The effects of a childbirth preparation course on birth outcomes among nulliparous Jordanian women

Reem Hatamleh [a],[*], Sanaa Abujilban [b], Asma'a Shaker AbdelMahdi AbuAbed [a],[c], Sawsan Abuhammad [a]

[a] *Faculty of Nursing, Jordan University of Science and Technology, B.O. Box 3030, Irbid 22110, Jordan*
[b] *Faculty of Nursing, Hashemite University, B.O. box 330127. Zarqa 13133, Jordan*
[c] *Obstetrics and Gynecology Department, AL-Hussein hospital, King Hussein Medical Center, Royal Medical Services, Amman, Jordan*

ARTICLE INFO

ABSTRACT

Objective: This study aimed to examine the effectiveness of a childbirth preparation course on birth outcomes among nulliparous Jordanian women.

Design: A randomized control trial pre-test/post-test design was used to assess the effects of a childbirth preparation course conducted in a military hospital in Amman, Jordan from 1 July to 15 September 2016. A total of 133 low-risk nulliparous women were recruited and randomly assigned to either (1) a control group who received standard care in antenatal clinics or (2) an intervention group who received standard care in antenatal clinics as well as a childbirth preparation course specifically designed for the purpose of this study. Data were collected at two different time points: at recruitment and within 24 to 48 h after giving birth. The chi-square test and independent sample *t*-test were used to compare birth outcomes.

Participants: Low-risk nulliparous women in their third trimester of pregnancy attending antenatal clinics at King Hussein Medical Centre in Amman, the capital of Jordan.

Measurements and findings: The childbirth preparation course had a positive effect on three birth outcomes. Specifically, more women in the intervention group than in the control group had spontaneous onset of labour (89.0% vs 70.3%, $p = .02$), the average of cervical dilation was greater in the intervention group than in the control group [(mean $= 3.8$, SD $= 1.55$) vs (mean $= 3.2$, SD $= 1.61$); $t = 2.24$, $p = .03$] and there was earlier initiation of breastfeeding in the intervention group than in the control group [(mean $= 6.2$, SD $= 0.4.43$) vs (mean $= 17.8$, SD $= 18.08$); $t = 4.90$, $p \leq 01$].

Key conclusions: The findings suggest that the childbirth preparation course increased the likelihood of pregnant women having spontaneous onset of labour and arriving at the maternity ward in active labour. Moreover, it helped them to initiate breastfeeding earlier after birth. No effect was found for other birth outcomes or neonatal outcomes. Further studies with a larger sample are needed to obtain more definitive conclusions.

Implication for practice: It is recommended that policymakers and administrators facilitate the embedding of this childbirth preparation course into antenatal care to improve maternal and neonatal health.

© 2019 Elsevier Ltd. All rights reserved.

Introduction

Childbirth education is a vital part of antenatal care and has been implemented through antenatal education courses in numerous settings all over the world (Homer, 2011). The aim of such courses is to empower expectant parents by enhancing their ability to make well-informed decisions that are appropriate to their individual circumstances (Fraser and Cooper, 2009).

In the developed world, antenatal education classes are well planned and provided by maternity healthcare providers in individual or group settings (Gagnon and Sandall, 2007). In other parts of the world, the main way for new mothers to acquire knowledge about childbirth is from their mothers (Fleming et al., 2014). In Jordan, antenatal education is part of the antenatal care provision for pregnant women and is mostly provided in the form of individual instruction. Group antenatal education has rarely been conducted in Jordanian maternity settings. Moreover, there is a lack of Jordanian studies in the area of childbirth education.

* Corresponding author.
  E-mail addresses: rahatamleh@just.edu.jo (R. Hatamleh), sanaa.abujilban@hu.edu.jo (S. Abujilban), shabuhammad@just.edu.jo (S. Abuhammad).

To the best of the authors' knowledge, this is the first Jordanian study to examine the effect of a childbirth education course on birth outcomes. It is therefore envisaged that the results of this study will shed light on the extent to which a childbirth preparation course can increase nulliparous Jordanian women's knowledge about childbirth and help them to anticipate the events associated with their pregnancy and delivery. Therefore, it is anticipated that the findings of this study will assist in improving maternal and neonatal outcomes. Furthermore, the results of this study will provide maternity healthcare providers with evidence on the type of beneficial effects that childbirth education can have on birth outcomes, which hopefully will encourage healthcare providers to provide this type of education for every pregnant woman regardless of their limited time.

Globally, the literature that has been published during the past few decades has produced controversial and inconclusive findings regarding the effects of antenatal education on labour and birth outcomes, primarily because of the small sample sizes (Ferguson et al., 2013; Gagnon and Sandall, 2007). Also, most of the studies have been experimental trials designed to compare the characteristics of attendees with those of non-attendees; the pre-test and post-test results of the psychological status of attendees; or the results of different models of childbirth preparation course on birth outcomes. Nevertheless, the literature has identified a number of positive effects of childbirth education on maternal and neonatal outcomes (Fraser and Cooper, 2009; Howarth et al., 2010), such as the better recognition of the onset of labour, a decrease in false labour admissions, a greater likelihood of arriving at hospital in active labour (Ferguson et al., 2013; Lumluk and Kovavisarach, 2011; Maimburg et al., 2010; Paz-Pascual et al., 2008), higher vaginal birth rates (Chunyi et al., 2013; Consonni et al., 2010), decreased caesarean section and instrumental birth rates (Lumluk and Kovavisarach, 2011; Stoll and Hall, 2012; Paz-Pascual et al., 2008), a reduction in the time taken to initiate breastfeeding (Mete et al., 2010; Craig and Dietsch, 2010), less use of pain medication during the latent phase and less epidural analgesia use (Paz-Pascual et al., 2008; Maimburg et al., 2010).

The above-cited studies were conducted in developed countries such as the United Kingdom, the United States of America, (USA), Canada, Denmark and Spain and analyse samples that consist of participants from different cultural and ethnic backgrounds. However, in many cases, their methodological quality is uncertain. On the other hand, the studies that have been conducted in developing countries, including Jordan, are limited in terms of number and scope. In Jordan specifically, there is a lack of information about whether childbirth education plays a role in improving maternal and neonatal health indicators. This motivated us to conduct an experimental study to identify the effects of providing safe childbirth information to Jordanian women on birth outcomes (Abujilban et al., 2014). Therefore, the aim of the study was to compare the birth outcomes of nulliparous Jordanian women who did and did not take part in a childbirth preparation course. It was hypothesized that the women who attended the course would report significantly better birth outcomes than those who did not do so.

Methods

Study design

A randomized control trial pre-test/post-test design was used to compare two groups of participants (intervention and control). This Jordanian trial was registered with the Australian New Zealand clinical trial registry (trial registration number: ACTRN 126001255471). Based on a power level of 0.8 with a medium effect size (Cohen, 1992) and an anticipated significance of 0.05,

the minimum required total sample size was 128 subjects (64 for each group). This number was increased by five to compensate for any possible attrition losses. Therefore a total sample of 133 nulliparous women who met the inclusion criteria were recruited. A consecutive sampling technique was employed to recruit the participants.

Study setting

Jordan is mainly an urban-based society as about 75% of the population lives in cities and towns. This means that the majority of the population is relatively close to one or more healthcare facilities. The current study was conducted in Amman, the capital city, at King Hussein Medical Centre (KHMC; the largest military medical centre in the country), specifically in the Centre's antenatal clinics and postnatal department. The Centre is under the authority of the Royal Medical Services. On average, there are 822 births per month at KHMC, 37.7% of which are caesarean births and 3.6% of which are instrumental births (RMS, 2016). Intrapartum and postpartum care is provided by 42 obstetricians, 73 midwives and 12 registered nurses, while antenatal care is provided by ten obstetricians, four registered nurses and 15 associate nurses (RMS, 2016). An associate nurse is a person who holds an associate nursing degree that is usually awarded to students who have followed a 2-year nursing programme. This degree is classroom and placement based at institutions of higher learning, which are equivalent to universities (Al Jarrah, 2013).

At KHMC, around 200–300 continuing cases and 50–100 new cases visit antenatal clinics each day. There are no scheduled antenatal education classes or childbirth courses. All pregnant women are examined by an obstetrician at each visit and an ultrasound screening is performed each time (RMS, 2016). It is worth mentioning that the model of reproductive healthcare provided at KHMC is based on the medical model. In this model, there is an absence of spontaneous/natural vaginal birth for all nulliparous women; instead, births are managed and controlled either by induction or augmentation. Moreover, primigravida are monitored continuously by an electronic foetal monitoring device, 2-hourly vaginal examinations, and episiotomy, and all women give birth in the lithotomy position (RMS, 2016; USAID, 2011).

Participants

Nulliparous women aged 18–45 years old were recruited into the study if they met the following inclusion criteria: low-risk singleton pregnancy, pregnant for at least 32 weeks, a vertex-presenting foetus and attending an antenatal clinic at KHMC. Also, to negate the effects of extraneous variables on the study outcomes, only women who planned to deliver at KHMC and who owned a smartphone loaded with the WhatsApp social media application were recruited.

Also, women with a high-risk pregnancy were excluded.

Control group

Women in the control group received standard care in antenatal clinics, including weight monitoring, blood pressure monitoring, urine analysis, blood tests, detection and treatment of maternal complications and evaluation of foetal status by ultrasound scan at each visit (RMS, 2016).

Intervention group

Women in the intervention group received standard care in antenatal clinics as outlined above as well as a childbirth preparation course that was specifically designed for the purpose of this study.

The education course was provided in the form of a class-based programme consisting of three classes held weekly over a 3 week period and was supported by additional material provided via a mobile application.

Each class lasted for 40 min. During classes, a range of teaching methods was used, such as discussion sessions about issues that were determined by the instructor or based on questions raised by the women themselves, and practical demonstrations of antenatal exercises, breathing exercises and relaxation and concentration techniques in addition guidance on other non-pharmacological methods of pain relief. Detailed information about the material covered in each educational session was included in pamphlets and video recordings, which were disseminated via a mobile application, WhatsApp. WhatsApp is an application for smart mobile devices that allows the user to send text messages, images and documents and make voice and video calls. Users can communicate quickly with other individual users or with a group of users simultaneously. WhatsApp is a popular application in Jordan. Therefore, it was envisaged that the use of WhatsApp would be very helpful in fostering engagement, increasing access and enhancing informational dissemination in the intervention group as well as in increasing adherence to the learning provided by the classroom sessions.

Therefore, after each session the pamphlets and video recordings were shared via WhatsApp messages that the researchers sent to the smart phones of the women in the intervention group. The researchers were able to confirm that the participants had received and viewed the message content based on the blue check marks (

) that appear in the footer of the sent messages and by receiving a reply message.

Intervention

The childbirth preparation course content was derived from the standards for preparing pregnant women for labour and birth that are recommended in *the Standards of Care for Health Centres* that was developed in 2002 by the United States Agency for International Development (USAID) and the Jordanian Ministry of Health (MOH) (USAID and MOH, 2002). Additional detailed educational content was obtained from the Baby Centre Arabia website (available at: https://arabia.babycenter.com).The class-based content covered the following topics: anatomy and physiology of the reproductive system, the counting of foetal movements, warning signs during pregnancy, how to pack a hospital bag, Braxton Hicks contractions, premonitory signs of labour and vaginal examination, stages of labour, methods of coping with early labour at home, active relaxation techniques for each stage of labour and non-pharmacologic pain management methods, intrapartum foetal monitoring, episiotomy, length of hospitalization, breastfeeding, physiological and psychological changes during the postpartum period, postpartum warning signs and prolonged pregnancy. This course content was assessed by a pilot study and participant feedback from the pilot study. Then, the content of the course was adjusted based on the feedback of the pilot study and designed at an appropriate audiovisual level and in a culturally appropriate style. The researchers tailored the educational interventions to ensure more satisfaction, as recommended in the literature (Halperin et al., 2014; Malata and Chirwa, 2011). Then the content of the course was converted into three videos and four pamphlets. The course content was depicted in PowerPoint slides and narrated by a specialist midwife. The video content was validated by specialists in the field of obstetrical health nursing and midwifery.

Instrument

A questionnaire that consisted of two parts was developed in order to assess the effectiveness of the intervention. The first part was designed to obtain socio-demographic data on the participants and was completed by the participants, while the second part was designed to gather data on birth outcomes and was collected from medical records by the researcher. The demographic data sheet gathered information about age, education, occupation, monthly income and pregnancy data (gestational age, expected date of birth, time of booking first visit and a number of antenatal visits). The birth outcome data sheet gathered information about the type of labour onset (spontaneous, augmented or induced), cervical dilation on admission in centimetres, type of birth (vaginal, caesarean, vacuum, forceps), use of electronic foetal monitoring, performance of an episiotomy, use of a postnatal pain killer or antibiotic medication, labour complications (perineal tears or haemorrhage) and neonatal outcomes (gestational age at birth, birth weight, Apgar score, birth trauma and time of initiation of breastfeeding).The data on variables such as the type of labour and the type of birth were coded on a nominal scale, those about variables such as the degree of perineal laceration were coded on an ordinal scale and those about variables such as age, income, gestational age and number of antenatal visits were coded on a ratio scale. Other variables were measured by using questions that required a binary answer, such as "Did you received any childbirth information?"

Before administration, the instrument was subjected to several reviews by the researchers themselves and by a panel of experts in the reproductive healthcare field. A pilot study was also conducted to ensure the validity of the study instrument, as well as to evaluate the feasibility of the data collection procedures. The Cronbach's Alpha of the instrument was 0.83.

Recruitment and data collection

The study was carried out from 1 July 2016 to 15 September 2016. Women who met the study criteria were recruited from antenatal clinics at KHMC. A convenience sampling technique was used to recruit participants. Eligible women who had consented to participate were randomly assigned to either the intervention or the control group by using Google Randomizer software. Each participant was assigned a number from 1 to 133 and the program generated two sets of unique numbers (67 for the control group and 66 for the intervention group). The participants who were assigned a number from the intervention set were placed in the intervention group and those who were assigned a number from the control set were placed in the control group. Five women were lost to the study; one woman changed her care to a private hospital and contact with the other four women was lost. The remaining women in both groups were invited to complete part one of the questionnaire at recruitment. In total, 128 of the 133 women initially recruited completed the study. The data on birth outcomes was collected from medical records within 24 h after each birth by the researcher. The data on the initiation time of breastfeeding was collected by asking the participants how many hours had elapsed after birth before the first breastfeed (their responses were all gathered within 48 h after giving birth). Fig. 1 provides a flow diagram of the data collection process.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the Jordan University of Science and Technology and the IRB of the Royal Medical Services before conducting the study.
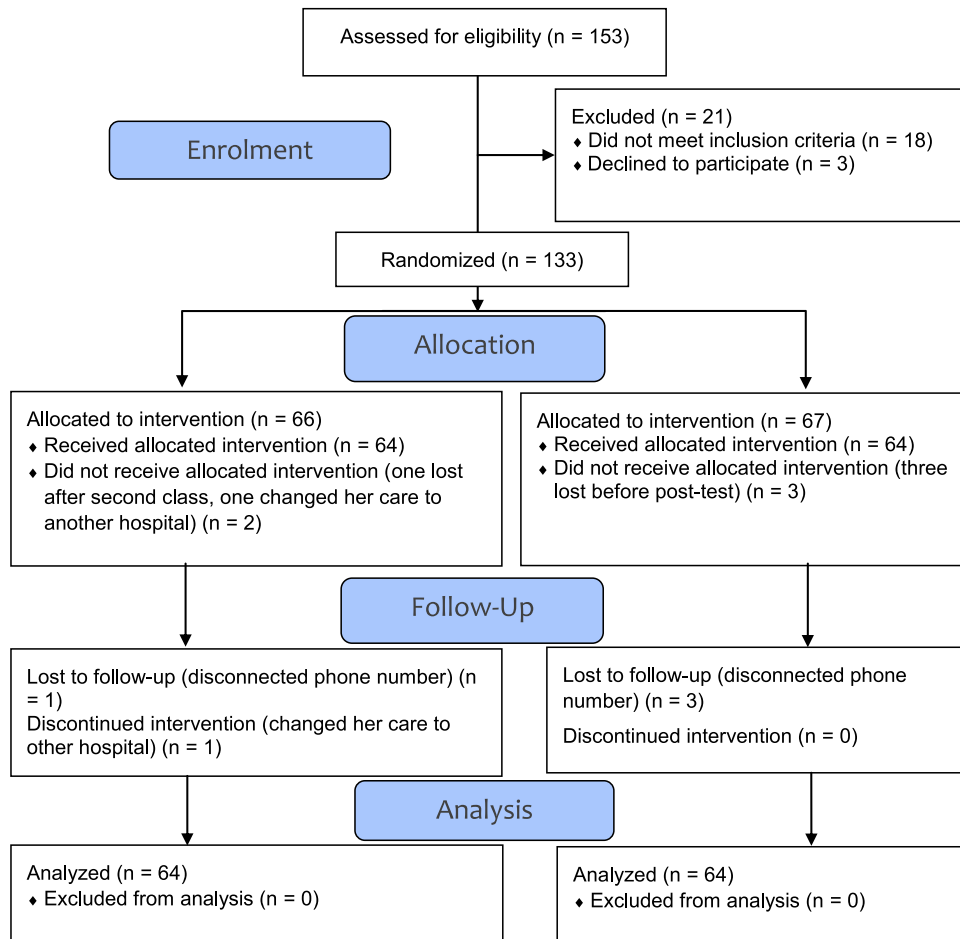
Fig. 1. CONSORT.

Signed informed consent was obtained from all the participants after providing them with adequate information about the purpose of the study. Each group of participants (control and intervention) was given an appropriate informed consent form tailored to the nature of their participation.

The pregnant women who agreed to participate in the study were assured that their privacy and the confidentiality of their responses would be protected. Maximum efforts were made to ensure the confidentiality and anonymity of the participants by identifying them on the questionnaires by their numbers instead of their names. The researchers also took steps to ensure that there were no physical, psychological, economic or social risks for those women who agreed to participate in the study. The women were also informed that they were free to withdraw from the study at any time and that doing so would not affect their care. After they had agreed to participate, they were asked to sign a consent form at recruitment. To ensure that the principle of justice was adhered to in relation to the control group, the content of the educational programme (three videos and four pamphlets) was sent to the women in the control group after completion of the study procedure.

Data analysis

The statistical analysis of the collected data was carried out by using the Statistical Package for the Social Sciences (Windows version 22, SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to describe the characteristics of the participants. The data were analysed by using the intention to treat analysis approach.

All the participants who were stayed in the study ($n = 128$) were included in the analysis and were analysed in the groups to which they had been randomly allocated. The two groups (intervention and control) were compared by using the chi-square test for the categorical variables and an independent sample t-test for the continuous variables and main study variables.

Also, an analysis of covariance (ANCOVA) was performed to identify any differences in the potential effects of the childbirth preparation course on birth outcomes. A significance level of 0.05 or less was considered as statistically significant. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variance, homogeneity of regression slopes, and reliable measurement of the covariates. These were essential qualitative checks of goodness of fit. The independent variable was the study group and the dependent variables consisted of the birth outcomes post-course. The dependent variables were tested in a separate model.

Results

Demographic characteristics of the participants

The total sample was 128 pregnant women, aged between 18 and 37 years (mean = 32.8, SD = 3.65). All of them were nulliparous Jordanian women who were healthy and in their third trimester of pregnancy. The number of antenatal visits ranged from 2 to 20 visits (mean = 9.4, SD = 2.79). More than half of the participants had a bachelor's degree (53%, $n = 69$) and more than one third (36.7%, $n = 47$) had a school education. Less than one third were employed

Table 1
Frequencies and percentages of demographic categorical variables.

Demographic variable	Number (n)	Percentage (%)
Group		
Control	64	50
Intervention	64	50
Total	128	100
Education level		
Elementary education	10	7.81
Secondary education	37	28.90
Diploma	10	7.81
Bachelor's degree	69	53.91
Master's degree	2	1.56
Total	128	100
Employment		
No	89	69.53
Yes	39	30.47
Total	128	100
Childbirth information before recruitment		
No	76	59.36
Yes	52	40.63
Total	128	100
Childbirth information source (if yes)		
Internet	13	25.0
Books	7	13.46
Relatives	32	61.54
Nurses	0	0
Total	52	100
Childbirth information after recruitment		
No	39	30.47
Yes	89	69.53
Total	128	100
Childbirth information source (if yes)		
Internet	13	14.61
Books	0	0
Relatives	10	11.24
Nurses	66	74.16
Total	89	100

(30.468%, $n = 39$) and the total household monthly income ranged between 250 JD (US\$351.67) and 1200 JD (US\$1688) (mean = 510.0 (US\$717.51), SD = 210.30 (US\$295.83)). Only a quarter of the participants reported that they had received health information regarding childbirth (40.6%, $n = 52$). Relatives (74.2%, $n = 66$) were the main source of that information. Table 1 provides full details of the participants' demographic characteristics.

The women were divided into two groups; 50% ($n = 64$) in the intervention group and 50% ($n = 64$) in the control group. A Chi-square test was conducted to compare the proportions of the categorical variables of the demographic characteristics of both groups. The result showed that there were no significant differences. On the other hand, the independent sample t-test conducted to compare the means of the continuous variables of the demographic characteristics of the two groups showed that there was a significant difference in the mean gestational age at recruitment between the control group and the intervention group [(mean = 35.39, SD = 1.24) vs (mean = 34.1, SD = 3.65); t (77.411) = 2.78, p = .01)]. Therefore, this confounding variable was controlled for by applying an ANCOVA (see below).

Effect of the childbirth preparation course on birth outcomes

A chi-square test was conducted to compare the proportions of the categorical variables of the birth outcome data of both groups. The result showed that the proportion of spontaneous onset of labour in the intervention group (89.0%, $n = 57$) was significantly different ($p = .02$) from that in the control group (70.3%, n = 45). In addition, an independent sample t-test was conducted to compare the means of the continuous variables of the birth outcome data of the two groups. The result showed that there was a significant difference in the mean cervical dilation in centimetres on ad-

mission between the control group (mean = 3.2, SD = 1.61) and the intervention group (mean = 3.8, SD = 1.55); $t (126) = 2.24$, $p = .03$). However, the magnitude of the difference in the mean was very small (eta squared = 0.004). There was also a significant difference in the mean time for breastfeeding initiation in hours between the control group (mean = 17.8, SD = 18.08) and the intervention group (mean = 6.2, SD = 0.4.43); ($t (68.08) = 4.90$, $p \leq .01$). In this case, the magnitude of the difference in the mean was moderate (eta squared = 0.07). For more details, see Table 2.

In addition, one-way between groups ANCOVA was conducted to identify any potential effect that the childbirth preparation course might have had on the birth outcomes of the participants. In light of the finding of the sample t-test conducted to compare the means of the continuous variables of the demographic characteristics of the two groups which showed that there was a significant difference in the mean gestational age at recruitment, the gestation age was used as the covariate. The ANCOVA result showed that there was no significant difference between the two groups in respect of birth outcomes post-course.

Discussion

As this study seems to be the first to assess the effects of a childbirth preparation course on birth outcomes in the context of Jordan, it provides much-needed benchmark data for policymakers on the value of providing a childbirth preparation course. In this study, the mean age of the participants, who were all giving birth for the first time, was 23.8 years old, and less than one third of the participants were employed. These characteristics are consistent with the currently available statistics of the Jordanian Higher Population Council (2013), the Jordan Population and Family Health Survey (JPFHS, 2013) and the Department of Statistics (DOS, 2013), which have all reported that the mean age of Jordanian women giving birth for the first time is 24.0 years old. Those publications also report that only one third (32%) of women who have ever been married women have been employed. This means that the sample of this study is representative of the Jordanian population. As regards the gestational age at first antenatal visit and the number of antenatal care visits, the findings are also congruent with the Jordanian statistics in this field. All the participants in the current study (100%) received antenatal care from a skilled reproductive healthcare provider and 99% of them had first antenatal visit before their fourth month of pregnancy, as recommended and reported by the Jordanian Higher Population Council (2013), the World Health Organization, and the United Nations International Children's Emergency Fund (WHO and UNICEF, 2015). However, in this study, 95% of the women made seven or more antenatal care visits, which is higher than the 78% reported in JPFHS (2013).

The current study found that there was a significant difference between the intervention and control groups in terms of the type of labour onset, the mean cervical dilatation on admission and the mean time for breastfeeding initiation. This indicates that the childbirth preparation course was effective in a number of ways. The significantly higher cervical dilation on admission and the higher proportion of spontaneous onset of labour in the intervention group might indicate that attending the educational sessions enhanced the women's confidence and their success in the self-diagnosis of true labour onset as the sessions increased their ability to recognize the signs of true labour, distinguish between true and false contractions, and use the coping skills taught and non-pharmacological pain management methods in the latent phase at home before coming to hospital. This could indicate that the participants in the intervention group were motivated enough to receive and retain knowledge and information about childbirth as they felt empowered by the knowledge they received and they were willing to learn and apply what they had learned, whereas

Table 2
Independent samples t-test for continuous birth outcome variables by group ($n = 128$).

Variable	Control group ($n = 64$)		Experiment group ($n = 64$)		t	df	p-value
	M	SD	M	SD			
Cervical dilation on admission (cm)	3.22	1.61	3.84	1.55	2.24	126	*.03
Length of first stage (h)	7.33	2.78	6.84	3.64	.70	88	.49
Length of second stage (min)	33.50	11.72	29.30	18.95	1.23	88	.22
Infant's birth weight (g)	3210.63	442.94	3177.81	373.90	.45	126	.65
Gestational age at delivery (weeks)	39.61	1.12	39.70	1.09	.48	126	.63
Apgar score (1 min)	8.28	.97	8.22	.75	.41	126	.68
Apgar score (5 min)	9.66	.761	9.64	.55	.13	124	.89
Initiation of breastfeeding (h)	17.79	18.08	6.20	4.43	4.91	68.08	>*.01

* Significant.

the control group did not receive this information in the standard care package.

These findings on cervical dilation and spontaneous onset of labour support those of Lumluk and Kovavisarach (2011) who reported fewer false labour admissions in the intervention group than in the control group and those of Maimburg et al. (2010) who found that women in the intervention group arrived at hospital in active labour more often than the control group. The findings are also consistent with those of an observational study conducted in Spain on 616 nulliparous women. The researchers compared three cohorts of women and found that 14% of the women attending five or more antenatal education sessions visited the hospital in false labour compared to 31% of women who did not attend any antenatal education sessions (Paz-Pascual et al., 2008). Moreover, the finding in this study regarding the accurate recognition of true labour is consistent with the result of the systematic data analysis carried out by Ferguson et al. (2013) who reported a significant positive link between attending antenatal classes and the more accurate recognition of the onset of labour.

Another explanation for the differences between the two groups in the current study might be the use of the WhatsApp mobile application. This application is a new technology which might have increased the effectiveness of the childbirth preparation course by motivating the women to use and apply the knowledge and information they derived from attending the childbirth preparation classes in preparing themselves for childbirth. Moreover, the application may have been helpful in empowering the women as it enabled them to gain access anytime anywhere to all of the information related to childbirth preparation course and may therefore have made them feel they had greater control over their pregnancy.

In this study, the time taken to initiate breastfeeding was significantly earlier in the intervention group and this may have resulted from an improvement in the level of the women's breastfeeding self-efficacy after attending the educational sessions (Balogun et al., 2016). This means that the childbirth preparation course had a positive effect in terms of improving the practical skills required for the successful initiation of breastfeeding. All the women in the intervention group had the same classroom sessions. They also received individualized, tailor-made information via WhatsApp about their own particular needs regarding the issues associated with breastfeeding, such as the best time to initiate breastfeeding, the benefits of breastfeeding, correct positioning and attachment, tips for commitment to breastfeeding and the necessary skills to achieve successful breastfeeding. Access to this tailored information may have increased their motivation and confidence in their ability to breastfeed.

The earlier initiation of breast feeding among the intervention group in this study is congruent with the finding of a Turkish quasi-experimental trial which showed a significantly earlier breastfeeding time in the experimental group who received two classes on breastfeeding education (Mete et al., 2010). The find-

ing of the current study also supports that of a descriptive qualitative pilot study by Craig and Dietsch (2010), which recruited 10 first-time Australian mothers to explore the perceived usefulness of a contemporary strategy for mothers' experience of breastfeeding initiation. Verbatim and thematic analyses of the semi-structured interview results showed that the strategy had benefits in terms of gaining the practical skills required to initiate breastfeeding successfully but that it was unable to reduce the women's anxiety and increase their confidence in their ability to breastfeed their babies (Craig and Dietsch, 2010). On the other hand, the finding of the current study conflicts with that of Stoll and Hall (2012) who reported no significant differences in the time taken to initiate breastfeeding between attendees and non-attendees of educational classes.

Overall, based on the findings of the current study, the childbirth preparation course had a positive effect on the three birth outcomes discussed above. However, it did not have a significant effect on the other birth outcomes, namely, need for induction of labour, type of birth, length of hospitalization, and neonatal outcome. This is not surprising as it reflects the type and quality of antenatal care currently provided for the women in this study. While the USAID and MOH (2002) standards for preparing pregnant women for childbirth are useful tools and resources that can be used in reproductive health services in Jordan, the results of this study suggest that there is a need to augment them through the addition of an educational programme.

Limitations

This study has two main limitations. First, the study was conducted only in one military hospital and did not include any governmental or private hospitals, which might affect the generalizability of the findings. Second, it was difficult to control for incidental teaching of the participants in the control group. However, an attempt was made to decrease this effect by using a randomized control trial design.

Implications for practice

This study has implications for researchers, practitioners and policymakers. First, researchers may wish to explore the perceptions of the usefulness of childbirth education among first-time mothers. Further research is also needed in order to gain an understanding as to why healthcare providers do not provide any courses for pregnant women.

Second, it is hoped that the findings of this study will motivate practitioners such as midwives and nurses to enrol in continuous education programmes to improve their education and counselling skills in order to provide appropriate and effective education for pregnant women.

Third, it is recommended that policymakers and healthcare administrators adopt the childbirth preparation course developed for

this study and incorporate it into a comprehensive national strategy for preparing all pregnant women for childbirth. In addition, policymakers may wish to consider utilizing simple social media technology, such as WhatsApp, to provide additional teaching materials to women in order to increase women's awareness of different topics related childbirth and improve their adherence to the antenatal education they receive.

Conclusion

The childbirth preparation course that was developed for this study was designed to increase nulliparous women's knowledge about pregnancy, childbirth and parenting in order to improve maternal and neonatal health outcomes. The results of this randomized controlled trial suggest that the intervention had a positive effect on spontaneous onset of labour and greater cervical dilation on admission as well as in reducing the time taken to initiate breastfeeding. Thus, it can be concluded that the childbirth preparation course was effective in helping expectant mothers to significantly improve their knowledge in respect of recognizing the onset of labour as well as their ability to use coping skills and to initiate breastfeeding at a time that was as early as individually practicable.

Conflict of interest

None.

Ethical approval

The Institutional Review Board of Jordan University of Science and Technology (IRB) (#25/96/2016) and from the Institutional Review Board of the Royal Medical Services (IRB) (#8/2016), a written permission from the head nurse of maternity ward at King Hussein Medical Center (KHMC) was obtained.

Funding

None.

Acknowledgments

We would like to acknowledge pregnant Jordanian women who attended the childbirth preparation course and participated in our study.

References

Abujilban, S., Sinclair, M., Kernohan, G.W., 2014. Antenatal education in Jordan: a rapid appraisal abstract. Evid. Based Midwifery 12 (4), 137.

Al Jarrah, I.A.T., 2013. Associate nursing students 'perceptions toward nursing profession in Jordan. Eur. Sci. J. 9 (6), 14–22.

Balogun, O.O., O'Sullivan, E.J., McFadden, A., Ota, E., Gavine, A., Garner, C.D., MacGillivray, S., 2016. Interventions for promoting the initiation of breastfeeding. Cochrane Database Syst. Rev. (11) doi:10.1002/14651858.CD001688.pub3.

Chunyi, G., Xiaodan, W., Yan, D., Xinli, Z., Zheng, Z., 2013. The effectiveness of a Chinese midwives' antenatal clinic service on childbirth outcomes for primipare: a randomised controlled trial. Int. J. Nurs. Stud. 50 (12), 1689–1697. doi:10.1016/j.ijnurstu.2013.05.001, 1689p.

Cohen, J., 1992. A power primer. Psychol. Bull. 112 (1), 155–159. doi:10.1037/0033-2909.112.1.155.

Consonni, E.B., Calderon, I.M.P., Consonni, M., De Conti, M.H.S., Prevedel, T.T.S., Rudge, M.V.C., 2010. A multidisciplinary program of preparation for childbirth and motherhood: maternal anxiety and perinatal outcomes. Reprod. Health 7, 28–33. doi:10.1186/1742-4755-7-28.

Craig, H.J., Dietsch, E., 2010. 'Too scary to think about': first time mothers' perceptions of the usefulness of antenatal breastfeeding education. Women Birth 23 (4), 160–165 http://dx.doi.org/10.1016/j.wombi.2010.04.004.

Ferguson, S., Davis, D., Browne, J., 2013. Does antenatal education affect labor and birth? A structured review of the literature. Women Birth 26 (1), 5–8 http://dx.doi.org/10.1016/j.wombi.2012.09.003.

Fleming, S.E., Vandermause, R., Shaw, M., 2014. First-time mothers preparing for birthing in an electronic world:internet and mobile phone technology. J. Reprod. Infant Psychol. 32 (3), 240–253. doi:10.1080/02646838.2014.886104.

Fraser, D., Cooper, M., 2009. Myles' Textbook for Midwives, (fifteenth ed.) Churchill Livingstone, Edinburgh.

Gagnon, A.J., Sandall, J., 2007. Individual or group antenatal education for childbirth or parenthood, or both. Cochrane Database Syst Rev (3) CD002869.

Halperin, O., Sarid, O., Cwikel, J., 2014. A comparison of Israeli Jewish and Arab women's birth perceptions. Midwifery 30 (7), 853–861. doi:10.1016/j.midw.2013.11.003.

HPC: Higher Population Council. National reproductive health/family planning strategy Available at CGd7l6p9aRU%3D.

Homer, C.S., 2011. The 'Ready for Child' structured antenatal training programme increases likelihood of mother's arriving at the maternity ward in active labor and decreases use of epidural analgesia. Evid. Based Nurs. 14 (1) 16–17. doi:10.1136/ebn1127.

Howarth, A., Swain, N., Treharne, G., 2010. A review of psychosocial predictors of outcome in labor and childbirth. NZ Coll Midwives J. 17-20 (42), 14 5727c34008aef9c00b8b502b.pdf.

JPFHS, DOS, 2013. Jordan Population and Family Health Survey.2013 October 2013accessed, 02.10.2015. Available at: https://dhsprogram.com/pubs/pdf/FR282/FR282.pdf.

Lumluk, T., Kovavisarach, E., 2011. Effect of antenatal education for better self-correct diagnosis of true labor: a randomized control study. J. Med. Assoc. Thailand. 94 (7), 772–774.

Maimburg, R.D., Væth, M., Dürr, J., Hvidman, L., Olsen, J., 2010. Randomised trial of structured antenatal training sessions to improve the birth process. BJOG 117 (8), 921–928. doi:10.1111/j.1471-0528.2010.02584.x.

Malata, A., Chirwa, E., 2011. Childbirth information feeds for first time Malawian mothers who attended antenatal clinics. Mal. Med. J 23 (2), 42–46 doi: A Malata, E Chirwa - Malawi Medical Journal, 2011 - ajol.info.

Mete, S., Yenal, K., Okumus, H., 2010. An investigation into breastfeeding characteristics of mothers attending childbirth education classes. Asia. Nurs. Res. 4 (4), 216–226. doi:10.1016/S1976-1317(11)60006-6.

Paz-Pascual, C., Pinedo, I.A., Grandes, G., de Gamboa, G.R.F., Hermosilla, I.O., de la Hera, A.B., de Pedro, M.U., 2008. Design and process of the EMA Cohort Study:the value of antenatal education in childbirth and breastfeeding. BMC Nurs. 7 (1), 1.

RMS: Royal Medical Services, 2016. Anual Statestics Report Amman- Jordan.

Stoll, K.H., Hall, W., 2012. Childbirth education and obstetric interventions among low-risk canadian women: is there a connection? J. Perinat. Educ. 21 (4), 229–237 '10.1891/1058-1243.21.4.229.

USAID: United states agency for international development, 2011. Best Practices for Implementing theMother-Newborn Package of Services at Hospitals- Maternal. The Health Systems Strengthening II (HSS II).

USAID: United states agency for international development, MOH: Ministry of Health, 2002. Standards of Care for Health Centers: Reproductive health SHOP'S, 3. accessed 18.09.2016Available at www.shopsproject.org .

WHO: World Health Organization, UNICEF: United Nation International Children's Emergency Fund, 2015. Trends in Maternal Mortality: 1990 to 2015: Estimates by WHO, UNICEF, UNFPA. The World Bank and the United Nations Population Division:Executive Summary accessed 04.08.2016.Available at www.who.int/reproductivehealth/publications/.../maternal-mortality-2015/en/ .