Evaluating the level of patient satisfaction with telehealth antenatal care during the COVID-19 pandemic at King Abdul-Aziz Medical City, Primary Health Care Center, Specialized Polyclinic

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Abstract

Aim: To evaluate the client satisfaction with a phone-based antenatal care consultation and identify the associated factors during the COVID-19 pandemic at King Abdul-Aziz Medical City, Primary Health Care Center Specialized Polyclinic during 2020.
Method: The study was a cross-sectional, retrospective study conducted with pregnant women attending the maternity clinic at the Specialized Polyclinic, Primary Health Care Center at King Abdul-Aziz Medical City, Jeddah. A self-administered questionnaire was sent via a text message (short message service) to collect the data after signed written consent.
Result: Of 279 pregnant women, 262 (93.9%) attended phone clinic appointments one to five times. The total satisfaction level score was 73.4 ± 6.5, indicating a high level of satisfaction with the phone clinics, and 252 (90.3%) reported a high level of satisfaction. There was a significant difference in the total score regarding education, occupation, husband's occupation, smoking, gravidity, parity, menstruation, gestational age, pregnancy complication, number of phone clinics during pregnancy, number of attending clinics during pregnancy, visiting another health facility, and reason of visiting phone clinic ($p < 0.0001$, $p < 0.0001$, $p < 0.0001$, $p = 0.015$, $p = 0.033$, $p < 0.0001$, $p < 0.0001$, $p = 0.027$, $p = 0.001$, $p < 0.0001$, and $p = 0.002$).
Conclusion: The study indicated a high level of satisfaction with the antenatal telephone clinics during the pandemic, which supports the trend of transition in the direction of the digitalization of antenatal care.

Keywords

antenatal care, COVID-19 pandemic, family medicine, patient satisfaction, telehealth, virtual

Introduction

Antenatal care (ANC) can be defined as "the care provided by skilled healthcare professionals to pregnant women to ensure the best health conditions for both mother and baby during pregnancy."[1,2] During these visits, various health services are done, including health promotion, screening, diagnosis, and disease prevention.[1,2] With each visit, the patient's medical history, physical examination, ordering required investigations, appropriate supplements, and medication should be assessed.

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In a low-risk pregnancy, primary health care is considered the first point of care that the client needs. At the King Abdul-Aziz Medical City, Primary Health Care Center (KAMC-PHC), ANC follows a shared care protocol with the Department of Obstetrics and Gynecology for low-risk pregnancy. The protocol adheres to the recommendation by the American College of Obstetricians and Gynecologists (ACOG), which consists of 12–14 visits. The clients are seen in-person monthly from weeks 8 to 28, then biweekly from weeks 28 to 36, and referred to the obstetrician at 36 weeks to be seen weekly until delivery.[3,4]

In the recent pandemic of coronavirus disease 2019 (COVID-19), health care systems were disrupted globally.[5–7] In Saudi Arabia, there was a complete lockdown for infection control purposes and overloading concerns. Caring for clients was challenging, especially for a vulnerable group such as pregnant women. Telemedicine and virtual clinics were crucial elements to maintaining continuity of care throughout this crisis.[8–10]

Telemedicine refers to the care delivered to the patient through a phone-based consultation without direct physical contact with the health care system. Telehealth and telemedicine are used interchangeably; they cover a wide range of digital care services, including video consultations, mobile phone consultations, and phone-based consultations. The last include the delivery of health services through phone calls.[11,12] However, in the United States, it has been used for many years to provide obstetric care, especially in rural areas.[3] In Saudi Arabia, a university hospital has been using the WhatsApp application for the past few months to facilitate communication and address non-urgent situations.[13]

The most appropriate intervention to deliver health care services in Saudi Arabia during the pandemic was social distancing. The care was shifted totally from a physical to a phone base consultation. This shift in care occurred in most countries, such as Australia and Scotland.[14] To support this, the Pregnancy and COVID-19: Saudi Society of Maternal-Fetal Medicine (SSMFM) guideline encouraged reducing the number of physical antenatal visits in low-risk populations to minimize exposure. At KAMC-PHC, ANC was delivered through a phone-based consultation by qualified family medicine physicians focused on promoting access and providing optimum care to pregnant women. All the pregnant women were booked through patient registration and given appointments according to risk factors. A special electronic form was completed. During these consultations, the clients were contacted through the registered phone number and asked about their complaints, fetal movement, vaginal bleeding, and other red flags. Investigations and obstetric ultrasound results were discussed as well. Prenatal supplements and medication were prescribed if necessary.

Client satisfaction is a significant indicator of the quality of care delivered during this pandemic. Evaluating of client satisfaction clinically matters for both health care providers and the health organization to ensure the effectiveness of the care and for the patients. As highlighted in the literature, satisfied clients are more likely to have a favorable outcome, adhere to the treatment plan, be involved with their care, and build trust with the health care system.[15] To our best knowledge, there are no local studies in Saudi Arabia addressing client satisfaction and the emergence of phone-based consultation in the antenatal clinic.

The study aimed to evaluate client satisfaction with antenatal phone-based consultation and detect the associated factors during the COVID-19 pandemic at KAMC-PHC Specialized Polyclinic from April to August 2020.

Materials and methods

The study was a cross-sectional, retrospective study conducted with the pregnant women attending the maternity clinic at the specialized polyclinic. The total number of pregnant women attending ANC from April to August 2020 was 1000. The required sample size was 278 using the Raosoft software at a 95% confidence interval (CI) level with a 50% response distribution and a margin of error of ±5%.[16]

The Ethical Committee approval by the Institutional Review Board (IRB) was obtained with reference number (RJ20/148/J), individual written consent was obtained, and the data were kept confidential.

The list of clients booked in the maternity clinic was used for randomization. Manual systematic randomization was used to reduce bias; number 3 was the starting point, and then every second patient was included. A self-administered questionnaire using Google Forms was sent via a text message (SMS) to the sample. On the first page of the form, there is the consent form which is mandatory to complete before they can proceed to the next section. They could open the link, answer the questions, and submit the final response. Only low-risk pregnant women were included in this study who attended at least one phone-based consultation visit. High-risk pregnancies and those who did not attend any phone-based consultation were excluded.

The questionnaire was adapted from the literature.[3,17] It was in English and Arabic and consisted of three parts:

1. Demographic data (independent variables): age, education level, marital status, occupation, monthly income, number of children, smoking, and exercise.
2. Obstetric information (independent variables): gestational age (GA), gravidity, parity, abortion, and chronic illness.
3. Satisfaction domains (dependent variables): scheduling, technology, equipment/technical issues, clinical assessment and provider, personal, general, and overall.

Table 1. The study client's demographic data.

Variable		N	%
Age (years)	20–30	142	50.9
	Less than 20	16	5.7
	More than 30	121	43.4
Education	Elementary, intermediate, high school	217	77.8
	University, postgraduate	58	20.8
	Illiterate	4	1.4
Occupation	Student	5	1.8
	Housewife	261	93.5
	Employee	13	4.7
Husband's occupation	Student	3	1.1
	Military	1	0.4
	Retired	14	5.0
	Employee	261	93.5
Smoking	No	85	30.5
	Ex-smoker	1	0.4
	Indirect smoker (in contact with smokers)	192	68.8
	Yes	1	0.4
Monthly income (Saudi Riyal)	5000–15,000	22	7.9
	Less than 5000	256	91.8
	More than 15,000	1	0.4

A pilot study was conducted with 20 pregnant women to test the questionnaire's feasibility and applicability. The participants in the pilot study were not included in the actual research.

Statistical analysis

The data were entered and analyzed with IBM SPSS statistical software package version 21. For the qualitative variables, frequency and percentage were used for the description, and a mean value with standard deviation for the descriptive of quantitative variables and the level of satisfaction score. An independent t-test and a one-way analysis of variance (ANOVA) test were used to compare continuous variables. Statistical significance was considered at p-value < 0.05 and a confidence interval of 95% CI.

Results

Of the sample of 279, 142 (50.9%) were from 20 to 30 years, 261 (93.5%) were housewives, 192 (68.8%) were indirect smokers, and 256 (91.8%) had a monthly income from 5000 to 15,000 Saudi Riyal (Table 1). Almost a third of the cases (31.5%, $n = 88$) had their first pregnancy, and 99 (35.5%) reported two to three previous pregnancies, 113 (40.6%) reported one to two previous delivery, 205 (73.5%) reported no abortion, 173 (62.0%) were in the second semester, and 88 (31.5%) were in the third semester, and 178 (63.8%) had one to five children. Only 17 (6.1%) had a chronic illness, and 9 (3.2%) had complications during pregnancy. The majority (93.9%, $n = 262$) attended the phone clinic appointments between one and five times, 246 (88.2%) had physical visits between one and five times, and 180 (64.5%) visited another health facility between one and five times. The main reason (88.9%, $n = 266$) for having a phone clinic was "Mandatory from the health facility" (Table 2).

The main items to measure satisfaction were as follows: 276 (98.9%) "The quality of the call is good, and the voice was clear," followed by 274 (98.2%) "Keeping privacy during the clinic call" and "Doctor's behavior" equally, then 273 (97.8%) "Your doctor's knowledge of your health," 269 (96.4%) "Doctor's interest in your questions and fears," "Meet all your needs during the phone clinic," and "Satisfaction with the telephone clinic during pregnancy follow-up" equally. Most of the participants, 266 (95.3%), reported "continue the pregnancy at this facility," and 203 (72.7%) reported, "Recommend a telephone clinic to others during pregnancy follow-up." (Table 3). The total level of satisfaction score was 73.4 ± 6.5, indicating a high level of satisfaction with the phone clinic, and 252 (90.3%) reported a high level of satisfaction (Figure 1 and Table 4).

The result showed a significant difference between the total score for education, occupation, husband's occupation, and smoking. The group with a lower education, were housewives, and those whose husbands were retired had a significantly higher score than others ($p < 0.0001$, $p < 0.0001$, and $p < 0.0001$). However, there was no significant difference in the age and monthly income score (Table 5). There was a significant difference between the total score and gravidity, parity, menstruation, GA, pregnancy complication, number of

Table 2. The study client's medical history.

Variable		N	%
Gravidity	2–3	99	35.5
	4–5	54	19.4
	More than 5	38	13.6
	First time pregnant	88	31.5
Abortion	1–2	63	22.6
	3–5	9	3.2
	More than 5	2	0.7
	Non	205	73.5
Menstruation	No	10	3.6
	Yes	269	96.4
Kids number	More than 5	15	5.4
	Non	86	30.8
	1–5	178	63.8
Pregnancy complication	Pregnancy poisoning	1	0.4
	GDM	8	2.8
	Nothing	270	96.8
Number of phone clinics during pregnancy	More than 5	7	2.5
	Non	10	3.6
	1–5	262	93.9
Number of attending clinics during pregnancy	More than 5	2	0.7
	Non	31	11.1
	1–5	246	88.2
Parity	1–2	113	40.6
	3–5	67	24.0
	More than 5	11	3.9
	Non	88	31.5
GA (weeks)	From the first month to the third month (1–12 weeks)	13	4.7
	From the fourth month to the sixth month (13–28 weeks)	173	62.0
	From the seventh month to the ninth month (29–40 weeks)	88	31.5
	After delivery	5	1.8
Chronic illness (1)	Yes	17	6.1
	No	262	93.9
Chronic illness (2)[a]	HTN	6	31.6
	DM	3	15.7
	Lupus	2	10.5
	Asthma	1	5.3
	Hypothyroidism	6	31.6
	HBV	1	5.3
Visiting another health facility	Non	99	35.5
	1–5	180	64.5
Reason for visiting phone clinic[a]	Pandemic lockout and curfew	4	1.3
	Fear of transmitting infection	27	9.1
	Lack of transportation	2	0.7
	Mandatory from the health facility	266	88.9

GA: gestational age; GDM: gestational diabetes mellitus; HTN: hypertension; HBV: hepatitis B virus.
[a]Multiple responses.

phone clinics during pregnancy, number of attending clinics during pregnancy, visiting another health facility, and reason for visiting phone clinic. The groups who have been pregnant more than five times (95% CI = −5.056 to −1.521, $p < 0.0001$), delivered more than five times (95% CI = −5.056 to −1.521, $p < 0.0001$),

Table 3. The study client's level of satisfaction with telehealth antenatal care during the COVID-19 pandemic.

Variable		N	%
Easy to have an appointment	Strongly dissatisfied and dissatisfied	51	18.2
	Strongly satisfied and satisfied	228	81.7
Number of physician visits during pregnancy	Strongly dissatisfied and dissatisfied	15	5.4
	Strongly satisfied and satisfied	264	94.6
Starting at the exact time of the appointment	Strongly dissatisfied and dissatisfied	20	7.2
	Strongly satisfied and satisfied	259	92.8
Satisfied with the time of the next appointment	Strongly dissatisfied and dissatisfied	17	6.1
	Strongly satisfied and satisfied	262	93.9
Doctor's knowledge of your health	Strongly dissatisfied and dissatisfied	6	2.2
	Strongly satisfied and satisfied	273	97.8
Consultation time	Strongly dissatisfied and dissatisfied	13	4.6
	Strongly satisfied and satisfied	266	95.4
Doctor's interest in questions and fears	Strongly dissatisfied and dissatisfied	4	1.5
	Neutral	6	2.2
	Strongly satisfied and satisfied	269	96.3
General evaluation of the providing services	Strongly dissatisfied and dissatisfied	4	1.5
	Neutral	7	2.5
	Strongly satisfied and satisfied	263	96.0
Easy to call the clinic's phone	Strongly dissatisfied and dissatisfied	16	5.8
	Strongly satisfied and satisfied	263	94.2
The quality of the call was good, and the voice was clear	Strongly dissatisfied and dissatisfied	3	1.1
	Strongly satisfied and satisfied	276	98.9
The doctor's role is clear	Strongly dissatisfied and dissatisfied	52	18.6
	Strongly satisfied and satisfied	227	81.4
Doctor's behavior	Strongly dissatisfied and dissatisfied	5	1.8
	Strongly satisfied and satisfied	274	98.2
Meet all your needs during the phone clinic	Strongly dissatisfied and dissatisfied	10	3.6
	Strongly satisfied and satisfied	269	96.4
Responding to concerns during the phone clinic	Strongly dissatisfied and dissatisfied	11	3.9
	Strongly satisfied and satisfied	268	96.1
Keeping privacy during the clinic call	Strongly dissatisfied and dissatisfied	5	1.8
	Strongly satisfied and satisfied	274	98.2
Satisfaction with the telephone clinic during pregnancy follow-up	Strongly dissatisfied and dissatisfied	5	1.8
	Neutral	5	1.8
	Strongly satisfied and satisfied	271	96.4
How likely is it that you will continue your pregnancy at this facility?	Too low and low	4	1.5
	Neutral	9	3.2
	Too much and much	266	95.3
How likely are you to recommend a telephone clinic to others during pregnancy follow-up	Too low and low	5	1.8
	Neutral	71	25.4
	Too much and much	203	72.7

menstruated (95% CI=−5.056 to −1.521, $p < 0.0001$), in the second semester (95% CI=−5.056 to −1.521, $p < 0.0001$), who had pregnancy complications (95% CI=−5.056 to −1.521, $p < 0.0001$), who had more than five phone clinic visits (95% CI=−5.056 to −1.521, $p < 0.0001$), who visited the clinic more than five times, who had visited another health facility, and who were fearful of transmitting infection had a significantly higher score than others ($p = 0.015$, $p = 0.033$, $p < 0.0001$, $p < 0.0001$, $p = 0.027$, $p = 0.001$, $p < 0.0001$, and

$p = 0.002$). There was no significant difference in the total score regarding abortion, chronic illness, and the number of children (Table 6).

Regarding the study client's satisfaction level, the multilinear regression model (enter) was statistically significant in prediction. The significant independent predictors for higher level of client's satisfaction include educational level (95% CI=−5.056 to −1.521, $p < 0.0001$), having menstruation (95% CI=−11.864 to 20.007, $p < 0.0001$), the semester (95% CI=−2.744 to −0.452, $p = 0.006$),
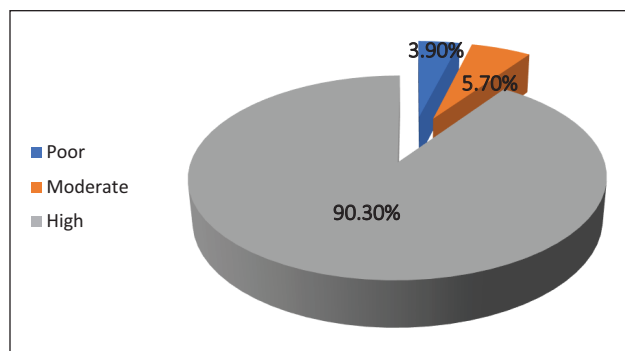
Figure 1. Satisfaction level category.

Table 4. The study client's satisfactory level with telehealth antenatal care during the COVID-19 pandemic score.

Variable	Mean $\pm$ SD	Range (minimum to maximum)
Total score	73.4 $\pm$ 6.5	(34–95)
Variable	**N**	**%**
Satisfaction level category		
Poor	11	3.9
Moderate	16	5.7
High	252	90.3

SD: standard deviation.

Table 5. The relation between the study client's satisfaction level with telehealth antenatal care during the COVID-19 pandemic and demographic data.

Variable		Mean	SD	p-value	95% confidence interval	
					Lower bound	Upper bound
Age (years)	20–30	73.0845	6.26992	0.108	72.0443	74.1247
	Less than 20	70.8125	13.77543		63.4721	78.1529
	More than 30	74.1405	5.13210		73.2168	75.0642
Education	Elementary, intermediate, high school	74.1705	3.50574	0.0001**	73.7014	74.6396
	University, postgraduate	71.3276	9.68701		68.7805	73.8747
	Illiterate	62.5000	30.98925		13.1892	111.8108
Occupation	Student	52.4000	23.64952	0.0001**	23.0352	81.7648
	Housewife	73.9387	4.77615		73.3566	74.5208
	Employee	70.9231	10.03711		64.8577	76.9884
Husband's occupation	Student	51.6667	27.13546	0.0001**	−15.7416	119.0749
	Military	65.0000				
	Retired	75.4286	5.90585		72.0186	78.8385
	Employee	73.5862	5.63550		72.8993	74.2731
Smoking	No	71.6235	10.80672	0.0001**	69.2926	73.9545
	Ex-smoker	95.0000				
	Indirect smoker (in contact with smokers)	74.0938	2.40017		73.7521	74.4354
	Yes	73.0000				
Monthly income (Saudi Riyal)	5000–15,000	73.6364	11.49553	0.910	68.5395	78.7332
	Less than 5000	73.3828	5.92584		72.6534	74.1122
	More than 15,000	76.0000				

SD: standard deviation.

previous illness (95% CI=−2.665 to 10.117, $p=0.001$), and phone clinic visit (95% CI=−5.746 to −0.095, $p<0.0001$), where $F=8.445$, $p<0.0001$, $R^2=0.225$, and adjusted $R^2=0.174$ (Table 7).

Discussion

Phone-based consultation has been used for decades to deliver medical care. Formerly, it has been used to reach rural areas and provide medical care to patients remotely with satisfactory results. Telemedicine technology is becoming more accessible, affordable, and routinely used by clinicians and patients. The COVID-19 pandemic has been an essential examination of the robustness of virtual care models applied in primary care.[18–21]

This study showed that most pregnant women had a high level of satisfaction with the phone clinics, as 252 (90.3%) reported a high level of satisfaction. Several studies reported a high level of satisfaction with phone clinics by pregnant women. In the United Kingdom, the study by Quinn et al.[21] reported that 86% rated their experience as good or very good. Liu et al.[19] reported that women stated being very or extremely satisfied (27.9%) or moderately satisfied (43.5%) with their virtual prenatal experiences. Peahl et al.[18] reported

Table 6. The relation between the study client's satisfaction level with telehealth antenatal care during the COVID-19 pandemic and medical history.

Variable		Mean	SD	p-value	95% confidence interval	
					Lower bound	Upper bound
Gravidity	2–3	73.0306	5.91774	0.015*	71.8442	74.2170
	4–5	74.3519	1.75001		73.8742	74.8295
	More than 5	75.7895	6.29095		73.7217	77.8573
	First time pregnant	72.1250	8.44157		70.3364	73.9136
Parity	1–2	73.2679	5.92594	0.033*	72.1583	74.3774
	3–5	73.8806	5.02877		72.6540	75.1072
	More than 5	78.2727	8.39155		72.6352	83.9103
	Non	72.5227	7.60214		70.9120	74.1335
Abortion	1–2	74.0161	5.64958	0.421	72.5814	75.4509
	3–5	74.7778	7.67753		68.8763	80.6792
	More than 5	76.0000	0.00000		76.0000	76.0000
	Non	73.0976	6.69872		72.1751	74.0200
Menstruation	No	60.1429	19.80260	0.0001**	41.8285	78.4572
	Yes	74.0000	4.39131		73.4729	74.5271
GA (weeks)	From the first month to the third month (1–12 weeks)	69.0000	14.95549	0.0001**	59.9625	78.0375
	From the fourth month to the sixth month (13–28 weeks)	73.7283	4.64197		73.0317	74.4249
	From the seventh month to the ninth month (29–40 weeks)	74.8295	3.81835		74.0205	75.6386
	After delivery	49.0000	12.76715		33.1475	64.8525
Kids number	More than 5	76.8000	7.53279	0.066	72.6285	80.9715
	Non	72.6163	7.76443		70.9516	74.2810
	1–5	73.5112	5.62002		72.6799	74.3425
Chronic illness (1)	No	73.5992	5.79831	0.059	72.8939	74.3046
	Yes	70.5294	13.25763		63.7130	77.3459
Pregnancy complication	No	73.2556	6.45585	0.027*	72.4820	74.0291
	Yes	78.1111	6.33333		73.2429	82.9793
Number of phone clinics during pregnancy	More than 5	80.5714	15.24092	0.001*	66.4759	94.6669
	Non	68.4000	17.25753		56.0547	80.7453
	1–5	73.4122	5.19854		72.7798	74.0446
Number of attended clinics during pregnancy	More than 5	84.0000	15.55635	0.0001**	−55.7683	223.7683
	Non	69.8065	11.43800		65.6110	74.0019
	1–5	73.7805	5.31081		73.1135	74.4474
Visiting another health facility	Non	72.1616	8.35526	0.017*	70.4952	73.8280
	1–5	74.1000	5.10022		73.3499	74.8501
Reason for visiting phone clinic	Pandemic lockout and curfew	60.5000	6.36396	0.002*	3.3221	117.6779
	Fear of transmitting infection	75.3000	1.33749		74.3432	76.2568
	Lack of transportation	73.3125	1.53704		72.4935	74.1315
	Mandatory from the health facility	73.3522	6.62109		72.5224	74.1820

SD: standard deviation.
**: significant assosiation.

that 77.5% of women were satisfied with doing virtual visits. Pflugeisen and Mou[3] also reported high satisfaction with virtual care. Historically, women's acceptance of virtual care has been limited due to concerns about lack of perceived support and the long gaps between in-person visits. However, a shift in practice with the pandemic has allowed increased capture of a wider proportion of women's preferences.[21–25] Holcomb et al.[26] reported high client satisfaction with audio-only virtual ANC during the COVID-19 pandemic, demonstrating that 99% of women felt their needs were met with virtual care and compliance with virtual clinics. In an integrative review, the authors reported that patient satisfaction and confidence in the care provided were consistently rated high, as identified through interviews and surveys covering several domains, including the ease of scheduling, interactions with health care providers, technology, and

Table 7. Multilinear regression for potentially predictive factors of the study client's satisfaction level with telehealth antenatal care during the COVID-19 pandemic.

The study client's satisfaction level	Unstandardized coefficients	Standardized coefficients	*p*-value	95% CI for odds ratio	
	B	*β*		Lower	Upper
(Constant)	67.054		0.000	52.446	81.661
Age	0.109	0.016	0.774	−0.638	0.856
Education	−3.288	−0.232	0.000	−5.056	−1.521
Occupation	−3.027	−0.118	0.129	−6.940	0.887
Husband occupation	−2.057	−0.124	0.090	−4.435	0.321
Smoking	0.342	0.049	0.387	−0.435	1.119
Monthly income	−2.344	−0.100	0.173	−5.722	1.034
Gravidity	−0.361	−0.096	0.437	−1.274	0.552
Parity	−0.189	−0.051	0.726	−1.252	0.873
Abortion	−0.100	−0.026	0.651	−0.532	0.333
Menstruation	15.936	0.631	0.000	11.864	20.007
Semester	−1.598	−0.144	0.006	−2.744	−0.452
Children number	−1.301	−0.119	0.148	−3.066	0.464
Chronic illness	−1.937	−0.071	0.195	−4.871	0.997
Previous illness	6.391	0.174	0.001	2.665	10.117
Phone clinic visit	−3.772	−0.209	0.000	−5.746	−1.797
Physical clinic visit	0.564	0.031	0.588	−1.483	2.612
Another health facility visit	1.059	0.078	0.164	−0.436	2.553
Visit reason	−0.758	−0.081	0.117	−1.708	0.191
$R^2 = 0.225$		Adjusted $R^2 = 0.174$			

CI: confidence interval.

personal benefits.[26–33] Patients indicated the time and cost reductions associated with not requiring to take time off work, organize childcare, or get transportation, consistent in rural and urban settings.[26–33] This result showed that the high satisfaction levels of pregnant women regarding phone clinics are common and have been reported by several studies.[27]

The response to the phone-based consultation was higher in the group in their second or third trimester or having more than one child. This is similar to other studies, and it could be related to previous pregnancy experience and other reassuring signs, such as fetal movement or a similar experience with pregnancy symptoms in the first trimester, which increased the satisfaction rate.[34] The study findings indicated that phone-based antenatal clinics were acceptable to all the patients surveyed, with significant differences regarding sociodemographic and obstetric data. In addition, the women would recommend such visits to others, which may be related to safety and decrease the time needed for physical visits and the need for transportation. Several studies reported a similar result where safety and saving time, and availability of transportation were the main reason for the perceived high level of satisfaction.[18] Holcomb et al.[26] reported that the 88% compliance with virtual clinics was significantly higher than with in-person appointments (82%; $p < 0.001$). A cross-sectional study by Futterman et al.[35] compared virtual with in-person

appointments and found a high level of satisfaction with both, although in-person satisfaction was significantly higher. The sample agreed that they would continue to follow up the same way, and they would recommend this service to other pregnant women, similar to a Pakistani study.[36]

Aziz et al. stated the importance of joining face-to-face and telemedicine approaches for high-risk pregnancies during the pandemic. We must ensure the adoption of telemedicine strategies that do not compromise feto-maternal outcomes.[37] A randomized controlled trial by Butler Tobah et al.[33] compared alternative virtual prenatal care with usual face-to-face care and reported that women had higher levels of satisfaction and less stress with the virtual care arm, with no difference in feto-maternal outcomes or perceived quality of care.

Overall, the high level of satisfaction with the phone-based ANC reported in the study demonstrated the importance of redesigning the delivery of health care and accommodating technology-based care in emergencies and as part of regular care. It requires more time in management, training, and adoption of such services in the future.

Limitations of the study

The main limitation of this study is the absence of comparison to other modalities of health care services, fetal and maternal outcomes, and the medicolegal aspects of

such a service. This can limit the generalization of the results of this study. Another limitation is the mandatory use of this service during the epidemic, as there was no other option to receive the care, which could increase the satisfaction compared with no care at all.

Implications for practice and research

This study indicated that women with a low risk were satisfied in all aspects of a phone-based consultation; it is a good opportunity for policymakers and health care organizations to review the current recommendations, cost-effectiveness, medicolegal aspects, and protocols in managing such cases.

This study also calls for more detailed studies in a broader population, including a qualitative approach to highlight what could be added to the current telehealth care services from the patient's point of view. This study was done early during the COVID-19 pandemic. Studies would be needed to explore the absolute need for technology-based services to deliver other health care services in emergencies and as part of routine health care.

Conclusion

The study indicates that the most pregnant women were satisfied with receiving care via a phone-based antenatal service during the COVID-19 pandemic. It also supports potential changes to models of care that incorporate the use of telehealth. Despite sociodemographic differences, women have widely accepted virtual antenatal clinics, supporting the feasibility of virtual clinics moving forward. The study supports the combination of virtual antenatal clinics besides face-to-face delivery of care as and where convenient to ensure delivery of patient-centered care; additional exploring studies to discover suitable telemedicine strategies that aim to personalize care for pregnant women are required. For future ANC delivery, it is suggested to integrate both technology-based health care with physical attendance to ensure high-quality, evidence-based health care, and the cost-effectiveness and medicolegal aspects of the services should be measured.

Author contribution(s)

Razaz Wali: Conceptualization; Methodology; Supervision; Writing—original draft; Writing—review & editing.
Amani Alhakami: Data curation; Methodology; Writing—original draft.
Nada Alsafari: Data curation; Formal analysis; Methodology; Writing—original draft.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

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References

1. WHO. Guidelines on antenatal care (overview), 2016, https://www.who.int/publications/i/item/9789241549912
2. WHO. Recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization, 2016, https://www.ncbi.nlm.nih.gov/books/NBK409110
3. Pflugeisen BM and Mou J. Patient satisfaction with virtual obstetric care. *Matern Child Health J* 2017; 21(7): 1544–1551.
4. American Academy of Pediatrics American College of Obstetricians Gynecologists. Guidelines for perinatal care. 7th ed. Elk Grove Village, IL: American Academy of Pediatrics, 2012.
5. Jnr BA. Use of telemedicine and virtual care for remote treatment in response to COVID-19 pandemic. *J Med Syst* 2020; 44: 132.
6. Kadir MA. Role of telemedicine in healthcare during COVID-19 pandemic in developing countries. *Telehealth Med Today* 2020; 2020: 219012713.
7. Prasad A, Brewster R, Newman JG, et al. Optimizing your telemedicine visit during the COVID-19 pandemic: Practice guidelines for patients with head and neck cancer. *Head Neck* 2020; 42(6): 1317–1321.
8. Golinelli D, Boetto E, Carullo G, et al. How the COVID-19 pandemic is favoring the adoption of digital technologies in health care a rapid literature review. *Medrxiv* 2020.
9. Neubeck L, Hansen T, Jaarsma T, et al. Delivering healthcare remotely to cardiovascular patients during COVID-19: a rapid review of the evidence. *Europ J Cardiovas Nurs* 2020; 19: 486–494.
10. Elson EC, Oermann C, Duehlmeyer S, et al. Use of telemedicine to provide clinical pharmacy services during the

SARS-CoV-2 pandemic. *Am J Health Syst Pharm* 2020; 5: zxaa112.

11. Field MJ; Institute of Medicine (US) Committee on Evaluating Clinical Applications of Telemedicine. *Telemedicine: a guide to assessing telecommunications in health care*, https://pubmed.ncbi.nlm.nih.gov/20845554/

12. *Telehealth: The delivery of health care health education health information services via remote technologies*. Waltham, MA: NEJM Catalyst, 2018.

13. Pregnancy and COVID-19: SAUDI society of maternal-fetal medicine (SSMFM) Guidelines, https://smj.org.sa/content/41/8/779#sec-6

14. Webster P. Virtual health care in the era of COVID-19. *Lancet* 2020; 395(10231): 1180–1181.

15. Ha JF and Longnecker N. Doctor-patient communication: a review. *Ochsner* 2010; 10(1): 38–43.

16. Raosoft. Sample size calculator, http://www.raosoft.com/samplesize.html

17. Fatehi F, Martin-Khan M, Smith AC, et al. Patient satisfaction with video teleconsultation in a virtual diabetes outreach clinic. *Diabetes Technol Ther* 2015; 17(1): 43–48.

18. Peahl AF, Powell A, Berlin H, et al. Patient and provider perspectives of a new prenatal care model introduced in response to the coronavirus disease 2019 pandemic. *Am J Obstet Gynecol* 2021; 224(4): 384.e1–384.e11.

19. Liu CH, Goyal D, Mittal L, et al. Patient satisfaction with virtual-based prenatal care: implications after the COVID-19 pandemic. *Matern Child Health J* 2021; 25(11): 1735–1743.

20. Kern-Goldberger Adina R and Srinivas SK. Obstetrical telehealth and virtual care practices during the COVID-19 pandemic. *Clin Obstet Gynecol* 2022; 65: 148–160.

21. Quinn LM, Olajide O, Green M, et al. Patient and professional experiences with virtual antenatal clinics during the COVID-19 pandemic in a UK tertiary obstetric hospital: questionnaire study. *J Med Internet Res* 2021; 23: e25549.

22. mHealth. *New Horizons for Health Through Mobile Technologies*. Geneva, Switzerland: World Health Organization, 2011.

23. Wallwiener S, Müller M, Doster A, et al. Pregnancy eHealth and mHealth: user proportions and characteristics of pregnant women using Web-based information sources-a cross-sectional study. *Arch Gynecol Obstet* 2016; 294(5): 937–944.

24. Novick G. Women's experience of prenatal care: an integrative review. *J Midwifery Womens Health* 2009; 54(3): 226–237.

25. Sikorski J, Wilson J, Clement S, et al. A randomised controlled trial comparing two schedules of antenatal visits: the antenatal care project. *BMJ* 1996; 312(7030): 546–553.

26. Holcomb D, Faucher MA, Bouzid J, et al. Patient perspectives on audio-only virtual prenatal visits amidst the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. *Obstet Gynecol* 2020; 136(2): 317–322.

27. Wu KK, Lopez C and Nichols M. Virtual visits in prenatal care: an integrative review. *J Midwifery Womens Health* 2021; 67: 39–52.

28. Jeganathan S, Prasannan L, Blitz M, et al. Adherence and acceptability of telehealth appointments for high-risk obstetrical patients during the COVID-19 pandemic. *Am J Obstet Gynecol MFM* 2020; 2(4): 100233.

29. Shields AD, Wagner RK, Knutzen D, et al. Maintaining access to maternal-fetal medicine care by telemedicine during a global pandemic. *J Telemed Telecare* 2020; 26: 1357633X20957468.

30. Leighton C, Conroy M, Bilderback A, et al. Implementation and impact of maternal-fetal medicine telemedicine program. *Am J Perinatol* 2019; 36(7): 751–758.

31. Wyatt SN, Rhoads SJ, Green AL, et al. Maternal response to high-risk obstetric telemedicine consults when perinatal prognosis is poor. *Aust N Z J Obstet Gynaecol* 2013; 53(5): 494–497.

32. Harrison TN, Sacks DA, Parry C, et al. Acceptability of virtual prenatal visits for women with gestational diabetes. *Women Health Issue* 2017; 27(3): 351–355.

33. Butler Tobah Y, LeBlanc A, Branda ME, et al. Randomized comparison of a reduced-visit prenatal care model enhanced with remote monitoring. *Am J Obstet Gynecol* 2019; 221(6): 638.e1–638.e8.

34. Chen M, Liu X, Zhang J, et al. Characteristics of online medical care consultation for pregnant women during the COVID-19 outbreak: cross-sectional study. *BMJ Open* 2020; 10(11): e043461.

35. Futterman I, Rosenfeld E, Toaff M, et al. Addressing disparities in prenatal care via telehealth during COVID-19: prenatal satisfaction survey in East Harlem. *Am J Perinatol* 2021; 38(1): 88–92.

36. Sulaman H, Akhtar T, Naeem H, et al. Beyond COVID-19: prospect of telemedicine for obstetrics patients in Pakistan. *Int J Med Inform* 2021; 158: 104653.

37. Aziz A, Zork N, Aubey JJ, et al. Telehealth for high-risk pregnancies in the setting of the COVID-19 pandemic. *Am J Perinatol* 2020; 37(8): 800–808.