



# Comparing the Impact of Multimedia and Educational Brochures on Knowledge, Attitude and Work Performance of Healthcare about COVID-19 Management in Pregnancy, Childbirth, and Breastfeeding

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## Abstract

**Background:** In times of pandemic and quarantine, it is necessary to use new educational methods. The aim of this study was to compare the effectiveness of multimedia and booklet educational methods on knowledge, attitude, and job performance of healthcare providers in community health centers regarding COVID-19 in women during pregnancy, childbirth, and breastfeeding.

**Objectives:** The aim of this study was to compare the effectiveness of multimedia and booklet educational methods on knowledge, attitude, and job performance of healthcare providers in community health centers regarding COVID-19 in women during pregnancy, childbirth, and breastfeeding.

**Methods:** The population of this quasi-experimental study consisted of 90 Iranian health care providers in the community health centers of Gonabad city in eastern Iran) 2021, who were selected using the non-probability, purposive sampling method and randomly divided into three groups using a permuted block randomization design: Control group, Multimedia group and Textbook group. Knowledge, attitude and work performance were measured and compared before, after and four weeks after the intervention. The educational content was based on the Iranian Ministry of Health guidelines for the management of Covid-19 in pregnancy, childbirth and breastfeeding.

**Results:** The results showed a significant difference between the mean score of knowledge, attitude, and work performance of the multimedia group and booklet group before and after the intervention ( $P < 0.001$ ), while there was no statistically significant difference between the mean score of knowledge, attitude, and work performance of the control group before and after the intervention ( $P < 0.05$ ).

**Conclusion:** Multimedia teaching increases the knowledge, attitude and work performance of healthcare providers in community health centers regarding COVID.

**Keywords:** Attitude, COVID-19, Health personnel, Knowledge, Multimedia, Work performance

## 1. Background

During pregnancy, childbirth, and breastfeeding as vulnerable periods, women experience new problems and difficulties (1). Pregnant women are vulnerable due to physiological and immunological changes during pregnancy, especially when exposed to emerging infections (2). Coronavirus disease 2019 (COVID-19) has become a global pandemic as a group of acute respiratory diseases (3). This emerging infection has rapidly spread across the world and has left numerous complications on mothers and fetuses as well (4). As a result, mothers should receive proper care in cases of risk of this infection, and the care team should have sufficient skills in performing such health care (4).

Covid-19 is associated with poor maternal and fetal outcomes. Severe Covid-19 infection causes spontaneous fetal loss and increases in pregnancy-related diseases (5). Complications of COVID-19 in women during pregnancy and childbirth include increased preterm birth and a higher rate of cesarean delivery (2). To date, vertical intrauterine

transmission has not been reported. According to the World Health Organization (WHO) recommendation, the only solution to reduce the incidence of this virus in pregnant mothers is to implement the most accurate care and support protocols for pregnant women (6).

Health care providers in health centers and hospitals and nurses and technicians of different wards have an important role in caring for mothers. The outbreak of a new virus requires sufficient knowledge of personnel and the need for care skills (4).

Education can support learning in learners and their behavior change. Education is the use of purposive and anticipated programs that strengthen the abilities of individuals and lead to the acquisition of knowledge, skills, and awareness in them. Since people's knowledge directly affects their attitudes and performance, the successful implementation of an appropriate training program leads to full knowledge of professional performance, and ignorance of these principles leads to irreparable harm to mother and fetus (7).

The quality of learning widely depends on the

quality of education. Researchers convince that any education leads to learning, but the depth and stability of learning in various education methods are different (8). No behavioral change in diet would be observed just using an educational CD (9). Personnel involved in maternal care require distance learning programs because of their employment. As a strategy based on searching and constructing concepts, E-learning forces learners to think at high levels to analyze and apply complex information, thus creating an exciting online teaching and learning strategy (10). One of the methods available in distance learning is called multimedia education as an e-learning method, including the use of text, graphics, video, and audio that stimulate the learner's inner motivation and can be used as an educational style (11). The multimedia method combines these essential media elements to create more innovative creativities (12).

According to Huynh Giao et al.'s study on the knowledge and attitudes of health workers about COVID-19 showed that health care providers had a positive level of knowledge and attitude, but this level of knowledge and attitude to care for COVID-19 was less than the expected level (13).

Rajabi Naeeni et al. found that education through multimedia software and face-to-face education were equally effective in raising pregnant mothers' knowledge about dangerous symptoms. Consequently, it seems that the use of the software will be an excellent alternative to face-to-face training due to the time constraints of health center staff (7). Therefore, considering the education based on increasing the knowledge of health care providers in the field of providing care and education during the corona epidemic for pregnant mothers and the lack of a study in this field, this study aimed to compare the effectiveness of multimedia and booklet education on the knowledge, attitude, and performance of health care providers in community health centers related to COVID-19 in women during pregnancy, childbirth, and breastfeeding.

## 2. Objectives

The aim of this study was to compare the effectiveness of multimedia and booklet educational methods on knowledge, attitude, and job performance of healthcare providers in community health centers regarding COVID-19 in women during pregnancy, childbirth, and breastfeeding.

## 3. Methods

### *Design, procedure, and the study sample*

This study was Quasi-experiment that was performed as a field trial with in the present field was performed on health care workers in community

health centers in Gonabad in east of Iran, to compare the effectiveness of multimedia and booklet training as well as a routine method on knowledge, attitude, and practice March to June in 2021.

### *Sampling and sample size*

In order to determine the sample size based on previous studies (14) where the size effect is 0.3, considering that we have three groups and considering the 95% confidence factor and 80% test power, the total number of 90 people was calculated according to the existence of three groups. In this study, 30 people were considered in each group. These 90 people were selected from all health care providing working in community health centers, who wanted to participate in the study through target-based non-probability sampling method, and they were divided into three groups of control, intervention multimedia training and intervention booklet (In this article, they will be called as follows: control, multimedia and booklet) by random allocation using the blocking approach. In total, six possible block arrangements were listed and one number from 1 to 6 was assigned to each block. One number (between 1 and 6) was then randomly selected and individuals were assigned to the groups control, booklet, multimedia, based on the respective block, and this was repeated until the sample size was completed.

In addition, there were 6 centers that provided health services, and both centers were placed in a separate group, and the research units of the intervention groups were requested not to present the educational content received to other people (Flowchart1).

Inclusion criteria: willingness to participate in research - having at least an associate's degree in one of the fields of medical sciences - having at least three months of work experience

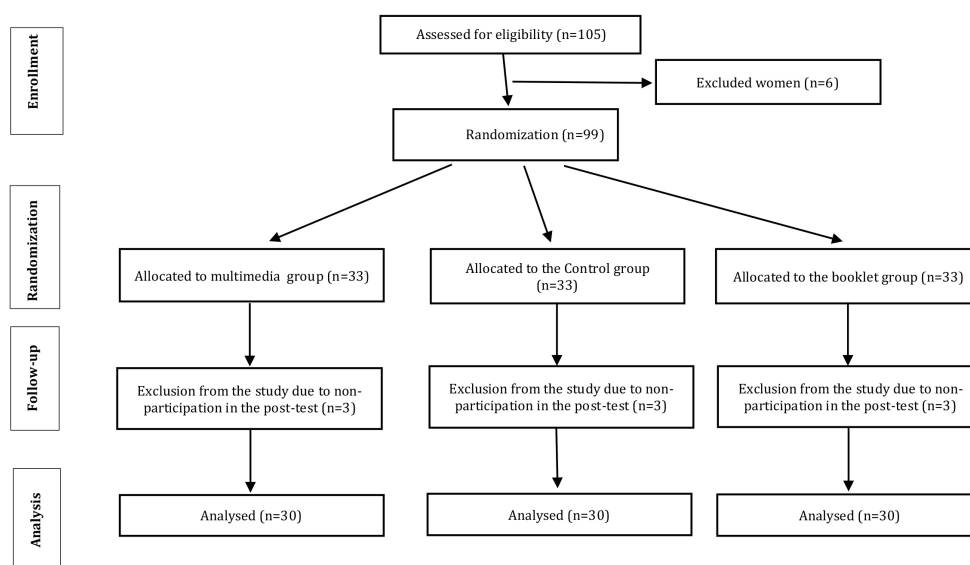
Exclusion criteria: unwillingness to participate in the research.

### *Data collection*

The tools used in this study include: the research unit selection form ( the research unit selection criteria), the research unit demographic data form (containing 11 items about quantitative variables such as age, duration of employment, working hours per week and qualitative variables such as marital status and level of education), informed consent form (e.g., objective and precise expressions that included explanations about the title of the research, its introduction, sampling method and the right to withdraw from the study), knowledge, attitude, and performance questionnaire of health care providers in community health centers related to COVID-19. The duration of completing the questionnaire was about 5 minutes.

The questionnaire of knowledge, attitude, and

## performance of health care providers in community health centers related to COVID-19 in women during



**Flowchart 1.** Inclusion process of individuals in the study

pregnancy, childbirth, and breastfeeding has developed a researcher-made questionnaire; the tools prepared in previous studies and valid sources were also used for its preparation; it was then provided to 10 relevant experts and specialists to determine the validity, and their suggestions were used to modify and determine the validity. For this purpose, CVI and CVR scores were determined. In order to determine the content validity, two methods were used: qualitative and quantitative. In the qualitative method, the developed questionnaire was given to ten specialists (gynecologists, PhDs in reproductive health), and they were asked to present their corrective views on the questionnaire. In order to evaluate the content validity quantitatively, two coefficients of content validity ratio (CVR- Content Validity Ratio) and content validity index (CVI- Content Validity Index) were used. The CVR and CVI were calculated to be 0.67 and 0.84, respectively, and the reliability coefficient was calculated to be 0.79 by Cronbach's alpha method.

The data collection tool included demographic information containing 11 questions and a researcher-made questionnaire on the knowledge, attitude and performance of health care provider. Questionnaire in the field of awareness in the form of 22 questions on a Likert scale with answers: yes, no and I don't know. In the field of attitude, there are 22 questions on a Likert scale with the answers I agree, disagree and have no opinion. And in the field of performance, including 22 questions, it was set on a Likert scale with yes and no answers. And in the field of performance, including 22 questions, it was set on a Likert scale with yes and no answers.

The knowledge score of health care workers' attitude and performance was calculated based on

the total scores of the questions. The amount of awareness score was in the range of (0-44) score, in the attitude range it was in the range of score (0\_44) and in the performance range it had a score of (0\_22).

Educational content (instructions and protocols sent by the Ministry of Health to universities) in the education group was prepared in the form of multimedia methods as files consisting of audio and video educational materials to health caregivers through cyberspace. The multimedia training content consisted of 5 files of 10 minutes each, and in addition to the written content file, it also contained audio content and animation for training. The booklet educational group received the same educational content in PDF format to health caregivers, and the control group received the educational content in a routine format provided by the centers and departments. Of course, the two intervention groups also received this routine educational content. The educational content was the same in the three groups, and the way it was presented in the three groups was only different. Then, in all three groups, a questionnaire was completed to assess knowledge and attitude immediately after the intervention and four weeks after the end of the educational intervention.

#### Statistical Analysis

The SPSS (version 19) software was used for data analysis. Quantitative and qualitative variables were described with mean  $\pm$  standard deviation, percentage, and frequency, respectively. The distribution of variables was assessed by the Kolmogorov-Smirnov test. Quantitative variables were assessed using Repeated Measure (for comparison before, after the intervention and 4 weeks after the intervention), one-way ANOVA (for

comparison among the three groups) and Chi-square (for comparison qualitative variables). Intergroup comparison of qualitative variables was performed using the chi-square test. In addition,  $P < 0.05$  was considered statistically significant.

#### 4. Results

This study population consisted of 90 health care provider working in the community health centers. The mean age of participants in this study was  $30.63 \pm 7.79$  years. Among them, 13.3% in the multimedia group, 6.7% in the booklet group, and 10% in the control group were village residents. In total, 20%, 13.4%, and 23.4% of the subjects had an associate degree education level in the intervention, booklet, and control groups, respectively. There were no statistically significant differences among the studied groups, and these three groups were completely homogeneous ( $P > 0.05$ ). In order to evaluate the normality of the quantitative variables used in the study, the Kolmogorov-Smirnov test was

used. Finally, the test results showed the normality of all quantitative variables ( $P > 0.05$ ) (Table 1).

The results of individuals' knowledge, attitude, and performance scores in the three groups before and after the intervention are shown in Table 2. According to the results in all three scores of knowledge, attitude, and performance before the intervention between the three groups, the results were not significantly different. However, the results of the analysis of variance showed a significant difference between the three groups after the intervention in all three cases ( $P < 0.05$ ). Analysis of variance and paired t-test were used for each group to analyze the differences before and after the intervention, showing that the knowledge scores in the multimedia group and booklet group after the intervention were significantly higher than before the intervention ( $P < 0.05$ ). However, the modification rate in the multimedia intervention group was much higher than in other groups.

**Table 1. Comparison of demographic data of individuals in three groups of multimedia training, booklet, and control**

Variable	Levels	Frequency (%)			Test Result*
		multimedia training	Booklet	Control	
Location(residence)	Village	4 (13.3)	2 (6.7)	3 (10)	0.690
	City	26 (86.7)	28 (93.3)	27 (90)	
Education	Associate degree	6 (20)	4 (13.4)	7 (23.4)	0.716
	Bachelor degree and higher	24 (80)	26 (86.6)	23 (76.6)	
Income level	Below sufficient	6 (20)	3 (10)	1 (10)	0.303
	Sufficient	24 (80)	27 (90)	27 (90)	
Marital Status	Married	23 (76.7)	26 (86.7)	21 (70)	0.295
	Single	7 (23.3)	4 (13.3)	9 (30)	
Employment Status	Contractual temporary to permanent and formal	10 (33.3)	8 (26.8)	6 (20)	0.723
	Conscription law's conscripts	10 (33.3)	13 (43.3)	15 (50)	
		10 (33.3)	9 (30)	9 (30)	
Daily working hours	>8 h	8 (26.7)	10 (33.3)	13 (43.3)	0.393
	≤8 h	22 (73.3)	20 (66.7)	17 (56.7)	
Information about COVID-19 before the pandemic	No information	25 (83.3)	26 (86.7)	28 (93.3)	0.484
	Little information	5 (16.7)	4 (13.3)	2 (6.7)	
Age (year)	Mean±SD	30.9±7.7	30.6±6.92	32.47±8.89	0.617**
Work experience (year)	Mean±SD	6.8±6.76	8.29±7.3	8.97±8.03	0.513**

\*: Chi-square test \*\*: ANOVA test

**Table 2. Comparison of health care providers' knowledge scores in providing services related to COVID-19 in women during pregnancy, childbirth, and breastfeeding in three groups before the intervention**

Variable	Multimedia		Booklet	Control	ANOVA Test
	Before	Mean ±SD	Mean ±SD	Mean ±SD	
Knowledge	Before	10.3±5.05	9.53±3.95	9.77±2.9	0.756
	After	18.43±1.98	16.47±3.37	10.8±4.89	<0.001*
	After 4weeks	19.17±2.36	17.13±3.76	11.5±4.6	<0.001*
Repeated Measure		<0.001*	<0.001*	0.313	***
Attitude	Before	7.27±6.77	5.5±7.35	4.83±5.02	0.325
	After	17.5±4.78	16.23±2.86	11.3±3.68	<0.001*
	After 4 weeks	18.17±5.3	16.9±3.36	12.1±3.9	<0.001*
Repeated Measure		<0.001*	<0.001*	<0.001*	***
Performance	Before	8.83±9.2	7.13±8.14	6.83±6.84	0.591
	After	20.2±1.56	18.57±2.42	15.6±3.41	<0.001*
	After 4weeks	20.73±2.35	19.23±3.18	16.23±3.65	<0.001*
Repeated Measure		<0.001*	<0.001*	<0.001*	***

\*: p.value < 0.05

The results for attitude and performance scores also showed a significant difference with higher scores after the intervention than before the intervention ( $P < 0.05$ ), while this increase in the multimedia group was much higher than in other groups. A significant difference was observed in the control group in any knowledge, attitude, and performance scores before and after the intervention ( $P < 0.05$ ).

In the study of pairwise comparisons before and after the intervention by groups, the results indicated that the knowledge scores in the multimedia method of all stages were different from each other, while there was no significant difference in the booklet method between the times after the intervention and one month after the intervention.

In a pairwise study, attitude scores of all stages in the multimedia and the booklet intervention groups

were significant, and in the control group, there was no significant difference between the times after the intervention and one month after the intervention. Moreover, performance scores were significant in all groups between the times before and after the intervention, and no differences were observed after the intervention (Table 2).

According to Repeated Measure test, the mean score of Knowledge did not change significantly from the prior to the fourth weeks after intervention in the control group ( $P = 0.313$ ); however, the mean score of Knowledge increased in the Multimedia and Booklet groups from the prior to fourth weeks after intervention ( $P < 0.001$ ). (Figure 1).

According to Repeated Measure test, the mean score of Attitude increased in the Multimedia, Booklet and Control groups from the prior to fourth weeks after intervention ( $P < 0.001$ ). (Figure 2)

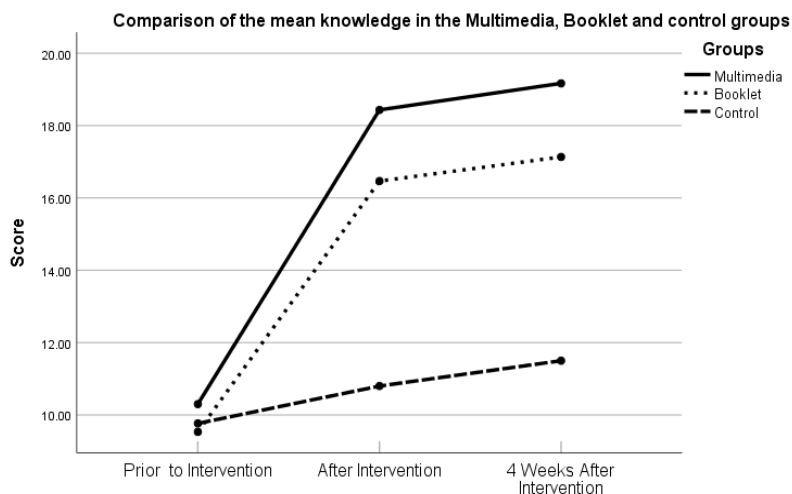


Figure 1. Knowledge comparison of the mean knowledge in the Multimedia, Booklet and control groups

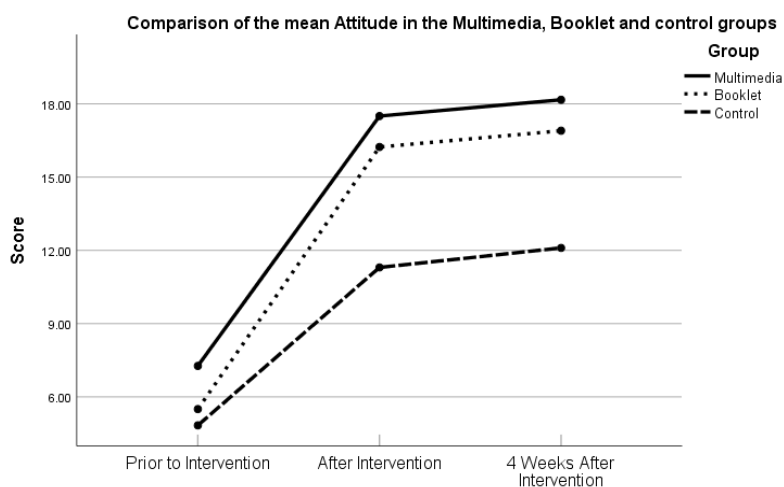
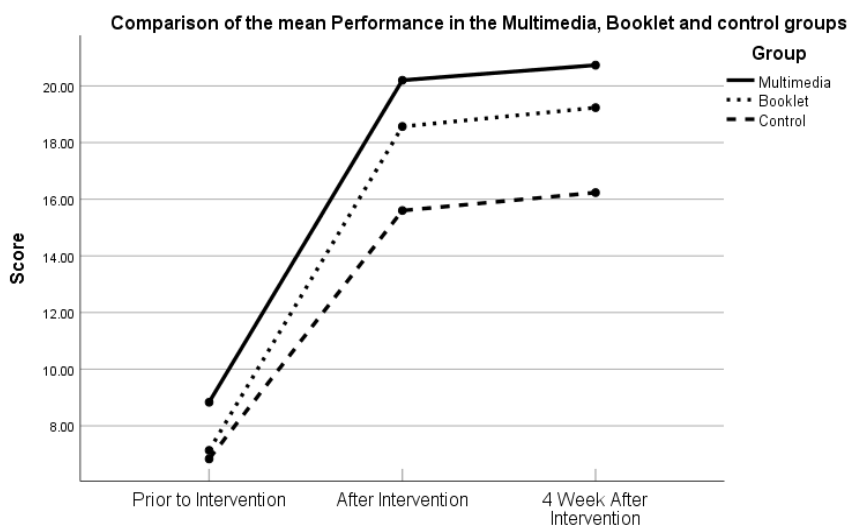


Figure 2. Attitude comparison of the mean Attitude in the Multimedia, Booklet and control groups

According to Repeated Measure test, the mean score of Performance increased in the Multimedia,

Booklet and Control groups from the prior to fourth weeks after intervention ( $P < 0.001$ ). (Figure3).



**Figure 3.** Performance comparison of the mean performance in Multimedia, Booklet and control groups

## 5. Discussion

The results showed a significant difference between the mean score of knowledge, attitude, and performance of the multimedia and booklet groups before and after the intervention, while there was no statistically significant difference between the mean scores of knowledges, attitude, and performance of the control group before and after the intervention.

In this regard, the results of the study of Froehlich et al. (2013) showed that education increases and improves performance. Moreover, increasing the information and knowledge of participants in training courses, along with strengthening the motivation of mothers to continue breastfeeding despite the problems, is effective (15).

Zangiabadizade et al. (2017), in a study entitled "Comparing the effects of role-playing and multimedia-based teaching methods on hry student's knowledge and attitude towards vaginal delivery," found that there was a statistically significant difference between the mean score of knowledge and attitude of the two groups immediately after education courses and this mean was higher in the multimedia education group, suggesting that multimedia method should be used if there is a need to quickly increase knowledge and create a positive attitude (16). Moreover, Mazani et al. (2012) stated that Both face-to-face and non-face-to-face training were effective in increasing mothers' Knowledge and children's anthropometric changes (17).

Rajabi Naeeni et al. (2015), in a study entitled "A Comparative Study of the Effectiveness of Multimedia

Software and Face-to-Face Education methods on Pregnant Women's Knowledge about Danger Signs in Pregnancy and Postpartum," showed a statistically significant difference in the level of knowledge in each group before and after the intervention. As a result, multimedia and face-to-face educational methods have been equally effective in raising pregnant mothers' knowledge of dangerous symptoms. Also, it seems that the use of the software will be an excellent alternative to face-to-face training due to the time constraints of health center staff (7). Bich et al. (2014), who trained couples in routine postpartum visits to health centers, found that the performance of the intervention group in breastfeeding infants at 4-6 months of age was better than the control group (18). There was a significant difference between mothers' knowledge, attitude, and performance scores in the control and intervention groups. Moreover, the scores of attitude, performance, and knowledge in the intervention group were higher than in the control group. According to the results of Sharifi Rad et al. (2010), education and educational intervention during pregnancy have a significant positive effect on breastfeeding behavior (19).

The average scores of knowledge, attitude, and performance in the multimedia method were much higher than the Booklet approach (Figure 1); therefore, it can be said that the effect of multimedia education is to improve and enhance the level of awareness. In Karimi et al. study (2022), The intervention group received self-care training program in physical, psychological, social and sexual



dimensions in 5 sessions during a week. The control group also had 5 sessions exactly the same as the intervention group, except that they received only routine care and training. Data were collected pre- and post-intervention using Menopause Symptoms' Severity Inventory (MSSI-38) questionnaire and the Revised Dyadic Adjustment Scale (RDAS) questionnaire. The findings indicate that self-care training has a positive effect on the severity of menopause symptoms and also improves marital satisfaction in postmenopausal women (20). The results of Sardari et al.'s study showed that the performance of nurses is not favorable in preventing pressure ulcers and the pressure ulcer care training program can improve their performance in this field. Therefore, it is recommended to use these training methods to improve the clinical performance of nurses (21). However, Hosseini et al. showed that booklet-based education had no effect on awareness and stated that the reason for this ineffectiveness is that people do not read the booklet (22). The results of the Khormemkan study showed that the use of an electronic education approach based on a web application, leveled, personalized and based on the needs of nurses, has led to the improvement of the knowledge of operating room nurses. Also, operating room nurses were happy to hold electronic training courses. E-learning can be used as a complementary educational tool and method for continuous training of operating room nurses in other specialized fields of operating room and surgery (23). In the multimedia method, oral information in addition to the written form with animation can be provided to people at home, travel, or whenever needed and can be printed if needed. Moreover, the ability to adjust the training of working mothers with their work schedule is another advantage of this method. It is noteworthy that using a computer, low-speed internet, and not accessing many educational materials are among the limitations of multimedia training. On the other hand, the multimedia method can serve as an important source of health information for those not accustomed to reading books and articles. Although the learning criterion is the score obtained from the test in all studies, the multimedia method leads to deeper learning because learners are responsible for their learning in this method (24),(25).

In a study in China, Minghe Zhou et al. (2020) on knowledge, attitude, and performance about COVID-19 among health staff in Hunan, China, found that knowledge and performance were above 80%, and a recent study showed that some other risk factors such as work experience, job category, workloads, and educational level could affect employees' attitudes and performance (26).

In a study by Simbar et al. (2011) on the educational needs for male participation in perinatal

care, 95% of participants agreed with perinatal care training for men, especially with maternal nutrition content and perinatal risk symptoms (27).

Huynh Giao et al. (2020), in a study in China entitled "Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City," found that health care providers had a positive level of knowledge and attitude. However, this level of knowledge and attitude to care for COVID-19 was lower than expected, and there was a significant relationship between knowledge and attitude scores (13).

According to a Chinese study, depression in pregnant women increased during the COVID-19 pandemic. On the other hand, as pregnant mothers require further emotional support, they may lose this support due to the restrictions imposed due to the COVID-19 pandemic because of the reduced communication with their relatives. In some cases, pregnant women may be incapable of visiting a specialist to monitor their condition and fetus for fear of developing the COVID-19 pandemic. Even in some cases, some pregnant mothers demand termination of pregnancy and elective cesarean section due to excessive worries and anxiety. Therefore, health staff, as one of the specialists and the leading actors related to pregnant women, after training and explaining the necessary points, should inform and advise mothers about the existing concerns and risks in these cases, which is also a requirement for staff itself to receive the required education (28).

#### *Limitations and Future Directions*

The random design of the present study is a strength; however, additional limitations need to be considered. The results should be repeated on physicians, nurses, midwives, and other health professionals. Future studies may require more than three months of follow-up to determine if results increase or decrease over time.

## **6. Conclusion**

Teaching by multimedia increase score the knowledge, attitude and performance among health care providers in community health centers related to COVID-19 in women during pregnancy, childbirth, and breastfeeding; therefore, it is recommended to has use new educational methods such as multimedia to promote the knowledge, attitude and performance among health care providers.

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## Footnotes

**Conflicts of Interest:** The authors declare that there is no potential conflict of interest regarding the research, authorship, and/or publication of this article.

**Author Contribution:** B.A. and N.K. and R.R. and R.R. Study concept and design, B.A. and R. R. AND R. R. drafting of the manuscript, B.A. and R.R. critical revision of the manuscript for important intellectual content, B.A. and N.K. reviewed the statistical methods and sample size calculations.

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All the experimental protocols for involving humans were in accordance to guidelines of national/institutional in the manuscript. All participant information was kept in a personal folder.

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