Life-Altering Findings and Concerns Over Data Privacy Take Influence on Patient Perspective on Telemedicine in the Perioperative Care of Female Malignancies: A Cross-Sectional Study

Sascha Hoffmann, Rebekka Hieber, Christina Barbara Walter, Tobias Engler

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Sascha Hoffmann[1]; Rebekka Hieber[1]; Christina Barbara Walter[1]; Tobias Engler[1]

[1]Universitätsklinikum Tübingen University Women's Hospital Tübingen DE

Corresponding Author:
Sascha Hoffmann
Universitätsklinikum Tübingen
University Women's Hospital
Calwerstr. 7
Tübingen
DE

Abstract

Telemedicine provides extensive options in perioperative care for female malignancies. This paper scrutinizes the elements that create the optimal environment from a patient's viewpoint. Between May and November 2022, 145 patients sought preoperative consultations for breast cancer or gynecological oncology surgery and were given self-report questionnaires. These questionnaires queried patients about their prior use of inter-net-based services, personal information, and attitudes towards telemedicine services. Patients generally ex-pressed high approval for telemedicine services, viewing them as a potential enhancement to their care. Nu-merous personal factors were scrutinized for their relationship to attitudes towards telemedicine. Notably, patients in a perioperative setting favored a video-based, web browser-supported format for teleconsultations. Data protection issues and the potential for life-altering discoveries emerged as significant reasons for tele-medicine rejection. Perioperative telemedicine in the treatment of breast cancer and gynecological cancer holds promise for enhancing patient care. While it cannot presently substitute for in-person encounters, tele-medicine can supplement these interactions, thus improving healthcare overall.

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Original Manuscript

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Telemedicine provides extensive options in perioperative care for female malignancies. This paper scrutinizes the elements that create the optimal environment from a patient's viewpoint. Between May and November 2022, 145 patients sought preoperative consultations for breast cancer or gynecological oncology surgery and were given self-report questionnaires. These questionnaires queried patients about their prior use of internet-based services, personal information, and attitudes towards telemedicine services. Patients generally expressed high approval for telemedicine services, viewing them as a potential enhancement to their care. Numerous personal factors were scrutinized for their relationship to attitudes towards telemedicine. Notably, patients in a perioperative setting favored a video-based, web browser-supported format for teleconsultations. Data protection issues and the potential for life-altering discoveries emerged as significant reasons for telemedicine rejection. Perioperative telemedicine in the treatment of breast cancer and gynecological cancer holds promise for enhancing patient care. While it cannot presently substitute for in-person encounters, telemedicine can supplement these interactions, thus improving healthcare overall.

Keywords: Telemedicine; Teleconsultation; Female Malignancies; Breast Cancer; Gynecological Oncology; Perioperative Management

1 Introduction

Telemedicine refers to the provision of medical care, diagnosis, consultation and monitoring via digital communication and information platforms. This technology enables healthcare professionals to care for patients remotely by using video calls, text messages, image transmissions, electronic health records, and other digital tools. Telemedicine allows for more efficient and accessible care, especially for patients in remote areas or with limited access to medical facilities. It can be used in various medical specialties to make diagnoses, monitor treatments, provide medical advice and improve patient care. Telehealth has been shown to be as effective or more effective than usual care. However, the available evidence is very discipline-specific. This highlights the need for more clinical effectiveness studies of telehealth across a broader range of clinical health services. The results of a review, therefore, support the perspective that, in the right context, telehealth does not compromise the effectiveness of clinical care compared to conventional forms of healthcare delivery [1]. Telemedicine, a facet of the digital transformation in healthcare, is revolutionizing the care and treatment of patients in numerous medical specialties, including perioperative care and gynecological oncology. This technology makes it possible to overcome spatial and temporal barriers between patients and healthcare professionals and opens up new ways of providing efficient, patient-centered care. Particularly for perioperative care of breast cancer or gynecologic oncology patients, whose treatment and care pathways are often complex and lengthy, telemedicine offers innovative solutions that not only improve accessibility and quality of care but also significantly enrich the patient experience.

Perioperative care in breast cancer and gynecologic oncology influences patient outcomes.

Approaches to improve the perioperative care of gynecologic oncology patients are therefore required. In particular, enhanced recovery after surgery (ERAS) programs offer great potential for improved patient care and even improved economic conditions in gynecological oncology[2–4].
The experience of the COVID-19 pandemic has shown that telemedicine applications can be used in this context. Patients showed a high level of willingness to participate in programs with telemedical offers under certain conditions[5]. It was also shown that gynecological oncology patients were highly satisfied with telemedicine services[6]. Although it could be demonstrated that perioperative eHealth programs for enhancing post-operative recovery after abdominal surgery are generally satisfactory for patients, further studies are needed to address the design of these eHealth programs[7]. Telemedicine presents numerous opportunities in a perioperative context[8]. So far, telemedicine has not been widely adopted due to various barriers. The biggest barriers are technology-specific and could, however, be overcome through training, change management techniques and switching between telemedical care and face-to-face interaction between patient and doctor[9].
This study specifically focuses on the perioperative teleconsultation of breast cancer and gynecological oncology patients. The goal is to define the optimal setup from the patient's perspective to maximize both acceptance and effectiveness. The null hypothesis asserts that there is no correlation between various factors – such as previous internet usage, computer skills, or data protection concerns – and the acceptance of telemedical approaches.

2 Methods

2.1. Recruitment

Between May and November 2022, 145 patients who were preoperative candidates for breast cancer or gynecologic oncology surgery were surveyed. These patients represent a subgroup of a total of 735 women from the same period. The larger group also included 590 patients who underwent surgery for benign conditions. Survey questions focused on the women's history of using internet-based services, general demographic information, and attitudes toward telemedicine. The analysis considered all women who sought pre-surgery consultations, whether for inpatient or outpatient procedures. Only completely blank questionnaires were excluded; partially completed questionnaires were still included. The participants in the study were informed in person by a doctor about the nature and aim of the study. By completing the questionnaire in writing, the patients agreed to participate. Patients who did not wish to participate did not fill out the questionnaire. The study results only pertain to patients who were both linguistically and cognitively capable and willing to participate due to the inability to record blank or non-returned questionnaires while maintaining anonymity. Participation in the survey was both anonymous and voluntary. The study had prior approval from the University of Tübingen's ethics committee (Approval number: 544/2021BO2).

2.2. Questionnaire and Statistical Analysis

Following a thorough review of the literature and analysis of relevant factors from routine clinical practice, a questionnaire was developed. The questionnaire comprises 63 questions. It is divided into general questions, questions on health and treatment satisfaction, questions on the private use of digital technologies, and questions on telemedicine. Apart from the year of birth and the first two digits of the zip code, all other questions were asked in multiple choice form. The questions were either nominally or ordinally scaled.
We conducted data archiving and processing using RedCap (V 9.8.5) and Microsoft Excel (Office 2019), while statistical analysis was carried out via DATAtab.de. The descriptive statistical depiction of the study population incorporated either relative or absolute frequency distributions for ordinal-scale data, while we computed averages and standard deviations for rational-scale data.
To identify potential factors impacting gynecologic patients' agreement to use perioperative

telemedicine services, we employed binary logistic regression analysis. The specific type of analysis used – t-test (nominal vs. metric), Chi^2 test (nominal vs. nominal), or Mann-Whitney U-test (nominal vs. ordinal) – depended on the data set. We set the significance level at $p \leq 0.05$.
We received valid questionnaires from 145 patients. Instances where a patient chose the option "no statement" or left a question blank were considered as a "no statement". Only valid responses were factored into the calculation of statistical significance, with cases offering no information being excluded from these calculations.

3 Results

One-hundred-forty-five patients underwent surgery for breast cancer and/or a gynecological malignancy (Table 1). In order to make the results of the study as clear as possible, the results are presented below in tables and graphs.

Table 1: *Diseases of the patients, multiple answers possible (questionnaires: n=145). In three cases, the patients had a simultaneous breast carcinoma and ovarian carcinoma and, in a further three cases, an endometrial carcinoma with an ovarian carcinoma or an ovarian metastasis.*

Entity	**Quantity n=151**	**%**
breast cancer	87	57.62%
cervical cancer	36	23.84%
endometrial cancer	12	7.95%
ovarian cancer	16	10.60%

A statistically significant correlation was observed between patient age and telemedicine service approval. However, no statistical relationships were found concerning daily health (EQ-VAS) (Figure 1), the number of prior visits, or the estimated journey duration (Table 2). The EQ-VAS (EuroQol-visual analogue scales) is a vertical visual analogue scale that takes values between 100 (best imaginable health) and 0 (worst imaginable health), on which patients provide a global assessment of their health.

Table 2: *An undirected, two-sided t-test was carried out to examine the relationship between the dependent variable and approval of telemedicine services.*

dependent variable	**valid statements**	**mean value**	**standard deviation (SD)**	***d* (efficiency for equal variances)**	**p-value**
Age	131 (90.3%)	52.76 years	±13.15 years	0.7 (medium)	0.001
Daily health (EQ-VAS)	123 (84.8%)	63.8	±21.9	0.11 (very low)	0.597
Number of previous visits	114 (78.6%)	4.0	±6.3	0.22 (low)	0.331
Approximate distance from home to the clinic in kilometers	132 (91.0%)	48.2 km	±44.55 km	0.09 (very low)	0.672

For those who approved of telemedicine services (n=98), the average age was approximately 50.55 years, with a standard deviation of ±11.94, and an age range from 27 to 76 years. Conversely, among individuals who disapproved of telemedicine services (n=33), the average age was higher, approximately 59.33 years, with a standard deviation of ±14.5, and an age range from 27 to 88 years (Figure 1).

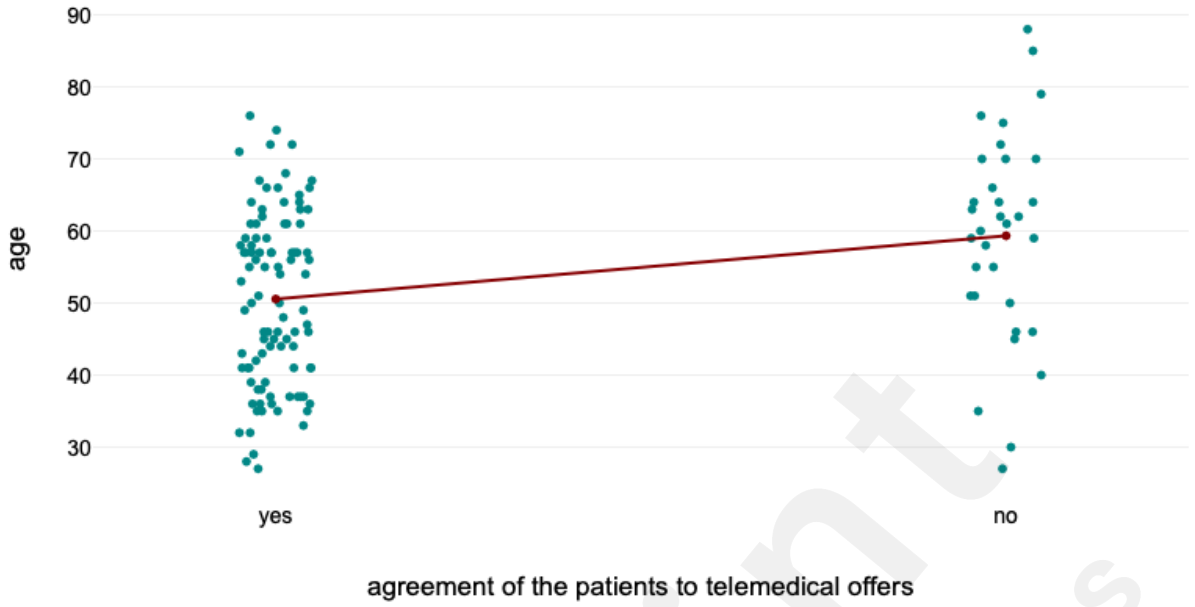


Figure 1: *Multi-vari chart showing approval or rejection of telemedicine services by age.*

Patients indicated their overall stance on telemedicine (Table 3). We then analyzed the relationship between individual characteristics and attitudes towards telemedicine services (Table 4). The association between the electronic services already in use and patients' views on telemedicine services was also examined (Table 5). Moreover, for those approving of telemedicine, we studied their preferred type of perioperative telemedical service (Table 6). For those disapproving, we analyzed the reasons behind their refusal (Table 7).

Table 3: *Descriptive statistics of patients' approval or rejection of telemedicine services.*

Descriptive evaluation		Frequency	%
total		145	100%
Agreement of the patients to telemedical offers			
Agreement	Completely agreeing	27	18.62%
	Somewhat agreeing	73	50.34%
Disagreement	Somewhat disagreeing	27	18.62%
	Completely disagreeing	7	4.83%
No statement		11	7.59%

Table 4: *Correlation between individual characteristics and approval or rejection of telemedicine services.*

	Frequency	Frequency	Frequency	*p-value* (Chi)^2
Agreement of the patients to telemedical offers (n=145)	Agreement	Disagreement	*No statement*	
Marital status				*0.001* (n=132)

married	60 (41.38%)	21 (14.48%)	6 (4.14%)	
single	27 (18.62%)	4 (2.76%)	1 (0.69%)	
divorced	12 (8.28%)	4 (2.76%)	2 (1.38%)	
widowed	0 (0%)	5 (3.45%)	1 (0.69%)	
no statement	1 (0.69%)	0 (0%)	1 (0.69%)	
Children				0.822 (n=131)
yes	71 (48.97%)	27 (16.62%)	2 (1.38%)	
no	25 (17.24%)	8 (5.52%)	1 (0.69%)	
no statement	11 (7.49%)	0 (0%)	3 (2.07%)	
Educational qualification				*0.373* (n=127)
vocational training	54 (37.24%)	22 (22.17%)	5 (3.45%)	
degree	27 (18.62%)	5 (3.45%)	1 (0.69%)	
no further education qualification than high school	12 (8.28%)	6 (4.14%)	4 (2.76%)	
others	2 (1.38%)	1 (0.69%)	1 (0.69%)	
no statement	5 (3.45%)	1 (0.69%)	0 (0%)	
Current gainful employment				0.738 (n=129)
part-time	45 (31.03%)	16 (11.03%)	5 (3.45%)	
full-time	28 (19.31%)	7 (4.83%)	2 (1.38%)	
not gainfully employed	24 (16.55%)	9 (6.21%)	4 (2.76%)	
no statement	3 (2.07%)	2 (1.38%)	0 (0%)	
Type of surgery that is planned				*0.008* (n=116)
breast surgery	54 (37.24%)	11 (7.59%)	9 (6.21%)	
laparotomy	3 (2.07%)	1 (0.69%)	0 (0%)	
laparoscopy	5 (3.45%)	6 (4.14%)	0 (0%)	
abrasion, local laser treatment, conization	14 (9.66%)	7 (4.83%)	1 (0.69%)	
others	12 (8.28%)	1 (0.69%)	0 (0%)	

no statement	12 (12.28%)	6 (4.14%)	4 (2.76%)	
Satisfaction with treatment				
completely/ somewhat satisfied	83 (57.24%)	34 (23.45%)	11 (7.59%)	
somewhat unsatisfied/ not at all satisfied	1 (0.69%)	0 (0%)	0 (0%)	
no statement	16 (11.03)	0 (0%)	0 (0%)	
How important is the environment and atmosphere during your consultation with a doctor?				*0.015* (n=110)
very important/ somewhat important	67 (46.21%)	28 (19.31%)	10 (6.90%)	
somewhat unimportant/ not at all important	15 (10.34%)	0 (0%)	1 (0.69%)	
no statement	18 (12.41%)	6 (4.14%)	0 (0%)	
Was it important for you to speak to the gynecologist in-person and on-site today and not via telemedicine?				*0.025 (n=101)*
very important/ somewhat important	57 (39.31%)	26 (17.93%)	10 (6.9%)	
somewhat unimportant/ not at all important	17 (11.72%)	1 (0.69%)	1 (0.69%)	
no statement	26 (17.93%)	7 (4.83%)	0 (0%)	
Own computer skills				0.112 (n=134)
professional skills (n=6)	5 (3.45 %)	1 (0.69 %)	0 (0 %)	
advanced skills (n=61)	49 (33.79 %)	9 (6.21 %)	3 (2.07 %)	
lay skills (n=42)	29 (20.00 %)	12 (8.28 %)	1 (0.69 %)	
beginner skills (n=15)	8 (5.52 %)	6 (4.14 %)	1 (0.69 %)	
no statement (n=21)	9 (6.21 %)	6 (4.14 %)	6 (4.14 %)	
Have you personally found out about your conditions on the Internet?				0.264 (n=128)
yes	70 (48.28 %)	20 (13.79 %)	2 (1.38 %)	
no	26 (17.93 %)	12 (8.28 %)	2 (1.38 %)	
no statement	4 (2.76 %)	2 (1.38 %)	7 (4.83 %)	

Have you personally researched your treatment options on the Internet?				0.036 (n=124)
yes	61 (42.07 %)	13 (8.97 %)	2 (1.38 %)	
no	33 (22.76 %)	17 (11.72 %)	2 (1.38 %)	
no statement	6 (4.14 %)	4 (2.76 %)	7 (4.83 %)	
Have you personally researched the various hospitals providing treatment on the Internet?				0.486 (n=124)
yes	27 (18.62 %)	7 (4.83 %)	1 (0.69 %)	
no	66 (45.52 %)	24 (16.55 %)	3 (2.07 %)	
no statement	7 (4.83%)	3 (2.07%)	7 (4.83%)	
Have you looked at the homepage of the treating hospital so far?				0.316 (n=125)
yes	61 (42.07%)	17 (11.72%)	1 (0.69%)	
no	33 (22.76%)	14 (9.66%)	2 (1.38%)	
no statement	6 (4.14%)	3 (2.07%)	8 (5.52%)	
How would you rate the offer of a video-based online consultation at the present time?				<0,001 (n=113)
very positive / somewhat positive	71 (48.97%)	7 (4.83%)	3 (2.07%)	
somewhat negative/ very negative	13 (8.97%)	22 (15.17%)	0 (0%)	
no statement	16 (11.03%)	5 (3.45%)	8 (5.52%)	
How important would it be for you to see a video-based image of your doctor during an online consultation?				0.723 (n=125)
very important/ somewhat important	67 (46.21%)	22 (15.17%)	3 (2.07%)	
somewhat unimportant/ not important at all	26 (17.93%)	10 (6.9%)	0 (0%)	
no statement	7 (4.83%)	2 (1.38%)	8 (5.52%)	
How important would it be for your doctor to see a video-based image of you during an online consultation?				0.253 (n=125)

very important/ somewhat important	60 (41.38%)	17 (11.72%)	2 (1.38%)	
somewhat unimportant/ not important at all	33 (22.76%)	15 (10.34%)	1 (0.69%)	
no statement	7 (4.83%)	2 (1.38%)	8 (5.52%)	
Data protection concerns regarding telemedicine applications				<0,001 (n=127)
no concerns at all	24 (16.55%)	5 (3.45%)	1 (0.69%)	
few concerns	53 (36.55%)	8 (5.52%)	0 (0%)	
somewhat concerned	17 (39.31%)	10 (6.90 %)	1 (0.69%)	
very concerned	3 (2.07%)	7 (4.83%)	0 (0%)	
no statement	3 (2.07%)	4 (2.76%)	9 (6.21%)	
Do you think that the Covid-19 pandemic has increased your willingness to use telemedicine services?				0.01 (n=127)
completely agreeing / somewhat agreeing	73 (50.34%)	16 (11.03%)	1 (0.69%)	
somewhat not agreeing/ not agreeing at all	23 (15.86%)	15 (10.34%)	2 (1.38%)	
no statement	4 (2.76%)	3 (2.07%)	8 (5.52%)	

Table 5: *Already used digital services (multiple answers possible) and approval or rejection of telemedicine services (independent variable) (n=134).*

Depended variable	Agreement	Disagreement	No statement	*p-value* (Chi)^2
online banking (n=90)	61 (42.07%)	22 (15.17%)	7 (4.83%)	0.701
Internet shopping (n=83)	59 (40.69%)	20 (13.79%)	4 (2.76%)	0.986
e-mail (n=110)	74 (51.03%)	27 (18.26%)	9 (6.21%)	0.527
video calls (e.g., skype, facetime, zoom) (n=53)	45 (31.03%)	6 (4.14 %)	2 (1.38 %)	0.005
existing telemedical service (n=6)	4 (2.76 %)	1 (0.69%)	1 (0.69%)	0.778
personal digital health record (n=7)	5 (3.45 %)	1 (0.69%)	1 (0.69%)	0.616
others	11 (7.59%)	2 (1.38 %)	0 (0 %)	0.384

no digital services used	2 (1.38 %)	2 (1.38 %)	1 (0.69%)	0.25
no statement	0 (0 %)	2 (1.38 %)	3 (2.07 %)	0.015

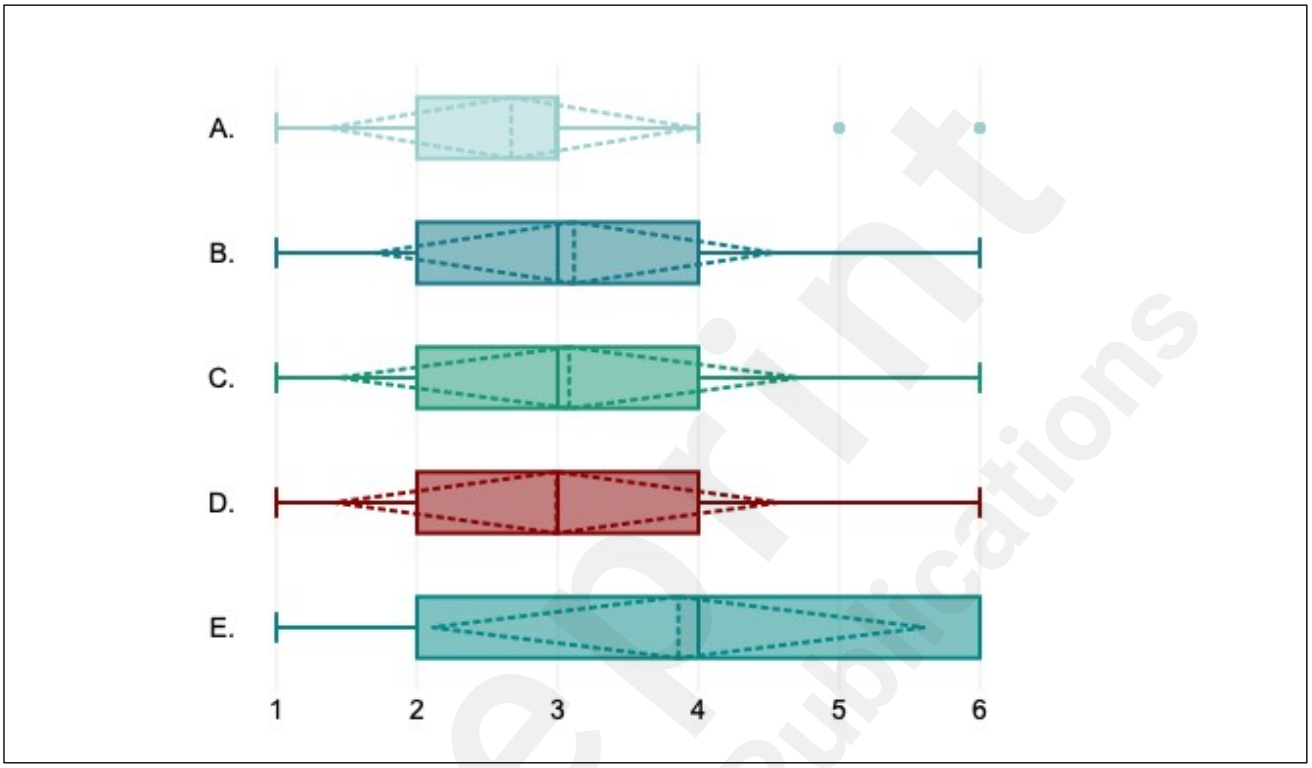
Table 6: *Preferred form of telemedical offer (multiple answers possible) when agreeing to telemedical offers (n=100).*

	Checked	**Unchecked**	***p*-value (Chi)^2**
telephone	64 (64%)	36 (36%)	0.253
app (smartphone, tablet,...)	19 (19%)	81 (81%)	0.166
Internet/webbrowser (videocall like Skype, Facetime, Zoom)	47 (47%)	53 (53%)	0.007
e-mail	33 (33%)	67 (67%)	0.172
SMS (short message service)	3 (3%)	97 (97%)	0.986
others	0 (0%)	100 (100%)	-

Table 7: *Reasons for rejection of telemedical forms of communication (multiple answers were possible here) (n=44).*

	checked	**unchecked**	***p*-value (Chi)^2**
missing internet access	5 (3.45%)	140 (96.55%)	0.004
I have never used such technology before	14 (9.66%)	131 (90.34%)	0.013
I feel uncomfortable when I have to use technology	7 (4.83%)	138 (95.17%)	<0.001
I have concerns that unauthorized persons may gain access to my data	17 (11.72%)	128 (88.28%)	0.016
I have basic problems with the use of technical devices	4 (2.76%)	141 (97.24%)	0.25
I currently feel too burdened by my illness	3 (2.07%)	142 (97.93%)	0.749
others	8 (5.52%)	137 (94.48%)	<0.001
no statement	101 (69.66%)		<0.001

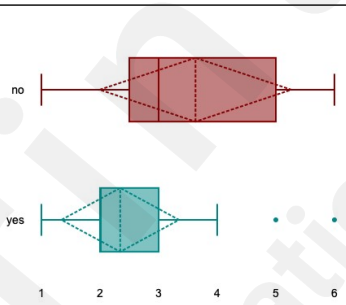
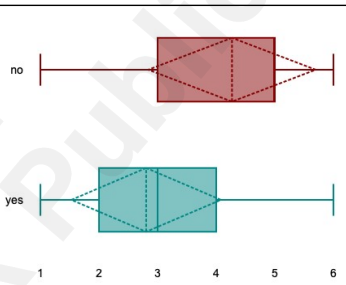
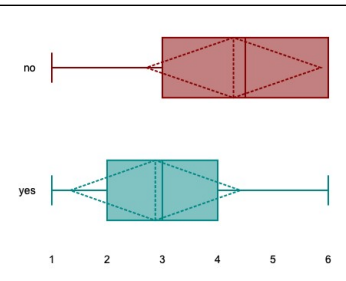
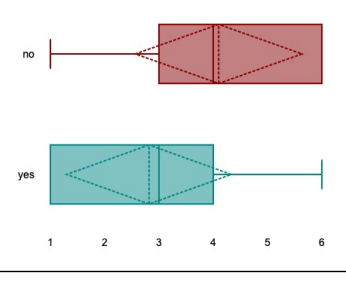
Patients were asked to rate, on a scale of 1 (strongly agree) to 6 (strongly disagree), their perceptions of telemedicine's influence in the perioperative setting, especially its relevance related to their malignant disease (Figure 2). Further sub-analysis categorized these responses into approval or rejection of telemedicine services, and statistical correlations were evaluated (Figure 3).



	1	2	3	4	5	6	n	mean	median	SD
A.- telemedicine services improve medical care in Germany	24	31	41	10	3	8	117	2.67	3	±1.34
B.- telemedicine services will improve my own medical care	18	21	35	17	17	8	116	3.16,	3	±1.47
C.- informed consent consultations (e.g., before an operation) via telemedicine	24	21	34	14	12	19	124	3.21	3	±1.67
D.- discussions/consultations for aftercare (e.g., post-operative) via telemedicine	26	20	37	10	18	14	125	3.13	3	±1.63
E.- communicating life-changing findings (e.g., CT findings) via	15	14	21	16	23	35	124	3.99	4	±1.75

	1	2	3	4	5	6	n	mean	median	SD
telemedicine										

Figure 2: *How patients assess telemedical approaches in perioperative gynecological oncology. The rating was given in grades from 1 (strongly agree) to 6 (strongly disagree). The perforated lines show the median and the standard deviation.*

	n=114	mean	median	SD	graphical distribution of ranking	effect size (r)	P-value Mann-Whitney U-test
A.- telemedicine services improve medical care in Germany							
rejection of telemedicine offers	27	3.63	3	±1.67		0.35	<0.001
agreement to telemedicine service	87	2.34	2	±1.01			
B.- telemedicine services will improve my own medical care							
rejection of telemedicine offers	26	4.27	5	±1.46		0.4	<0.001
agreement to telemedicine service	87	2.8	3	±1.28			
C.- informed consent consultations (e.g., before an operation) via telemedicine							
rejection of telemedicine offers	28	4.29	4.5	±1.61		0.37	<0.001
agreement to telemedicine service	94	2.87	3	±1.55			
D.- discussions/consultations for aftercare (e.g., post-operative) via telemedicine							
rejection of telemedicine offers	30	4.1	4	±1.56		0.33	<0.001
agreement to telemedicine service	93	2.82	3	±1.52			

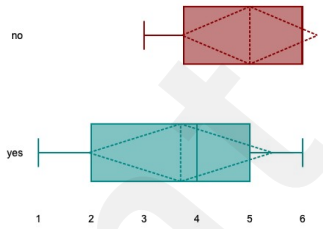
	n=114	mean	median	SD	graphical distribution of ranking	effect size (r)	P-value Mann-Whitney U-test
A.- telemedicine services improve medical care in Germany							
E.- communicating life-changing findings (e.g., CT findings) via telemedicine							
rejection of telemedicine offers	28	5.0	6	±1.31		0.33	<0.001
agreement to telemedicine service	94	3.69	4	±1.75			

Figure 3: *How patients rate telemedicine approaches in perioperative gynecologic oncology or breast cancer care depends on their general approval or disapproval of telemedicine services. The effect size Cohen (r) is: Small (0.1), Medium (0.3), Large (0.5).*

4 Discussion

For patients with breast cancer, a review showed that there is evidence for the effectiveness of telehealth programs in relation to mental health problems in women with breast cancer. With this in mind, the authors concluded that the use of telehealth programs, which can save time and money, are accessible to nurses and are easy to use, should be expanded to improve the mental health of women with breast cancer. This approach also seems transferable to the entire field of gynecologic oncology. Positive effects are especially likely when perioperative approaches are used and in conjunction with ERAS[10].

From March 2020 to October 2021, less than 30% of a US-based gynecologic oncology cohort utilized telemedicine[11]. In this sample, just 4% of patients confirmed their use of telemedicine services, while 5% acknowledged having a personal digital health record. The disparity in these data could stem from unclear patient definitions of what constitutes telemedicine. Despite this, German medical professionals, known for their substantial acceptance of telemedicine, identified technical and regulatory challenges in 2020[12,13]. The study suggests that patients with gynecologic cancer are predominantly open to using telemedicine, showing a 69% approval rate. This acceptance could potentially enhance the accessibility of expert gynecologic cancer care[14]. An Italian study of patients with colon cancer has shown that digital health tools are useful and effective in the follow-up of patients after early discharge. The mobile application iColon is a user-friendly technology that has been well-received. It has an impact on practice by increasing adherence to active ERAS points, leading to an improvement in the quality of care perceived by users[15]. Apart from fundamentally useful considerations regarding the perioperative use of telemedicine approaches, the COVID-19 pandemic has led to a change in the acceptance of telemedicine approaches. COVID-19 has had an impact on the treatment of patients with female malignancies, both in terms of setting priorities and identifying strategies to reduce hospitalization and length of stay, with social media even proving to be a reliable tool for conducting rapid, global surveys to address patient needs[16].

4.1. Advantages and Disadvantages of Perioperative Telemedical Approaches

Through patient-reported outcomes, there is growing evidence that digital health provides benefits to patients across clinical and health economic endpoints. These digital solutions can be integrated into

routine supportive care in oncology practices to improve patient-centered care[17]. During the COVID-19 pandemic, it became clear that innovative telemedicine approaches could potentially improve patient care[18]. Using general practice as an example, it was shown that the use and evaluation of telemedicine have changed radically during the COVID-19 pandemic. The key themes identified were related to patient/user experience and knowledge of telehealth use, levels of patient/user satisfaction, collaboration with GPs, workload, and suitability of consultations for telehealth. It was found that certain patient groups and areas of clinical and administrative work performed well, if not better, with the use of telemedicine[19]. This experience suggests that a needs-based design of perioperative telemedicine services can lead to an improvement in patient care. A study conducted in the care of US veterans showed that telehealth programs appear safe, save time, are cost-effective and are associated with extremely high patient satisfaction in post-operative care[20]. Telemedicine approaches can contribute in various ways to enabling patients to return to normal activities after general surgical and gynecological procedures[21]. A Dutch study was able to show that a cost-effective alternative to the usual post-operative care is available through tailored web-based care programs in gynecological patients[22].

However, the possible positive aspects and advantages of telemedical approaches in the perioperative care of gynecological oncology patients are also offset by possible negative aspects. In addition to the benefits, including time savings, patient/healthcare cost savings and community access, there are also limitations due to clinical uncertainty, technology infrastructure requirements, cybersecurity vulnerabilities and healthcare regulatory constraints[23].

Other known disadvantages of telemedicine approaches are a disruption of the relationship between doctor and patient, a disruption of the relationship between health professionals, problems with the quality of health information, and organizational and bureaucratic difficulties[24]. For these reasons, it is clear that a differentiated approach can reduce the disadvantages and improve patient care, particularly in perioperative management. It was shown that, for example, the use of a mobile app was associated with fewer potentially avoidable emergency department visits and shorter lengths of stay after major elective bowel surgery, possibly due to improved post-discharge monitoring and better communication between patient and provider[25].

Existing approaches to telemedical care for cancer patients are also conceivable in the perioperative setting. For example, a number of eHealth physical activity interventions that increase physical activity levels in adults with cancer already exist, and certain components (e.g., websites, use of theory, and action planning) may be associated with greater effectiveness. However, there is not yet sufficient knowledge to determine and optimize effectiveness, measure long-term effects, and address concerns about bias and incomplete reporting [26]. However, this example illustrates how telemedicine anesthesia could be integrated into a perioperative setting.

One aspect of telemedicine is that it enables the transfer of university expertise to regional hospitals and improves collaborative care while maintaining high levels of physician satisfaction. A study from Germany in palliative patient care demonstrated that telemedicine can also avoid a significant number of referrals and outpatient presentations in tertiary hospitals, leading to potentially significant cost savings in the healthcare system. In doing so, it is possible to target consultation for a variety of reasons for the request, ranging from minor concerns to difficult and more complex situations that may lead to subsequent selective transfers [27]. The results of this study contribute to the overall picture of the conditions under which such perioperative telemedical care can also be provided by different medical care providers.

4.2. Factors for Rejection of Telemedicine Approaches

The literature has scarcely described reasons for rejecting telemedicine despite its increasing prevalence. For instance, reviews from 2022 found a lack of specifically tailored measures to boost telemedicine acceptance among older cancer patients [28,29]. This study reveals a strong correlation between older age and telemedicine rejection. However, findings of no significant correlation also

hold interest. For instance, women undergoing systemic therapy for gynecological cancer are more likely to accept telemedicine due to financial and logistical incentives, but this acceptance decreases with insufficient computer skills [5,30]. Surprisingly, there seems to be no correlation between approval of telemedicine and factors such as travel distance or employment. This disparity could be due to the varying needs of those undergoing surgery versus routine systemic therapy. While there's no statistical correlation between patients' computer skills and their views on telemedicine, there is a trend showing increased rejection among those with less computer knowledge. During the COVID-19 pandemic, anesthesia was safely and feasibly administered for perioperative evaluations through telemedicine, although this does not apply universally [31]. This study's findings seemingly support this, citing additional factors for rejection, including the handling of life-altering findings and concerns over data privacy. These factors reflect statistically significant rejection considerations.

4.3. Factors for Approval of Telemedicine Approaches

Telemedicine visits have been increasingly used since 2020 and promoted by the COVID-19 pandemic. For example, they are used to discuss results and/or treatment plans, monitor treatment, and be part of clinical trials for gynecological oncology patients [32]. This study demonstrates not only a readiness to adopt telemedicine methods but also a statistically significant preference for video-based and web browser-based modalities. Patients reported a significant rise in their willingness to utilize telemedicine services due to the COVID-19 pandemic – a trend supported by existing literature [17,33]. They also asserted, with statistical significance, that telemedicine services could enhance medical care both across Germany and on an individual level. Specifically, the ERAS concept is well-suited to the introduction of telemedicine services tailored to specific needs [34].

5 Conclusions

Telemedicine has the potential to enhance breast cancer and gynecological cancer care from the patient's perspective. While it currently does not substitute face-to-face interaction, it serves as a beneficial supplement, elevating the quality of medical care provided.

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