Assessment of Pre and Post-Intervention Telehealth Knowledge among Midwives in Selected Hospitals in Ibadan, Oyo State

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ABSTRACT

Telehealth intervention involves health care delivery and education over a distance using electronic and telecommunication technologies. Midwives play a crucial role among healthcare professionals regarding maternal and neonatal care, making it essential for them to be well-equipped with telehealth knowledge and awareness. This study is therefore aimed to examine the pre- and post-intervention of telehealth knowledge among the midwives in some selected hospitals in Ibadan, Oyo state.

This study adopted quasi experimental design and two (2) hospitals (Adeoyo Maternity Teaching Hospital and Ring Road Teaching Hospital) in Ibadan Oyo State, Nigeria were selected. The two hospitals selected are subjected to randomly stratified and unequal proportionate sampling was used to determine sample size per facilities with one serving as the control group and another as the experimental group. This study utilized two research instruments (standardized structured questionnaire and observational checklist) and the target respondents were midwives from the aforementioned hospitals. The sample size was 270 (including 10% of the value of minimum desired sample size (n) that was added to replace the loss or incomplete questionnaire) and was calculated using Leslie Kish cross sectional model for sample size determination for a single proportion The data obtained from the respondents were sorted, coded and processed using SPSS version 27. The analysis was done using both descriptive and inferential statics.

The result of the study revealed that prior to the intervention, awareness of real-time video consultations was high, with 85.0% and 87.3% of participants at Control group and Experimental group, respectively, identifying it as a component of telehealth. Post-intervention, this increased to 95.0% and 100.0%, respectively. Similarly, recognition of store-and-forward transmission improved from 85.8% and 86.0% pre-test to 94.2% and 100.0% post-test. Remote patient monitoring showed a significant increase in awareness, rising from 61.7% to 95.0% at Control group and from 69.3% to 100.0% at Experimental group. Understanding of mobile health applications also improved, with recognition increasing from 70.8% to 95.0% at Control group and from 62.7% to 100.0% at Experimental group. Regarding pre and post intervention level of knowledge of telehealth, the score was rated on a 60-point rating scale in both control and experimental group. The control group showed that 60% of the respondents indicating high level of knowledge before intervention and 100% high level of knowledge after the intervention. Whereas, 71% of the respondents indicating high level of knowledge of telehealth before intervention and 100% of the respondents had high level of knowledge of telehealth after the intervention. The result shows that there was significant increase in the midwives' knowledge after the intervention.

This study concluded that the midwives are aware and are increasing in the knowledge of telehealth in delivering a good and quality healthcare to pregnant women and the baby.

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Keywords: Telehealth, pre-intervention, post-intervention, knowledge, midwives, hospital

INTRODUCTION

The rapid evolution of healthcare technology has transformed the delivery of medical services, with telehealth emerging as a vital tool in modern clinical practice (1). Globally, utilization of modern maternal healthcare facilities increases pregnant women's chances of survival (2). This is because in modern healthcare facilities, adequate precautions are taken to prevent complications which probably reduces maternal or child mortality. Some of these efforts include, routine health status checks, educating pregnant women on ways to prevent complications and if complication occurs, conducting referral or Caesarean section towards achieving good pregnancy or birth outcome. Telehealth therefore refers to a technologically enabled process, that promotes interaction between healthcare providers and patients (3). It bridges geographical barriers, expands access to healthcare, and enhances efficiency in patient management (4).

Midwives play a crucial role among healthcare professionals regarding maternal and neonatal care, making it essential for them to be well-equipped with telehealth knowledge and awareness (5). Despite the increasing adoption of telehealth in various medical fields, its integration into midwifery practice remains inconsistent due to knowledge gaps, technical barriers, and limited institutional support (6).

Since utilization of maternity center increases knowledge about preventive health as well as aid timely discovery of likely complications for prompt intervention (7). It is therefore expedients that an alternative to physical meetings across maternity centers be explored to promote accessibility of maternity service to pregnant women. As a way to mitigate these effects, the World Health Organisation (8), proposed use of telehealth, a globally accepted technological based for communication, as a means to compliment physical meeting, to further promote access to maternal services for pregnant women. The point is could this intervention bring about the increase the knowledge to fully explore the benefit of telehealth in health care delivery and management? This study therefore, examined the pre- and post-intervention of telehealth knowledge among the midwives using some selected hospitals in Ibadan, Oyo state as case study.

METHODOLOGY

Study Area

The study was conducted at two major maternal hospitals in Ibadan, Nigeria: Ring Road and Adeoyo Maternal Hospitals. These hospitals serve as primary referral centers for maternal and child health services in the region, providing comprehensive care to a diverse patient population

Study Design

A quasi-experimental pre-post intervention design was employed to evaluate the effectiveness of the training program on midwives' knowledge on telehealth.

Study Population

The study population comprised midwives working at Ring Road and Adeoyo Maternal Hospitals. These midwives deliver antenatal, intrapartum, and postnatal care services, making them key stakeholders in maternal health interventions.

Eligibility Criteria for the Participant in the Study

Inclusion: This study includes midwives that are skilled birth attendants with certificate to practice Midwifery from Nursing and Midwifery Council of Nigeria. Rationale for selecting this group was based on the need to base the investigation on only professionals to avoid errors and language barriers during intervention. Also those midwives who gave verbal and writing consent will be granted opportunity to be part of this study

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Exclusion: Registered midwives that are already under telehealth training programmes and traditional birth attendants will be excluded from this study. Also midwives who met the eligibility criteria, but were not around or sick during data collection will be excluded.

Sample size

A total of 270 midwives participated in the study, with 120 recruited from Ring Road Hospital (Control group) and 150 from Adeoyo Hospital (Experimental group). The sample size was calculated to ensure adequate statistical power for detecting significant changes in knowledge and practice following the intervention.

Sample Determination

The sample size was calculated using Leslie Kish cross sectional model for sample size determination for a single proportion

The calculation is carried out as follows:

$n = Z^2 p (1 - p)/d^2$

Where;

n = Minimum desired sample size

Z = the standard normal deviate, usually set as 1.96 which corresponds to 5% level of significance.

P =80%; a = 0.80

d = Degree of accuracy (precision) set at 5% (0.05)

$n = 1.96^2$ x 0.8 x (1- 0.8)/ 0.05

n =.614656/0.00250

n = 246 (Approx)

10% of the value of n will be added to replace the loss or incomplete questionnaire;

10% of 246 = 24, approximately

Therefore, the sample 246+24 = 270

Sampling Technique

A stratified random sampling technique was used to select participants, ensuring proportional representation from both hospitals.

Study instrument

This study utilized two research instruments: standardized structured questionnaire and observational checklist. Specifically, the standardized structured questionnaire was used to collect data related to knowledge of telehealth, while the observational checklist was used to collect data related to maternal care outcomes.

Validity of the instrument

The questionnaire underwent item evaluation with two research experts from the field of nursing. The experts ensured the face, content and construct validity.

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Reliability of the instrument

To ensure the reliability of the instrument, 10% (22) of the total sample size were subjected to test re-test type of reliability in two different maternity healthcare centres from Ibadan, Oyo State. Twenty-two Midwives were presented with 22 questionnaires and Observational checklist twice at interval of three weeks. Data collected was subjected to Cronbach's Alpha analysis and the internal consistency of the instruments was determined. Cronbach's Alpha coefficient of 0.82 was obtained, demonstrating reliability.

Method of Data Collection

Data were collected using structured questionnaires administered before and after the training intervention. The questionnaires assessed midwives' knowledge using telehealth in relation to maternal care and management.

Data collection procedure

The researcher conducted familiarization visits together with two research assistants, who are midwives trained on how to go about the data collection exercise, for two weeks. Numbers of midwives in each selected center were documented and consent form presented. Then the appointment was booked for Pre-intervention. After which the researcher and assistants returned for pre-intervention assessment. Immediately after the pre-intervention, educational intervention was conducted among the midwives. The participants were allowed to practice for twelve weeks, before post-interventional assessment in form of distribution of questionnaires and checklist was carried out. Retrieval of instrument was done immediately after completion.

Data Analysis

Data were analyzed using SPSS version 25. Paired t-tests were conducted to compare pre- and post-training scores, measuring the intervention's impact on knowledge of telehealth. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to assess the likelihood of improved knowledge following the intervention. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval to carry out the study was obtained from Oyo State Ministry of Health Secretariat, Ibadan. Verbal informed consent was also obtained from each participant. Effort was made to ensure and maintain anonymity and confidentiality of data collected. Information obtained was exposed to other personnel, except those directly involved in the study.

RESULT AND DISCUSSION

Results

Table 1: Knowledge of telehealth (n=270)

Variable	**CONTROL GROUP (n=120)**				**EXPERIMENTAL GROUP (n=150)**			
	PRETEST		**POST-TEST**		**PRE-TEST**		**POST-TEST**	
	YES	**NO**	**YES**	**NO**	**YES**	**NO**	**YES**	**NO**
	F(%)	**F(%)**	**F(%)**	**F(%)**	**F(%)**	**F(%)**	**F(%)**	**F(%)**
Which of the following are components of telehealth?								
Real-time video consultations	102	18	114 (95.0%	6	131	19	150	0

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	(85.0%)	(15.0%)	)	(5.0%)	(87.3%)	(12.7%)	(100.0%)	(0.0%)
Store-and-forward transmission of medical images	103 (85.8%)	17 (14.2%)	113 (94.2%)	7 (5.8%)	129 (86.0%)	21 (14.0%)	150 (100.0%)	0 (0.0%)
Remote patient monitoring	74 (61.7%)	46 (38.3%)	114 (95.0%)	6 (5.0%)	104 (69.3%)	46 (30.7%)	150 (100.0%)	0 (0.0%)
Mobile health applications	85 (70.8%)	35 (29.2%)	114 (95.0%)	6 (5.0%)	94 (62.7%)	56 (37.3%)	150 (100.0%)	0 (0.0%)
What are the essential requirements for conducting a video consultation?								
Stable internet connection	102 (85.0%)	18 (15.0%)	114 (95.0%)	6 (5.0%)	131 (87.3%)	19 (12.7%)	150 (100.0%)	0 (0.0%)
Device with camera and microphone	88 (73.3%)	32 (26.7%)	120 (100.0%)	0 (0.0%)	112 (74.7%)	38 (25.3%)	144 (96.0%)	6 (4.0%)
Private, well-lit space	97 (80.8%)	23 (19.2%)	120 (100.0%)	0 (0.0%)	109 (72.7%)	41 (27.3%)	145 (96.7%)	5 (3.3%)
Electronic health record system	81 (67.5%)	39 (32.5%)	120 (100.0%)	0 (0.0%)	109 (72.7%)	41 (27.3%)	144 (96.0%)	6 (4.0%)
Which of the following maternal conditions can be monitored through telehealth?								
Gestational diabetes	93 (77.5%)	27 (22.5%)	120 (100.0%)	0 (0.0%)	120 (80.0%)	30 (20.0%)	140 (93.3%)	10 (6.7%)
Mild pregnancy-induced hypertension	93 (77.5%)	27 (22.5%)	120 (100.0%)	0 (0.0%)	109 (72.7%)	41 (27.3%)	142 (94.7%)	8 (5.3%)
Routine antenatal progress	85 (70.8%)	35 (29.2%)	120 (100.0%)	0 (0.0%)	119 (79.3%)	31 (20.7%)	142 (94.7%)	8 (5.3%)
Postpartum depression screening	78 (65.0%)	42 (35.0%)	120 (100.0%)	0 (0.0%)	101 (67.3%)	49 (32.7%)	144 (96.0%)	6 (4.0%)
What security measures are important for telehealth practice?								
End-to-end encryption	92	28	120	0	114	36	143	7

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	(76.7%)	(23.3%)	(100.0%)	(0.0%)	(76.0%)	(24.0%)	(95.3%)	(4.7%)
Secure password protection	91 (75.8%)	29 (24.2%)	120 (100.0%)	0 (0.0%)	116 (77.3%)	34 (22.7%)	143 (95.3%)	7 (4.7%)
Regular software updates	83 (69.2%)	37 (30.8%)	120 (100.0%)	0 (0.0%)	106 (70.7%)	44 (29.3%)	143 (95.3%)	7 (4.7%)
Patient consent documentation	97 (80.8%)	23 (19.2%)	120 (100.0%)	0 (0.0%)	118 (78.7%)	32 (21.3%)	145 (96.7%)	5 (3.3%)
Which of the following statements about telehealth documentation are correct?								
Virtual consultations must be documented in patient records	96 (80.0%)	24 (20.0%)	120 (100.0%)	0 (0.0%)	129 (86.0%)	21 (14.0%)	140 (93.3%)	10 (6.7%)
Consent for telehealth services should be recorded	96 (80.0%)	24 (20.0%)	120 (100.0%)	0 (0.0%)	120 (80.0%)	30 (20.0%)	140 (93.3%)	10 (6.7%)
Follow-up plans must be clearly documented	96 (80.0%)	24 (20.0%)	120 (100.0%)	0 (0.0%)	111 (74.0%)	39 (26.0%)	141 (94.0%)	9 (6.0%)
Time and duration of consultation should be noted	86 (71.7%)	34 (28.3%)	120 (100.0%)	0 (0.0%)	114 (76.0%)	36 (24.0%)	143 (95.3%)	7 (4.7%)
What are appropriate scenarios for telehealth in midwifery practice								
Routine antenatal education	86 (71.7%)	34 (28.3%)	120 (100.0%)	0 (0.0%)	106 (70.7%)	44 (29.3%)	147 (98.0%)	3 (2.0%)
Non-emergency postpartum follow-up	96 (80.0%)	24 (20.0%)	120 (100.0%)	0 (0.0%)	124 (82.7%)	26 (17.3%)	145 (96.7%)	5 (3.3%)
Lactation consultation	73 (60.8%)	47 (39.2%)	120 (100.0%)	0 (0.0%)	100 (66.7%)	50 (33.3%)	140 (93.3%)	10 (6.7%)
Active labor management	83 (69.2%)	37 (30.8%)	120 (100.0%)	0 (0.0%)	105 (70.0%)	45 (30.0%)	138 (92.0%)	12 (8.0%)
Which of these are important considerations when scheduling Telehealth								
Appointments?	95	25	120	0	123	27	139	11

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	(79.2%)	(20.8%)	(100.0%)	(0.0%)	(82.0%)	(18.0%)	(92.7%)	(7.3%)
Time zone differences	72 (60.0%)	48 (40.0%)	119 (99.2%)	1 (0.8%)	112 (74.7%)	38 (25.3%)	141 (94.0%)	9 (6.0%)
Language barriers	96 (80.0%)	24 (20.0%)	114 (95.0%)	6 (5.0%)	117 (78.0%)	33 (22.0%)	145 (96.7%)	5 (3.3%)
Emergency backup plans	69 (57.5%)	51 (42.5%)	115 (95.8%)	5 (4.2%)	98 (65.3%)	52 (34.7%)	146 (97.3%)	4 (2.7%)
What should be included in pre-consultation patient instructions?								
Technical requirements	106 (88.3%)	14 (11.7%)	116 (96.7%)	4 (3.3%)	125 (83.3%)	25 (16.7%)	146 (97.3%)	4 (2.7%)
Backup contact information	93 (77.5%)	27 (22.5%)	116 (96.7%)	4 (3.3%)	125 (83.3%)	25 (16.7%)	146 (97.3%)	4 (2.7%)
Privacy considerations	81 (67.5%)	39 (32.5%)	117 (97.5%)	3 (2.5%)	109 (72.7%)	41 (27.3%)	147 (98.0%)	3 (2.0%)
Expected consultation duration	95 (79.2%)	25 (20.8%)	115 (95.8%)	5 (4.2%)	111 (74.0%)	39 (26.0%)	147 (98.0%)	3 (2.0%)
Which vital signs can be monitored remotely with appropriate patient education?								
Blood pressure	89 (74.2%)	31 (25.8%)	116 (96.7%)	4 (3.3%)	113 (75.3%)	37 (24.7%)	148 (98.7%)	2 (1.3%)
Temperature	96 (80.0%)	24 (20.0%)	116 (96.7%)	4 (3.3%)	120 (81.1%)	28 (18.9%)	147 (98.0%)	3 (2.0%)
Fetal movements counting	79 (65.8%)	41 (34.2%)	116 (96.7%)	4 (3.3%)	99 (66.0%)	51 (34.0%)	148 (98.7%)	2 (1.3%)
Weight	100 (83.3%)	20 (16.7%)	120 (100.0%)	0 (0.0%)	124 (82.7%)	26 (17.3%)	147 (98.7%)	2 (1.3%)
What are valid reasons to transition from telehealth to in-person care?								
Technical difficulties affecting assessment quality	96 (80.0%)	24 (20.0%)	112 (93.3%)	8 (6.7%)	121 (80.7%)	29 (19.3%)	146 (97.3%)	4 (2.7%)

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Signs of emergency conditions	87 (72.5%)	33 (27.5%)	113 (94.2%)	7 (5.8%)	116 (77.3%)	34 (22.7%)	146 (97.3%)	4 (2.7%)
Patient request for physical examination	90 (75.0%)	30 (25.0%)	117 (97.5%)	3 (2.5%)	109 (72.7%)	41 (27.3%)	143 (95.3%)	7 (4.7%)
Need for immediate interventions	98 (81.7%)	22 (18.3%)	115 (95.8%)	5 (4.2%)	121 (80.7%)	29 (19.3%)	145 (96.7%)	5 (3.3%)
Which of the following are best practices for telehealth communication								
Clear speaking pace	86 (71.7%)	34 (28.3%)	112 (93.3%)	8 (6.7%)	117 (78.0%)	33 (22.0%)	147 (98.0%)	3 (2.0%)
Regular confirmation of understanding	98 (81.7%)	22 (18.3%)	112 (93.3%)	8 (6.7%)	119 (79.3%)	31 (20.7%)	150 (100.0%)	0 (0.0%)
Use of teach-back method	91 (75.8%)	29 (24.2%)	112 (93.3%)	8 (6.7%)	118 (78.7%)	32 (21.3%)	147 (98.0%)	3 (2.0%)
Visual aids when appropriate	85 (70.8%)	35 (29.2%)	115 (95.8%)	5 (4.2%)	111 (74.0%)	39 (26.0%)	148 (98.7%)	2 (1.3%)
What should be verified during patient identification in a telehealth session								
Government-issued ID	108 (90.0%)	12 (10.0%)	113 (94.2%)	7 (5.8%)	136 (90.7%)	14 (9.3%)	147 (98.0%)	3 (2.0%)
Date of birth	82 (68.3%)	38 (31.7%)	114 (95.0%)	6 (5.0%)	103 (68.7%)	47 (31.3%)	150 (100.0%)	0 (0.0%)
Current location	106 (88.3%)	14 (11.7%)	114 (95.0%)	6 (5.0%)	131 (87.3%)	19 (12.7%)	147 (98.0%)	3 (2.0%)
Emergency contact information	86 (71.7%)	34 (28.3%)	111 (92.5%)	9 (7.5%)	112 (74.7%)	38 (25.3%)	147 (98.0%)	3 (2.0%)
Which of these are important elements of telehealth etiquette?								
Professional appearance	93 (77.5%)	27 (22.5%)	111 (92.5%)	9 (7.5%)	124 (82.7%)	26 (17.3%)	147 (98.0%)	3 (2.0%)
Neutral background	89 (74.2%)	31 (25.8%)	114 (95.0%)	6 (5.0%)	108 (72.0%)	42 (28.0%)	150 (100.0%)	0 (0.0%)

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Adequate lighting	101 (84.2%)	19 (15.8%)	113 (94.2%)	7 (5.8%)	133 (88.7%)	17 (11.3%)	146 (97.3%)	4 (2.7%)
Minimized background noise	99 (82.5%)	21 (17.5%)	120 (100.0%)	0 (0.0%)	111 (74.0%)	39 (26.0%)	150 (100.0%)	0 (0.0%)
What information should be included in a telehealth emergency protocol?								
Patient's current location	93 (77.5%)	27 (22.5%)	113 (94.2%)	126 (84.0%)	121 (80.7%)	29 (19.3%)	147 (98.0%)	3 (2.0%)
Local emergency numbers	89 (74.2%)	31 (25.8%)	112 (93.3%)	99 (66.0%)	118 (78.7%)	32 (21.3%)	148 (98.7%)	2 (1.3%)
Nearest emergency facility	101 (84.2%)	19 (15.8%)	113 (94.2%)	121 (80.7%)	122 (81.3%)	28 (18.7%)	147 (98.0%)	3 (2.0%)
Alternative contact methods	99 (82.5%)	21 (17.5%)	112 (93.3%)	117 (78.0%)	123 (82.0%)	27 (18.0%)	147 (98.0%)	3 (2.0%)
Which of the following are valid quality indicators for telehealth services?								
Patient satisfaction rates	98 (81.7%)	22 (18.3%)	107 (89.2%)	13 (10.8%)	126 (84.0%)	24 (16.0%)	146 (97.3%)	4 (2.7%)
Technical connection quality	80 (66.7%)	40 (33.3%)	113 (94.2%)	7 (5.8%)	99 (66.0%)	51 (34.0%)	147 (98.0%)	3 (2.0%)
Documentation completeness	94 (78.3%)	26 (21.7%)	111 (92.5%)	9 (7.5%)	121 (80.7%)	29 (19.3%)	146 (97.3%)	4 (2.7%)
Clinical outcome measures	89 (74.2%)	31 (25.8%)	108 (90.0%)	12 (10.0%)	117 (78.0%)	33 (22.0%)	146 (97.3%)	4 (2.7%)

The study assessed the knowledge and awareness of telehealth components, requirements, and best practices among healthcare professionals at Control group and Experimental group before and after an educational intervention. From the table 1 above it can be deduced that prior to the intervention, awareness of real-time video consultations was high, with 85.0% and 87.3% of participants at Control group and Experimental group, respectively, identifying it as a component of telehealth. Post-intervention, this increased to 95.0% and 100.0%, respectively. Similarly, recognition of store-and-forward transmission improved from 85.8% and 86.0% pre-test to 94.2% and 100.0% post-test. Remote patient monitoring showed a significant increase in awareness, rising from 61.7% to 95.0% at Control group and from 69.3% to 100.0% at Experimental group. Understanding of mobile health applications also improved, with recognition increasing from 70.8% to 95.0% at Control group and from 62.7% to 100.0% at Experimental group.

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Similarly, regarding the essential requirements for video consultations, awareness of the need for a stable internet connection rose from 85.0% to 95.0% at Control group and from 87.3% to 100.0% at Experimental group. Knowledge of the importance of having a device with a camera and microphone improved significantly from 73.3% to 100.0% at Control group and from 74.7% to 96.0% at Experimental group. Additionally, awareness of the necessity of a private, well-lit space increased from 80.8% to 100.0% at Control group and from 72.7% to 96.7% at Experimental group. The study also evaluated knowledge of maternal conditions that can be monitored through telehealth. Awareness of gestational diabetes monitoring increased from 77.5% to 100.0% at Control group and from 80.0% to 93.3% at Experimental group. Similarly, recognition of telehealth monitoring for mild pregnancy-induced hypertension rose from 77.5% to 100.0% at Control group and from 72.7% to 94.7% at Experimental group. Routine antenatal progress monitoring was acknowledged by 70.8% pre-test at Control group, rising to 100.0% post-test, while at Experimental group, it improved from 79.3% to 94.7%. Security measures for telehealth practice were also analyzed, showing notable improvements. Awareness of end-to-end encryption as a key security measure increased from 76.7% to 100.0% at Control group and from 76.0% to 95.3% at Experimental group. Secure password protection was recognized as important by 75.8% pre-test at Control group, increasing to 100.0% post-test, while at Experimental group, awareness rose from 77.3% to 95.3%. Regular software updates were identified as essential by 69.2% of participants at Control group before the intervention, rising to 100.0% post-test, and from 70.7% to 95.3% at Experimental group.

Furthermore, the necessity of documenting telehealth consultations was another focus area. Prior to the intervention, 80.0% of participants at Control group acknowledged that virtual consultations must be documented, increasing to 100.0% post-test. At Experimental group, awareness grew from 86.0% to 93.3%. Similarly, the importance of recording consent for telehealth services was recognized by 80.0% pre-test at Control group, increasing to 100.0%, and by 80.0% at Experimental group, rising to 93.3%. Regarding appropriate telehealth scenarios in midwifery practice, awareness of using telehealth for routine antenatal education increased from 71.7% to 100.0% at Control group and from 70.7% to 98.0% at Experimental group. Recognition of non-emergency postpartum follow-up improved from 80.0% to 100.0% at Control group and from 82.7% to 96.7% at Experimental group. Lactation consultation was initially identified as a valid telehealth service by 60.8% at Control group, increasing to 100.0%, and by 66.7% at Experimental group, improving to 93.3%.

In scheduling telehealth appointments, awareness of key considerations also improved. Recognition of the need to assess patients' access to technology increased from 79.2% to 100.0% at Control group and from 82.0% to 92.7% at Experimental group. Awareness of time zone differences as a factor rose from 60.0% to 99.2% at Control group and from 74.7% to 94.0% at Experimental group. Understanding the importance of addressing language barriers improved from 80.0% to 95.0% at Control group and from 78.0% to 96.7% at Experimental group. The study also examined pre-consultation patient instructions, noting significant improvements in understanding. Awareness of the need to inform patients about technical requirements increased from 88.3% to 96.7% at Control group and from 83.3% to 97.3% at Experimental group. The importance of backup contact information was recognized by 77.5% pre-test at Control group, increasing to 96.7%, and by 83.3% at Experimental group, improving to 97.3%. Vital signs that can be remotely monitored through telehealth were also assessed. Awareness of remote blood pressure monitoring increased from 74.2% to 96.7% at Control group and from 75.3% to 98.7% at Experimental group. Recognition of fetal movement counting as a telehealth monitoring method rose from 65.8% to 96.7% at Control group and from 66.0% to 98.7% at Experimental group.

The table also shows respondents views in respect to the reasons for transitioning from telehealth to in-person care. Awareness of the need to shift due to technical difficulties affecting assessment quality increased from 80.0% to 93.3% at Control group and from 80.7% to 97.3% at Experimental group. Recognition of emergency conditions requiring in-person care rose from 72.5% to 94.2% at Control group and from 77.3% to 97.3% at Experimental group. Best practices for telehealth communication showed marked improvements in understanding. Awareness of the importance of a clear speaking pace increased from 71.7% to 93.3% at Control group and from 78.0% to 98.0% at Experimental group. The use of the teach-back method was

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recognized as essential by 75.8% pre-test at Control group, increasing to 93.3%, and by 78.7% at Experimental group, improving to 98.0%.

Similarly, in terms of patient identification during telehealth sessions, knowledge of the need to verify government-issued IDs increased from 90.0% to 94.2% at Control group and from 90.7% to 98.0% at Experimental group. Awareness of the need to confirm current location improved from 88.3% to 95.0% at Control group and from 87.3% to 98.0% at Experimental group. Finally, the study assessed awareness of telehealth etiquette, with recognition of professional appearance improving from 77.5% to 92.5% at Control group and from 82.7% to 98.0% at Experimental group. The need for a neutral background was identified by 74.2% pre-test at Control group, increasing to 95.0%, and by 72.0% at Experimental group, improving to 100.0%.

Table 2: Pre and Post Intervention Level of Knowledge of Telehealth (CONTROL GROUP) (n=120)

Value	**Pre knowledge**			**Post knowledge**		
	Score	**F**	**%**	**F**	**%**	**Remark**
Min=0, Max=60	(31-60)	72	60.0	**120**	**100.0**	High Knowledge
	(0-30)	48	40.0	0	0.0	Low knowledge
	Total	**120**	**100.0**	**120**	**100.0**	
	Mean Score = 45.52±10.2			Mean Score = 57.9±2.22		

Table 2 shows the Pre and post intervention level of knowledge of telehealth in Control group. The score was rated on a 60-point rating scale with 60% of the respondents indicating high level of knowledge before intervention took place, while 100% of the respondents had high level of knowledge after the intervention was done.

Table 3 Pre and Post Intervention Level of Knowledge of Telehealth (EXPERIMENTAL GROUP) (n=150)

Value	**Pre knowledge**			**Post knowledge**		
	Score	**F**	**%**	**F**	**%**	**Remark**
Min=0, Max=60	(31-60)	107	71.3	150	100.0	High Knowledge
	(0-30)	43	28.7	0	0.0	Low knowledge
	Total	**150**	**100.0**	**150**	**100.0**	
	Mean Score = 46.3±8.99			Mean Score = 58.2±2.44		

Table 3 shows the Pre and post intervention level of knowledge of telehealth in Experimental group. The score was rated on a 60-point rating scale with 71% of the respondents indicating high level of knowledge of telehealth before intervention took place, while 100% of the respondents had high level of knowledge of telehealth after the intervention was done.

DISCUSSION

The primary aim of this study was to assess the effect of educational intervention on telehealth knowledge among midwives working in selected hospitals in Ibadan, Oyo State, Nigeria. The evaluation and analysis of

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pre-intervention compared with post-intervention responses show a marked improvement in midwives' knowledge of telehealth as a result of the educational stimulus.

Before the intervention, midwives' awareness of telehealth components, which include real-time video consultations, store-and-forward transmission, remote patient monitoring, and mobile health applications, was found to be fairly high among midwives in both Control group Hospital and Experimental group. But an elevation of awareness and understanding of all the elements was seen, even after intervention. For example, recognition of real-time video consultation as a telehealth component increased from 85.0% to 95.0% at Control group and from 87.3% to 100.0% at Experimental group. Similarly, the knowledge on store-and-forward transmission increased from 85.8% to 94.2% at Control group and from 86.0% to 100.0% at Experimental group. These results correlate with the existent literature, in which Golden et al. (9) highlighted the significance of midwives having access to telehealth training, which increases their capacity to incorporate technology into clinical practice.

In addition, the study showed that midwives possess knowledge about the basic needs to perform video consultations such as stable internet connection, camera and microphone on devices, and availability of private, well-lit environment. The post-intervention data showed a significant increase in knowledge of the importance of internet presence, with respondents aware of this aspect rising from 85.0% to 95.0% at Control group and from 87.3% to 100.0% at Experimental group (Table 4). These results agree with the work of Adenuga *et al*. (10)—emphasized that both technical preparedness and infrastructure awareness are key to successful telehealth adoption.

CONCLUSION

This study concluded that the midwives are aware and are increasing in the knowledge of telehealth in delivering a good and quality healthcare to pregnant women and the baby.

RECOMMENDATION

Integrating Telehealth Training into Midwifery Education – Telehealth training should be incorporated into the nursing and midwifery curriculum to prepare the next generation of midwives with the appropriate digital skills needed to provide care at a distance.

Declarations

Data Availability Request

The data generated during the study will be provided on a reasonable request from corresponding author.

Declaration of interests Statement

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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