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Factors influencing abortion duration, bleeding volume, pain scores, and anxiety levels during medical abortion: a cross-sectional study

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Abstract

Background Some factors that influence the medical abortion(MA) process are unknown. This study aims to investigate the influential factors associated with abortion time, bleeding volume, pain scores, and anxiety during the process of MA.

Methods A cross-sectional design was used in this research. Demographic information, pregnancy duration, bleeding volume, abortion duration, pain scores, anxiety levels, step count, and rate were recorded for each participant throughout MA. Data analysis was conducted using the SPSS version 26.0.

Results The mean age of the 450 women included in the study was 32.14 ± 5.57 years. The study revealed that older age correlates with longer abortion duration (rs = 0.102, $P < 0.05$) but lower pain scores during MA (rs=-0.178, $P < 0.001$). A history of dysmenorrhea shortened abortion time (rs=-0.097, $P < 0.05$) but increased pain (rs = 0.106, $P < 0.05$) and anxiety (rs = 0.119, $P < 0.05$). Women with cesarean section histories reported less pain (rs=-0.226, $P < 0.001$) and anxiety (rs=-0.129, $P < 0.001$) during MA. Vaginal delivery history decreased pain scores (rs=-0.117, $P < 0.05$) but did not significantly affect other outcomes. Previous surgical abortion alleviated pain (rs=-0.139, $P < 0.001$) and anxiety (rs=-0.093, $P < 0.05$) during MA. Increased walking steps or faster step rates shortened abortion duration (rs=-0.107, $P < 0.05$; rs=-0.133, $P < 0.05$) but raised pain scores (rs = 0.258, $P < 0.001$; rs = 0.235, $P < 0.001$).

Conclusions Individuals with dysmenorrhea and high physical activity (PA)may have shorter abortion durations. Older individuals and those with cesarean or surgical abortion histories may experience less pain during medical abortion. Dysmenorrhea correlates with higher anxiety, while cesarean sections and surgery abortion lower it.

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Keywords Medical abortion, Bleeding, Pain score, Physical activity, Anxiety

Introduction

According to global statistics, the number of abortions has been rising significantly each year, with developing countries accounting for a large portion of the increase. It is important to note that these figures represent only officially recorded cases; many unreported abortions are likely contributing to this upward trend as well [1]. Approximately 45% of these abortions are considered unsafe, particularly in regions where access to abortion services is limited. Unsafe abortions pose serious health risks, contributing to an estimated 5–13% of maternal deaths worldwide [2]. Moreover, they can result in substantial physical and mental health consequences for women. Given that some abortions may be unavoidable, it is essential to focus on minimizing the health risks involved to ensure a safer procedure. MA is widely recognized as a common, safe method for terminating pregnancies and is often the preferred choice for women seeking to end unintended pregnancies [3]. Mifepristone and misoprostol are the primary medications used for MA [4]. Studies have indicated that in many countries, women are using or attempting to use abortion pills at home without professional medical supervision. This trend raises safety concerns, as without proper medical guidance, the risk of complications and negative health outcomes increases [5, 6]. It is essential to receive the necessary services and information from qualified healthcare providers to ensure the safe and effective use of these medications. Bleeding, severe pain, cramping, headache, and nausea will be experienced after taking the pills, which may result in anemia, syncope, fever, uterine contents retained, and other adverse complications that are harmful to their health or even bad for the subsequent pregnancies [7, 8]. Theoretically, the experience of severe pain during MA can occur due to uterine contractions and the potential difficulty in expelling the uterine contents, including the embryo sac [9, 10]. These processes involve the contraction and relaxation of the uterine muscles to expel the pregnancy tissue [11]. While emotional stress and anxiety are also significant risk factors related to greater pain when MA [12–14]. Prior studies have reported that psychological factors, younger age, and a history of dysmenorrhea are significant predictors of pain in women undergoing abortion [15].

The role of PA is also emerging as a key area of research in the context of abortion. Several studies have begun exploring whether exercise influences abortion outcomes, with findings suggesting that higher levels of PA may be associated with an increased risk of miscarriage. This elevated risk could negatively affect embryo implantation or early pregnancy [16]. Whether an increase in walking or light PA can enhance uterine contractions and reduce the duration of delivery time is uncertain. There is lacking evidence about the relationship between activities and placental expulsion time and the volume of bleeding in the process of MA.

Materials and methods

This cross-sectional study recruited 450 female participants who opted for MA within the first 12 weeks of pregnancy. This research was approved by the ethics committee of Hong Kong University, Shenzhen Hospital (Approved No. hkuszh2023122). Every participant in this research had been told the aim of the study and signed the informed consent.

Participants recruitment

The inclusion criteria of this study include:

1. Women who choose the MA to end the pregnancy and get the knowledge of MA.
2. A B-ultrasound result showed intrauterine conception.
3. The blood test showed no coagulopathy.
4. The age is 18–50.

The exclusion criteria of this study were as follows:

1. Women missed abortions before taking mifepristone.
2. Females with serious pelvic inflammation or acute vaginitis.
3. Taking anti-anxiety or antidepressant medications in the long term.

Research progress

In the recovery ward, all female participants underwent a comprehensive assessment of their vital signs, including blood pressure, temperature, pulse, and respiratory rate, to ensure these parameters were within normal ranges. Furthermore, the researchers conducted additional inquiries and double-checked with women who expressed their intention to undergo MA. These measures aimed to confirm that the participants made the decision freely, had no contraindications to misoprostol administration and accurately determined their gestational age before initiating the intake of medication. Under the guidance and prescription of medical professionals, female participants were instructed to take mifepristone in the form

of eight pills (25 mg each) two days before the scheduled abortion procedure. The administration method involved taking two tablets twice a day, at a 12-hour interval, and fasting for two hours before and after each dose. On the day of the abortion, participants received two sublingual pills of misoprostol, each containing 20 mg of the medication, administered under the supervision of medical staff. During the hospital stay, nurses closely monitored the vital signs of the women and diligently assessed the volume of bleeding to provide medical assistance if necessary. In cases where participants experienced excessive bleeding in a short period, such as soaking a night pad with blood within half an hour, healthcare providers would implement interventions to control the hemorrhage. Two commonly utilized methods for managing excessive bleeding include intravenous infusion of oxytocin and sublingual administration of misoprostol. The choice of intervention would be determined based on the specific clinical situation and the healthcare provider's judgment.

Data collection

A questionnaire (Q1) was distributed to participants to collect demographic information, including age, educational level, marital status, BMI, maternity history, menstrual history, abortion history, gestational weeks, and social support (from spouses, family members, or friends). A second questionnaire (Q2) was designed in a table format to record specific data points related to the participants' MA process, including the timing of medication intake, the timing of gestational sac expulsion, pain scores, bleeding volume, and walking steps and rate measured before gestational sac expulsion. Additionally, Q2 included an assessment of the participant's mental health using the Chinese version of the 7-item Generalized Anxiety Disorder (GAD-7) Scale, which has a score range of 0–21, to evaluate anxiety levels. To accurately measure bleeding volume, an electric scale was utilized to weigh the blood collected in each participant's pad or bedpan, ensuring precise measurement and recording of blood loss during the MA process. Furthermore, participants were provided with an electric wristband equipped with a recording function throughout the abortion procedure, allowing for continuous and automatic tracking of their walking steps.

Statistical analysis method

Statistical Package for the Social Science (version SPSS 26.0) was used for data analysis. Demographic characteristics of participants were described. Spearman correlation analysis was used to investigate the relationships between various variables.

Results

A total of 450 women who had MA from 1 May to 31 August 2023 in Hongkong University, Shenzhen Hospital. All the data were collected and analyzed.

The mean (SD) age of the 450 women was 32.14 ± 5.57 years. 129 (28.7%) females have a history of dysmenorrhea. 374 (83.1%) participants have caregivers when they come to the hospital for MA. 258 (57.3%) of all participants have a history of cesarean section, 238 of them have cesarean section within 2 times, and 20 of them have more than 3 times. 118 (26.2%) of all participants have experiences of vaginal delivery, only 4 of them had vaginal delivery more than 3 times. For the experiences of abortion, 161 (35.8%) of all participants have a history of surgery abortion and 142 (31.6%) of them have a history of MA. 28 (6.2%) of all participants have uterine complications(Including hysteromyoma, endometriosis, endometrial hyperplasia, uterine prolapse, endometrial polyps, and other related uterine diseases). 16 (3.6%) of all females have a uterine surgery history.

The demographic characteristics of all participants are listed in Table 1.

The results showed that older age increase abortion time (rs = 0.102, $P<0.05$), but reduces pain score during MA (rs=-0.178, $P<0.001$). Patients who have had dysmenorrhea can shorten the time needed for abortion time (rs=-0.097, $P<0.05$). but a positive factor in increasing pain score (rs = 0.106,$P<0.05$) and anxiety score (rs = 0.119,$P<0.05$). Females with a history of cesarean section have a positive influence in relieving pain score (rs=-0.226, $P<0.001$) and anxiety (rs=-0.129, $P<0.001$) during MA. Women who have a history of vaginal delivery can decrease the pain score of MA (rs=-0.117, $P<0.05$) but no statistically significant effect in other results. Females with MA history have no statistical influence in abortion time, bleeding, pain score, and anxiety but those who have experienced surgery abortion can alleviate pain (rs=-0.139, $P<0.001$) and anxiety (rs=-0.093, $P<0.05$) when MA. Data analysis revealed that increasing the number of steps walked or accelerating step rate shortened the abortion time(rs=-0.107, $P<0.05$), (rs=-0.133, $P<0.05$), but both increased voiding pain scores(rs = 0.258, $P<0.001$), (rs = 0.235, $P<0.001$).

The results of the relevant spearman analysis data are displayed in Table 2.

Discussion

Main findings

This study analyzed the factors that affect females' abortion time, bleeding, pain, and anxiety state of MA. In some cases, severe pain is a common occurrence among patients undergoing MA. This discomfort has been identified as a significant factor leading some females to opt for surgical abortion instead [17, 18]. Research detected that painkillers could decrease pain in MA. Instances of incomplete or failed abortion, as well as complications such as heavy

Table 1 Demographic characteristics of all participants

	Mean (SD) /Number	Percentage
Year	32.14 ± 5.57	
BMI	20.37 ± 2.87	
Marital status		
Married	260	57.8%
Unmarried	168	37.3%
Divorced	22	4.9%
Educational level		
Junior school	3	0.7%
High school	61	13.6%
College	334	74.2%
Master or PhD.	52	11.6%
Dysmenorrhea		
Yes	129	28.7%
No	321	71.3%
Caregiver		
Yes	374	83.1%
No	76	16.9%
Cesarean section times		
0	192	42.7%
1-2	238	52.9%
≥3	20	4.4%
Vaginal delivery		
0	332	73.8%
1-2	114	25.3%
≥3	4	0.9%
Numbers of surgery abortion		
0	289	64.2%
1-2	148	32.9%
≥3	13	2.9%
Numbers of medical abortion		
0	308	68.4%
1-2	132	29.3%
≥3	10	2.3%
Uterine complications		
Yes	28	6.2%
No	422	93.8%
Uterine surgery		
Yes	16	3.6%
No	434	96.4%

bleeding and infection, may arise when women do not know how to use the abortion pills correctly [19]. Abortion education and provision from medical staff are very important, as they can have a significant impact on reducing negative emotions such as anxiety and depression [20]. By ensuring that women receive accurate information, counseling, and appropriate care throughout the abortion process, medical staff can help alleviate emotional distress and promote overall well-being. Our hypothesis suggested that older age might be associated with longer abortion duration, although the effect size was small, there was a positive relationship observed between age and abortion duration. Additionally, our findings indicated that older females tended to experience lighter pain during MA. This result is consistent with another study, which reported that teenagers experienced more intense pain during MA compared to adult women [18]. In this study, we discovered that women who had a history of dysmenorrhea were more likely to experience increased pain and anxiety scores during the MA procedure. These findings are consistent with previous research that has also shown a correlation between a history of dysmenorrhea and more severe pain, higher levels of anxiety, and a greater need for analgesics [18, 21]. Results of this research also insisted that a history of dysmenorrhea was associated with a shorter abortion time during MA; embryos are excreted earlier in women with a history of dysmenorrhea compared to women without it. This finding highlights a potential relationship between dysmenorrhea and the efficiency of the MA process. It has been suggested that the uterus of patients with dysmenorrhea may already be experiencing cyclic contractions and an inflammatory response that results in increased smooth muscle sensitivity. This physiologic state may allow drugs such as mifepristone and misoprostol to trigger uterine contractions more rapidly, thereby accelerating the medication flow process. In addition, dysmenorrhea is associated with localized inflammation and angiogenesis in the endometrium, which may affect drug metabolism and effects. This mechanism can lead to a shorter duration of abortion and may also increase the pain experience [22].

Women who have a history of cesarean section seems a protective role in relieving pain and anxiety score. The reasons include the following: 1. Experience and Adaptation: Women who have previously given birth often have a higher pain tolerance, which may result in a more subdued response to pain during the medical abortion process;2. Psychological Preparedness: Women familiar with the processes of childbirth and abortion may be psychologically prepared, leading to lower levels of anxiety;3.Physiological Adaptation: The uterine and related structures of women who have experienced childbirth may react differently to medication, potentially affecting uterine contractions and pain perception. That conclusion is similar to other studies that women with higher age, and richer experiences of previous pregnancies and deliveries (including cesarean section and vaginal delivery) can contribute to decreased pain levels during MA [21, 23]. This research indicated that all factors did not correlate with bleeding and bleeding rate during MA. This also concluded that previous delivery or abortion routes do not impact the duration of MA, and are in line with a retrospective study conducted in Turkey [24]. While other previous studies indicate that there is potential a relationship between the history of childbirth and the duration of MA. These studies have reported that the median duration of the abortion was decreased by 25% in multiparous women and nulliparous women, and the time interval between the first inclusion and fetal expulsion was

Table 2 Spearman analysis table

		Abortion time	Bleeding	Bleeding rate	Pain score	Anxiety
Age	rs	0.102*	0.061	−0.01	−0.178**	−0.064
	Sig.(P)	0.031	0.194	0.838	0.0003	0.176
	N	450	450	450	450	450
Dysmenorrhea	rs	−0.097*	−0.072	−0.031	0.106*	0.119*
	Sig.(P)	0.039	0.127	0.508	0.025	0.011
	N	450	450	450	450	450
Cesarean section	rs	0.009	0.054	0.049	−0.226**	−0.129**
	Sig.(P)	0.852	0.256	0.296	0.0004	0.0002
	N	450	450	450	450	450
Vaginal delivery	rs	0.054	0.02	0.001	−0.117*	−0.028
	Sig.(P)	0.252	0.672	0.978	0.013	0.55
	N	450	450	450	450	450
Surgery abortion	rs	−0.048	0.059	0.073	−0.139**	−0.093*
	Sig.(P)	0.309	0.214	0.121	0.0003	0.048
	N	450	450	450	450	450
Medical abortion	rs	0.016	0.011	0.026	0.058	−0.041
	Sig.(P)	0.73	0.815	0.589	0.223	0.384
	N	450	450	450	450	450
Step rate	rs	−0.113*	−0.058	0.017	0.235**	0.027
	Sig.(P)	0.016	0.22	0.726	0.0004	0.569
	N	450	450	450	450	450
Total walk steps	rs	−0.107*	−0.018	0.031	0.258**	0.015
	Sig.(P)	0.024	0.705	0.511	0.0004	0.75
	N	450	450	450	450	450

*: $P<0.05$; **: $P<0.001$

significantly shorter in multiparous than in primiparous women [25]. Through the present study, it was found that increasing PA behaviors during MA, such as elevating the total number of steps walked and accelerating the step rate can lead to a shorter duration of MA, however, this process may lead to an increase in the pain index. The reason for this may be related to the fact that exercise leads to accelerated blood flow to the tissues throughout the body, resulting in an elevated rate of blood circulation, which promotes the absorption of the medication for the abortion. Moreover, when the body walks upright, the longitudinal axis of the uterus is perpendicular to the ground, which facilitates the elimination of tissues during uterine contractions. However, exercise can cause uterine spasms and muscle pain, which can cause pain scores to appear elevated.

Novelty and significance

Based on the available research, there is a lack of studies that have specifically examined the impact of abortion history on MA outcomes. To the best of our knowledge, this study represents the first attempt to evaluate the effect of abortion history on later MA. By exploring the relationship between abortion history and MA outcomes, this research contributes to the existing knowledge in the field and sheds light on a previously unexplored area. The findings of this study may provide valuable insights into the potential influence of abortion history on the outcomes of MA procedures. By analyzing this study, it will be possible in the future to predict what might happen during an abortion based on some basic information about the patient and to make better decisions for clinical.

Interpretation

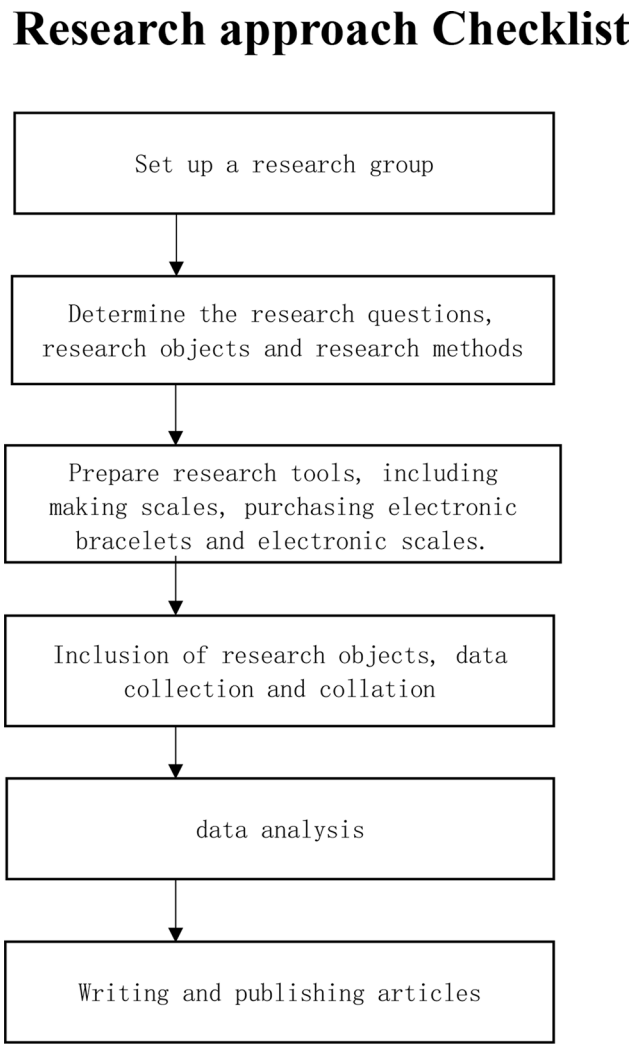
Limited research has addressed the correlation between PA and the duration of MA. We previously assumed that appropriate activities, such as walking during the abortion procedure rather than remaining lying in bed, may facilitate the expulsion of the placenta and lead to a shorter abortion duration. The patient's activity level was based on the number of steps recorded through the electronic bracelet, which was started after the administration of misoprostol and stopped after the expulsion of the fetal sac, after the medication abortion process was completed, the patient was mainly bed-ridden; the anxiety scores were statistically converted by the GAD-7 scale filled out by the patients, and at least two investigators integrated the data statistically, and then the average of the data was taken as the final anxiety scores.

Conclusion

In this study, we got the conclusions as follows:

1. Individuals with a history of dysmenorrhea and a high PA may experience a shorter duration of abortion.

2. Elderly individuals, cesarean section, vaginal delivery, and surgical abortion, may contribute to a decreased perception of pain during MA.
3. A history of dysmenorrhea was associated with higher levels of anxiety, while a history of cesarean section and surgical abortion were associated with lower levels of anxiety.
4. We can encourage the patient to engage in more PA during the MA process and make the best clinical decision based on her baseline condition to determine possible pain indices as well as anxiety. These findings highlight the complex interplay of various factors about the duration of abortion, pain, and anxiety experienced during MA. Further research and consideration are necessary to better understand and optimize the management of these factors to improve the overall experience and outcomes of MA procedures.



Abbreviations

MA Drug abortion
PA Physical activity

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03672-9.

Supplementary Material 1

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Author contributions

W. B. W drafting the article. L. Y. W and W. J. W substantial contributions to conception. W. X. Y and X. F. Z collected data. Q. Q. J and Y. G and W. C analyzed the data. Y. H. D and Y. H. Z final approval of the version to be published.

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Data availability

The Data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request. Analyses were performed on SPSS 26.0 software (IBM SPSS, Armonk, NY, USA SPSS Software| IBM).

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of the University of Hong Kong–Shenzhen Hospital (approval number: (2023)152). The study complies with ICH-GCP, GCP, national standards, and relevant regulations. All participants were fully informed about the study's purpose and provided written informed consent prior to participation.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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