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The Effect of WhatsApp-Based and Conventional Education Methods on Sexual Myths and Sexual Health Knowledge: A Comparative Intervention Study in Midwifery Students

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ABSTRACT

Objective: To investigate the effects of sexual education provided via WhatsApp on the level of sexual knowledge and sexual myths in midwifery students in Turkey. **Methods:** Students were randomly divided into WhatsApp education, conventional education, and control groups. Data were collected using a Questionnaire Form, the Sexual Health Knowledge Test, and the Sexual Myth Scale. **Results:** Post-education and one-month-follow-up the Sexual Health Knowledge Test medians in the control group (24.0 and 27.0 respectively) were significantly lower than those of the WhatsApp (31.0 and 32.5 respectively) and conventional education groups (30.5 and 32.0 respectively) and Sexual Myth Scale medians in the control group (70.0 and 67.0 respectively) were significantly higher than those of the WhatsApp (55.5 and 60.0) and conventional education groups (53.0 and 55.0, respectively) ($p < .001$). There was no difference between WhatsApp and conventional education groups in terms of the Sexual Health Knowledge Test and Sexual Myth Scale scores ($p > 0.05$). **Conclusion:** Sexual education provided by conventional methods and via WhatsApp increased sexual health knowledge and decreased sexual myths.

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KEYWORDS

Sexual education; sexual health; sexual myths; WhatsApp-based

Introduction

Sexuality is an important part of human life from birth to death, and it is an important indicator of health status (Bates, 2011; World Health Organization [WHO], 2005). Despite the importance of sexuality in people's lives, the topic still remains overlooked, secret, and even shameful in many contexts (Bozdemir & Ozcan, 2011; Civil & Yildiz, 2010). Due to the fact that sexuality and issues related to sexuality are regarded in the context of shame, sin, and prohibition in Turkish society, sexual issues are not sufficiently addressed in the family, in society, and in schools (Bozdemir & Ozcan, 2011; Civil & Yildiz, 2010; Yucesan & Alkaya, 2018). In Turkey, sexual health education is not included as a separate subject in primary and secondary school national curricula, and in the university, it is limited to the curriculum of only health sciences (departments such as medicine, nursing, midwifery).

Therefore, in Turkey, families should be informed about the sexual education to be given to children and sexual education should start in the family. In addition, this education that starts in the family should continue at school age, and sexual the subject of health education and topics related to this subjects need to be incorporated into formal education curricula from elementary school to high school (Ozturk & Esen, 2020; Yucesan & Alkaya, 2018).

During pre-university and university education in Turkey, individuals are not provided sufficient formal sex education, and thus, sexuality-related information cannot be transmitted to young people, which leads to the development of sexual myths (Bozdemir & Ozcan, 2011; Ejder Apay et al., 2013). Sexual myths are exaggerated and false beliefs about sexuality that are not linked to real scientific data, spread by individuals passing on hearsay information, and shaped by the

imagination of society (Torun et al., 2011). Some of the most common sexual myths and sexual prejudices in Turkey include homosexuality is a disease and disrupts the structure of society; women are helpless and powerless individuals; every stage of sexual intercourse is under man's control; all men are born with good love-making skills; sexuality is instinctive and cannot be learned later; menopause completely eliminates sexual desire; masturbation causes physical and psychological illnesses; and, the woman in a short skirt deserves rape (Ejder Apay et al., 2013; Golbasi et al., 2016). In young people sexual myths cause sexual function disorders, sexual identity development problems, and decreased quality of sexual life (Beckwith et al., 2009; Ejder Apay et al., 2013; Golbasi et al., 2016).

Midwives, one of the professions providing health education, are essential in demystifying sexual myths and providing appropriate and true sexual knowledge to young people, women and families. In a study, it was reported that while females in Turkey are uninformed regarding sexual matters and males are misinformed (Sexual Education & Treatment & Research Association, 2006). In our society, while boys are raised free in terms of sexuality and have more privileges compared to women, girls are often under pressure/control and are raised by sexual pressures, involving more conservative, traditional role expectations and the prohibition of sexual intercourse before marriage (virginity). For this reason, it is more troublesome for young girls and women to get information about sexuality than men (Civil & Yildiz, 2010). Sexuality-related knowledge level of health professionals working in the field of obstetrics and gynecology is important in increasing women's sexual knowledge and solving their sexuality-related problems. In studies with obstetricians and gynecologists, it was found that most of them did not take the sexual history of the pregnant patients (Vieira et al., 2015); they did not feel confident/felt inadequate to answer questions about sexuality (Pancholy et al., 2011; Vieira et al., 2015); they attribute these difficulties to lack of knowledge (Vieira et al., 2015); nearly half of them find after graduation that the training they received to manage sexual problems was

inadequate (Worly et al., 2018), and they need additional training (Vieira et al., 2015). One of the healthcare professionals serving in the field of obstetrics and gynecology and having the opportunity to reach large populations is midwives. Therefore, it is important for midwives to have sufficient sexual health knowledge.

Midwifery students' negative beliefs and attitudes toward a medical issue are expected to transform in time during vocational education. Aker and Böke (2016) reported that various health professionals in Turkey have various sexual misconceptions, and that debunking of these misconceptions is possible through education. Therefore, it is essential to educate student midwives regarding sexuality/sexual health to improve individuals' sexual health. Formal education is one of the ways to increase student midwives' knowledge levels and transform their attitudes.

It can integrate up-to-date technologies into the sexual health education program in the easiest, fastest, and most effective way to meet the needs of midwifery students. In order to meet the needs of midwifery students, current technologies can be integrated into sexual health education programs in the easiest, fastest, and most effective way. In this sense, some applications on smart phones (like social networking sites, WhatsApp, etc.), which have been getting increasingly popular among people and are an integral part of social life introduce a new form of teaching by allowing students and teachers share information online with ease; students access educational materials easily with greater flexibility via these tools; teachers communicate with students remotely and independent of time and space constraints; and, they also motivate students (Callaghan & Bower, 2012; Cetinkaya, 2017; Gasaymeh, 2017; Schroeder & Greenbowe, 2009; Wang et al., 2012). One of the message applications that are free, easy-to-use, fast, and quite common among university students is WhatsApp (Ahad & Lim, 2014, Gasaymeh, 2017; Yeboah & Ewur, 2014). Studies have shown that WhatsApp can be used effectively in attaining various aims, creating fast connections, and maintaining coordination in higher education (Gachago et al., 2015; Gasaymeh, 2017; Rambe &

Chipunza, 2013). The use of WhatsApp in education does not require any additional specific infrastructure. Virtually all university students own the hardware, i.e., smartphone, and can download WhatsApp at no cost (Gasaymeh, 2017). Therefore, WhatsApp is one of the most suitable programs that can be included in educational processes.

In the field of health education, several programs, such as WhatsApp, have been integrated into teaching and learning, and several studies have been conducted to evaluate their effects (Devi & Tevera, 2014; Mohanakrishnan et al., 2017; Ventola, 2014; Willemse, 2015). Even though there exist studies in the literature investigating the use of WhatsApp in teaching and learning, to the best of our knowledge, there exists no study in the literature investigating the status of sexual knowledge and sexual myths of students following a sexual education program. For this reason, integration of applications such as WhatsApp in sexual health education methods in a way that appeals to midwifery student, and evaluating its results can bring a new dimension to education models and make an important contribution to literature. The present study aimed to evaluate the effects of sexual education provided via WhatsApp and the conventional method on the level of sexual knowledge and sexual myths in midwifery students.

Hypotheses

H1: The mean Sexual Health Knowledge Test score of the midwifery students receiving WhatsApp education and conventional education would be statistically higher than that of controls.

H2: The mean Sexual Myth Scale score of the midwifery students receiving WhatsApp education and conventional education would be statistically lower than that of controls.

Materials and methods

Study design and participants

The study design was a randomized controlled intervention. The participants consisted of second year students attending the midwifery department at a university in the city of Konya

in 2018–2019. The reason for the selection of 2nd-year students was that because they were over the age of 18 years and they had not received any formal sexual education based on the school curriculum.

The study included students over the age of 18 years, those who had not received any education regarding sexuality or sexual health, and those who volunteered to participate in the study. All students were asked if they had received a formal sexual health education before starting the study and before they were given questionnaires. None of the students had any previous sexual health education. For this reason, all midwifery 2nd grade students were included in the sample.

G-power package version 3.1.9.2 was used to determine the sample size. Prior and post-hoc power analysis were both performed based on a fixed effect ANOVA test. Expected Cohens' f value for the effect size was 0.25, which is considered a medium effect size. For a 0.25 effect size with a 0.05 type I error and 80% power minimum required, an estimated total sample size was 108. There were 112 students enrolled in the second-year midwifery section during the relevant period. Even though there were 112 students at the 2nd year registered in 2018–2019, two students were not attending school and one student refused to participate in the study; therefore, 109 students were eventually included and randomized in the study. Using a random number table, the researcher randomly assigned each participant to one of three groups: WhatsApp education group ($n=36$), conventional education group ($n=37$), and control group ($n=36$). At some points of the study period, 4 participants from WhatsApp education group (2 transferred to another university, one dropped out of university, one withdrew from the study), 2 participants from conventional education group (2 withdrew from the study), and 5 participants from control group quit (3 transferred to another university, 2 withdrew from the study). Therefore, the study was completed with a total of 98 participants (Figure 1).

Post-hoc power analysis was performed to a fixed effect ANOVA test the adequacy of the sample number at the end of the study. The

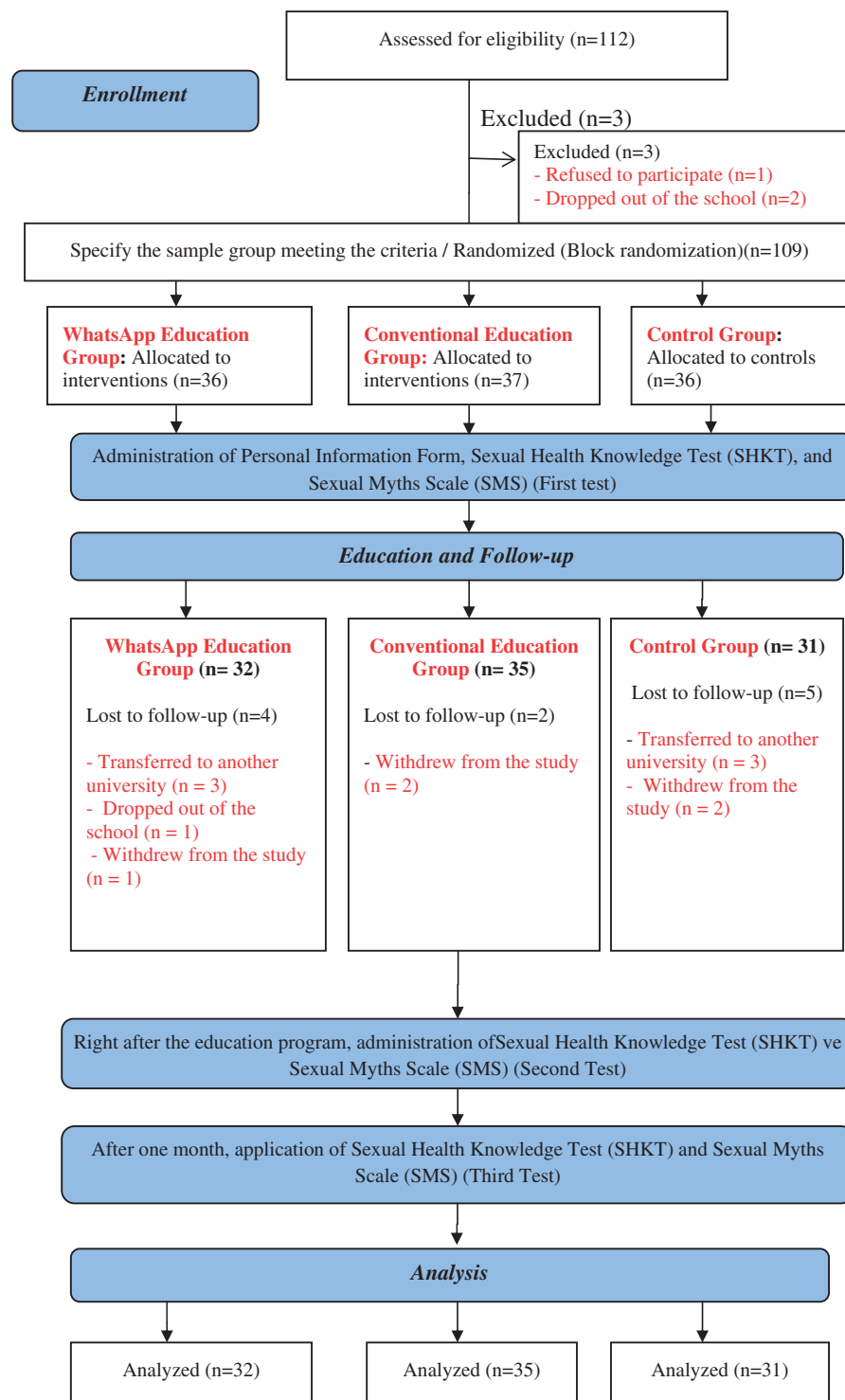


Figure 1. Flow diagram of the study.

power of the study was calculated as 0.95 based on 98 participants and the post-hoc power analysis of the results of the 1-month-follow-up Sexual Health Information Test. Post-hoc effect size of the study was calculated as 0.46 and post-hoc power as 99%.

Measurements

Data were collected using a Personal Information Form, the Sexual Health Knowledge Test, and the Sexual Myth Scale. Following the random assignment of the students to the groups, data collection was completed using these three tools.

Participants in both WhatsApp education group and conventional education group received education. Immediately after the completion of the educational programs and 1 month later, the Sexual Health Knowledge Test and the Sexual Myth Scale were administered in all groups (Figure 1). In a similar study in the literature, the effectiveness of the education was reevaluated 3 weeks later (Chi et al., 2015). Based on this, it was reevaluated after 1 month whether the education activity was continuing. The data were collected by the researchers face to face.

Personal information form

The form was developed by the authors based on the relevant literature (Bailey et al., 2015; Golbasi et al., 2016; Ogur et al., 2016; Rahimi-Naghani et al., 2016; Wang et al., 2015). This questionnaire included 20 items inquiring about the socio-demographic characteristics of the participants (age, place of living, income level, parents' educational status) and some information about their sexuality (sexual experience status, the person with whom it is easy to talk about sexuality, having received sexual education, having sufficient sexual knowledge, opinion about providing counseling about sexual health on campus, approving premarital sex, seeing sexuality as an important factor in romantic relationships).

The sexual health knowledge test

The Sexual Health Knowledge Test was developed by Evcili and Golbasi in 2017 for individuals to self-report about their knowledge of sexuality and sexual health-related issues. It was used in the present study to identify the participants' sexual knowledge level before the administration of the educational programs. It was also used after the programs to observe the effects of the educational programs on the participants' sexual health knowledge levels. The Cronbach's alpha coefficient of the Sexual Health Knowledge Test was reported as .88 (Evcili & Golbasi, 2017). In the present study, the Cronbach's alpha coefficients were found as .68, .79, and .82 for the first, second, and third measurements, respectively. The test includes 40 multiple-choice questions. Table 1 presents the distribution of the numbers of questions according to subjects in the Sexual

Table 1. Distribution of the Numbers of Questions According to Subjects in Sexual Health Knowledge Test.

Subject	The numbers of questions
Basic concepts of sexual health/reproductive health	1 question
Sexuality-related universal values	1 question
Development of sexual identity	4 questions
Sexual orientation	3 questions
Sex-gender	3 questions
Anatomy of the reproductive system	3 questions
Sexual intercourse/sexual satisfaction	4 questions
Physiology of reproduction	3 questions
Family planning	6 questions
Sexually transmitted diseases (stds)	7 questions
Sexual violence	3 questions
Safe sexual behaviors	2 questions
Total questions	40 questions

Health Knowledge Test. In the scoring of the test, the right answer receives 1 point and wrong/blank answers receive 0. Higher total scores indicate higher levels of sexual health knowledge.

Sexual myths scale

The Sexual Myth Scale was developed by Golbasi et al. (2016) to identify sexual myths. Cronbach's alpha coefficient was calculated as .91 by Golbasi et al. (2016). On the other hand, in the present study, the Cronbach's alpha coefficients were found to be .84, .93, and .93 for the first, second, and third measurements, respectively. The scale included 28 items (homosexuality should be treated; housework is a women's task; to have a satisfactory sex life, one must be young; women's appearance/clothing may cause the emergence of sexual violence; sex life ends with aging, etc.). Each item was rated using a 5-point Likert type scale: "strongly agree (5 points)", "agree (4 points)", "undecided (3 points)", "disagree (2 points)", and "strongly disagree (1 point)". The lowest and highest possible scores to be obtained from the scale were 28 and 140, respectively. It is considered that the higher the score is, the higher the possibility of having sexual myths is.

Theoretical education program

A comprehensive sexual health education program should provide sufficient information on the reproductive system, growth and development, family life, reproductive physiology, parenting, family planning, sexual abuse, and

Table 2. Theoretical Education Program.

Sessions	Subjects	Time
Week 1	Basic concepts of sexuality Sexual health What is sexual health? Sexual health and sexual myths Sexual health in puberty/adolescence Risky sexual behaviors Safe sexual behaviors Decision-making skills Reproductive health and reproductive rights Sexuality-related universal values Creating values Sexuality-related universal values Development of sexual identity Sexual identity Theories of sexual identity development Sexual identity disorder Diagnosis criteria for sexual identity disorder complaints	(360 min)
Week 2	Sexual orientation What is sexual orientation? Sexual orientation types Sexual orientation indicators Sexual orientation: myths and facts Gender What is gender? Importance of the concept of gender Gender: myths and facts Anatomy of the reproductive system Anatomy of the female reproductive system Anatomy of the male reproductive system sexual response cycle	(360 min)
Week 3	Physiology of reproduction Family planning Sexually transmitted diseases (stds)	(360 min)
Week 4	Sexual violence What is sexual violence? Signs of sexual violence in a victim Things to do to prevent sexual violence. Sexual violence crimes and laws Sexual violence: myths and facts Safe sexual behaviors Risky sexual behaviors Safe sexual behaviors Decision-making skills	(360 min)

sexually transmitted infections (Cinsel Eğitim Tedavi ve Araştırma Derneği [CETAD], 2007; Yucesan & Alkaya, 2018). The basic principles of sexual health education should be prepared in accordance with the age, development, social and cultural structure of the individual, and should include issues related to interpersonal relations, sexual behavior, sexual health, society, and culture. In addition, the program should focus on reducing risky sexual behaviors and address community pressures related to sexuality (CETAD, 2007; Lederman et al., 2008; Ozturk & Siyez, 2015; Talib et al., 2012). In this study, the researchers prepared an education program by considering the above-mentioned principles and previous studies on sexual health education (Table 2; Bozdemir & Ozcan, 2011; CETAD, 2007; Evcili & Golbasi, 2017; Karabulutlu et al.,

2011; Ozsoy & Bulut, 2017; Ozturk & Esen, 2020; Yazici et al., 2012; Yucesan & Alkaya, 2018). In this study, the following elements were aimed with sexual health education in young people: having knowledge about the body and having positive feelings, accepting individual differences, speaking and expressing oneself comfortably about sexual issues, distinguishing between appropriate and inappropriate sexual behaviors, the awareness of sexual prejudices and myths they already possess, learning about sexual rights, the awareness of the concept of gender in society and society's oppression of sexuality, self-protection against harassment and abuse, and developing safe sexual behavior. Regarding the content of the programs, 3 experts in sexuality and sexual health education provided consultation. The content of education is shown in Table 2.

Procedure

Conventional education group

Students in this group received education on sexuality and sexual health knowledge. The content of education is shown in Table 1. Students were given face-to-face education in a classroom. In conventional education, sexual health education was performed by lectures using slide presentations. The program was enriched with related visuals. At the end of the program, the participants' questions were answered. The education programs were held for four weeks, six hours a week, with a total of 24 sessions.

The follow-up of the students attending each session throughout the education period was checked with an absentee chart. Students who did not participate in the weekly education were identified, and face-to-face education was given to them at a time suitable for both the researchers and the students.

WhatsApp education group

All of the learning objectives were designed the same as the conventional method, and only the teaching mode was different. Students in this group received an education program involving the same content with the conventional education program via WhatsApp. These students were not offered any face-to-face education. A WhatsApp group was created where the researchers were the admins. Then, those who were selected for this group were invited to join the WhatsApp group. Only those who were invited were able to join the group. After the education program was started, no newcomers were allowed to participate. All sessions were completed online via WhatsApp. A learning environment in which interactions among peers and the research were encouraged via WhatsApp was created. The slide files prepared for the conventional education were converted to PDF and MS word documents and sent to the students in the WhatsApp education group over WhatsApp for 4 weeks. Each time, after sending a part of the content to the students, the authors answered the students' questions again via WhatsApp. Furthermore, the student held discussions amongst themselves.

Whether the students in the WhatsApp education group participated in the sessions or not was tracked with the "message read" indicator of the WhatsApp application. Students who did not read the messages during WhatsApp education were reminded of the education and the students were invited to the education sessions again. Thus, maximum effort was made for the full participation of all students in both conventional and WhatsApp education groups.

The control group

Students in this group did not receive any sexuality or sexual health education. In order to encourage the control group to participate in the study, they were informed about the scientific importance and contributions of the study. They were informed that if they participate in the study, they will be given free sexual health education at the end of the study if they wish, and the resources used in the education will be shared with them free of charge.

Data analysis

Data analyses were conducted with SPSS Windows 24.0. All analyses were made based on a 95% confidence level and 5% type-1 error. To identify the sociodemographic characteristics of the participants, numbers, percentages, means, and standard deviations were used. The Shapiro Wilk Test, Chi-square, Kruskal Wallis, and the Dunn-Bonferroni multiple comparison tests, the Friedman test, and Spearman correlation were utilized in data analyses. In the analyzes with significant differences, eta-square (η^2) effect size coefficients were calculated. Effect sizes were evaluated according to Cohen's (1988) effect size classification.

Ethical approval

Before the study, institutional (#74019718-044/31686) and ethics committee (IRB: 2018/111) approvals were obtained, and the participants were informed about the study and their written consents were obtained. The consent form includes information that the participants can voluntarily participate in the study without any

Table 3. Sociodemographic Characteristics of the Participants by Group ($n = 98$).

Socio-demographic and obstetric characteristics	WhatsApp education group ($n = 32$) n (%)	Conventional education group ($n = 35$) n (%)	Control group ($n = 31$) n (%)	Total n (%)	Chi-square p -value p
Place of living					
Village	6 (18.8)	3 (8.6)	5 (16.1)	14 (14.3)	0.830
Town	7 (21.9)	12 (34.3)	7 (22.6)	26 (26.5)	
City	12 (37.5)	14 (40.0)	13 (41.9)	39 (39.8)	
Metropolis	7 (21.9)	6 (17.1)	6 (19.4)	19 (19.4)	
Income level					–
Low	0 (0.0)	0 (0.0)	1 (3.2)	1 (1.0)	0.384
Middle	32 (100.0)	35 (100.0)	30 (96.8)	97 (99.0)	
Mother's education status					0.051
Primary education	23 (71.9)	23 (65.7)	19 (61.3)	65 (66.4)	
Middle school	5 (15.6)	10 (28.6)	6 (19.4)	21 (21.4)	
High school or uni.	4 (12.5)	2 (5.7)	6 (19.4)	12 (12.2)	0.614
Father's education status					
Primary education	20 (62.5)	18 (51.4)	9 (29.0)	47 (48.0)	
Middle school	3 (9.4)	9 (25.7)	8 (25.8)	20 (20.4)	0.713
High school or uni.	9 (28.1)	8 (22.9)	14 (45.2)	31 (31.6)	
Sexual knowledge					0.325
Sufficient	14 (43.8)	12 (34.3)	14 (45.2)	40 (40.8)	
Not sufficient	18 (56.2)	23 (65.7)	17 (54.8)	58 (59.2)	0.964
The person whose sexuality is easy to talk about					
Mother	14 (43.7)	21 (60.0)	16 (51.6)	51 (52.0)	
Sisters/friends	12 (37.5)	8 (22.9)	10 (32.3)	30 (30.6)	0.713
None	6 (18.8)	6 (17.1)	5 (16.1)	17 (17.3)	
Sexual health-related counseling services on campus					0.325
Necessary/should be	29 (90.6)	27 (77.1)	25 (80.6)	81 (82.7)	
Unnecessary/ shouldn't be	3 (9.4)	8 (22.9)	6 (19.4)	17 (17.3)	–
Premarital sex					
Approved	3 (9.7)	0 (0.0)	1 (3.1)	4 (4.1)	0.964
Not approved	28 (90.3)	35 (100.0)	31 (96.9)	94 (95.9)	
Is romantic relationship important in sexuality?					0.964
Important	22 (68.8)	23 (65.7)	21 (67.7)	66 (67.3)	
Nonimportant	10 (31.3)	12 (34.3)	10 (32.3)	32 (32.7)	0.964
Sexual experience					
No	32 (100.0)	35 (100.0)	31(100.0)	98 (100.0)	

pressure or coercion, have rights to refuse to participate in the study and quit the study at any time. The participation or refusal of the study will never affect the educational process because it is not a part of education. There are no conflicts of interest. No funding source was utilized. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Results

Participant characteristics

The mean age of the students was 19.24 ± 1.140 years (min = 18, max = 25). The place of the longest residence was province (39.8%) and 99% were on a medium economic level. Mothers of the 66.4% and fathers of 48% had an educational level of primary school or below. All these outcomes were similarly distributed among the groups ($p > .05$). None of the

students had received any formal sexuality education before. It was found that 59.2% of the students did not think that they had sufficient sexual knowledge. Regarding sexuality-related subjects, 52% of the students stated that they could easily talk to their mothers and 17.3% stated that they could not talk to anybody, and 82.7% stated that sexual health-related counseling services should be provided on campus. Almost all students (95.9%) disapproved of premarital sex, 67.3% considered sexuality as an important factor in romantic relationships, and none of them had a sexual experience (Table 3).

Scores of groups for the sexual health knowledge test, and sexual myths scale

Differences among groups in terms of these variables were insignificant ($p > .05$). At the first measurement before educations, the Sexual Health Knowledge Test median was 23.5 (min = 9, max = 35) and the Sexual Myth Scale median

Table 4. Comparison of Median Sexual Health Knowledge Test Scores between Whatsapp Education Group, Conventional Education Group, and Control Group ($n = 98$).

Variables	WhatsApp education group ($n = 32$) (a) Median (Minimum–Maximum)	Conventional education group ($n = 35$) (b) Median (Minimum–Maximum)	Control group ($n = 31$) (c) Median (Minimum–Maximum)	Chi-square	p^a	η^2	Statistical difference
Sexual health knowledge test 1 (A)	24.5 (17–33)	24.0 (14–31)	22.0 (9–35)	4.297	.117	.045	
Sexual health Knowledge test 2 (B)	31.0 (22–38)	30.5 (21–36)	24.0 (11–36)	24.479	.001	.249	(a-c; b-c)
Sexual Health Knowledge test 3 (C)	32.5 (18–37)	32.0 (22–36)	27.0 (12–36)	18.912	.001	.192	(a-c; b-c)
Chi-square	42.934	44.481	17.136				
p^b	.001	.001	.001				
Statistical difference	(A-B; A-C; B-C)	(A-B; A-C)	(A-B; A-C; B-C)				

Note. Sexual Health Knowledge Test 1 = Pre-education, Sexual Health Knowledge Test 2 = Post-education, Sexual Health Knowledge Test 3 = 1 month after education.

^aKruskal Wallis Test was performed.

^bFriedman Test was performed.

was 70.0 (Min = 30, max = 138). Pre-education Sexual Health Knowledge Test medians by groups were: WhatsApp education group = 24.5 (17–33), conventional education group = 24.0 (14–31), and control group = 22.0 (9–35) ($p > .05$). The effect size of the pre-education Sexual Health Knowledge Test scores is $\eta^2 = .045$. This eta-squared value indicates a small effect size. According to the calculated eta square effect size coefficient, it can be said that 4.5% of the observed variance of pre-education Sexual Health Knowledge Test scores depends on the group variable.

Post-education Sexual Health Knowledge Test medians by groups were: WhatsApp education group = 31.0 (22–38), conventional education group = 30.5 (21–36), and control group = 24.0 (11–36), where differences between groups were significant ($p < .001$). The effect size of the post-education Sexual Health Knowledge Test scores is $\eta^2 = .249$. This eta-squared value indicates a large effect size. According to the calculated eta square effect size coefficient, it can be said that 24.9% of the observed variance of post-education Sexual Health Knowledge Test scores depends on the group variable.

One-month-follow-up Sexual Health Knowledge Test medians by groups were: WhatsApp education group = 32.5 (18–37), WhatsApp education group = 32.0 (22–36), and control group = 27.0 (12–36), where differences between groups were also significant ($p < .001$). In-group comparisons showed that scores increased after the first measurement and the differences were statistically significant ($p < .001$)

(Table 4). The effect size of the one-month-follow-up Sexual Health Knowledge Test scores is $\eta^2 = .192$. This eta-squared value indicates a large effect size. According to the calculated eta square effect size coefficient, it can be said that 19.2% of the observed variance of the one-month-follow-up Sexual Health Knowledge Test scores depends on the group variable.

Pre-education Sexual Myth Scale medians by groups were: WhatsApp education group = 68.5 (46–100), conventional education group = 68.0 (51–104), and control group = 75.0 (36–98) ($p > .05$). The effect size of the pre-education Sexual Myth Scale Test scores is $\eta^2 = .003$. This eta-squared value indicates a small effect size. According to the calculated eta square effect size coefficient, it can be said that 3% of the observed variance of pre-education Sexual Myth Scale Test scores depends on the group variable.

Post-education Sexual Myth Scale medians of the WhatsApp education group (55.5; min = 30–max = 138) and conventional education group (53.0; min = 34 – max = 105) were lower than that of the control group (70.0; min = 36 – max = 99), which was statistically significant ($p < .001$). The effect size of the post-education Sexual Myth Scale Test scores is $\eta^2 = .127$. This eta-squared value indicates a large effect size. According to the calculated eta square effect size coefficient, it can be said that 12.7% of the observed variance of the post-education Sexual Myth Scale scores depends on the group variable.

One-month-follow-up Sexual Myth Scale medians were WhatsApp education group = 60.0

Table 5. Comparison of Median Sexual Myths Scale Scores between Whatsapp Education Group, Conventional Education Group, and Control Group ($n = 98$).

Variables	WhatsApp education group ($n = 32$) (a) Median (Minimum–Maximum)	Conventional education group ($n = 35$) (b) Median (Minimum–Maximum)	Control group ($n = 31$) (c) Median (Minimum–Maximum)	F	p^a	η^2	Statistical Difference
Sexual Myth Scale 1 (A)	68.5 (46–100)	68.0 (51–104)	75.0 (36–98)	.024	.977	.003	–
Sexual Myth Scale 2 (B)	55.5 (30–138)	53.0 (34–105)	70.0 (36–99)	4.001	.002	.127	(a-c; b-c)
Sexual Myth Scale 3 (C)	60.0 (28–84)	55.0 (28–124)	67.0 (28–94)	39.40	.028	.073	(a-c; b-c)
F	8.437	13.892	3.688				
p^b	.001	.001	.094				
Statistical Difference	(A-B; A-C)	(A-B; A-C)					

Note. Sexual Myth Scale 1= Pre-education, Sexual Myth Scale 2= Post-education, Sexual Myth Scale 3 = 1 month after education.

^aKruskal Wallis Test was performed.

^bFriedman Test was performed.

Table 6. The Relationship between Sexual Health Knowledge Test and Sexual Myth Scale Medians ($n = 98$).

	Sexual Myth Scale 1	Sexual Myth Scale 2	Sexual Myth Scale 3
Sexual Health Knowledge Test 1			
r	-.314**	-.277**	-.195
p	.002	.006	.054
Sexual Health Knowledge Test 2			
r	-.269**	-.476**	-.450**
p	.008	.000	.000
Sexual Health Knowledge Test 3			
r	-.278**	-.470**	-.419**
p	.006	.000	.000

Note. Spearman correlation was performed.

** $p < 0.05$ is statistically significance value.

(28–84), conventional education group = 55.0 (28–124), and control group = 67.0 (28–94), indicating statistically significant differences between groups ($p < .001$). In-group comparisons showed that scores decreased in WhatsApp education group and conventional education group after the first measurement and the difference was statistically significant ($p < .001$) (Table 5). The effect size of the one-month-follow-up Sexual Myth Scale Test scores is $\eta^2 = .073$. This eta-squared value indicates a medium effect size. According to the calculated eta square effect size coefficient, it can be said that 7% of the observed variance of the one-month-follow-up Sexual Myth Scale scores depends on the group variable. There was a negative significant correlation between Sexual Health Knowledge Test and Sexual Myth Scale scores among the first ($r = -.314$; $p = .02$), second ($r = -.476$; $p < .001$), and third measurements ($r = -.419$; $p < .001$), indicating that as the sexual health knowledge increases; sexual myths decrease (Table 6).

Discussion

In the present study, none of the students had received any formal sexuality education before. Sex education is not part of the curricula in Turkey and legitimate resources for sex-related information such as school, teachers, specialists, and books are not utilized sufficiently in Turkey, and both cause a severe information gap (Sexual Education, Treatment and Research Association, 2006). Sexuality in Turkey, as in many other countries, has been a subject that is difficult to talk about. While sexual education should start in the family, parents do not have enough information about it. In addition, it is a taboo to talk about sexual issues in the family due to social and cultural factors. In our country, sexual information generally starts in adolescence and there is no formal sexual education program for adolescents (Tekgül et al., 2014). Generally, sources such as friends, television, magazines, and the Internet are the source of sexual information that starts in adolescence (Ogur et al., 2016). These

sources, which present largely incomplete information, or even worse, misinformation, contribute to the general acceptance of prejudices and myths about sexuality. In a study by Drago et al. (2016), 37% of the students stated that the source of information about sex education should be families and teachers. However, they also reported that only 9% received sexual education at schools (Drago et al., 2016). In a study by Topkaya and Hatipoglu-Sumer (2016), the students in their study stated the top two information resources for sexual education as their mothers and friends. In the same study, they maintained that it is an expected outcome for female participants to share information with their mothers regarding sexual subjects. In the present study, half of the students stated that they talked to their mothers regarding sexual issues and about one fifth stated that they could not talk to anybody. Karabulutlu et al. (2011) reported that 50.8% of their participants talked to their mothers regarding sexual health issues, and the health of reproductive organs was the most common topic they discussed (30.6%). Families and schools are the primary parties responsible for young individuals' sexual health. However, due to some social and cultural factors, sexuality-related subjects cannot be discussed in families, and also parents' level of sexual knowledge is usually insufficient (Ogur et al., 2016). For this reason, it is important for young people to get sexual health education from nurses who are professionals in this field.

More than half of the students (59.2%) stated that they consider their sexual knowledge level insufficient in our study. Similarly, students' pre-education Sexual Health Knowledge Test scores were lower than the desired level (23.5; min = 9 – max = 35), and sexual myths were found to be quite high (70.00; min = 30 – max = 138), which is an important outcome. In a previous study, students' mean Sexual Myth Scale score was found to be 82.21 ± 17.37 , and the mean Sexual Health Knowledge Test score was found to be 19.94 ± 6.16 , indicating that their sexual knowledge levels were low and sexual myths were high (Evcili & Golbasi, 2017). Yazici et al. (2012) and Kumar et al., 2017 found that students' sexual knowledge levels were insufficient, and their

behaviors and attitudes were affected by conventional approaches. Fernández-Rouco et al. (2019) studied 3,853 adolescents of both genders in an age range of 12–18 years and found that they tend to be misinformed about sexuality. Similarly, previous studies reported low sexual health knowledge and high sexual myths in students (Ejder Apay et al., 2013; Evcili & Golbasi, 2017). Sexual myths may result in sexual function disorders, adversely affected sexual identity development, and decreased quality of sexual relationships. To avoid the debilitating effects of these myths on individuals' sexual health, reliable, sufficient, and information-based educational programs are needed (Ejder Apay et al., 2013; Evcili & Golbasi, 2017).

In the present study, post-education sexual health knowledge level of the WhatsApp education group students was significantly higher than that of the control group (Table 4). This result supports our hypothesis H2. However, no significant difference was found between the sexual health knowledge levels of the students in the WhatsApp education group and the conventional education group (Table 4). This result does not support our hypothesis H1.

After the education, the level of sexual myths of the students in the WhatsApp education group was significantly lower than that of the control group (Table 5). This result supports our hypothesis H4. However, no significant difference was found between the sexual myths level of the WhatsApp education group and the conventional education group (Table 5). This result does not support our hypothesis H3. Accordingly, we can say that the education provided on WhatsApp is as effective as conventional education in increasing the level of sexual health knowledge and reducing sexual myths. Calculated eta square values also support this finding. The effect sizes of the sexual health knowledge scores just after the training and one month after the training show a large effect size; also a large effect size for sexual myths scores immediately after training; a medium effect size one month later. There exists no published report investigating the effectiveness of sexual health education provided via WhatsApp. However, there exist some studies in the literature in which digital technologies were

used in sexual health education. In a study in which 19 randomized controlled studies were investigated, it was found that interactive digital interventions were as effective as face-to-face educations in increasing sexual health knowledge (Bailey et al., 2015). Today, the digital world is used by many people to get information about sexuality. Seeking information about sexual health and being open to electronic counseling are universally accepted practices. Ross et al. (2018) examined the use of sexually related electronic media among men who have sex with men and reported that nearly all of the participants used electronic media to get information about sexuality. In the same study, 51.5% of the participants stated the frequency of use as once a few weeks, and 28.6% stated that it was a few times a month. This study emphasizes that electronic media can provide an anonymous and confidential service to avoid concerns about HIV and STD stigmatization (Ross et al., 2018). In addition, the use of such tools in sexual education provides convenience for individuals who have difficulty in obtaining face-to-face sexual education from someone of the opposite sex. Especially in cultures where sexuality is a shame, sin, or taboo, and therefore, the right education cannot be obtained on this subject, the use of WhatsApp and other social media resources for sexual health education will ensure that individuals receive education from the right sources. This situation will provide equal opportunities between individuals who are ashamed to talk about sexuality due to the culture they live in, who are afraid of talking about sexuality, and who are afraid of being stigmatized, and those in societies who can speak about sexuality freely. Education with WhatsApp will offer an alternative to classical education that limits the individual in terms of time and place, providing an education that facilitates the individual to reach the right information, which is not compulsory, has options and supports individuality.

Wang et al. (2015) conducted a study in 2,483 individuals and reported that reproductive health education provided online substantially increased the participants' knowledge level of reproductive health. In the literature, there exist studies in which WhatsApp is used in various educational

settings. In a study, Primary Health Care Education was provided via a WhatsApp discussion group in a group of 21 nursing students. At the end of the study, the researchers concluded that WhatsApp discussion groups may be used to integrate theoretical and practical knowledge of the nursing students (Willemse, 2015). Ajuwon et al. (2018) conducted a study in student nurses and they found that student nurses find the use of WhatsApp group discussions in education valuable for their professional development. In the same study, it was concluded that WhatsApp can be used as an educational tool especially in conditions where opportunities for face-to-face interaction are limited. Raiman et al. (2017) reported that WhatsApp allowed students to benefit from sporadic educational opportunities within the hospital setting. In the same study, it was reported that WhatsApp is a faster communication method between students and teachers compared to other communication methods, and WhatsApp allows students to re-read the messages any time they want. According to our study results and literature, it can be suggested that health education (including sexual health education) provided via WhatsApp is beneficial for students and teachers and that WhatsApp should be included in the education programs. In the present study, in the measurements performed one month after the education, the sexual health knowledge levels of the students in the WhatsApp and conventional education groups were still higher than the control group (Table 4), and the level of sexual myths was still low (Table 5). According to these results, we can say that the effects of sexual health education given both via WhatsApp and conventional method continue for at least one more month after the education. Similarly, Chi et al. (2015) conducted a study in 80 students of a comprehensive sexual education class (education group) and 92 students of a general mental health education class (control group), and they measured their sexual health knowledge at baseline, post-education, and 3 weeks after the education. They reported that there were significant effects of the program on sexual health knowledge. In future studies, if the effects of sexual health education given via WhatsApp and conventional methods are

evaluated in 1 month, 3 months, and 6 months after education, the permanence of the education and the duration of its effect on young people can be measured more clearly.

There was a negative statistically significant correlation between Sexual Health Knowledge Test and Sexual Myth Scale medians, indicating that as the sexual health knowledge score increases sexual myths decrease (Table 6). Similarly, Evcili and Golbasi (2017) reported a negative statistically significant correlation between Sexual Myth Scale and Sexual Health Knowledge Test. Rahimi-Naghani et al. (2016) reported that their participants' sexual and reproductive health (SARH) knowledge was medium level and myths and misperceptions affect SARH in different aspects. Ejder Apay et al. (2013) reported that myths affect sexual health negatively; therefore, they recommended providing educations targeting common sexual myths. Increasing sexual health knowledge decreases sexual myths, contributing to improvements in sexual health. Sex education not only reveals the sexual myths of individuals, it can also enable midwives to review their own thoughts and beliefs. Midwives' beliefs regarding sexual myths can negatively affect their ability to identify the sexual health problems of individuals they care for, and to plan, implement and consult their care (Kartal, 2020). Midwives should be aware of their own beliefs and thoughts about sexuality and know the myths prevalent in the society he serves, which will enable him to better understand the complex structure of sexuality and empathize with the individuals they care for by getting to know better. Therefore, the topic of sexual myths should be considered in sexual health educations.

Limitations

This study has certain limitations. First, the study included only women. Sexuality is about both sexes. The inclusion of men in further studies would provide more insight into the subject. Another limitation of the study was that the study was conducted in a single center with a relatively homogenous study group. Further studies with a heterogeneous study group would be

important for the generalization of the study. To prevent information contamination, students in the WhatsApp and conventional education groups were informed not to share the information shared in these groups with those who are in the control group. The importance of this was explained to the participants. Their written consent was obtained. However, there is a possibility that students may have exchanged information with the control group. This is one of the limitations of this study. In addition, the final test evaluation in the study was made immediately after the education was completed and one month later. A longer follow-up could not be done to evaluate the effectiveness of the education due to time constraints and difficulty in reaching the students.

Conclusions

In the present study, WhatsApp and classical education groups had higher sexual health knowledge scores and lower sexual myth scale scores than the control group. When WhatsApp and classical education were compared, there was no difference between groups in terms of sexual health knowledge score and sexual myth scale score. This outcome showed that the education given via WhatsApp is as effective as classical education in increasing the knowledge of sexual health and reducing myths. WhatsApp is a free, easy-to-use, and fast communication tool commonly used by students. It is considered that WhatsApp provides opportunities to reach out to students on such a subject that is not easily discussed with/by students and in cases where face-to-face interaction is limited. Moreover, sexual health education provided via WhatsApp allows the effective use of time and money by providing access to a large number of people and disseminating correct information in large groups. It is considered that nurse and midwife educators can use WhatsApp as an educational tool in providing sexual health in young individuals.

Disclosure statement

The authors report no conflict of interest relevant for this manuscript.

Author's contribution

Dr. Ilknur Munevver Gonenc is the first author to design and plan the study. She also analyzed the collected data and wrote. Hacer Alan Dikmen is the second author. She also planned the study, collected the data and wrote. Prof. Dr. Zehra Golbasi is the third author to help writing the study.

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