Long-acting reversible contraception and satisfaction with structured contraceptive counselling among non-migrant, foreign-born migrant and second-generation migrant women: evidence from a cluster randomised controlled trial (the LOWE trial) in Sweden

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ABSTRACT

Objective This trial aimed to evaluate effects of structured contraceptive counselling among non-migrants, foreign-born migrants and second-generation migrants.

Methods A cluster randomised controlled trial was conducted in 2017–2019 at abortion, youth and maternal health clinics in Stockholm, Sweden (the LOWE trial). Patients were eligible if they were 18 years or older, could understand Swedish or English (or if assisted by an interpreter), were sexually active or planning to be, and were seeking contraception for pregnancy prevention. We randomised clinics at a 1:1 allocation ratio to give either structured contraceptive counselling (intervention) or to maintain standard contraceptive counselling (control). Blinding was not deemed feasibile. A study-specific package for structured contraceptive counselling was used and comprised an educational video, an effectiveness chart, four key questions and a box with contraceptive models. Outcomes were effects of the intervention on long-acting reversible contraception (LARC) choice, initiation and use, and satisfaction with the intervention material among the participants.

Results We involved 14 clinics in each of the intervention and control groups, respectively. A total of 1295 participants were included: 1010 non-migrants, 169 foreign-born migrants and 116 second-generation migrants. Participants in the intervention group chose LARC to a higher extent than the control group (adjusted OR (aOR) 2.85, 95% CI 2.04–3.99), had higher LARC initiation rates (aOR 2.90, 95% CI 1.97 to 4.27) and higher LARC use within the 12-month follow-up period (aOR 2.09, 95% CI 1.47 to 2.96). The majority of the participants who received the intervention package found all the different parts to be supportive in contraceptive choice. The effectiveness chart was the only part of the package that a higher proportion of

Key messages

- Structured contraceptive counselling increases long-acting reversible contraception (LARC) choice, initiation and use, controlled for migration background.
- Satisfaction with the structured contraceptive counselling material was high among non-migrants, foreign-born migrants and second-generation migrants.
- Foreign-born migrants and second-generation migrants stated to a higher extent that the effectiveness chart was supportive in contraceptive choice as compared to non-migrants.

foreign-born migrants (58/84, 69%) and second-generation migrants (40/54, 74.1%) found supportive in contraceptive choice compared to non-migrants (259/434, 59.7%) (p = 0.048).

Conclusions Structured contraceptive counselling increased LARC choice, initiation and use, controlled for participants' migration background. The effectiveness chart was found to be significantly more supportive among foreign-born migrants and second-generation migrants compared to non-migrants when choosing contraceptive methods.

Trial registration number NCT03269357.

INTRODUCTION

Contraception is crucial for ensuring reproductive health and autonomy.[1] Lower contraceptive use and higher abortion rates have been reported among migrants from low- and middle- income countries who reside in high-income countries in Europe, including Sweden.[2–5] The lower use of contraception among migrants has been explained by language and knowledge barriers and limited access to healthcare as well as by values related to contraceptive use or the use of certain contraceptive methods.[6 7] Since 2005, immigration to Sweden has increased,[8] and a lower contraceptive use is still seen among migrants compared with non-migrants.[9]

There are conflicting data on how to provide contraceptive counselling to migrants. Some data show that healthcare providers proactively take opportunities to discuss contraception with migrants while other data indicate that contraception is less often discussed with migrants compared with non-migrants.[7 10] Providing contraceptive counselling to migrants may increase the demands on healthcare providers, such as handling time constraints and knowledge and language barriers,[11] as well as having to acquire knowledge and awareness of cultural and religious factors.[12]

An increased use of long-acting reversible contraception (LARC), including intrauterine devices (IUDs) and subdermal implants, leads to lower rates of unintended pregnancies.[13 14] LARCs are associated with high user satisfaction and continuation rates,[15] independent of users' ethnicity.[16] Different international interventional trials have resulted in increased uptake of LARC.[17 18] We conducted a cluster randomised controlled trial (the LARC fOrWard counsElling (LOWE) trial) to evaluate the effects of structured contraceptive counselling on LARC uptake (ie, choice and initiation) and subsequent unintended pregnancies. The trial showed that the intervention led to higher LARC uptake compared with standard contraceptive counselling. Also, for participants who received the intervention, fewer pregnancies were seen at the 12-month post-abortion follow-up.[19]

The objectives of this study were to evaluate the effects of structured contraceptive counselling on LARC choice, initiation and use among non-migrants, foreign-born migrants and second-generation migrants. Additionally, the satisfaction with the intervention material was assessed according to migration status, and comparisons made between the three participant groups.

METHODS

Study design, setting and participants

We conducted a cluster randomised controlled trial in abortion, youth and maternal health clinics in Stockholm, Sweden. We randomised clinics at a 1:1 allocation ratio to give either structured contraceptive counselling (intervention) or to maintain their standard contraceptive counselling (control). Randomisation was stratified by LARC prescription and clinic type. For youth and maternal health clinics, we also stratified by proportion of migrants within their catchment areas. Clinics were grouped according to type of clinic and migration status (low, high). Within each group clinics were then sorted in increasing order with respect to LARC prescription. They were then randomised pairwise after increasing order of LARC prescription, one to control and one to active. Four youth clinics and six maternal health clinics were considered as clinics with high migrant population, while nine youth clinics and five maternal health clinics were considered as clinics with low migrant population (online supplemental section). No such information was collected from abortion clinics due to their larger catchment areas with expected equal distribution of sociodemographic factors. Patients were eligible if they (i) were 18 years or older (ii) could understand Swedish or English, either alone or with the help of an interpreter, (iii) were sexually active or planning to be within 6 months and (iv) were seeking contraception to prevent pregnancy. Informed consent was signed prior to study participation. A detailed description of the LOWE trial has been published elsewhere.[19]

Contraceptive counselling services, including the prescription of methods, are free of charge in Sweden. Contraceptive methods are available at no cost for women up to 21 years of age, and are subsidised at a yearly cost of 10 euros for women up to 26 years of age.

Intervention

A study-specific intervention package for structured contraceptive counselling was used to present different contraceptive methods and their effectiveness, advantages and disadvantages.[19] The package consisted of the following parts: an educational video, an effectiveness chart, four key questions, and a box with contraceptive models, all aiming to facilitate for the participant to make an informed decision on contraceptives. The 7-minute long video was available in Swedish with English subtitles and was shown at the beginning of the counselling visit, while the effectiveness chart, the key questions and the box with models were used during

the counselling visit. Prior to trial start, healthcare providers at the intervention clinics were invited to a 3-hour training conducted by the researchers of the trial, focusing on the effectiveness of LARC methods and how to use the intervention materials.

Study outcomes

The intervention effect on LARC uptake and pregnancy rates of the LOWE trial is already published.[19] This study evaluated the intervention effects on LARC choice, initiation and use, as well as satisfaction with the intervention material among non-migrants, foreign-born migrants and second-generation migrants (secondary outcomes). LARC choice was measured by the participant's choice reported by the healthcare provider at the clinic visit whereas LARC initiation was reported by the participant at 3-month follow-up (FU3) and LARC use reported by the participant at 12-month follow-up (FU12). Satisfaction with the intervention material was reported by the participant after the visit and was thus concealed to the healthcare provider, and assessed at the clinic visit.

At the clinic visit the participants reported their own and their parents' country of birth. This information was used to define the participants into the three groups hereafter referred to as participant groups: non-migrants, foreign-born migrants and second-generation migrants (ie, born in Sweden with both parents born abroad).[20]

Online questionnaires were used to collect the reports from the healthcare provider and the participant. Participants were emailed questionnaires at the 3- and 12-month follow-up. Several email attempts were made to collect the questionnaires. If needed, additional telephone calls were made to ensure the participant had received the follow-up email.

Sample size and statistical analysis

Background characteristics were analysed by descriptive statistics. The dependent variables – LARC choice, initiation and use – were analysed using a logistic mixed model with clinic as a random effect. The independent variables – group allocation, the three participant groups, clinic type, intended use of LARC, age, highest level of completed education and previous pregnancy, with and without previous abortion – were analysed as the fixed effects. To compare satisfaction with the intervention material between the three participant groups we used the Kruskal–Wallis test and the Chi-square test for the categorical variables as appropriate. Data were analysed with R and SPSS Statistics (versions 25 and 27, respectively) and the α-level for all analyses was set at 0.05.

Patient and public involvement statement

A previous Swedish survey in which participants provided suggestions for improved contraceptive counselling and future research questions[21] was taken into account when designing the LOWE trial. However, these participants had no influence on design, recruitment or conduct of the study nor analysis, interpretation or publication of the data. The results from the LOWE trial will be communicated to the participants by email.[19]

RESULTS

Study population

Between 2017 and 2019, 1364 participants were enrolled in the main trial, of which 1295 participants, who reported their own and their parents' countries of birth, were included in this study: 1010 (78.0%) non-migrants, 169 (13.1%) foreign-born migrants and 116 (9.0%) second-generation migrants (figure 1). The proportion of these three participant groups by clinic type is presented in online supplemental table S1.

Background characteristics

In both the intervention and the control group foreign-born migrants were older with a median age of 27 and 28 years, respectively, compared with non-migrants and second-generation migrants where the median age was the same, namely 23 and 24 years, respectively. Furthermore, a higher proportion of foreign-born migrants had a current (at the abortion clinic) or previous pregnancy and had given birth compared with non-migrants and second-generation migrants. In the intervention group there were significant differences in the proportion of participants regarding current relationship and highest completed education between the three participant groups. We could not see any other significant differences in background characteristics between the three participant groups (table 1).

The four most common countries of birth among the foreign-born migrants were Iran, Iraq, Poland and Finland, and the median number of years spent in Sweden for the foreign-born migrants was 10–12 years (online supplemental table S2).

LARC choice, initiation and use

We found that the three participant groups in the intervention group had chosen, initiated and used LARC to a higher extent as compared with the control group, when adjusted for clinic type, intended use of LARC, age, highest level of completed education and previous pregnancy with and without previous abortion (table 2).

Among the foreign-born migrants in the intervention group, 17/90 (18.9%) stated that the cost impacted their choice of contraceptives, as compared with 67/491 (13.6%) non-migrants and 3/58 (5.2%) second-generation migrants (p=0.059). Additionally, participants' choice of LARCs if all contraceptive methods were free of charge is presented in online supplemental table S3.

There were no significant differences in pregnancy rates at FU3 and FU12 between the three participant

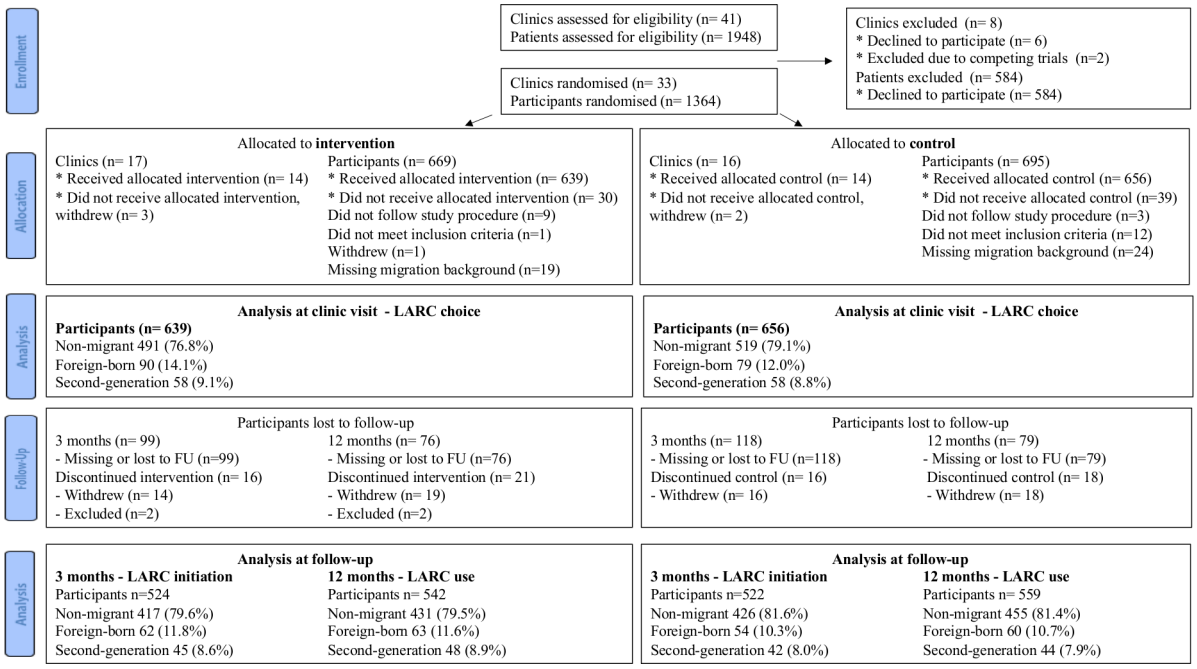

Figure 1 Trial flowchart of the participants. FU, follow-up; LARC, long-acting reversible contraception.

groups irrespective of intervention or control group. However, at FU12, a higher but non-significant proportion was seen in the control group where 9/73 (12.3%) of the foreign-born migrants reported a pregnancy compared with 39/508 (7.7%) among non-migrants and 5/56 (8.9%) among second-generation migrants (p=0.334) (online supplemental Table S4). At FU12, a total of 5/9 of the foreign-born migrants in the control group chose to have induced abortions when becoming pregnant compared with 0/5 of the foreign-born migrants in the intervention group (p=0.086).

Satisfaction with the intervention material

Satisfaction with the intervention material (rated as "very good" to "good") was high among all three participant groups, especially among the foreign-born migrants. A significantly higher proportion of foreign-born migrants and second-generation migrants reported that the effectiveness chart was supportive in choice of contraceptive method, as compared with non-migrants (table 3).

DISCUSSION

Main findings

Our results show that structured contraceptive counselling effectively increases LARC choice, initiation and use, controlled for migration background. Satisfaction with the intervention material was high among all participants; however, a higher proportion of foreign-born migrants and second-generation migrants than non-migrants found the effectiveness chart to be supportive in their contraceptive choice.

Findings in context

The need for access to sexual and reproductive health and rights (SRHR), including counselling and the provision of contraception, has been identified as particularly important for vulnerable groups such as migrants.[22] Our results may contribute to limiting these inequities by providing effective and structured contraception counselling which is well received and increases LARC use controlled for migration background.

Our result show a high satisfaction with structured contraceptive counselling among foreign-born migrants and second-generation migrants in different clinics. Several Swedish studies have pointed out how healthcare providers describe challenges in providing contraceptive counselling to foreign-born women.[11 12] Thus, structured contraceptive counselling enhances informed decision-making regarding contraceptive use and reduces the risk of contraceptive coercion, which have been defined as key principles in contraceptive counselling.[23] Other findings from the LOWE trial showed high satisfaction not only among participants but also among the healthcare providers.[24] This supports prompt implementation into clinical practice.

In a previous Swedish study on post-abortion contraception, foreign-born migrants and second-generation migrants chose LARC methods to a higher extent compared with non-migrants.[9] Our results, though not significant, support this finding, as a higher proportion of foreign-born migrants and second-generation migrants, regardless of belonging to the intervention or the control group, chose LARC methods compared with non-migrants. If all contraceptives in our trial had

Table 1 Background characteristics for non-migrants, foreign-born migrants and second-generation migrants by group allocation

Characteristic	Non-migrants n (%)		Foreign-born migrants n (%)		Second-generation migrants n (%)		Total n (%)	
	Intervention (n=491)	Control (n=519)	Intervention (n=90)	Control (n=79)	Intervention (n=58)	Control (n=58)	Intervention (n=639)	Control (n=656)
Age								
Median (IQR)	24 (20–29)	23 (20–29)	28 (22–34)	27 (21–33)	23 (20–27)	24 (21–28.5)	24 (20–29)	23 (20–30)
Current relationship								
Single	151 (30.8)	135 (26.0)	14 (15.6)	17 (21.5)	17 (29.3)	16 (27.6)	182 (28.5)	168 (25.6)
Partner – living together	205 (41.8)	222 (42.8)	42 (46.7)	36 (45.6)	13 (22.4)	19 (32.8)	260 (40.7)	277 (42.2)
Partner – living apart	127 (25.9)	155 (29.9)	34 (37.8)	25 (31.6)	27 (46.6)	22 (37.9)	188 (29.4)	202 (30.8)
Other	8 (1.6)	7 (1.3)	0	1 (1.3)	1 (1.7)	1 (1.7)	9 (1.4)	9 (1.4)
Highest completed education*								
Primary school	53 (10.8)	62 (11.9)	14 (15.6)	12 (15.2)	4 (6.9)	3 (5.2)	71 (11.1)	77 (11.7)
Secondary school	264 (53.8)	291 (56.1)	32 (35.6)	38 (48.1)	32 (55.2)	36 (62.1)	328 (51.3)	365 (55.6)
College/university	174 (35.4)	166 (32.0)	43 (47.8)	29 (36.7)	22 (37.9)	19 (32.8)	239 (37.4)	214 (32.6)
Current or previous pregnancy	158* (32.3)	173* (33.4)	45 (50.0)	43 (54.4)	15 (25.9)	28 (48.3)	218 (34.2)	244 (37.3)
Nulliparous	409* (83.8)	413* (79.9)	59* (66.3)	50 (63.3)	53 (91.4)	52 (89.7)	521 (82.0)	515 (78.7)
Planned LARC†	101* (20.7)	117* (22.8)	16* (18.6)	21* (27.6)	9 (15.5)	12* (21.1)	126 (19.9)	150 (23.2)

*Missing answers.
†Planned LARC, intervention group n = 133, control group n = 160.
IQR, interquartile range; LARC, long-acting reversible contraception.

been free of charge, this may have increased LARC uptake even more among the foreign-born migrants who were older and not eligible for the subsidised contraceptives that are provided to women up to 26 years of age. It is known that women who use a LARC method are more satisfied and have a higher continuation rate compared with women who use other methods,[15] which also applies irrespective of ethnicity.[16] Despite this, we found a lower, but not significant, proportion of LARC use among the foreign-born migrants in the control group, which may be explained by the fact that they had received less information about their method. For LARC methods, information on bleeding irregularities, which can occur especially during the first months following method implementation, needs to be communicated as it is otherwise a well-known cause of dissatisfaction.[25] Furthermore, it is important to provide information about the increased menstrual pain and bleeding that are frequently observed with copper IUD use.[25] If foreign-born migrants in the control groups had received more information on factors affecting contraceptive compliance, such as bleeding patterns with their chosen method, this might have resulted in a higher continuation of LARC use and fewer pregnancies subsequently terminated by an induced abortion. We could not see any significant difference between the three participant groups in pregnancy rates by group allocation, which may be a result of too few events in each group and possibly too short follow-up period. However, in the LOWE trial we found statistically significant differences in the intervention compared with the control group, in pregnancy rates post-abortion at the 12-month follow-up, and in LARC uptake.[19] Our results from the LOWE trial[19] differ from the results from a systematic review of randomised controlled trials showing no evidence for the effect of enhanced peri-abortion counselling on LARC uptake or subsequent pregnancies.[26] Limitations with the systematic review were that it was only based on six studies, and the heterogeneity between studies may have affected the result. Other published randomised controlled trials confirm the results of the LOWE trial[19] and report a higher LARC uptake after contraceptive effectiveness counselling.[17 18]

Table 2 Long-acting reversible contraception choice (at clinic visit), initiation (3-month follow-up) and use (12-month follow-up) by group allocation and the three participant groups

Parameter	Intervention n (%)	Control n (%)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
LARC choice				
Total	262/639 (41.0)	199/656 (30.3)	1.75 (0.95 to 3.24)	2.85 (2.04 to 3.99)
Non-migrants	199/491 (40.5)	153/519 (29.5)	1 (Reference)	1 (Reference)
Foreign-born migrants	34/90 (37.8)	32/79 (40.5)	1.04 (0.72 to 1.50)	1.02 (0.64 to 1.63)
Second-generation migrants	29/58 (50.0)	14/58 (24.1)	0.95 (0.61 to 1.46)	1.14 (0.68 to 1.93)
LARC initiation				
Total	211/486 (43.4)	150/485 (30.9)	1.93 (1.07 to 3.45)	2.90 (1.97 to 4.27)
Non-migrants	172/391 (44.0)	119/403 (29.5)	1 (Reference)	1 (Reference)
Foreign-born migrants	22/56 (39.3)	21/47 (44.7)	1.17 (0.75 to 1.84)	1.24 (0.71 to 2.16)
Second-generation migrants	17/39 (43.6)	10/35 (28.6)	0.93 (0.55 to 1.57)	1.13 (0.61 to 2.11)
LARC use				
Total	189/422 (44.8)	149/429 (34.7)	1.61 (0.99 to 2.61)	2.09 (1.47 to 2.96)
Non-migrants	150/338 (44.4)	123/357 (34.5)	1 (Reference)	1 (Reference)
Foreign-born migrants	22/46 (47.8)	14/43 (32.6)	0.99 (0.62 to 1.58)	0.97 (0.55 to 1.71)
Second-generation migrants	17/38 (44.7)	12/29 (41.4)	1.12 (0.66 to 1.91)	1.45 (0.80 to 2.62)

The results were analysed using mixed logistic regression, and all models include a random intercept for clinic. The unadjusted model includes group allocation and the three participant groups. In addition to group allocation and the three participant groups, the adjusted model includes clinic type, intended use of LARC, age, highest level of completed education, and previous pregnancy with and without previous abortion. The reference categories for the independent variables were allocation to control group and being non-migrant.
CI, confidence interval; LARC, long-acting reversible contraception; OD, odds ratio.

Strengths and limitations

One strength of this trial is the high number of participants of different ages and from different clinic types that were followed up for a period of 12 months. A limitation is that our study population differs from the official statistics regarding the proportion of non-migrants (higher proportion in our study, 78.0% vs 60.0%) and foreign-born migrants (lower proportion in our study, 13.1% vs 32.3%) in the Stockholm area,[27] which reduces the study's external validity. However, the randomisation of participating youth and maternal health clinics was stratified by the proportion of migrants within their catchment areas which reduced the effects of this limitation. Due to the large size of the catchment areas, we expected an equal distribution of migrant proportions among the abortion clinics, and therefore they were not stratified. Some clinics with a high proportion of migrants withdrew their participation prior to the study start, had difficulties recruiting participants or could not participate in this trial due to competing ongoing research. Other factors for this lower participation, such as foreign-born women seeking contraceptive counselling less frequently or declining to participate to a higher extent, were not explored in our study. These factors may also correspond to the lower rate of younger foreign-born participants in this trial and may occur due to secrecy of seeking contraceptive counselling pre-marriage.[28] Another explanation for the lower rate of younger foreign-born participants in this trial may be the fact that foreign-born women often are older when they arrive to Sweden. Conversely, regarding the lower participation of migrants, the median time for having lived in Sweden among foreign-born migrants in this trial was 10–12 years, which may have been a favourable factor for accessing healthcare services, accepting trial inclusion, as well as affecting values regarding SRHR to be less secretive. Efforts were made to reduce selection bias by informing clinics to invite *all* patients who fulfilled the inclusion criteria for participation. In the intervention group we could see a significant difference between the participant groups where fewer foreign-born migrants were singletons. Even if we had included more foreign-born singletons in the intervention group, we do not think that our results would have been any different due to LARC methods being the first-line choice in Sweden today regardless of age or relational status. Additionally, we could see a significant difference in the intervention group in highest completed education, where a higher proportion of foreign-born participants reported primary school or university/college. The highest level of completed education was adjusted for in the mixed logistic regression model, therefore this difference would not have impacted our results. In total, the intervention group had higher LARC choice, initiation and use compared with the control group after adjustments. When comparing the three migrant groups to each other no differences were observed (table 2), which suggests that

Table 3 Satisfaction with the intervention material among non-migrants, foreign-born migrants and second-generation migrants in the intervention group

Satisfaction with the intervention material	Non-migrants (n=491) n (%)	Foreign-born migrants (n=90) n (%)	Second-generation migrants (n=58) n (%)	Total (n=639) n (%)	P value
Educational video					0.080*
Very good	279 (56.8)	58 (64.4)	41 (70.7)	378 (59.2)	
Good	186 (37.9)	31 (34.4)	13 (22.4)	230 (36.0)	
No opinion	24 (4.9)	1 (1.1)	3 (5.2)	28 (4.4)	
Poor	2 (0.4)	0	1 (1.7)	3 (0.5)	
Very poor	0	0	0	0	
Video was supportive in contraceptive choice	322 (65.6)	64 (71.1)	45 (77.6)	431 (67.4)	0.132†
Effectiveness chart					0.086*
Very good	236 (48.1)	50 (55.6)	33 (56.9)	319 (49.9)	
Good	169 (34.4)	33 (36.7)	19 (32.8)	221 (34.6)	
No opinion	30 (6.1)	1 (1.1)	2 (3.4)	33 (5.2)	
Poor	0	0	0	0	
Very poor	0	0	0	0	
I was never shown the effectiveness chart	56 (11.4)	6 (6.7)	4 (6.9)	66 (10.3)	
Chart was supportive in contraceptive choice	259/434‡(59.7)	58/84 (69.0)	40/54 (74.1)	357/572 (62.4)	0.048†
Box with contraceptive models					0.086*
Very good	212 (43.2)	45 (50.0)	35 (60.3)	292 (45.7)	
Good	143 (29.1)	25 (27.8)	9 (15.5)	177 (27.7)	
No opinion	38 (7.7)	6 (6.7)	4 (6.9)	48 (7.5)	
Poor	0	0	0	0	
Very poor	0	0	0	0	
I was never shown the box with the models	98 (20.0)	14 (15.6)	10 (17.2)	122 (19.1)	
Models were supportive in contraceptive choice	241/391 (61.6)	51/76 (67.1)	32/48 (66.7)	324/515 (62.9)	0.567†

The results were analysed using Kruskal–Wallis and Chi-square tests, and contain only data from the intervention group and are therefore not adjusted for intraclass correlation. However, we confirmed the results using the Cochran–Mantel–Haenszel test which was stratified for centre and thus takes into account the possible clustering effect.
*Kruskal–Wallis test.
†Chi-square test.
‡One missing answer.

the intervention is effective when controlled for migration background. However, the sample size calculation of the main trial included no information on variations in migration background, infering a lower power to present differences when divided into migrant groups. This is a limitation when presenting subgroup analyses of bigger trials.[29]

Another limitation was that the intervention material and questionnaires were only available in Swedish and English. The importance of providing migrants with different formats of translated information on contraception has been shown previously.[30] This may also have reduced the numbers of foreign-born migrants in our trial due to lack of known need for an interpreter prior to the visit and the time allocated for each visit. An additional strength of this trial is the use of multimodal tools in the intervention material. Although many of the foreign-born migrants had been residing in Sweden for a long time and the majority spoke Swedish, multimodal materials can be an important complement in shared decision-making,[7] especially when one is not receiving information in one's native language. Hence, translated materials are important. Further, a significant difference regarding the support in contraceptive choice by the effectiveness chart between the foreign-born and second-generation migrants compared with the non-migrants was seen. This may be because visual materials can assist in decision-making when Swedish is not the native language. Even if one understands and speaks Swedish, visual materials such as the effectiveness chart may help an individual to understand information more easily. Future research on structured contraceptive counselling provided in more languages is needed to evaluate the effects on a more diverse population but also on providing counselling only using visual materials instead of audio or text material. Additionally, future research may also evaluate the timing of the counselling since it has been reported that migrants value antenatal discussion on postpartum contraception.[30] A previous systematic review has stated the need for conducting randomised controlled trials with new interventions for contraceptive counselling and additional evaluation of satisfaction with the interventions.[31] Further, to improve high-quality

evidence, recommendations for reporting such studies have been announced.[31] In the LOWE trial[19] most of these reccomendations were met. However, a limitation is that we did not collect information on the participants' satisfaction with their current method before entering the trial. Nor did we ask participants if they still had a need for contraception during the 12-month follow-up period. Future research should perhaps take these limitations into account when designing a new trial.

CONCLUSIONS

Structured contraceptive counselling increased LARC choice, initiation and use, controlled for migration background. The effectiveness chart was found to be significantly more supportive among foreign-born migrants and second-generation migrants compared with non-migrants when choosing contraceptive methods.

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Contributors KGD was responsible for the study concept, trial protocol and regulatory approvals, and took overall responsibility for the study conduct and funding. KGD is acting as the guarantor. HKK contributed to study design protocol development and in securing funding as well as in supervision of the study. All authors except ECL and IB were involved in the development of study tools and recruitment of participating clinics. NE, KEI and IB acquired the data. KEI, ECL, NE and the statisticians were responsible for data analyses. All authors contributed to the interpretation of the data and manuscript writing.

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Supplementary section

METHODS

Study design, setting and participants

A number of 41 clinics were assessed for eligibility whereof 33 were randomised. Some clinics withdrew their participation before the trial started which resulted in 14 clinics allocated to intervention and 14 clinics allocated to control (Figure 1). Each clinic constituted a cluster. In the LOWE trial we aimed to include 24 clinics with a mean of 50 participants/clinic or 28 clinics with a lower mean than 50 participants/clinic to get a 90% power.[1] We assumed an intraclass correlation (ICC) of 0.05 however our estimated ICC was 0.01 (95% CI 0.00-0.05%).[1]

Stockholm is the capital of Sweden. Stockholm county is divided into 26 municipalities where the largest is called "Stockholm Stad" and it is further divided into 13 districts. In the randomisation to intervention or control group, we stratified youth clinics and maternal health clinics by proportion of migrants within their catchment areas. The number of women with migration background (including both foreign-born migrants and second-generation migrants) aged 15-24 years and 15-54 years were divided by the number of all women in the same age groups, to get the proportion of women with foreign background in the specified municipality.[2] We had eight maternal health clinics situated in "Stockholm Stad" and for those we found statistics of the proportion of all men and women with foreign background 16-64 years of age.[3] We considered the proportion of women with migration background in each municipality or district as high or low. The cut off was set at >37%. For the randomisation we had 10 clinics (four youth clinics and six maternal health clinics) considered as clinics with high migrant population and 14 (nine youth clinics and five maternal health clinics) with low migrant population.

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Supplemental Material

Table S1. Baseline characteristics of clinics

Clinic type	**Non-migrants** n (%)	**Foreign-born migrants** n (%)	**Second-generation migrants** n (%)	**p-value**
Abortion clinic n = 4				
Intervention	83/110 (75.5)	16/110 (14.5)	11/110 (10.0)	0.163
Control	70/110 (63.6)	24/110 (21.8)	16/110 (14.5)	
Youth clinic n = 13				
Intervention	222/276 (80.4)	27/276 (9.8)	27/276 (9.8)	0.568
Control	249/297 (83.8)	24/297 (8.1)	24/297 (8.1)	
Maternal Health clinic n = 11				
Intervention	186/253 (73.5)	47/253 (18.6)	20/253 (7.9)	0.145
Control	200/249 (80.3)	31/249 (12.4)	18/249 (7.2)	

Table S2. The most common countries of birth and number of years in Sweden for foreign-born migrants

	Intervention n=89* n (%)	**Control n=79** n (%)	**Total n=168** n (%)
Countries of birth			
Iran	7 (7.9)	5 (6.3)	12 (7.1)
Iraq	4 (4.5)	7 (8.9)	11 (6.5)
Poland	5 (5.6)	6 (7.6)	11 (6.5)
Finland	7 (7.9)	4 (5.1)	11 (6.5)
Other	66 (74.2)	57 (72.2)	123 (73.2)
Years in Sweden			
Median (IQR)	10 (6-17)	12 (8-17.25)	11 (6-17)

*1 missing data

Table S3. Cost impact on contraceptive choice and LARC impact on choice if all contraceptives were for free, divided by the three participant groups

	Non-migrants n (%)	**Foreign-born migrants** n (%)	**Second-generation migrants** n (%)	**Total** n (%)	**p-value**
Cost impact on contraceptive choice					
Intervention					
Yes	67 (13.6)	17 (18.9)	3 (5.2)	87 (13.6)	0.059
No	424 (86.4)	73 (81.1)	55 (94.8)	552 (86.4)	
Control					
Yes	57 (11.0)	9 (11.4)	7 (12.1)	73 (11.1)	0.966
No	462 (89.0)	70 (88.6)	51 (87.9)	583 (88.9)	
LARC impact on choice					
Intervention					
Yes	192 (39.1)	42 (46.7)	25 (43.1)	259 (40.5)	0.372

No	299 (60.9)	48 (53.3)	33 (56.9)	380 (59.5)	
Control					
Yes	156 (30.1)	29 (36.7)	17 (29.3)	202 (30.8)	0.475
No	363 (69.9)	50 (63.3)	41 (70.7)	454 (69.2)	

Table S4. Pregnancy rates at FU3 and FU12 divided by the three particpant groups and allocated group

Pregnancy	**Non-migrants** n (%)	**Foreign-born migrants** n (%)	**Second-generation migrants** n (%)	**Total** n (%)	**p-value**
FU3					
Intervention					
Yes	5 (1.0)	1 (1.2)	1 (1.8)	7 (1.1)	0.634*
No	475 (99.0)	85 (98.8)	55 (98.2)	615 (98.9)	
Control					
Yes	10 (2.0)	2 (2.7)	4 (7.0)	16 (2.5)	0.066*
No	499 (98.0)	71 (97.3)	53 (93.0)	623 (97.5)	
FU12					
Intervention					
Yes	27 (5.7)	5 (5.9)	6 (10.7)	38 (6.2)	0.322*
No	449 (94.3)	80 (94.1)	50 (89.3)	579 (93.8)	
Control					
Yes	39 (7.7)	9 (12.3)	5 (8.9)	53 (8.3)	0.334*
No	469 (92.3)	64 (87.7)	51 (91.1)	584 (91.7)	

*Fisher´s exact test