From Department of Women's and Children's Health
Karolinska Institutet, Stockholm, Sweden

FAMILY PLANNING SERVICE – ADDRESSING POTENTIAL BARRIERS

Volodymyr Podolskyi

Karolinska Institutet

Stockholm 2024

Published by Karolinska Institutet.
Printed by Universitetsservice US-AB, 2024

ISBN 978-91-8017-064-2
Cover illustration: Cover picture represents the support for Ukraine by Sweden. Artwork created using the AI tool.

Family planning service – addressing potential barriers

Thesis for Doctoral Degree (Ph.D.)

By

Volodymyr Podolskyi

The thesis will be defended in public at the Conference room, Widerströmska huset 8th floor, Karolinska Institutet, on Wednesday, April 10, 2024, at 9.00 am.

Principal Supervisor:
Associate Professor Lena Marions
Karolinska Institutet
S1 Department of Clinical Science and Education, Södersjukhuset
Division of Obstetrics and Gynecology

Co-supervisor(s):
Professor Kristina Gemzell-Danielsson
Karolinska Institutet
K6 Department of Women's and Children's Health
Division of Obstetrics and Gynecology

Opponent:
Cristian Furau
Western University of Arad, Romania, Arad Romania
Department of Obstetrics and Gynecology

Examination Board:
Professor Viveca Odlind
Uppsala University
Department of Women's and Children's Health
Division of Obstetrics and Gynecology

Associate Professor Sebastian Brusell Gidlöf
Karolinska Institutet
Department of Clinical Science, Intervention and Technology
Division of Obstetrics and Gynecology

Professor Angelica Lindén Hirschberg Karolinska Institutet
K6 Department of Women's and Children's Health
Division of Obstetrics and Gynecology

To my parents, to my country.

Popular science summary of the thesis

Access to safe and effective family planning services is a fundamental requirement for promoting reproductive health. It is essential that individuals of reproductive age have the autonomy to make informed choices regarding parenthood, including the timing and circumstances of conception. To achieve this, individuals should have access to a range of contraception methods as well as abortion methods that are safe and readily accessible, irrespective of their geographic location or socioeconomic status. Although medical abortion has become more widely used for ending pregnancies, it's crucial to acknowledge that there are still obstacles and areas of research that need to be addressed in terms of self-managed abortions.

Our project has focused on women's perception of contraception, and expanded access to home abortion and potential barriers for obtaining medical abortion via telemedicine in different settings.

Women in Ukraine participated in a survey regarding their experiences with different contraceptive methods. Most women expressed a desire to delay or avoid future pregnancies following an abortion or delivery. However, the level of familiarity and understanding of the benefits of long-acting reversible contraceptives such as intrauterine devices (IUDs) and implants was found to be inadequate. Instead, barrier methods and oral contraceptives were the most commonly used methods, while only a small proportion of women had experience with IUDs.

With the purpose to compare if expanding medical abortion at home up to 10 weeks is as safe and effective as in earlier pregnancy, we performed a clinical study. Pregnant women with a pregnancy length up to 63 days were compared to those with a pregnancy length up to 70 days. Results showed that complete abortion occurred in 95% (CI=89-98) of women in the early group and 96% (CI=92-99) in the late group. No significant differences were observed in terms of side effects, and the acceptability of the procedure was high in both groups.

Pre abortion ultrasound is a common procedure for dating of the pregnancy. However, this examination may constitute a barrier for abortion specially for women using telemedicine. This option has become an important tool to increase access to healthcare and also when it comes to family planning. We have collected data from the web based abortion provider Women on Web and performed a survey regarding women's perception of the need for an ultrasound examination prior to medical abortion. We found that a majority of women in our survey did not undergo a pre abortion ultrasound examination. Main reasons stated were that they did not find it necessary or lack of resources and privacy issues.

The thesis emphasizes the significance of safe and effective family planning and abortion services for promoting reproductive health. Research on Ukrainian women demonstrated insufficient knowledge about long-acting contraceptive methods, despite their desire to delay or avoid future pregnancies. A clinical trial on home use of medical abortion up to 10 weeks found no significant differences in safety and effectiveness between pregnancies up to 63 days and those up to 70 days. Obtaining a pre-abortion ultrasound can be a barrier to accessing medical abortion. Among women obtaining medical abortion through Women on Web confidence in pregnancy length was the major reason for not having an ultrasound scan. While, lack of resources, and privacy concerns were other major reasons. These obstacles must be addressed to ensure access to safe and effective family planning and abortion service, regardless of location or socioeconomic status.

Abstract

Background

Access to family planning service is crucial for reproductive health. Family planning service include contraceptive methods as well as safe methods for pregnancy termination when needed. It was estimated in 2019 that 163 million women globally in fertile age (18-49 years) have an unmet need for contraception. Reasons include poor knowledge among users and providers, experience or fear of side effects, limited availability of family planning services of good quality, limited resources and sometimes also religious or political opposition. Similar barriers are also present for access to abortion service of good quality.

Aim

To evaluate recently pregnant women's perceptions of contraceptive methods and to evaluate the effect of structured contraceptive counselling on contraceptive uptake. In most settings home administration of misoprostol is offered up to 9 weeks of pregnancy and we wanted to also evaluate the efficacy and women's perceptions of home administration of misoprostol in medical abortion up to 10 weeks of gestation and to explore women's perception of a pre abortion ultrasound when opting for medical abortion on-line.

Material and methods

We performed a survey, among recently pregnant women in Kiev, Ukraine, which included questions regarding experience and knowledge about contraceptive methods. We also performed a randomized controlled trial where young women were allocated to either advanced, structured counselling abort different contraceptive method or regular counselling. The primary outcome was to measure if the effect on participants choice of effective contraceptive methods would differ between the intervention and the control groups.

In order to expend access to home medical abortion we included women with a gestational age up to 70 days, opting for medical abortion using home administration of misoprostol. We investigated effect of the treatment and women's perception.

We also made an analysis of data from the website Women on Web where women opting for medical abortion on line participated. We evaluated the use of pre abortion ultrasound and women's perception about the need for this examination.

Results

We found that the knowledge on effective contraceptive methods were low in our study group and that fear of side effects were a common reason for not using some methods.

Structured counselling was found to have a profound impact on the young women's preferences for effective contraceptive methods. A significant increase in long-acting reversible contraceptives was observed in the intervention group.

Our abortion study supports the previously shown data that it is safe and effective to offer home administration of misoprostol for medical abortion up to 10 weeks of gestation. Most women opting for medical abortion through the online service did not have a pre abortion ultrasound scan and they did not find that necessary. Lack of resources or privacy issues were reasons stated.

Conclusion

The studies in the thesis confirm that there is still a need to increase knowledge regarding effective methods for family planning. It also shows that constructive counselling has an effect on the uptake of contraceptive methods. Home administration of misoprostol for medical abortion is as safe up to 70 days of gestation as it is in earlier gestations. Pre abortion ultrasound examination can be a barrier to access abortion service and women opting for abortion in our study do not perceive this a necessary demand.

List of scientific papers

I. Contraceptive experience and perception, a survey among Ukrainian women.

   Podolskyi V, Gemzell-Danielsson K, Marions L.

   BMC Womens Health. 2018 Sep 29;18(1):159.

II. Effectiveness and acceptability of home use of Misoprostol for medical abortion up to 10 weeks of pregnancy

   Podolskyi V, Gemzell-Danielsson K, Maltzman LL, Marions L.

   Acta Obstet Gynecol Scand. 2023 May;102(5):541-548.

III. Preabortion ultrasound - a patient perspective

   Podolskyi V, Gemzell-Danielsson K, Marions L, Gomperts R.

   Eur J Contracept Reprod Health Care. 2023 Oct;28(5):268-273.

IV. Long-Acting Reversible Contraception Choices in Young Women: Insights from a cluster randomised controlled trial, the LOWE* Trial
   * LARC fOrWard counsElling-a cluster randomized trial

   Emtell Iwarsson K, Podolskyi V, Bizjak I, Kopp Kallner H.,Gemzell Danielsson K, Envall N

   Submitted to Journal of Adolescent Health 14.02.2024

Contents

List of abbreviations

aOR	Adjusted odds ratio
CI	Confidence interval
COVID-19	Coronavirus Disease 2019
CuIUD	Copper intrauterine device
GA	Gestational age
IQR	Interquartile range
IUC	Intrauterine contraception
IUD	Intrauterine device
LA	Long acting
LARC	Long acting reversible contraception
LNG-IUD	Levonorgestrel intrauterine device
LMP	Last menstrual period
LOWE	the LARC fOrWard counsElling, LOWE-trial
MA	Medical abortions
MRI	Magnet resonance imaging
OR	Odds ratio
SARC	Short acting reversible contraception
UK	United Kingdom
WHO	World Health Organization

1 Introduction

Sexual and reproductive health depends on the possibility to have access to effective and safe family planning methods. Methods to prevent pregnancy as well as methods to terminate unwanted pregnancy are important parts of family planning services [1]. Settings where individuals have no or poor access to effective and safe family planning services are often, or always, accompanied by poor general and reproductive health, demonstrated by high maternal mortality as well as high under-five mortality[2]. This makes family planning service something crucial for a society caring for the inhabitants. The present thesis is aiming to explore women's choice, experience and perception regarding methods for family planning including termination of an unwanted pregnancy, and to identify potential barriers.

2 Background

2.1 Contraception

2.1.1 Contraceptive uptake

Today many effective and safe contraceptive methods are available. However, still it is estimated that more than 225 million women who want to avoid pregnancy do not use effective contraception [3] , contributing to approximately 85 million unintended pregnancies[4].

There are many barriers to women´s access to safe methods for family planning. Political and financial factors affect the possibilities for many women globally to make their own decision regarding family planning and thus the future of their life [5].

An important aspect is the presence or absence of information on contraception in the local culture and religion. Modern society either could interact with the historical cultural or religious aspects of fertility but that highly depends on the role of the traditions in the society and everyday life [6,7] .

The most dramatic example of tradition influence on the contraceptive uptake and rate of unwanted pregnancy is gender inequality [8] . A strange medieval tradition that somehow survived in the modern society. Limited access to education for women and girls leads to absence of knowledge on women's rights and modern contraceptive methods. Women undergo marriage and childbirth under psychological pressure, including possible episodes of violence from male partner or relatives [9]. Economical aspect is also very important in societies without gender equality for example the absence of free funds, which women could use to buy hormonal contraceptives or pay for abortion services. Uneducated or low educated women have limited options to make a career, especially in working areas with a male dominance.

United Nations Millennium Declaration, committing to achieve the Millennium Development Goals by 2015 was signed by 189 countries including Ukraine. Target 5- Improvement in maternal health through universal access to reproductive health requires an increased contraceptive prevalence rate and a decrease in unmet need for family planning methods.

The number of heterosexually active women of reproductive age without current desire of childbearing and who are not using a contraceptive method, are used to calculate the total unmet need for family planning. Unmet need for family planning is also closely associated to gender inequality and poverty, affecting quality of life [10,11].

2.1.2 Contraceptive knowledge

Exploring the factors that constitute barriers to utilization of family planning services is crucial. Lack of knowledge among potential users or lack of knowledge among providers could be some factors. Misperceptions regarding efficacy and side effects are common [12–14]. A study from Romania among female university students showed low knowledge regarding hormonal contraception and many expressed negative attitudes towards them [15] . Medical students had however better knowledge compared to students studying in other areas such as pharmacy students. It is often stated that the most common reason for discontinuation from hormonal contraception is experienced side-effects, however there are no data indicating that this is really true. Westhoff and coworkers interviewed 1716 young women 3 and 6 months after initiation of oral contraception [16]. By 6 months 60% discontinued but most reported no side effects and most discontinuation occurred for reasons unrelated to side effects. Fear of side effects are however frequent and might constitute a barrier for not wanting to use the method. Also, for Intrauterine contraception (IUC) there are many myths and misperceptions regarding both efficacy and safety [17]. Insertions of an IUC in nulliparous women have been considered a contraindication due to risk for complications such as infections, perforations and impaired fertility. However, the evidence shows none of these complications to be more frequent among nulliparous women compared to parous [14,18,19]. It has been shown that infection and perforation after IUC insertion are very rare complications nowadays [20].

Long-acting reversible contraception (LARC), such as IUC and subdermal implants, are proven to be safe and effective. LARC methods constitute the most effective methods mainly because it does not require the attention of the user on a daily, weekly or monthly basis [21,22].

According to WHO guidelines LARC should become the method of choice for immediate postabortion contraception and it is currently widely used after induced abortion. Early insertion of long-acting contraceptive methods is the most effective method in preventing a new unintended pregnancy since the first ovulation could occur already a week after the surgical as well as medical abortion procedure [23,24].

2.1.3 Contraceptive counselling

The contraceptive counselling itself has to be of high quality. The contraceptive CHOICE project was launched in St Louis, USA and included over 9000 sexually active women 14-45 years of age [25]. After high quality counselling by trained providers, participants were offered, free of charge, their preferred method of choice for contraception. Seventy-five per cent chose one of the three LARC methods. Compared to neighbouring regions there was a substantial reduction in teen pregnancies. The LARC users were also much more prone to continue with their chosen method after both 12 and 24 months, compared to the SARC users[25].

The research conducted by Gemzell-Danielsson et al. and Iwarsson et al. collectively highlights the transformative impact of comprehensive contraceptive counselling on women's contraceptive choices. In Sweden, Gemzell-Danielsson et al.'s findings reveal a significant shift towards non-daily combined hormonal contraceptives (CHCs) post-counselling, underscoring the value of informed guidance in aligning contraceptive methods with individual needs [26]. The LARC fOrWard counsElling-a cluster randomized trial (LOWE trial) shows that structured counselling most efficiently increases LARC uptake and decreases the number of unintended pregnancies [27]. These studies support the use of structured, evidence-based counselling in all reproductive health service areas as an important tool for improvement of contraceptive care and reproductive autonomy.

Cost of contraceptive method is one of the main barriers for provider recommendations of LARC methods [28]. In Sweden, modern contraceptive methods are to a large extent subsidized by the state but in many other countries such as Ukraine women have to pay everything by themselves. In a study from USA, contraceptive choice among teenagers were explored in two states with different insurance policies, Texas and California. In Texas, with much lower insurance coverage for contraception than in California, the adolescents stated that they could not afford the contraceptive method they otherwise would have preferred[29].

2.2 Medical abortion

The medical abortion procedure usually consists of administration of a combined treatment consisting of two drugs. The first drug is mifepristone – the antiprogesterone (progesterone receptor modulator), which cause shedding of the decidua, softens the uterine cervix and blocks the effects of progesterone on uterine myocytes, causes the start of uterine constrictions and increases the sensitivity for prostaglandins [30]. The dose of mifepristone for pregnancy termination was initially an oral administration of 600mg, but later studies showed that 200mg of mifepristone had the same effect [31]. The second drug for the pregnancy termination procedure is misoprostol. Misoprostol is a synthetic prostaglandin E2 analogue that induces cervical ripening and increases uterine contractions. The recommended dose of misoprostol for first trimester medical abortion following pretreatment with mifepristone is 800mcg, administered sublingually or vaginally (or buccally). Depending on the effect and gestational length additional doses of 400mcg may be needed. The interval between mifepristone and misoprostol administration is recommended to be 24-48 hours [32–34].

2.2.1 Medical abortion at home

Improving women's acceptance of the procedure has also been an important focus of research. Allowing early pregnancy termination to be performed as an outpatient procedure where misoprostol is administered at home has been shown to be a safe and highly accepted procedure for both the woman and her partner. Home administration of misoprostol was first limited to a gestational age up to 49 days, but later increased to 63 days [35]. In the US and in Sweden it is routine to offer home administration of misoprostol in medical abortion and the acceptance is high among women [36,37]. It is important to provide careful information to women before home-use of misoprostol. Bleeding and pain are an expected part of the process. Women who are not aware about this might find it harder to accept [38]. Expanding the outpatient abortion service to include women with a more advanced pregnancy length has been shown to be effective in some settings. Studies indicate that increasing the upper limit of the gestational age to 70 days is safe and effective [39–41]. It was however observed that the more advanced pregnancy the more bleeding was reported. There were no differences in number of ongoing pregnancies or need for blood transfusion [39]. A review of home abortion in late first trimester pregnancy is reassuring that the efficacy remains unchanged in the 10th gestational week compared to earlier gestation but the authors emphasize the need for more clinical studies [42]

Current changes in medical abortion legislation in Great Britain, due to the COVID-19 pandemic, allowed women to receive both drugs, Mifepristone and Misoprostol, at home without the need to diagnose pregnancy at the hospital. Medical abortion drugs were delivered directly to women, and in case of any adverse events, women could receive

medical aid in the clinic. Prospective cohort studies comparing telemedicine and traditional abortion care models in Great Britain showed high efficacy and acceptability rates in both groups [43].

When women were given the possibility to administer misoprostol at home the next development was to also enable women to assess the outcome after medical abortion themselves outside of the clinic. Several reports confirmed that the use of sensitive pregnancy test by the women were as safe as an evaluation at the clinic[44]. The ability to assess complete abortion at home is part of most telemedicine models [45]. Telemedicine can't replace all existing healthcare services, but for healthy women it may be a valuable option to standard care [46].

2.2.2 Medical abortion and telemedicine

Altogether, the series of publications by Gomperts et al, and Aiken et al. bridges the gap to better understand how telemedicine facilitates medical abortion services and facilitates comparative analysis into different geopolitical scenarios [47–52]. These studies shed further light on the crucial role of telemedicine in improving the accessibility of safe abortion services especially in places where conventional access is limited or unavailable. The Women on Web (WoW) is an international non-profit organization that avails safe abortion services through telemedicine technology to women across the globe, and especially to those in areas where safe abortions are not accessible or are limited. The organization provides online counselling, support, and, if it is feasible, delivers abortion pills to individuals with a focus on confidentiality, security, and reproductive freedom. The studies demonstrate that telemedicine can offer a viable alternative to unsafe abortion with outcomes comparable to those of in-clinic procedures. Using online consultations and medication mailing options, WoW provides the critically needed health services for poor populations, thus proving the power of telemedicine to eliminate global health inequality in reproductive care. It highlights the relevance of clinical guideline adaptation to embrace telemedicine within reproductive health services and champion's policy adjustments to fill in the vacuum in safe abortion care everywhere. [53]

The randomized controlled trial conducted by Endler et al. in South Africa supports the telemedicine effectiveness, safety, adherence, and acceptability for medical abortions [54]. The study demonstrates the telemedicine interventions as being non-inferior to standard care. The results are particularly relevant in settings where the provision of safe abortion services is limited, thus indicating that telemedicine could play an important role in addressing health disparities in reproductive care [54].

The COVID-19 pandemic profoundly disrupted access to reproductive health services. A study from Scotland showed 98% efficacy of abortions provided by telemedicine

services during the COVID-19 outbreak including women with a gestational age up to 12 weeks [55].

Furthermore, the COVID-19 pandemic significantly reduced contraceptive visits due to social distancing, healthcare system strain, and prioritization of COVID-19 care[56]. The pandemic also accelerated telemedicine adoption for contraceptive counselling, as shown by Stifani and coworkers, [57].

2.2.3 Medical abortion and ultrasound examination

Recent research, including a pivotal study by Ralph in AJOG 2022, scrutinizes the efficacy of last menstrual period (LMP) and ultrasound in determining gestational age for abortion services [58]. Self-assessment of gestational duration, when supplemented with targeted questions, aligns closely with ultrasound findings, suggesting the possibility of expanding assessment methods to improve access to medication abortion, particularly where ultrasound access is limited. Conversely, Bracken et al.'s exploration into non-ultrasound eligibility assessment for medical abortion indicates minimal inaccuracies with LMP and physical examination, advocating for these cost-effective alternatives in enhancing service accessibility [59]. Blanchard et al. further affirm the reliability of provider clinical judgment in gestation estimation, supporting the safe provision of medical abortion without mandatory ultrasound confirmation[60]. The World Health Organization (WHO) abortion guidelines also recommends against the use of routine ultrasound in medical abortion. However, ultrasound should be offered when medically indicated [53]. Collectively, these findings underscore a nuanced view of gestational assessment, balancing ultrasound's precision against LMP's accessibility, with an overarching goal of optimizing care and choice in abortion services. However, so far, the acceptability and views of women on ultrasound in medical abortion has not been extensively explored.

3 Research aims

Overall aim of the project: The project aims to find and describe some potential barriers to family planning and to improve standard of care.

3.1 Objectives

I. To explore contraceptive uptake and knowledge among recently pregnant women (post abortion and postpartum women) (Paper I).

II. To study efficacy and acceptability in gestations up to and above 63 days with home use of Misoprostol. (Paper II).

III. To evaluate the use of ultrasound and reasons for non-use ultrasound among from a patient perspective among women who requested abortion through telemedicine from "Women on Web" (Paper III).

IV. To assess the impact of structured contraceptive counselling on the contraceptive choices of young women aged 18-25 years of age. (Paper IV)

4 Materials and methods

4.1 Table 1: Outline of papers included in the thesis

	Study I	Study II	Study III	Study IV
Aim	to explore contraceptive uptake and knowledge among recently pregnant women	to study efficacy and acceptability with home use of misoprostol for medical abortion in gestations up to 70 days	to evaluate the use and perception of ultrasound among women opting for abortion through a website	to assess the impact of structured contraceptive counselling on the contraceptive choices of young women
Design	self-administered questionnaire	prospective multicentre cohort study	online survey	randomized controlled trial
Participants	500 women who had an abortion or a delivery (250 women post abortion and 250 women post-partum)	273 women with gestations up to 70 days, opting for medical abortion.	59648 pregnant women from 207 countries, requesting abortion through the website	770 women aged 18-25 years seeking contraceptive counselling.
Data Collection	January-August 2015	November 2014-november 2021	January 2019-October 2020	September 2017 – May 2019

4.2 Study design and population

4.2.1 Study I

This study was aiming to explore knowledge and attitudes towards modern contraceptive methods, among women with a recent pregnancy in Ukraine.

A survey was done among women attending, three gynaecological units and one postpartum clinic in Kiev, Ukraine. The gynaecological units were located at two Public Hospitals in Kiev. The postpartum clinic was located at the Institute of Paediatrics, Obstetrics and Gynaecology of National Academy of Medical Sciences of Ukraine in Kiev. A convenience sample of 500 women who had undergone abortion or delivery (250 women post-abortion and 250 women postpartum) were consecutively invited to participate in the study. Prior to their discharge from the clinic, the doctor in charge provided the women with study-related information, and the women provided their informed consent to participate in the study by signing a form.

A self-administered questionnaire was utilized to gather information from women on various demographic questions, including age, parity, gravidity, relationship status, and educational level. The questionnaire also included questions regarding plans for future pregnancies, contraceptive experience, knowledge, and source information as well as perceived primary barriers to contraceptive uptake (see appendix). For experience and knowledge regarding contraceptive methods participants were able to select more than one option from a list of potential methods, The questionnaires were completed during the participants' stay at the clinic, either in their single rooms or in a separate private room at the postpartum unit or at the gynaecological unit. Prior to the main study, a pilot survey involving 50 women was conducted and these were included in the final results.

4.2.2 Study II

The aim of this study was to study efficacy and acceptability with home use of misoprostol for medical abortion in gestations up to and above 63 days.

A prospective multicentre open-label cohort study was designed to be a pragmatic non-inferiority trial to be conducted in five units but was mainly carried out in three clinics: Stockholm, Södersjukhuset, and two separate clinics at Karolinska University Hospital. Some patients were also recruited from Sahlgrenska University Hospital, Göteborg and Helsingborgs Hospital. Women opting for medical abortion up to 70 days of gestation were enrolled in the study between November 2014 and November 2021. Recruitment was stopped in November 2021 due to slow patient inclusion. The inclusion criteria were an ultrasound-confirmed intrauterine pregnancy up to 70 days of

gestation, willingness to administer misoprostol at home, 18 years of age or older, haemoglobin level higher than 100 g/L, ability to comprehend the instructions, and absence of any known health problems or clinical findings that could affect the patient's safety during the study. This study was not designed as a randomized trial, and women who had contraindications to mifepristone or misoprostol (such as anaemia, breastfeeding, liver disease, bleeding disease) or whose pregnancy length was more than 70 days of gestational age were excluded. All women included in the study were stratified into two groups based on gestational age. The first group included women with a gestational age up to 63 days, while the second group included women with a gestational age between 64 and 70 days.

4.2.2.1 Procedure

Trained midwives provided information and doctors were responsible for enrolling women in the study at all clinics. Oral and written information were provided to eligible women prior to inclusion and all participants signed a consent form. At the initial clinic visit, women were administered 200 mg of mifepristone on-site and given 1200 mcg of misoprostol, pain medication, and a diary to daily record bleeding, pain, and any side effects that occurred during treatment. The participants were instructed to take four tablets of misoprostol vaginally at home 24-48 hours after mifepristone administration. If bleeding did not start within 3 hours after misoprostol administration, they were advised to take two additional misoprostol tablets sublingually.

Approximately four weeks after the first visit, women were scheduled for a second visit to one of the study sites. During this visit, women were asked to return any unused misoprostol tablets and/or empty blisters and the diary. Complete abortion was assessed using a low-sensitivity urine pregnancy test or transvaginal ultrasound examination to evaluate the treatment outcome. Women were also asked about ongoing bleeding, any other symptoms, or possible adverse events. If ongoing pregnancy, heavy uterine bleeding, or retained products of conception were detected, they were treated according to the local guidelines of the study site.

All women were asked to complete a questionnaire at follow-up regarding their satisfaction and perceptions about the abortion procedure and preferred method of contraception. The questionnaire included seven statements on satisfaction and one yes-or-no statement regarding recommending home abortion to a friend in the same situation. The worst pain experienced during the abortion procedure was assessed on a scale from 1 to 10.

The primary objective of the study was to assess efficacy in gestations up to 70 days with home use of misoprostol, defined as complete abortion without any need for surgical or medical intervention due to incomplete abortion or ongoing pregnancy.

Secondary objectives included pain, bleeding, side effects, and women's satisfaction and perception of home use of misoprostol.

4.2.2.2 Sample size calculation

Our research design intended to execute a non-inferiority study, aiming to compare the efficacy and acceptance of medical abortions carried out within two different gestational age ranges - up to 63 days versus 64 to 70 days. Over 88% of early pregnancy medical abortions conclude without the need for any additional intervention. Assuming the true difference in efficacy is 8.7%, we could assert with 95% power that the upper limit of a one-sided 95% confidence interval would exclude a treatment difference greater than 1.05%, thereby establishing non-inferiority.

Recognizing the likelihood of participant drop-out, our preliminary strategy involved enlisting a total of 660 women, all with a gestational age not exceeding 70 days. This population was further to be divided into two specific groups depending on gestational length to facilitate a thorough comparison.

4.2.3 Study III

This was a cohort study aiming to investigate women's attitudes towards not undergoing ultrasound assessment prior to abortion. The study was part of a larger project aiming to assess abort-seeking women's self-awareness regarding reproductive health. The study included women who had requested medical abortion via the website www.womenonweb.org (WoW) between January 1, 2019, and October 5, 2020. All participants were asked to complete an online survey before receiving abortion drugs for self-administration. The questionnaire included general information regarding health and potential contraindications and questions regarding methods of pregnancy assessment (clinical diagnosis, ultrasound scan, or self-assessment). During the pre-abortion online consultation, women were informed that ultrasound examination is important in determining the exact length of pregnancy and to exclude ectopic pregnancies (pregnancies outside of the uterus). Women answering that they did not have a pre-abortion ultrasound examination were given the option to choose reasons for not having a pre-abortion ultrasound scan, such as affordability, lack of knowledge about where to get one, fear of partner or other individuals finding out, inability to travel to a clinic due to distance or transportation, belief that an ultrasound was unnecessary, lack of knowledge regarding the need for one, or simply not having enough time. The primary objective was to evaluate women's perceptions regarding the necessity of ultrasound scans prior to undergoing medical abortion, while the secondary objective was to compare the demographic characteristics of women who had or had not undergone pre-abortion ultrasound scans. The anonymized data obtained from the WoW database were converted into Excel. Missing values were recorded for variables

where answers were not provided by participants or could not be evaluated. The demographic characteristics of women were analysed using descriptive statistics.

4.2.4 Study IV

This study, part of the LOWE-trial - a multicentre cluster randomized controlled trial (LARC fOrWard counsElling)[27], examined a subset of 18–25-year-olds from a cluster randomized trial in Stockholm County, Sweden. This trial assessed the impact of structured contraceptive counselling on LARC selection and initiation at abortion, youth, and maternal health clinics. Clinics were randomized in a 1:1 ratio to provide either structured contraceptive counselling (intervention) or to remain with their standard contraceptive counselling (control). All patients receiving contraceptive counselling at these clinics, and accepting to participate, constituted the clusters in the trial.

The randomization was stratified by clinic type, and for youth and maternal health clinics by the proportion of migrants within the catchments area. Masking of allocation was not applicable on the cluster level, however, patients receiving the intervention did not receive information about the purpose of the study. An independent statistician performed the randomization, using the statistical software R 3.4.0 (www.r-project.org).

According to Swedish national regulations contraceptive counselling and methods were free (up to 21 years) or subsidized (up to €9 annually for those up to 26 years).

Between September 2017 and May 2019, the LOWE trial was conducted across 28 clinics, enrolling 1,338 participants. Of these, 658 were assigned to receive the intervention at 14 clinics, and 680 constituted the control group at the remaining clinics. The average cluster size was 48 participants, with a range from a minimum of 11 to a maximum of 60. The study population (n=770) comprised 375 participants from the intervention group and 395 from the control group. Clinics were randomly assigned to either provide the structured counselling intervention or continue standard counselling. The intervention included an educational video in Swedish with English subtitles, a method-specific pregnancy rate chart, four key questions, and a toolbox with contraceptive models. The video was viewed pre-appointment, while other elements were used during the visit. Healthcare providers at intervention clinics were trained to use all components together.

Participants and healthcare providers filled out surveys at the initial clinic visit and subsequent three, six, and 12-month follow-ups. Telephone interviews and medical record reviews supplemented data collection, especially for participants with incomplete data.

The primary outcome was the effect of the intervention on young women's LARC choice at the initial visit based on the report of the health care provider. Secondary outcomes included LARC initiation and use, pregnancy rates, satisfaction with the intervention by

the type of visit, and SARC choice and efforts to improve satisfaction and compliance such as extended use.

4.3 Statistics

4.3.1 Study I and III

The studied population was characterized in relation to the research questions using descriptive statistics.

4.3.2 Study II

The means and standard deviations of continuous data and the median and range of discrete data were reported. The normality of the distribution was evaluated using the Shapiro-Wilk test. The Mann-Whitney U test was used to compare means between groups, while Fisher's exact test was used to compare categorical variables. The statistical significance was set at a p-value of ≤0.05. All statistical analyses were performed using R version 4.2.1 (R Core Team, 2021).

4.3.3 Study IV

To explore the primary outcome, our study was based on a sample size of 28 clinics and a total of 1,364 participants of the main trial. We collected data from participants in each of the three types of clinics participating in the main trial. We used Shapiro-Wilk tests to evaluate the normal distribution of variables. We used the data non-parametric Kruskal Wallis test to analyse proportions, setting a two sides significance threshold at $p < 0.05$.

Our odds ratio for the intervention effect was derived by logistic regression, with fixed factors of only the intervention (control being the reference), and clinic as a random factor. To obtain the adjusted odds ratio, we expanded the logistic regression model to include additional fixed factors: intervention (control as reference), age, highest education level of intended LARC user, previous pregnancy status and history of abortion use prior to sexual debut. Also taking the clinic into account as a random factor. Statistical analyses were done in R, version 4.3.2 (www.r-project.org).

4.4 Ethical considerations

All studies were conducted in accordance with the World Medical Association Declaration of Helsinki.

4.4.1 Study I.

All data collected in the study was anonymous and women included gave written consent prior to inclusion. All were invited to participate only after their treatment was completed reducing the fear that a potential decline might affect the treatment. By participating in the study is possible that the awareness regarding effective contraceptive methods increased among the women. Ethical permission for the study was received from the ethics committee of the Institute of Paediatrics, Obstetrics and Gynaecology of the National Academy of Medical Sciences of Ukraine (7/2013-12-27).

4.4.2 Study II.

The case report forms from which data were extracted were anonymous and could not be used to track individual patients; hence, personal integrity was preserved during the study. The women were given oral and written information about the study's aim and procedures before obtaining their written informed consent. Participating women were asked some detailed information regarding their symptoms during the observation period and some might feel this to be sensitive. On the other hand, the participants were given more attention than regular patients something that may give a feeling of security. Patients had the right to withdraw from the study at any time without giving any reason and without affecting their care. This project was approved by the Regional Ethical Review Board in Stockholm January 22, 2014, Reg. No 2013/2160-31/2.

4.4.3 Study III.

This study is part of a broader research project aiming to evaluate abortion seeking women's self-awareness of health. All data, already anonymized, was collected prior to initiation of our project and no individual data was presented. The research project was approved by Regional Ethical Review Board in Stockholm (Solna, Sweden) (2009/2072-31/2).

4.4.4 Study IV.

All participants voluntarily joined the study and could withdraw anytime without impacting their care. They were given oral and written information regarding the study and the study's purpose. All women were given opportunities to ask questions. In order to avoid coercion no direct benefits were offered to participants. Structured contraceptive counselling might thus have increased awareness and informed decision-making in contraception, demonstrating the study's adherence to ethical principles. The

research project was approved by the regional ethics committee in Stockholm (Dnr 2017/525-31/4).

5 Results

5.1 Study I.

A total of 500 women with a recent pregnancy were included in the study, 250 women after an abortion and 250 women after a delivery. The demographic characteristics is presented in table 1 in paper I. The main finding from this project was that knowledge and experience regarding effective contraceptive methods was low among women responding to our survey. The majority of the women (67%) wanted to postpone a new pregnancy for at last 3 years following child birth or abortion or to refrain from further pregnancies. Thirty-seven women (9%) expressed a wish for a future pregnancy within one year and 24% wanted to wait between one and three years.

Barrier methods (condoms and pessaries) and oral contraceptives were the most commonly used methods (75% and 46% respectively) whilst only a few women had used IUC (16%). (Fig. 1) (Paper I) The knowledge regarding LARC methods such as IUC was low (17%) however more women had heard about the implants (47%).

A majority of participants (89%) stated that information on contraception was obtained from a physician. Internet and friends were other sources, however most women (82%) expressed that a physician was their preferred source of information. When asked about experienced side effects from hormonal contraceptive methods, 50% of all women did not report any side effects at all. Most commonly reported side effects were weight gain, mood changes, headache and breast tenderness. Fear of future infertility as a side effect of hormonal contraceptive methods was expressed by 35% of the women in our study. Other feared side effects that were expressed were thrombosis and weight gain.

5.2 Study II.

In this study 273 women opting for medical abortion were included in the study. Participants were thereafter allocated into two groups based on length of pregnancy. In the early group 112 women with a pregnancy length up to 63 days were included and of them 100 had assessable outcomes, and 84 had returned completed questionnaires. In the late group 161 women were included with a pregnancy from 64 to 70 days, where 141 had assessable outcomes, and 118 women returned complete questionnaires. Mean

pregnancy length in the early group was 45 days, and in the late group it was 66 days. Additional Patient characteristics are presented in table 1 in paper II.

There was no significant difference in complete abortion rate between the two groups. Complete abortion rate, without a need for additional treatment, was found to be 95% in the early group and 96% in the late group 96% (table 2). Additional treatment, medical or surgical, was needed in case of an ongoing pregnancy or heavy and/or prolonged bleeding.

Table 2 Primary outcome

Success rate	≤63 days (n =100)	64-70 days (n=141)	*p*	*OR*
Complete abortion n (%)	95 (95)	136 (96)	0.745	0.7 (0.16-3.13)
Incomplete abortion	5	4		
treated medically n (%)	3 (3.2)	2 (1.4)	0.65	0.46 (0.04-4.16)
treated surgically n (%)	2 (2.1)	2 (1.4)	1	0.7 (0.05-9.8)
Ongoing pregnancy	0	1		
treated surgically n (%)	0 (0)	1 (0.7)	1	

The acceptability was similarly high in both groups (table 3, Paper II). The majority of women in both groups were satisfied with the treatment. The participants were also satisfied with the information received before the abortion and the provided pain medication. In both groups, most of the women answered that they were either very satisfied or satisfied in respect of feeling calm and safe during the abortion, and also, they expressed satisfaction that the treatment, including the bleeding, met their expectations.

No significant differences were observed in reported pain, and duration of bleeding between the two groups (table 4, Paper II) However no further information after the follow-up was available.

No significant difference in pregnancy-related symptoms was found between the groups. These symptoms were reported after the mifepristone administration (day 1 in the diary). The median duration of nausea was 1 (0-14, IQR=3) days in the early group and 1 (0-15, IQR=1) days in the late group p=0.9. Women in the early group reported 0 (0-2, IQR=1) days median duration of vomiting versus 1 (0-6, IQR=1) days in the late group p=0.109. The median duration of pelvic pain in the early group was 3 (0-22, IQR=5) vs 4 (0-23, IQR=5) in the late group p=0.111. In the early group median duration of fever/chills was 0 (0-8, IQR=1) days versus 1 (0-15, IQR=1) days reported by women in the late group p=0.241.

5.3 Study III.

In this study we included 59648 women from 207 countries requesting a medical abortion by telemedicine service and 76,5% of these women did not have any pre-abortion ultrasound examination. The main reasons for not having a pre-abortion ultrasound scan were that they felt no need for an examination, they could not afford to have the scan or that they were concerned regarding their own privacy. (table 3)

Women from Thailand, Poland, South Korea, and Brazil were most likely to not having had a pre-abortion ultrasound scan. Women stating that they could not afford to have an ultrasound scan was more often from Thailand, Brazil and South Korea.

The demographic characteristics of the women with and without pre-abortion ultrasound scan did not differ significantly (table 1 paper III).

Table 3. Reasons for not having a pre-abortion ultrasound scan (main reason or multiple reasons)

Reason	Total n=34390	Total n=45336
	Main reason	One of multiple reasons
I thought I did not need one as I am sure I am pregnant, and I know how long I have been pregnant	10910 (31.7%)	16616 (36.7%)
I cannot afford one	10589 (30.8%)	10594 (23.4%)
I am afraid my partner or other people will find out	6472 (18.8%)	9412 (20.8%)
I just did not have time to do it	2478 (7.2%)	3312 (7.3%)
I did not know that I needed one	1974 (5.7%)	2234 (4.9%)
I cannot get to a clinic to get one because of distance or lack of transportation	1611 (4.7%)	2175 (4.8%)
I am unsure where to get one	356 (1%)	993 (2.2%)

5.4 Study IV.

From September 2017 to May 2019, the main trial conducted at 28 clinics enrolled 1338 participants whereof 658 received allocated intervention and 14 clinics and 680 patients received allocated control. The mean cluster size was 48 participants (min 11, max 60). The study population in this study (n=770) includes 375 participants from the intervention group and 395 from the control group.

Both groups were comparable in terms of median age, pregnancy history, abortion, childbirth, education level, and relationship status, with no significant differences (Table 1, Paper IV). Most participants were recruited from youth clinics (582/770, 75.6%), followed by maternal health clinics (106/770, 13.8%) and abortion clinics (82/770, 10.6%).

The intervention effect on LARC choice, initiation and use is presented in Table 4. More participants at intervention clinics chose LARC at the clinic visit compared to participants at control clinics (aOR 5.96, 95% Confidence Interval (CI) 3.25 - 10.94, P<0.001). In addition, more women in the intervention group had initiated (aOR 4.43, 95% CI 2.32 - 8.46, P<0.001) and were using (aOR 2.21, 95% CI 1.31 - 3.73, P<0.003) LARC at three- and 12-months follow-up compared to the control group.

Table 4 Intervention effect on LARC choice, initiation, and use

Outcome	Intervention	Control	OR[a] (95% CI)	*p* value	aOR[b] (95% CI)	*p* value
LARC Choice[c]	168/375 (44.8)	114/395 (28.9)	2.10 (1.11 – 3.99)	.023	5.96 (3.25 – 10.94)	<.001
LARC initiation[d]	132/289 (45.7)	82/298 (27.5)	2.20 (1.41 – 3.43)	<.001	4.43 (2.32 – 8.46)	<.001
LARC use[e]	123/317 (38.8)	88/331 (26.6)	1.76 (1.24 – 2.51)	.002	2.21 (1.31 – 3.73)	.003

LARC, long-acting reversible contraception; OR, odds ratio; aOR, adjusted odds ratio; CI, confidence interval.
Data are n (%) if not stated elsewise

[a]analysed by logistic regression with intervention as sole fixed factor (reference: control) and clinic as random factor

[b]analysed by logistic regression with intervention (reference: control), age, highest level of completed education, previous pregnancy, with and without previous abortion, intended use of LARC, and clinic type as fixed factors and clinic as random factor

[c]choice recorded at clinic visit.

[d]initiation reported at three-months follow-up.

[e]use reported at 12-months follow-up.

There were no differences regarding pregnancies between the intervention and control groups.

The intervention group had a higher proportion and odds of LARC choice for both booked and drop-in visits compared to the control group, however, only significant for booked visits (aOR 5.86 95% CI 3.08 - 11.13, P<0.001). On the contrary, among those who intended to use a LARC method, we found no significant difference between the type of visit.

The intervention materials were generally well-received, with higher satisfaction reported for the educational video (P=0.03), effectiveness chart (P=0.02) and box of contraceptive models (P<0.01) during booked visits compared to drop-in visits. There was no difference whether the different parts of the intervention were found supportive in contraceptive choice between booked or drop-in visits.

The participants in the control group had higher rates of SARC choice (aOR 0.23, 95% CI 0.14 - 0.40, P<0.001), initiation (aOR 0.25, 95% CI 0.14 - 0.45, P<0.001) and use (aOR 0.61, 95% CI 0.38 - 0.95, P=0.029) than the intervention group. Among participants using SARC methods, more participants in the intervention group had received information about extended use (133/143, 93%), compared to the control group (178/213, 83.6%, aOR 13.87, 95% CI 2.94-65.41, P<0.001).

6 Discussion

6.1 Summary of findings

High quality family planning services are necessary for reproductive health. The findings from our studies indicate a suboptimal knowledge among potential users regarding effective contraceptive methods and a need for improvement. Structured counselling on contraceptive methods was shown to influence young women's choice in favour of more effective methods. This may result in reduced need of abortion among adolescents. Access to abortion care will however always be needed, and it is therefore of importance to make acceptable and safe abortion methods available to women asking for the service. In our project we demonstrate that it is possible and safe to extend the use of home administration of misoprostol for medical abortion up to 10 weeks of pregnancy. We also showed that women opting for medical abortion via telemedicine do not find it necessary to have an ultrasound examination prior to medical abortion. Previous studies have shown that pregnancy length can be estimated accurately using LMP [58,61] removing the requirement of preabortion ultrasound for pregnancy dating an important barrier to abortion can be removed.

6.2 Contraceptive knowledge and counselling

In study I, which was conducted among 500 Ukrainian women who had recently undergone pregnancy, we found that the utilization of contraception was low. Although our study sample may not be representative for all fertile women in the country it indicates a lack of knowledge regarding effective family planning methods. There was a low use of LARCs and yet most women in our study stated they wanted to delay or prevent pregnancies in the future. In fact, a lot of them used barrier methods and oral contraceptives, which suggested that they had limited knowledge and experience with LARCs. Identifying potential barriers against the use of effective contraceptive methods is important. Access and cost are factors that are known have a great impact [25,28]. Implants are not available on the market in Ukraine and LNG-IUS are expensive. Fear of side-effects from effective contraceptive methods is a well-known reason for women to choose more "natural" methods such as condoms and "safe periods" during the menstrual cycle (Kiessling 2016). Among women in our project the most feared side effect was future infertility something that was expressed by more than one-third of our participants. This is a misconception, or rather a myth, that is frequent around the globe [62]. A recent study among sexually active female college students in the US showed that most of the participants (69%) feared that the use of contraception, hormonal and as well as non-hormonal, could have a negative impact on their future fertility [63]. This concern also affected their use of contraceptive methods.

These findings highlight the importance of rapid improvement in access and awareness regarding effective contraceptive methods as a method for lowering the number of unwanted pregnancies and abortions. This not only highlights a public health issue but also underscores the importance of women making informed decisions regarding their reproductive well-being.

It is obvious that knowledge about different contraceptive methods among potential users is crucial and studies have shown high quality contraceptive education to improve contraceptive uptake [64]. Different strategies have been used such as educational videos [65], mobile applications [66]or on-line contraceptive education[67]. This was also the main finding in our study IV showing that structured contraceptive counselling has a significant impact on young women's choices of contraceptives. The findings indicate a significant rise in the uptake and utilization of LARC methods among women who were offered structured contraceptive counselling. This rise reflects a change of contraceptive tastes to more efficient, long-lasting approaches and it illustrates that educational interventions can help to change contraceptive behaviour considerably and this fact underscores the importance of providing all women with comprehensive information about every available contraception method.

High quality education requires high quality knowledge also among the providers. In study I women expressed that they preferred a clinician as their main source of information. This was also shown in a survey from the US exploring young women's preferences and perceived trustworthiness of contraceptive information [68]. They also found that the trustworthiness was improved when clinicians recommended supplemental resources. These findings do not diminish the value of other methods of counselling such as on-line education and mobile applications however it is important that the receiver of the information understand where it comes from and that clinicians support the content of the information. Study IV revealed that pre-booked visits were more effective in promoting LARC choice compared to drop-in visits. This suggests that the structured approach, coupled with the anticipatory setting of pre-booked appointments, enhances the decision-making process for young women regarding contraception.

6.3 Medical abortion

6.3.1 Home use of misoprostol

In study II we explored efficacy and acceptability of home administration of misoprostol in women opting for medical abortion up to 10 weeks of gestation. Earlier studies had

shown convincing data regarding the safety for home use of misoprostol up to 9 weeks [69] and lately increasing data support that also more advanced pregnancies could be an option for home abortion [40]. However fewer reports had evaluated data on women's perception and acceptability. Our study confirmed a success rate for abortion 64-70 days of gestation exceeding 95%, the same success rate as for pregnancies up to 63 days and the treatment was very well accepted among all women in our study population. It has been reported that the risk for incomplete abortion and the risk for ongoing pregnancies increases when gestational length exceeds 9 weeks [41,70,71]. The few cases of ongoing pregnancies in our study and the fact that our sample size was not large enough made it however impossible to draw any conclusion regarding potential differences in efficacy between the two groups.

The findings from our study supports previous reports about suggesting maintained acceptability of home use of misoprostol for medical abortion also in gestations exceeding 9 weeks. This knowledge might be able to contribute to increased access to medical abortion for women not only in urban areas of Sweden but also other places with geographically challenging remote areas. This will be important to evaluate in further studies. Home administration in combination with telemedicine has the potential to add more possibilities for women in need for pregnancy termination.

6.3.2 Pre-abortion ultrasound

In study III we wanted to explore how women opting for abortion through a website perceived the need for a pre-abortion ultrasound. A majority of women in our survey replied that they did not undergo such an examination. The main reason was that they did not find it necessary since they already knew how advanced the pregnancy was. Other reason stated included lack of resources or privacy issues. The main purpose with a pre abortion ultrasound scan is to confirm pregnancy length in order to offer the most effective abortion method[50]. However, during the COVID-19 pandemic many abortion guidelines were revised making it possible to communicate with patients virtually [72]. Abortion service through telemedicine had already been an option but now this service was extended to many settings. In a UK study outcome after medical abortion in first trimester was compared between pregnant women were one group (n=22 158) had received standard care in clinic including ultrasound and another group (n=29 984) received counselling and treatment without ultrasound scan, either in clinic or by telemedicine[43]. No differences in outcome were found but waiting time was significantly shorter in the telemedicine group.

Dating of pregnancy based on a validated questionnaire was proven in a French study to be as safe as a pre abortion ultrasound scan [61]. To perform examinations only in cases where there seems to be uncertain data will make it possible to use the resources where

they are best needed. Ultrasound scan prior to abortion as a routine should not be mandatory, making abortion through telemedicine much easier for most women [53].

Both studies II and III focus on the concept of autonomy that is associated with women's access to reproductive health in relation to medical abortion. Study II demonstrates the effectiveness and acceptability of using misoprostol at home for medical abortions, highlighting its convenience and potential to empower women in their reproductive choices. Study III on the other hand, delves into women's perspectives on the necessity of pre-abortion ultrasounds, revealing a preference for omitting this step due to confidence in their knowledge, resource constraints, and privacy concerns. Together, both studies highlight the need to offer safe and available patient-centred medical abortion services that is sensitive to women's autonomy rights and individual situations.

6.4 Methodological Considerations

6.4.1 Study I

This survey was conducted in five gynaecological and obstetrical units in Kiev, Ukraine. Women who just had an abortion or a delivery were invited to complete a questionnaire. During the study period, 324 women had an abortion and 282 women had a delivery at these settings. In total 83% of potential responders were included in the study. The questionnaire used in the study was not validated however a pilot survey of 50 women was performed prior to the main study. This could affect internal validity and by combining the quantitative survey with qualitative interviews we might have been able to increase internal validity. The study also has limitations regarding external validity and generalizability due to the limited sample size and the lack of analysis of women declining participation in the survey. The sample was taken from particular districts in Kiev and does not reflect the diversity of Ukrainian women. In order to mitigate this selection bias, the use of randomized sampling that would encompass a wider demographic could be used. This strategy would be directed at obtaining a more diverse sample of the general population, which will include different people belonging to various socio-economic groups and representing Ukrainian regions. Due to insufficient statistical data from Ukraine, we have not been able to relate our study sample to the number of women in fertile age in the region.

6.4.2 Study II

This study was a prospective cohort study aiming to evaluate efficacy and acceptability of home administration of misoprostol for medical abortion in pregnancies up to 10 weeks of gestation. Participants were stratified according to gestational age in to two

groups, those with a pregnancy up to 63 days and those with a pregnancy between 64 and 70 days. Based on available studies showing a complete abortion rate of more than 88% we performed a power calculation. If the true efficacy difference is 8.7% then with the power of 95%the upper limit of one-sided 95% confidence interval would exclude a difference in treatment of more than 1.05% to achieve non-inferiority. To compensate for potential drop-out we wanted to include 660 women, 330 in each group. During the study it was obvious that it would be difficult to reach the target sample. Most women seeking abortion in Sweden are presenting in early pregnancy. The inclusion of participants was stopped after seven years when 273 women had been included. Due to the small sample size, we cannot state that home administration of misoprostol in the tenth week of pregnancy is a safe as in earlier pregnancy however our data adds to available data that the efficacy is high also in more advanced pregnancies, exceeding 63 days of gestation. Acceptability and side effects such as bleeding and pain was evaluated using self-reports. Combining the diaries with interviews could have increased internal validity. A more objective assessment of potential side effects could have been performed by using medical records however this form of evaluation was not included in the ethical permission. For external validity and generalizability, the study is limited to the Swedish health care setting and may not easily be applied to other settings with different abortion legislations, healthcare systems, or cultural beliefs. One way this limitation might be addressed is through the repetition of similar studies in other health care settings and countries. This would promote the validation of results in different populations and healthcare settings, improving the global applicability of this study.

6.4.3 Study III

This cross-sectional study was launched in order to explore abortion seeking women's perception regarding the need for an ultrasound scan prior to medical abortion. The data for this study was collected from the website www.womenonweb.org. During a ten-month period almost 60000 women requested medical abortion through this website. They were asked to complete a survey online before receiving the treatment. Women were asked if they did or did not undergo a pre-abortion ultrasound. They were also asked to state the reason for not having such an examination. This survey was also used for a larger project aiming to evaluate women's self-awareness of health. For our project only a part of the questions was used. The questionnaire was not validated previously and the internal validity could have been increased by using a mixed method approach. External validity and generalizability are also limited but the strength of the study is the sample size and the fact that women from 207 countries were included. Primary outcome was the perceived need for a pre-abortion ultrasound and the reason for not having one. Secondary outcome was a comparison of the demographic characteristics of women having or not having an examination.

6.4.4 Study IV

This was a sub study performed on a subgroup of participants from a trial evaluating the effects of structured counselling on contraceptive methods. It was a randomized controlled trial where participants were randomized to either structured contraceptive counselling or standardized counselling. This sub-group consisted of young women aged 18-25 years of age. The study was conducted at four abortion clinics, 13 youth clinics and 11 maternal health clinics, in the Stockholm region. Before randomization clinics were stratified according to type of clinic, for youth clinics and maternal health clinics stratification was also done according to LARC prescription rate as well as migration background among the visitors. The aim was to achieve as equal distribution in respect to sociodemographic characteristics as possible. Clinics were then randomized at 1:1 allocation for structured counselling (intervention) or standardized counselling (control). The purpose of randomizing clinics instead of individuals was to avoid spillover effects if the same health care provider was to provide both intervention and standardized counselling. The aim was to include all eligible patients however this was not always feasible and since masking of the allocation was not possible it cannot be ruled out that some selection bias might have occurred.

The intervention package included an educational video, watched in company with a health care provider, detailed written information regarding the most effective contraceptive methods and life-sized models of the different methods. Also, four key-questions regarding pregnancy intentions and bleeding experiences were presented. The material included in the package has been successfully used in other studies, however not all parts at the same time [25,73–75]. Following this intervention package evaluating surveys were performed at the clinic at three, six and 12 months.

The population chosen for this study were women aged 18-25 years who engage in sexual activities and seek contraceptive counselling; thus, the applicability of its results is limited to other groups. The age gap and characteristics of the participants could be widened to aid in increasing representativeness for this study. This would be by ensuring that women of different ages and with diverse experiences are included in the study, hence giving perspectives more relevant to the overall population of young females.

The population of young women used in this research is specific to Stockholm County, Sweden only; hence its relevance cannot be directly applied to other regions or cultures. One possible solution to increase its generalizability would be broadening the study by involving subjects of a wider age range and diverse demographic groups. This broadening would enable the study to encompass a wider range of experiences and perceptions, which could increase its generalizability across different groups of people.

7 Conclusions

Study I - fertile women participating in our survey demonstrated insufficient knowledge and low uptake of effective contraceptive methods. This indicates a need for high-quality education interventions in this setting and improved contraceptive counselling.

Study II – home use of misoprostol for medical abortion up to 10 weeks of pregnancy is safe and well accepted.

Study III – most women in our study did not undergo an ultrasound examination prior to their request for medical abortion through telemedicine. The reasons stated were lack of perceived need, lack of resources or privacy issues.

Study IV - our study demonstrates that constructive, high-qualitive contraceptive counselling can constitute a significant impact on young women's contraceptive choice and thus potentially contribute to a reduction in unwanted pregnancies.

Lack of contraceptive knowledge, unnecessary requirements and reduced availability of family planning services are barriers against good reproductive health. The findings from this thesis show that contraceptive knowledge is suboptimal in some settings and that structured and high-quality interventions have the potential to improve this and increase contraceptive uptake. The findings also support that home use of misoprostol for medical abortion can be extended to at least 10 weeks of pregnancy and that pre abortion ultrasound may not be perceived as necessary by women requesting telemedicine abortion. By addressing the barriers and implementing structured contraceptive counselling and self-managed (partly or fully) medical abortion reproductive health could be improved.

8 Points of perspective

Research into healthcare providers' understanding and perceptions of contraceptive methods should expand its focus to include a wider variety of professionals. This research should adopt a holistic approach, examining the impact of cultural norms, training, policy, and technology. It should also aim to enhance communication between patients and providers, track changes over time through longitudinal studies, and strive for a global perspective to identify regional similarities and differences. The influence of these perceptions on health outcomes, such as unintended pregnancies, warrants further investigation.

Investigations into the home use of mifepristone should prioritize safety, efficacy, and accessibility, while also delving into the patient's experience and the required support and follow-up care. The potential of telemedicine, the quality of available information, and the effects of policy and regulation should be explored. These studies should also consider equity in access and outcomes, study long-term effects, and strive for a global viewpoint, especially in areas with limited access to clinic-based services.

Research comparing self-awareness and provider measures of gestational length in women undergoing medical abortion should concentrate on the precision of self-assessment and the influencing factors, such as training, education, and technology. The importance of patient-provider communication, cultural norms, and psychological factors should be examined, along with the impact of these assessments on abortion outcomes. These studies should aim for a global viewpoint, conduct longitudinal research to monitor changes over time, and address issues of equity in access and outcomes.

9 Acknowledgements

My heartfelt gratitude goes to the Department of Women's and Children's Health and the Karolinska Institutet which has provided me with unique insights and opportunities, improving my outcomes, the institute's innovative environment and commitment to health sciences development. I am humbly grateful to be a part of their mission, acknowledging sincere thanks for the critical support that has made my achievement possible.

I am profoundly grateful for the guidance, support, and wisdom provided by my main supervisor, associate Professor Lena Marions. Her expertise in family planning and women`s reproductive health has been invaluable to my research journey, and her patience and encouragement have been cornerstones of my academic development. Associate Professor Marion's ability to challenge and inspire has profoundly shaped my approach to scientific inquiry.

I also extend my sincere thanks to my co-supervisor, Professor Kristina Gemzell-Danielsson, whose insights and critiques have significantly contributed to the depth and rigor of my work. Her expertise in global women`s health, women`s reproductive health and family planning has been instrumental in broadening the scope of my research.

My appreciation also goes to my coauthors in publications, for their contributions to the manuscripts that form the core of this thesis. Collaborating with them has been a rewarding experience that has enhanced the quality and breadth of my research: Lena Marions, Kristina Gemzell-Danielsson, Lena L Maltzman, Rebecca Gomperts, Karin Emtell Iwarsson, Isabella Bizjak, Helena Kopp Kallner, Niklas Envall.

I would like to extend my deepest gratitude to Lalit Kumar Parameswaran Grace, Associate Professor in Experimental Reproductive Medicine and Principal Researcher of the Department of Women's and Children's Health for the unwavering commitment to excellence significantly enhanced the quality of our research and findings. His insights and knowledge not only propelled our project forward but also fostered an environment of collaboration and innovation.

Special acknowledgment is due to my mentor, Professor Tommy Linne, for his unwavering support and invaluable advice throughout this journey. His mentorship extended beyond academic guidance, providing me with the resilience and perspective needed to navigate the challenges of PhD research.

I am grateful to my colleagues in the Department of Women's and Children's Health for creating a stimulating and collaborative environment. Their diverse perspectives and constructive feedback have been integral to refining my ideas and methodologies.

I extend my gratitude to fellow PhD students and researchers: Assistant Professor Nageswara Rao Boggavarapu, Assistant Professor Twana Alkasalias, Yiqun Tang, Caroline Frisendahl, Karin Brandell, Christian Fiala and to the director of WHO Collaborating Centre for Research and Research Training in Human Reproduction Annette Aronsson and the staff of the WHO centre Lisa, Ulrika and Anette, for their camaraderie, insightful discussions, and the shared experiences that have enriched my personal and professional growth. The journey has been more meaningful and enjoyable because of their presence.

I thank Karolinska Institutet`s administrative and technical staff for their assistance and support, which facilitated a conducive research environment, especially to Catharina Karlsson, Caroline Rådestad, Sandra Brogårde, Johanna Ahlström, Simon Begallo, Jennifer Frithiof.

This journey would not have been possible without the collective wisdom, encouragement, and support of all these individuals. I am deeply grateful for their contributions to my academic journey and the completion of this thesis.

I gratefully acknowledge funding from the Swedish Institute and the Swedish research council, Forte.

I am very grateful to Sweden and Swedes for their support to my country in a very hard time.

10 References

1. Souza JP, Day LT, Rezende-Gomes AC, Zhang J, Mori R, Baguiya A, et al. A global analysis of the determinants of maternal health and transitions in maternal mortality. Lancet Glob Health. 2024 Feb;12(2):e306–16.

2. Guttmacher Institute. Adding It Up: Investing in Contraception and Maternal and Newborn Health, 2017 [Internet]. Fact Sheet. 2017 [cited 2024 Feb 26]. Available from: https://www.guttmacher.org/fact-sheet/adding-it-up-contraception-mnh-2017

3. United Nations Population Fund. Family planning—overview. . 2016.

4. Bearak J, Popinchalk A, Ganatra B, Moller AB, Tunçalp Ö, Beavin C, et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. Lancet Glob Health. 2020 Sep;8(9):e1152–61.

5. Secura GM, Allsworth JE, Madden T, Mullersman JL, Peipert JF. The Contraceptive CHOICE Project: reducing barriers to long-acting reversible contraception. Am J Obstet Gynecol. 2010 Aug;203(2):115.e1-115.e7.

6. Mukasa B, Ali M, Farron M, Van de Weerdt R. Contraception supply chain challenges: a review of evidence from low- and middle-income countries. Eur J Contracept Reprod Health Care [Internet]. 2017;22(5):384–90. Available from: http://dx.doi.org/10.1080/13625187.2017.1394453

7. Forsythe E. Religious and cultural aspects of family planning. J R Soc Med [Internet]. 1991;84(3):177–8. Available from: http://dx.doi.org/10.1177/014107689108400326

8. Dereuddre R, Van de Velde S, Bracke P. Gender inequality and the "East-West" divide in contraception: An analysis at the individual, the couple, and the country level. Soc Sci Med [Internet]. 2016;161:1–12. Available from: http://dx.doi.org/10.1016/j.socscimed.2016.05.030

9. Coll CVN, Ewerling F, García-Moreno C, Hellwig F, Barros AJD. Intimate partner violence in 46 low-income and middle-income countries: an appraisal of the most vulnerable groups of women using national health surveys. BMJ Glob Health. 2020 Jan 26;5(1):e002208.

10. Sedgh G, Hussain R, Bankole A, Singh S. Women with an Unmet Need for Contraception in Developing Countries and Their Reasons for Not Using a Method. 2007 Jan 1;

11. Mosha I, Ruben R, Kakoko D. Family planning decisions, perceptions and gender dynamics among couples in Mwanza, Tanzania: a qualitative study. BMC Public Health [Internet]. 2013;13:523. Available from: http://dx.doi.org/10.1186/1471-2458-13-523

12. Payne JB, Sundstrom B, DeMaria AL. A Qualitative Study of Young Women's Beliefs About Intrauterine Devices: Fear of Infertility. J Midwifery Womens Health [Internet]. 2016;61(4):482–8. Available from: http://dx.doi.org/10.1111/jmwh.12425

13. Kopp Kallner H, Thunell L, Brynhildsen J, Lindeberg M, Gemzell Danielsson K. Use of Contraception and Attitudes towards Contraceptive Use in Swedish Women--A Nationwide Survey. PLoS One [Internet]. 2015;10(5):e0125990. Available from: http://dx.doi.org/10.1371/journal.pone.0125990

14. Jatlaoui TC, Riley HEM, Curtis KM. The safety of intrauterine devices among young women: a systematic review. Contraception [Internet]. 2016;95(1):17–39. Available from: http://dx.doi.org/10.1016/j.contraception.2016.10.006

15. Blidaru IE, Furau G, Socolov D. Female Romanian university students' attitudes and perceptions about contraception and motherhood. Eur J Contracept Reprod Health Care [Internet]. 2015;21(1):39–48. Available from: http://dx.doi.org/10.3109/13625187.2015.1066495

16. Westhoff CL, Heartwell S, Edwards S, Zieman M, Stuart G, Cwiak C, et al. Oral contraceptive discontinuation: do side effects matter? Am J Obstet Gynecol [Internet]. 2007;196(4):412.e1-6; discussion 412.e6-7. Available from: http://dx.doi.org/10.1016/j.ajog.2006.12.015

17. Buhling KJ, Hauck B, Dermout S, Ardaens K, Marions L. Understanding the barriers and myths limiting the use of intrauterine contraception in nulliparous women: results of a survey of European/Canadian healthcare providers. Eur J Obstet Gynecol Reprod Biol [Internet]. 2014;183:146–54. Available from: http://dx.doi.org/10.1016/j.ejogrb.2014.10.020

18. Prager S, Darney PD. The levonorgestrel intrauterine system in nulliparous women. Contraception [Internet]. 2007;75(6 Suppl):S12-5. Available from: http://dx.doi.org/10.1016/j.contraception.2007.01.018

19. Marions L, Lövkvist L, Taube A, Johansson M, Dalvik H, Øverlie I. Use of the levonorgestrel releasing-intrauterine system in nulliparous women--a non-interventional study in Sweden. Eur J Contracept Reprod Health Care [Internet]. 2011;16(2):126–34. Available from: http://dx.doi.org/10.3109/13625187.2011.558222

20. Barnett C, Moehner S, Do Minh T, Heinemann K. Perforation risk and intra-uterine devices: results of the EURAS-IUD. Eur J Contracept Reprod Health Care [Internet]. 2018;22(6):424–8. Available from: http://dx.doi.org/10.1080/13625187.2017.1412427

21. Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE, et al. Effectiveness of long-acting reversible contraception. N Engl J Med [Internet]. 2012;366(21):1998–2007. Available from: http://dx.doi.org/10.1056/NEJMoa1110855

22. Mansour D. The benefits and risks of using a levonorgestrel-releasing intrauterine system for contraception. Contraception [Internet]. 2011;85(3):224–34. Available from: http://dx.doi.org/10.1016/j.contraception.2011.08.003

23. Rose SB, Lawton BA. Impact of long-acting reversible contraception on return for repeat abortion. Am J Obstet Gynecol [Internet]. 2011;206(1):37.e1-6. Available from: http://dx.doi.org/10.1016/j.ajog.2011.06.102

24. Cameron ST, Glasier A, Chen ZE, Johnstone A, Dunlop C, Heller R. Effect of contraception provided at termination of pregnancy and incidence of subsequent termination of pregnancy. BJOG [Internet]. 2012;119(9):1074–80. Available from: http://dx.doi.org/10.1111/j.1471-0528.2012.03407.x

25. Madden T, Mullersman JL, Omvig KJ, Secura GM, Peipert JF. Structured contraceptive counseling provided by the Contraceptive CHOICE Project. Contraception. 2013 Aug;88(2):243–9.

26. Gemzell-Danielsson K, Thunell L, Lindeberg M, Tydén T, Marintcheva-Petrova M, Oddens BJ. Comprehensive counseling about combined hormonal contraceptives changes the choice of contraceptive methods: results of the CHOICE program in Sweden. Acta Obstet Gynecol Scand. 2011 Aug 20;90(8):869–77.

27. Emtell Iwarsson K, Envall N, Bizjak I, Bring J, Kopp Kallner H, Gemzell-Danielsson K. Increasing uptake of long-acting reversible contraception with structured contraceptive counselling: cluster randomised controlled trial (the LOWE trial). BJOG. 2021 Aug 7;128(9):1546–54.

28. Gyllenberg F, Juselius M, Gissler M, Heikinheimo O. Long-Acting Reversible Contraception Free of Charge, Method Initiation, and Abortion Rates in Finland. Am J Public Health. 2018 Apr;108(4):538–43.

29. Hopkins K, Yarger J, Rossetto I, Sanchez A, Brown E, Elmes S, et al. Use of preferred contraceptive method among young adults in Texas and California: A comparison by state and insurance coverage. PLoS One. 2023 Aug 31;18(8):e0290726.

30. Swahn ML, Bygdeman M. The effect of the antiprogestin RU 486 on uterine contractility and sensitivity to prostaglandin and oxytocin. Br J Obstet Gynaecol [Internet]. 1988;95(2):126–34. Available from: http://dx.doi.org/10.1111/j.1471-0528.1988.tb06840.x

31. Wu YM, Gomez-Alzugaray M, Haukkamaa M, Ngoc NTN, Ho PC, Pretnar-Darovec A, et al. Comparison of two doses of mifepristone in combination with misoprostol for early medical abortion: A randomised trial. Br J Obstet Gynaecol. 2000 Apr 1;107:524–30.

32. von Hertzen H, Huong N, Piaggio G, Bayalag M, Cabezas E, Fang A, et al. Misoprostol dose and route after mifepristone for early medical abortion: a randomised controlled noninferiority trial. BJOG. 2010 Sep 16;117(10):1186–96.

33. Bracken H, Ngoc NTN, Schaff E, Coyaji K, Ambardekar S, Westheimer E, et al. Mifepristone Followed in 24 Hours to 48 Hours by Misoprostol for Late First-Trimester Abortion. Obstetrics & Gynecology. 2007 Apr;109(4):895–901.

34. von Hertzen H, Piaggio G, Wojdyla D, Marions L, My Huong N, Tang O, et al. Two mifepristone doses and two intervals of misoprostol administration for termination of early pregnancy: a randomised factorial controlled equivalence trial*. BJOG. 2009 Feb 21;116(3):381–9.

35. Kopp Kallner H, Fiala C, Stephansson O, Gemzell-Danielsson K. Home self-administration of vaginal misoprostol for medical abortion at. Hum Reprod [Internet]. 2010;25(5):1153–7. Available from: http://dx.doi.org/10.1093/humrep/deq037

36. Fiala C, Winikoff B, Helström L, Hellborg M, Gemzell-Danielsson K. Acceptability of home-use of misoprostol in medical abortion. Contraception [Internet]. 2004;70(5):387–92. Available from: http://dx.doi.org/10.1016/j.contraception.2004.06.005

37. McKay RJ, Rutherford L. Women's satisfaction with early home medical abortion with telephone follow-up: a questionnaire-based study in the U.K. J Obstet Gynaecol [Internet]. 2013;33(6):601–4. Available from: http://dx.doi.org/10.3109/01443615.2013.782276

38. Hedqvist M, Brolin L, Tydén T, Larsson M. Women's experiences of having an early medical abortion at home. Sex Reprod Healthc [Internet]. 2016;9:48–54. Available from: http://dx.doi.org/10.1016/j.srhc.2016.07.003

39. Winikoff B, Dzuba IG, Chong E, Goldberg AB, Lichtenberg ES, Ball C, et al. Extending outpatient medical abortion services through 70 days of gestational age.

Obstet Gynecol [Internet]. 2012;120(5):1070–6. Available from: http://dx.doi.org/10.1097/aog.0b013e31826c315f

40. Abbas D, Chong E, Raymond EG. Outpatient medical abortion is safe and effective through 70 days gestation. Contraception [Internet]. 2015;92(3):197–9. Available from: http://dx.doi.org/10.1016/j.contraception.2015.06.018

41. Bracken H, Dabash R, Tsertsvadze G, Posohova S, Shah M, Hajri S, et al. A two-pill sublingual misoprostol outpatient regimen following mifepristone for medical abortion through 70 days' LMP: a prospective comparative open-label trial. Contraception. 2014 Mar;89(3):181–6.

42. Kapp N, Eckersberger E, Lavelanet A, Rodriguez MI. Medical abortion in the late first trimester: a systematic review. Contraception [Internet]. 2018;99(2):77–86. Available from: http://dx.doi.org/10.1016/j.contraception.2018.11.002

43. Aiken A, Lohr P, Lord J, Ghosh N, Starling J. Effectiveness, safety and acceptability of no-test medical abortion (termination of pregnancy) provided via telemedicine: a national cohort study. BJOG. 2021 Aug 24;128(9):1464–74.

44. Iyengar K, Paul M, Iyengar SD, Klingberg-Allvin M, Essén B, Bring J, et al. Self-assessment of the outcome of early medical abortion versus clinic follow-up in India: a randomised, controlled, non-inferiority trial. Lancet Glob Health. 2015 Sep;3(9):e537–45.

45. Endler M, Lavelanet A, Cleeve A, Ganatra B, Gomperts R, Gemzell-Danielsson K. Telemedicine for medical abortion: a systematic review. BJOG. 2019 Aug 25;126(9):1094–102.

46. Grossman D, Grindlay K, Buchacker T, Lane K, Blanchard K. Effectiveness and Acceptability of Medical Abortion Provided Through Telemedicine. Obstetrics & Gynecology. 2011 Aug;118(2):296–303.

47. Gomperts R. Women on Waves: Where Next for the Abortion Boat? Reprod Health Matters. 2002 Jan;10(19):180–3.

48. Aiken A, Gomperts R, Trussell J. Experiences and characteristics of women seeking and completing at-home medical termination of pregnancy through online telemedicine in Ireland and Northern Ireland: a population-based analysis. BJOG. 2017 Jul;124(8):1208–15.

49. Aiken ARA, Guthrie KA, Schellekens M, Trussell J, Gomperts R. Barriers to accessing abortion services and perspectives on using mifepristone and misoprostol at home in Great Britain. Contraception. 2018 Feb;97(2):177–83.

50. Gomperts R, Jelinska K, Davies S, Gemzell-Danielsson K, Kleiverda G. Using telemedicine for termination of pregnancy with mifepristone and misoprostol in settings where there is no access to safe services. BJOG. 2008 Aug;115(9):1171–8.

51. Gomperts R, Petow SAM, Jelinska K, Steen L, Gemzell-Danielsson K, Kleiverda G. Regional differences in surgical intervention following medical termination of pregnancy provided by telemedicine. Acta Obstet Gynecol Scand. 2012 Feb;91(2):226–31.

52. Gomperts R, van der Vleuten K, Jelinska K, da Costa CV, Gemzell-Danielsson K, Kleiverda G. Provision of medical abortion using telemedicine in Brazil. Contraception. 2014 Feb;89(2):129–33.

53. Geneva: World Health Organization. Abortion care guideline [Internet]. [Internet]. 2022 [cited 2024 Feb 26]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK578942/

54. Endler M, Petro G, Gemzell Danielsson K, Grossman D, Gomperts R, Weinryb M, et al. A telemedicine model for abortion in South Africa: a randomised, controlled, non-inferiority trial. The Lancet. 2022 Aug;400(10353):670–9.

55. Reynolds-Wright JJ, Johnstone A, McCabe K, Evans E, Cameron S. Telemedicine medical abortion at home under 12 weeks' gestation: a prospective observational cohort study during the COVID-19 pandemic. BMJ Sex Reprod Health. 2021 Oct;47(4):246–51.

56. Steenland MW, Geiger CK, Chen L, Rokicki S, Gourevitch RA, Sinaiko AD, et al. Declines in contraceptive visits in the United States during the COVID-19 pandemic. Contraception. 2021 Dec;104(6):593–9.

57. Stifani BM, Avila K, Levi EE. Telemedicine for contraceptive counseling: An exploratory survey of US family planning providers following rapid adoption of services during the COVID-19 pandemic. Contraception. 2021 Mar;103(3):157–62.

58. Ralph LJ, Ehrenreich K, Barar R, Biggs MA, Morris N, Blanchard K, et al. Accuracy of self-assessment of gestational duration among people seeking abortion. Am J Obstet Gynecol. 2022 May;226(5):710.e1-710.e21.

59. Bracken H, Clark W, Lichtenberg E, Schweikert S, Tanenhaus J, Barajas A, et al. Alternatives to routine ultrasound for eligibility assessment prior to early termination of pregnancy with mifepristone-misoprostol. BJOG. 2011 Jan;118(1):17–23.

60. Blanchard K, Cooper D, Dickson K, Cullingworth L, Mavimbela N, Von Mollendorf C, et al. A comparison of women's, providers' and ultrasound assessments of

pregnancy duration among termination of pregnancy clients in South Africa. BJOG. 2007 Apr 11;114(5):569–75.

61. Ode C, Cavelier T, Eydoux R, Federicci M, Hamdaoui N, Piclet H, et al. Diagnostic value of a questionnaire for term assessment among women seeking abortion. J Gynecol Obstet Hum Reprod. 2023 Nov;52(9):102639.

62. Kaur S, Blumenthal PD. Global myth busting in family planning. Curr Opin Obstet Gynecol. 2021 Dec;33(6):458–62.

63. Watson A, Yarger J, Sedlander E, Urbina J, Hopkins K, Rodriguez MI, et al. Concern that contraception affects future fertility: How common is this concern among young people and does it stop them from using contraception? Contracept X. 2023;5:100103.

64. Harper CC, Brown BA, Foster-Rosales A, Raine TR. Hormonal contraceptive method choice among young, low-income women: How important is the provider? Patient Educ Couns. 2010 Dec;81(3):349–54.

65. Garbers S, Meserve A, Kottke M, Hatcher R, Ventura A, Chiasson MA. Randomized controlled trial of a computer-based module to improve contraceptive method choice. Contraception. 2012 Oct;86(4):383–90.

66. Gilliam ML, Martins SL, Bartlett E, Mistretta SQ, Holl JL. Development and testing of an iOS waiting room "app" for contraceptive counseling in a Title X family planning clinic. Am J Obstet Gynecol. 2014 Nov;211(5):481.e1-481.e8.

67. Kus LH, Paul R, Nigaglioni Rivera A, Zeal C, Madden T. Improvement in contraceptive knowledge after using an online educational resource. Contraception. 2023 Oct;126:110095.

68. Zeal C, Paul R, Dorsey M, Politi MC, Madden T. Young women's preferences for contraceptive education: The importance of the clinician in three U.S. health centers in 2017-2018. Contraception. 2021 Nov;104(5):553–5.

69. Gambir K, Garnsey C, Necastro KA, Ngo TD. Effectiveness, safety and acceptability of medical abortion at home versus in the clinic: a systematic review and meta-analysis in response to COVID-19. BMJ Glob Health. 2020 Dec;5(12):e003934.

70. Dzuba IG, Castillo PW, Bousiéguez M, Lugo Hernández EM, Castañeda Vivar JJ, Sanhueza Smith P. A repeat dose of misoprostol 800 mcg following mifepristone for outpatient medical abortion at 64–70 and 71–77 days of gestation: A retrospective chart review. Contraception. 2020 Aug;102(2):104–8.

71. Young D, Fitzgerald K, Laursen L, Whitaker AK. Comparison of vaginal and buccal misoprostol after mifepristone for medication abortion through 70 days of gestation: A retrospective chart review. Contraception. 2022 Nov;115:62–6.

72. Lord J, Lohr P, Masters T, Hall S, Black B. Coronavirus (COVID-19) Infection and Abortion Care. London: Royal College of Obstetricians and Gynaecologists. 2020;

73. Hellström A, Gemzell Danielsson K, Kopp Kallner H. Trends in use and attitudes towards contraception in Sweden: results of a nationwide survey. The European Journal of Contraception & Reproductive Health Care. 2019 Mar 4;24(2):154–60.

74. Harper CC, Rocca CH, Thompson KM, Morfesis J, Goodman S, Darney PD, et al. Reductions in pregnancy rates in the USA with long-acting reversible contraception: a cluster randomised trial. The Lancet. 2015 Aug;386(9993):562–8.

75. Claringbold L, Sanci L, Temple-Smith M. Factors influencing young women's contraceptive choices. Aust J Gen Pract. 2019 Jun 1;48(6):389–94.

11 Appendix 1.

Survey. Postpartum contraception in Ukraine

Your age (in years) _____

Please specify your current relationship status

○ Married

○ Unmarried

○ Current partner

○ No partner

Will you have a discussion with your husband/partner about choosing a method of contraception?

○ Yes

○ No

How many pregnancies have you had before?_____

How many deliveries have you had before ?_____

Please indicate the highest level of your education

○ Middle school

○ High school

○ College

○ University

Are you working?

○ Yes

○ No

○ Student

Do you plan pregnancy in the future?

○ Yes

○ No

If “Yes”, when do you want o have a planned pregnancy?

○ As soon as possible

○ In one year

○ Within 3 years

○ In more than 3 years

How often you visit an obstetrician and gynecologist per year (times)

_____
_

Do you smoke?

○ Yes

○ No

Do you use alcohol?

○ Yes

○ No

Do you use ant recreational drugs?

○ Yes

○ No

Have you heard about emergency contraception?

○ Yes

○ No

Please specify the contraceptive method you have heard of

○ Contraceptive pill?

○ Progestogen-only contraceptive pill?

○ Contraceptive implant

○ Contraceptive ring or patch

○ Contraceptive injection

○ IUD with copper

○ IUD with hormone

○ Condoms

○ Diaphragm

○ None

○ Withdrawal

○ Rhythm

○ Other, specify_____

Please specify the source of your knowledge about contraceptive methods

○ Doctor

○ Newsletter

○ TV

○ Radio

○ Internet

○ Conversation with friends

○ Conversation with relatives

○ Other, please
specify:_____

To obtain more information about contraceptive methods, which source of knowledge would you trust/ find the most reliable?

○ Professional contraception guidelines for women

○ Experience of your friends that had used contraception

○ Experience of unknown person that you have seen on one of the popular forums

○ Other_____

If someone will tell you that a new contraceptive method is available on Ukrainian pharmaceutical market what would you do?

○ Wait for results of clinical studies in Ukraine

○ Search for the results of clinical studies from abroad throw Internet

○ Try it

○ Ask a friend if she has tried it

○ Start looking for women who have already tried it

○ Will not try it

How would you prefer to obtain information on contraception?

○ To have a direct conversation?

○ To have a conversation throw a social network

○ To have a conversation throw email

○ To read a blog and contact the author

○ To read a forum and contact the author

○ To use an Internet search engine (e.g. Google) to look for experiences by women who have already used it

○ To contact your doctor

Would you prefer to check if your hormonal contraceptive protects you?

○ Yes

○ No

If "Yes", how often would you like to perform such control?

○ Once in a month

○ Once in a half-year

○ Once in year

○ Once in 3 years

○ Once in 5 years

○ Other:_____

Which contraceptives have you used in the past

○ Contraceptive pill

○ Contraceptive implant

○ Contraceptive ring /patch

○ Contraceptive injection

○ IUD

○ IUD with hormone

○ Condoms

○ Diaphragm

○ None of the above

○ Rhythm

○ Wthdrwal

○ LAM

○ none

Have you ever had any side effects of the contraceptives that you have been using?

○ Acne

○ Pelvic pain

○ Loss of libido

○ Increased discharge

○ Headache

○ VTE

○ Bloating

○ Weight gain

○ Skin discolouration (pigmentation)

○ Irregular bleeding

○ Mood changes

○ Breast tenderness

○ None

Which type of contraceptive use is more convenient for you?

○ Using it every day

○ Using it once a month

○ Using it only at the time of coitus

○ Emergency contraception

If at the “time of coitus” please specify what is more comfortable

○ Pill

○ Condom

○ Diaphragm

○ Withdrawal

○ IUC

○ Ring/Patch

○ Implant

What is your main “fear” of hormonal contraception

○ Thrombosis

○ Infertility

○ Weight gain

○ Acne

○ Absence of menses in a future

○ Uncomfortable coitus (for condom, diaphragm, ring or IUD)

○ Other:

Have you heard about Sexually Transmitted infections?

○ Yes

○ No

Please specify which kind of sexually transmitted diseases have you heard about?

○ Chlamydia Tr.

○ N. Gonorrhea

○ Trichomonas V.

○ Herpes Simplex Virus 2 type

○ Human Papillomavirus /Condyloma

○ Syphilis

○ HIV

○ Mycoplasma G.

How many times per year do you have symptoms of infection?_____

How many times per year have you experienced discharge_

Have you been treated for an STI? If yes how many times;_____

Are you concerned about your weight?

o No

o Yes, I want to stop gaining weight

o Yes, I want to lose weight

12 Appendix 2.

1. Jag är nöjd med behandlingen

1. I am satisfied with the treatment

Mkt missnöjd 1 2 3 4 5 Mkt nöjd

Very dissatisfied 1 2 3 4 5 Very satisfied

2. Under aborten kände jag mig lugn och trygg

2. During the abortion, I felt calm and safe

Mkt missnöjd 1 2 3 4 5 Mkt nöjd

Very dissatisfied 1 2 3 4 5 Very satisfied

4. Jag fick tillräcklig information inför aborten

4. I received sufficient information before the abortion

Mkt missnöjd 1 2 3 4 5 Mkt nöjd

Very dissatisfied 1 2 3 4 5 Very satisfied

5. Behandlingen motsvarade mina förväntningar

5. The treatment met my expectations

Mkt värre 1 2 3 4 5 Mkt bättre

Much worse 1 2 3 4 5 Much better

6. Blödningen motsvarade mina förväntningar

6. The bleeding matched my expectations

Lindrigare / mindre 1 2 3 4 5 Mkt rikligare

Milder / less 1 2 3 4 5 Much more abundant

7. Om jag jämför med min mens var blödningen

7. If I compare my period, the bleeding was

Mindre 1 2 3 4 5 Mkt rikligare

Less 1 2 3 4 5 Much more abundant

8. Smärtan motsvarade mina förväntningar

8. The pain met my expectations

Lindrigare 1 2 3 4 5 Mkt värre

Milder 1 2 3 4 5 Much worse

9. Om jag jämför med vanlig mens var smärtan

9. If I compare with regular menstruation, the pain was

Lindrigare 1 2 3 4 5 Mkt värre

Milder 1 2 3 4 5 Much worse

10. Jag fick tillräcklig smärtmedicinering

10. I was given sufficient pain medication

Mkt missnöjd 1 2 3 4 5 Mkt nöjd

Very dissatisfied 1 2 3 4 5 Very satisfied

11. Ringa in den siffra som motsvarar den värsta smärtan du upplevde under aborten:

11. Circle the number corresponding to the worst pain you experienced during the abortion:

Ingen smärta alls 1 2 3 4 5 6 7 8 9 10 Värsta tänkbara smärta

No pain at all 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable

12. Jag har sökt akut pga. besvär som jag trott hänger samman med aborten:

12. I have applied for an emergency due to problems I thought were related to the abortion:

Ja Nej

Yes No

Var sökte du?

Where did you go?

När?

When?

Beskriv dina besvär:

Describe your problems:

Behandling?

Treatment?

13. Jag skulle rekommendera abortbehandling i hemmet till en väninna i samma situation

13. I would recommend abortion treatment at home to a friend in the same situation

Ja Nej

Yes No

14. Jag har valt följande preventivmetod:

14. I have chosen the following method of contraception:

Jag har påbörjat behandlingen:

I have started the treatment:

Ja Nej

Yes No