

Providing specialized midwifery telemedicine services during the COVID-19 pandemic

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A – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

Summary Background. The COVID-19 crisis encouraged policymakers, regulators and payers to use remote health care.

Objectives. This study was conducted to investigate the awareness and practice of midwifery as a remote service during the COVID-19 pandemic.

Material and methods. This is a descriptive research in which the views and practices of 600 midwives from all over Iran were assessed using a web-based questionnaire as a data collection tool. A hyperlink to the questionnaire was shared in social media groups dedicated to midwife members.

Results. 62.7% of the midwives participating in the study considered telemedicine to be applicable in health services. However, most of them still provided specialised services in person during the COVID-19 pandemic, and provision of remote services was limited to telephone counselling. The awareness and practice of midwives in this field were not appropriate. A significant relationship of midwives' awareness and practice with their age, previous work and education was observed ($p < 0.01$).

Conclusions. As far as provision of specialised midwifery services through telemedicine is concerned, the awareness and practice of midwives are limited to the provision of telephone counselling, thus it is necessary to provide technological and educational infrastructure to set the stage for providing comprehensive midwifery services through telemedicine.

Key words: telemedicine, health care services, midwifery, COVID-19 pandemic.

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Background

On 12 February 2020, the World Health Organization officially announced the outbreak of an acute respiratory syndrome which came to be known as COVID-19 [1]. Reducing social contact to slow the spread of the virus led to the widespread use of simple communication methods such as e-mail and text messages [2]. This isolation also became problematic for patients, thus healthcare systems sought solutions to provide their services more effectively. One of the new methods that is often used as a solution to healthcare problems in developed countries is telemedicine [3]. The purpose of telemedicine is to provide quality, effective and efficient health care to individuals [4] by using telecommunication technology and information science as a communication tool. Thanks to telemedicine, healthcare professionals and patients located in different places can have contact with each other via telephone, radio, fax, teleconferencing and the Internet within the local networks of healthcare organisations, and provision of care and treatment services to patients is made possible without the need for their physical presence [5, 6]. The strategy of telemedicine is based on the fact that providing care, monitoring, follow-up of medical records, management of services and medical facilities and in general all patient information and medical records using this technology will lead to transparency, disease management and analysis [7].

Interventions via mobile phones, digital handheld devices, personal computers, laptops or Internet servers facilitate healthcare programmes by providing more efficient health care [8]. With the advent of smart phones, such interventions have become an inevitable part of everyday life [9]. Similarly, today, it is impossible to imagine a healthcare system without information technology [10]. Telemedicine is even used in rural areas. Ward et al. found that urban hospitals were more likely than rural hospitals to have operational telehealth implementations in cardiology/stroke/heart attack programmes, while rural hospitals were more likely than urban hospital to have operational telehealth implementations in radiology departments and in emergency/trauma care [11].

With respect to the examination of patients in need of colonoscopy, the emergence of high quality digital imaging technology and rapid testing has enabled the specialist to remotely evaluate the patient and make recommendations for a biopsy during the same visit. In addition, video conferencing technology allows physicians and patients to interact before and after a colonoscopic examination [12]. As far as pregnant women are concerned, the possibility of monitoring postpartum blood pressure with Wi-Fi-connected devices, virtual patient consultation using special services and remote viewing of ultrasound records have all increased the use of telehealth services, so much so that in 2014, approx. 2,000 apps were developed which were dedicated to obstetrics alone. In 2015, women's health and



pregnancy apps accounted for 7% of total health apps [13]. DeNicola et al. demonstrated that telephone interventions have a positive effect on clinical outcomes in the fields of gynaecology, obstetrics and other specialties [14]. Bhandari et al. reported that most of the studied patients were very satisfied with the telephone service and had positive perceptions about the future use of the service. They also found that more than 90% of service providers (obstetricians) were highly satisfied and rated telemedicine as “excellent” [15]. Of course, empowering patients as partners in the provision of medical services may be an important factor in the burgeoning of telephone services [16].

The COVID-19 crisis has prompted policymakers, regulators and payers to use remote healthcare. The first use of telemedicine in neurology was to assess stroke patients in hospitals where neurologists were not present. Evidence showed that remote assessment was no different from face-to-face encounters. The results also showed that many assessment and management services could be performed remotely [17]. In a cross-sectional study on 654 patients in China, Zhai et al. examined how remote medical assistance was used to fight COVID-19 and proposed the design of a remote consultation system. They stated that such a system can be effective in terms of diagnosis, consultation, patient monitoring, multidisciplinary care and distance education on preventive measures [18]. According to Lee et al., telehealth is an effective and efficient way for triage and providing timely and quality medical care. On 17 March 2020, the Centres for Medicare & Medicaid Services extended the coverage of distance care to all patients with COVID-19. This minimised the risk of COVID-19 transmission and ensured that limited clinical resources were fairly distributed to those most in need [19]. Zhou et al. recommend that simple communication methods such as e-mail and texting should be used more widely to share information about symptoms of burnout, depression, anxiety and PTSD during COVID-19. They maintain that online self-help programmes to improve cognitive and relaxation skills in dealing with minor symptoms should be designed and used for patients with COVID-19 in order to provide support if needed [2]. On the other hand, people who are not infected with the COVID-19 virus, especially those who are at higher risk for the disease (for example, older adults with pre-existing medical conditions may also be offered remote health care) [20]. During the corona pandemic, even in the most developed countries, psychiatric services were provided online through cyberspace in order to minimise the risk of disease transmission. Of course, medical staff are an exception to this rule. It is necessary to mention that providing face-to-face services depends on two conditions: the person seeking these services must not be infected, and all health protocols must be observed [21]. It should also be noted that no telemedicine programme can be created overnight; however, US health systems that have already made medical innovations have been able to use it in order to deal with COVID-19. The main strategy for controlling the increased demand for health care is to use “forward triage” and arrange patients before they enter the emergency department [22]. The COVID-19 epidemic makes implementation of telehealth a necessity in order to ensure safe and effective delivery of medical care. It is an undertaking that still requires thoughtful planning, procedures and processes [23].

Objectives

Since midwives are able to provide effective health services related to mothers and children, they are one of the first groups

that have the potential to provide these services in the form of telehealth. However, no study has yet examined the opinion of this particular group of health professionals about their awareness and practices with respect to providing telemedicine care, especially during the COVID-19 pandemic. Therefore, the present study was conducted to bridge this gap in literature.

Material and methods

This is a descriptive research study addressing the views and practices of midwives about the use of telemedicine midwifery services during the COVID-19 pandemic in Iran. To this aim, 600 midwives completed the submitted questionnaire. This research was web-based, its site included all Iranian cities, and the research community consisted of Iranian midwives. In order to conduct this research, an approval was first obtained from the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref. ID: IR.AJUMS.REC.1399.492). A questionnaire was then prepared based on the existing instructions regarding the job description of midwives. The first section of the questionnaire was about the general characteristics of the volunteers and their general awareness of providing telemedicine services. The next section contained 13 questions about the participant’s awareness about the possibility of providing telemedicine services to pregnant women and their practices in this field during the corona pandemic period. The third section of the questionnaire elicited the same information from non-pregnant women, including 20 questions on their awareness and 20 questions on the practice. In order to assess the content validity of the questionnaire, a copy was provided to 10 faculty members of Ahvaz University of Medical Sciences, and the questionnaire was modified based on their opinions. As for evaluation of reliability, after completion of the first 30 copies of the questionnaire, Cronbach’s alpha was used, and the questionnaire was redesigned to be used in WhatsApp. In the next step, the administrators of the well-known midwifery groups on WhatsApp in Iran were telephoned and were provided with a hyperlink to the questionnaire. Along with the hyperlink, the purpose of the research was fully explained to the participants-to-be, and they were asked to read and answer the questions carefully.

Inclusion criteria: Being a midwifery graduate and a member of one of the well-known and reputable midwifery groups on WhatsApp.

Exclusion criteria: Incomplete completion of the questionnaire. Sampling was continued until a sufficient amount of data was obtained. After achieving the desired sample size, the information was entered into and analysed by SPSS 23.

Results

According to the result, the mean age of participants was 32.89, with a standard deviation of 7.8 and minimum and maximum ages being 21 and 55 years, respectively. The place of residence of the participants included the provinces of Tehran, Khuzestan, Guilan, Kerman, Yazd, Khorasan, West and East Azerbaijan, Ardabil, Zanjan, Isfahan, Ilam, Alborz and Fars (demographic characteristics of the participants are shown in Table 1).

The results revealed that 62.7% of the participants considered telemedicine to be applicable in health services, and 75% stated that telemedicine services are currently implemented in

Table 1. Demographic characteristics of research participants

Variable	Answers						
Educational attainment	PhD 10.8		Master’s degree 23.5		Bachelor’s degree 61		Associate degree 4.7
Place of occupation	Health centers 8.7	Maternity care facility 14.4	Private office 8.5	University 11.7	Unrelated to midwifery 12.5	Unemployed 43.8	

the world. As far as the type of services were concerned, 18.7% of the respondents expressed that this is done through land-lines, 47.3% said through voice calls with cell phones, and 7.8% believed it was done through Internet social networks. However, 26.2% stated that they were unaware of the applicability of such services in health care.

In the specialised section of the questionnaire, we sought the opinions of midwives regarding the ability to remotely provide 13 types of services to pregnant mothers (Table 2). By assigning a score of 1 to each correct answer, we then obtained an overall score for each participant. Those who obtained 75% or more of the possible score were regarded as having good awareness, those between 50 to 75% as having average awareness, and those obtaining less than 50% were considered as having poor awareness. According to our results, 31.2% of the midwives had poor awareness, 23.2% had moderate awareness, and 45.7% had good awareness about the studied topic (Table 6). We then asked the participants if they had provided remote services to clients during the COVID-19 epidemic (Table 3). The results showed 6.5% had good performance, 15.5% had average performance, and 78% had poor performance.

The second part of the specialised section of the questionnaire assessed the provision of services to non-pregnant women, which includes a wider age range and a total of 20 areas in the 2 sections of awareness (Table 4) and practice (Table 5). As in the first section (i.e. giving a score of 1 to each correct answer), the overall score was obtained for each participant, and the same cut-off points for good, moderate and average awareness used in the first section were used here as well. Our results showed that 92.2% of the midwives participating in this study had poor awareness, 1.7% had moderate awareness, and 6.2% had poor awareness, and with respect to their practice in providing remote services to clients, 6.3% showed good practice, 2% showed average practice, and 91.7% showed poor practice (Table 6). The correlation between awareness and practice of midwives in providing remote services to pregnant mothers and non-pregnant women was significant ($p < 0.0001$). The results also showed a significant relationship of awareness and practice of midwives with their age, previous work and education ($p < 0.01$).

Table 2. Midwifery service that can be provided remotely to pregnant mothers

Type of service	Yes	No	Don't know
Nutrition education, self-care	62.7	12.8	24.5
Answering mother's questions	62.7	12.8	24.5
Performing Leopold manoeuvres	18.7	45	36.3
Checking the mother's vital signs	10.8	59.4	29.8
Foetal heart control	6.3	74.7	19
Prescribing vitamins, Fe, etc.	77.5	9.5	13
Perform pelvic exams	7.8	67.5	24.7
Holding a physiological delivery class	72.5	10.2	17.3
Requesting essential tests	61.3	21.3	17.3
Interpretation of test results	62.7	12.8	24.5
Advice on maternal worries and anxieties	75.3	9.5	15.2
Violence screening	65.5	19.5	15
Maternal weight assessment	58.5	24.5	17

Table 3. Areas of midwifery services that can be provided remotely to non-pregnant women

Type of service	Not feasible	Feasible
Teaching and counselling about adolescence, puberty and the related issues and problems	52.7	47.3
Education and counselling before and after marriage and pregnancy preparation	91.2	8.8
Education and counselling on different methods of contraception	40.3	59.7
Teaching methods of contraception after childbirth and abortion	50.3	49.7
Advice and training on breast self-examination and breast diseases	9.2	90.8
Education on vaccination for infants and children under 6 years of age	20.3	79.7
Training on breastfeeding and timely and correct start of complementary foods	14.3	85.7
Education on any developmental problems of the child	7.8	92.2
Oral health education and personal hygiene	91.3	8.7
Educating the couples about sexually transmitted diseases, hepatitis, etc.	92.2	7.8
Counselling and education on sexual issues and problems	90.7	9.3
Counselling and education on issues and problems of menopause	86.5	13.5
Performing periodic breast examinations	91.5	8.5
Diseases follow-up and performing genital examinations	92.7	7.3
Periodic Pap smear and cytological examination of the sample	93.5	6.5
Request for the necessary tests and culture of vaginal discharge	90	10
Treatment of vaginal and cervical infections	89.3	10.7
Monitoring and vaccinating women before marriage and pregnancy	93.5	6.5
Vaccinating infants and children under 6 years of age	92.8	7.2
Monitoring the growth of infants and children under 6 years of age	91.5	8.5

Table 4. Did participants provide remote services to pregnant mothers during the COVID-19 epidemic?

Type of service	Yes	No
Education on nutrition and self-care	55.2	44.5
Answering mother's questions	60.7	39.3
Performing Leopold manoeuvres	6.5	93.5
Checking the mother's vital signs	6.5	93.5
Foetal heart control	6.5	93.5
Prescribing vitamins, Fe, etc.	6.5	93.5
Performing pelvic exams	19.8	90.9
Holding a physiological delivery class	27.7	72.3
Requesting essential tests	6.5	93.5
Interpretation of test results	44.3	55.7
Anxiety counselling	54.8	45.2
Violence screening	9.2	90.8
Maternal weight assessment	10.2	89.8
Referral of problematic cases to specialised centres	27.7	72.3

Table 5. In which areas did participants provide remote services to non-pregnant women during the COVID-19 epidemic?

Type of service	Yes	No
Education and counselling about adolescence, puberty and the related issues and problems	58.8	41.2
Education and counselling before and after marriage and pregnancy preparation	53	47
Education and counselling on different methods of contraception	59.8	40.2
Teaching methods of contraception after childbirth and abortion	8.2	91.8
Advice and training on breast self-examination and breast diseases	14.8	85.2
Education on vaccination for infants and children under 6 years of age	11.5	88.5
Training on breastfeeding and timely and correct start of complementary foods	61.5	38.5
Education on any developmental problems of the child	14.7	85.3
Oral health education and personal hygiene	12.2	87.8
Educating the couples on sexually transmitted diseases, hepatitis, etc.	58.5	41.5
Counselling and education on sexual issues and problems	49.7	50.3
Counselling and education on issues and problems of menopause	13.3	86.7
Performing periodic breast examinations	93.2	6.8
Disease follow up and performing genital examinations	6.2	93.8
Periodic Pap smear and cytological examination of the sample	6	94
Requesting the necessary tests and culture of vaginal discharge	9.5	90.5
Treatment of vaginal and cervical infections	9.3	90.7
Monitoring and vaccinating women before marriage and pregnancy	8.5	91.5
Vaccinating infants and children under 6 years of age	7.7	92.3
Monitoring the growth of infants and children under 6 years of age	7	93

Table 6. The frequency of midwives' knowledge and performance regarding the provision of telehealth services

The investigated variables	Good	Average	Poor
Awareness of midwives about provision of telehealth services to pregnant women	45.7%	23.2%	31.2%
Performance of midwives in providing remote health services to pregnant women	6.5%	15.5%	78%
Midwives' awareness of providing remote health services to non-pregnant women	6.2%	1.7%	92.2%
Performance of midwives in providing remote health services to non-pregnant women	6.3%	2%	91.7%

Discussion

In this study, 600 midwives from different parts of the country completed our information form concerning their opinions about the possibility of providing tele-midwifery services. About 60% of the participants believed that providing these services was possible, and 70% of them were aware of the establishment of this method of service provision in the world. Research at the Tele-Endocrinology Clinic at Princess Alexandra University Hospital in Brisbane, Australia, has shown that endocrinologists believe that a significant proportion of visits to diabetics can be made remotely [24]. Advances in science and technology have opened the way for humans to go beyond the Earth's atmosphere, and it is necessary to use telemedicine in these journeys and discoveries. In space travel, there are two systems of health and medical care. The first system involves basic first aid, with which one or all astronauts are familiar. The second system involves medical equipment and drugs that can only be used under the supervision of medical professionals. Telemedicine is part of the second system that must be implemented with maximum coordination. To this aim, communication must be well established, and the required information must be exchanged carefully. Computer medical databases and medical diagnostic software programs should also be used [25]. Therefore, the use of telemedicine is mandatory today, at least in countries that make such discoveries. The applicability of midwifery services for pregnant women through telemedicine was explored from different perspectives in this study, and the answers summarised in Table 1 show that most midwives believe that apart from services related to physical examination, most midwifery services can be provided through telemedicine. However, ac-

ording to the findings in Table 4, most of them had poor performance, except for providing counselling services during the COVID-19 pandemic. Strengthening the telemedicine system during a pandemic can create more safety for mothers and even midwives in health care facilities.

In a review study on controlling diabetic mothers during the COVID-19 pandemic, Moradi et al. found that compared with routine care, telemedicine services were associated with reduced polyhydramnios, premature rupture of membranes, pre-term birth, emergency caesarean section and neonatal asphyxia in women with gestational diabetes. The use of telemedicine for women with gestational diabetes during the coronavirus outbreak is a suitable and cost-effective way to prevent the disease, reduce the risks of gestational diabetes and reduce women's anxiety [26]. In the study of Ghorbanzadeh et al., 81.1% of the respondents confirmed the usefulness and efficiency of tele-nursing and had a positive attitude towards using telemedicine in nursing services [27]. After reviewing the opinions of 288 healthcare professionals about the use of telemedicine in obstetrics and gynaecology, Grassl et al. reported that 72.9% were sceptical about the use of telemedicine in obstetrics and gynaecology, while 55.8% recognised its potential. Efforts to promote the use of telemedicine should focus on nurses and midwives because these groups are the most sceptical about using these services. In contrast, young physicians recognise the potential of patient care programmes and are willing to use such technology in pregnancy monitoring [28]. Pflugeisen and Mou investigated patient satisfaction with virtual vs. actual obstetric care. Their results showed that respondents were very satisfied with both models of care, but those who chose the actual care model reported significantly higher mean satisfaction scores. The virtual care model was chosen by a significantly larger number of wom-

en who already had children compared with those who were experiencing their first pregnancy [29], and this care model may be a reasonable alternative to care even in non-pandemic situations.

The question that is posed at this juncture is: Why do midwives generally disagree with this type of service to pregnant mothers? It is possible that this period of a woman's life is sensitive, and in fact, in the event of a mistake, albeit unintentional, the lives of two people instead of one are at risk, especially given the fact that events during pregnancy and childbirth can affect the entire life of the child. The next reason may be the feeling of satisfaction not only in the recipient of the service but also in the service provider from face-to-face contact and human communication and from contact with the mother. Finally, the concept of performing remote physical examinations is still under a veil of ambiguity, and the correct application of this technology needs to be included in official university curricula.

As far as provision of health services to non-pregnant women is concerned, the situation was even worse according to our results. The participants believed that even teaching issues related to breast self-examination, vaccination, oral health, etc., which somehow require illustration, are not possible. According to the results in Table 5, during the COVID-19 epidemic, the participants did not show good performance in terms of providing remote services to non-pregnant women in most areas, and they provided all their services in person during quarantine conditions. Two possible reasons can be attributed to this condition. One reason is the lack of infrastructure for using information technology services widely and publicly for the purpose of telecommunication services, making this technological infrastructure a priority. The second reason is the absence of hands-on instruction on the application of such services in university curricula. By the time students start studying at university, they should be taught how to provide remote services, since they will be the staff of tomorrow, and the provision of these services should be included in the structure of the Ministry of Health to provide the best and highest quality services without endan-

gering the lives of its specialist staff. According to Bień, modern devices used in prenatal care (CTG, UDT, pulse oximeter, etc.) reduce the number of unjustified medical interventions, resulting in improved quality of care. With the development of technology and the reduction in implementation costs of technological projects, it can be assumed that the use of facilities and new technologies will continue to grow [30]. The growth of these technologies will increase the possibility of providing midwifery services to both pregnant and non-pregnant clients. The available information on how to provide telemedicine services, especially in obstetrics and gynaecology, is still incomplete. Magann believes that the published information on the use of telemedicine in obstetrics and gynaecology has not shown adverse effects but has not yet provided definitive benefits either. However, to determine the role of telemedicine in the future, appropriate and structured research is certainly needed [31]. From the available information, it can be understood that telemedicine is an unavoidable necessity in today's society. With the growth of technology, reading ultrasounds, interpreting test results, providing patient counselling, diabetes management, postpartum depression management and support for parents and infants in the postpartum period have been made possible even in non-pandemic conditions for people living in remote areas. Even under normal circumstances, this reduces the time lost at work and transportation costs, promotes the efficiency of healthcare providers and reduces medical costs. The first step towards a healthier community should be taken by providing the needed infrastructure and then by offering specialised training to community health professionals and even by providing public education for service users.

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Tables: 5

Figures: 0

References: 31

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