemedicine as a flexible solution that increases the independence of health authorities and personal knowledge [20]. Other studies suggest that: Health care created by TV sets is as effective as after personal visits [21,22]. A qualitative study also reports that patients would be willing to accept electronic recording and sharing of Patient Reports(PROs) between clinical encounters when it is necessary to communicate with healthcare providers and access to reliable information [23]. However a recent study has shown that: doctors hesitate to study electronic PROs because it would lead to a massive increase in their workload [24]. Mobile apps promise to speed up diagnostic examinations and improving monitoring [25]. The small number of gynecological oncologists who use of apps to improve clinical routine contrasted with previous research from 2018, in which 49% said they were already use such apps [26]. One of the main reasons for dislikes to use apps may lack proof [27]. Our results show that both transient patients and gynecological oncologists accept telemedicine. We have also differences in the acceptance and preferences of telemedicine in relation to the age and gender of physicians; nature and region of their activities. No or only differences Small differences were found.

## Perspectives for tele-gynecology

COVID-19 has the importance of contactless approaches to medical care. Already in 2018, when we conducted the survey, transient patient and gynecological oncologists were willing to use telemedicine. It is assumed that these as a result of the pandemic, there has been an increase in the willingness to speed up the use of telemedicine as part of social action; new standards in health care [25]. However, the great potential of telemedicine lies not in fully achieved. However, the great potential of telemedicine is not fully achieved. Further research on implementation is urgently needed. These includes large-scale randomized controlled studies on the effects and health effects, risks and incidents, specific interventions. Since our results show that there will be no "one-size-fits-all" solution in the field of telemedicine, perspectives and preferences of physicians, patients and others telemedicine users in tele-gynecology are indispensable. This can create the basis for individual patient and physician-adapted telemedicine options and triage mechanisms to select patients for digital or analogue

consultation, appropriate [26,27]. As doctors reported on barriers to the use of telemedicine, it seems that the structural framework for the effective implementation of tele-gynecology is not yet in place. A considerable administrative burden and inadequate reimbursement structures prevented the doctors interviewed the use of telemedicine. The biggest obstacle, however, was the limited knowledge of physicians about the use of telemedicine, which is why it is necessary to provide early information on telemedicine in introduction of low-threshold training courses.

## Conclusion

Our study showed that gynecological oncologists and patients support the implementation of tele-gynecology, and two thirds of those surveyed want telemedicine in their clinical routine. The medical profession expressed an even greater willingness to use telemedicine. Respondents welcome a variety of telemedicine approaches. However, at present only a minority of the doctors interviewed are use of telemedicine. In addition, most doctors consider their knowledge of telemedicine is rather poor. The provision requires high-quality telemedicine care urgently needed research and a reduction in existing obstacles and training for professionals and generalists. Patients with gynecological cancer are very open to treatment with telemedicine applications. The foundations have been laid, development concepts in this area have great potential for the future and should be developed.

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## Authors' Contributions

The author was involved in drafting the article and critically revising it for important intellectual content and approved the final version to be submitted for publication.

## Conflicts of Interest

None declared.

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