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Risk factors and the choice of long-acting reversible
contraception following medical abortion : effect on subsequent
induced abortion and unwanted pregnancy

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2018

Korjamo , R , Heikinheimo , O & Mentula , M 2018 , ' Risk factors and the choice of long-acting reversible contraception following medical abortion : effect on subsequent induced abortion and unwanted pregnancy ' , European Journal of Contraception and Reproductive Health Care , vol. 23 , no. 2 , pp. 89-96 . <https://doi.org/10.1080/13625187.2018.1440385>

<http://hdl.handle.net/10138/322885>

<https://doi.org/10.1080/13625187.2018.1440385>

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1 **Risk Factors and the Choice of Long-acting Reversible Contraception Following Medical**
2 **Abortion – Effect on Subsequent Induced Abortion and Unwanted Pregnancy**

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16

17 Word count 2806/3500

18 **Abstract (250 words)**

19 **Risk Factors and the Choice of Long-acting Reversible Contraception Following Medical**
20 **Abortion – Effect on Subsequent Induced Abortion and Unwanted Pregnancy**
21

22 **Objective:** To analyse the post-abortion effect of long-acting reversible contraception (LARC)
23 plans and initiation on the risk of subsequent unwanted pregnancy and abortion.

24 **Materials and methods:** A retrospective cohort study of 666 women who underwent medical
25 abortion between January–May 2013 at Helsinki University Hospital, Finland. Altogether 159
26 (23.8%) women planning post-abortion use of levonorgestrel-releasing intrauterine system (LNG-
27 IUS) participated in a randomized study and had an opportunity to receive the LNG-IUS free-of-
28 charge from the hospital. The other 507(76.2%) women planned and obtained their contraception
29 according to clinical routine. Demographics, planned contraception, and LARC initiation at the time
30 of the index abortion were collected. Data on subsequent abortions were retrieved from the Finnish
31 Abortion Register and electronic patient files until the end of 2014.

32 **Results:** During the 21 months ([median], IQR 20–22) follow-up, 54(8.1%) women requested
33 subsequent abortions. When adjusted for age, previous pregnancies, deliveries, induced abortions,
34 and gestational-age, planning LARC for post-abortion contraception failed to prevent subsequent
35 abortion (33 abortions/360 women,9.2%) compared to other contraceptive plans (21/306, 6.9%)
36 (HR1.22, 95%CI 0.68–2.17). However, verified LARC initiation decreased the abortion rate (4
37 abortions/177 women,2.3%) compared to women with uncertain LARC initiation status (50/489,
38 10.2%) (HR0.17, 95%CI 0.06–0.48). When adjusted for LARC initiation status, age <25 years was a
39 risk factor for subsequent abortion (27 abortions/283 women,9.5%) compared to women ≥25 years
40 (27/383, 7.0%, HR1.95, 95%CI 1.04–3.67).

41 **Conclusions:** Initiation of LARC as part of abortion service at the time of medical abortion is an
42 important means to prevent subsequent abortion, especially among young women.

43 **Keywords:** abortion, termination of pregnancy, repeat abortion, long-acting reversible
44 contraception

45

46 **Running head:** (48/50 characters)

47 Risk factors and LARC following medical abortion

48

49 **Introduction**

50 Recent estimates show that almost half of the pregnancies in the USA are unintended and about
51 40% of them end up in abortion [1]. Induced abortion is often a consequence of inadequate
52 contraception and the reasons not to use contraception originate from lack of correct information
53 [2]. Women undergoing an induced abortion are at higher risk for a subsequent induced abortion
54 [3]. Although abortion incidence has declined in the developed world [4,5], the rate of repeat
55 abortion has not decreased [6]. In research studies, the reported rates of subsequent induced
56 abortions have been 5%, 11%, and 20% at one, two, and four years after the index abortion,
57 respectively [7,8]. The number of repeat induced abortions should be diminished, as they increase
58 the risk of needing surgical interventions and preterm delivery [9,10–13]. Long-acting reversible
59 contraceptives (LARC), including intrauterine devices (IUDs) and implants, are associated with the
60 lowest incidence of subsequent abortion [3,14,15], especially if initiated at the time of the abortion
61 [8,16,17].

62
63 Several interventions have been performed to increase the uptake of LARC after induced abortion.
64 Contraceptive counselling alone has not increased LARC uptake [18]. Yet women are motivated to
65 choose LARC at the time of abortion, especially if they have a recent history of induced abortion
66 [19]. Studies suggest that the reduction of financial barriers may facilitate women to initiate LARC
67 methods [20–23]. Also, minimizing the number of visits needed increases LARC uptake; the effect
68 is well documented for surgical abortion [3,14,15,17,24,25]. However, increasing use of medical
69 instead of surgical abortion has challenged the option to initiate LARC methods immediately.
70 Initiation may be delayed 3-4 weeks after the abortion, if a conservative protocol is followed.
71 Studies have shown that immediate insertion of the etonogestrel-implant shortly after mifepristone
72 intake at the initial visit for abortion did not affect the efficacy of medical abortion, but increased
73 the implant initiation rate [26,27]. Similar effects are evident in response to shortening the interval

74 between medical abortion and IUD insertion, and offering it as a part of abortion service [8,28,29].
75 We recently performed a randomized clinical trial that demonstrated the feasibility and safety of the
76 fast-track (≤ 3 days) insertion of a levonorgestrel-releasing intrauterine system (LNG-IUS) during
77 medical induced abortion [30,31]. Moreover, immediate insertion resulted in better one-year
78 continuation rates than later LNG-IUS insertion [16].

79
80 In this cohort study we assessed factors affecting the selection and initiation of LARC for post-
81 abortion contraception at the time of medical induced abortion. We also analysed the effect of
82 planned *vs.* initiated contraception on the risks of subsequent unwanted pregnancy and induced
83 abortion both for LARCs and for other contraceptives.

84

85 **Materials and Methods**

86 This retrospective cohort study analyses the effects of contraceptive plans and initiation after
87 medical induced abortion. The study was performed in tandem with a randomized study assessing
88 immediate *vs.* later provision of free-of-charge LNG-IUS (Mirena®, Bayer AG, Turku, Finland)
89 [30,31]. The study population consisted of adult (≥ 18 years) women undergoing medical abortion
90 up to 20 weeks of gestation during January 17th to May 20th 2013 at the Department of Obstetrics
91 and Gynaecology of the Helsinki University Hospital, Finland. The recruitment for randomised
92 controlled trial occurred after contraceptive counselling among women showing interest in LNG-
93 IUS contraception. During the study period all women showing interest in LNG-IUS contraception
94 and meeting the inclusion criteria had an opportunity to participate to the study.

95

96 Medical induced abortion was performed using oral mifepristone 200 mg and misoprostol 400 to
97 800 mcg 1-3 days later according to the Finnish national guidelines [32]. Medical abortions up to 9

98 weeks of gestation (up to 63 days of amenorrhea) can be performed partially at home where
99 misoprostol is self-administered by the patient. Later abortions were performed at the hospital ward.
100

101 During the randomized trial [30,31] the LNG-IUS was offered either immediately (*i.e.* ≤ 3 days) or
102 2–4 weeks after the abortion. If the woman did not participate in the trial, the LNG-IUS, copper-
103 IUD (Cu-IUD, Nova T380, Bayer Pharma AG, Berlin, Germany), or contraceptive implant
104 (Nexplanon®, N.V. Organon, Oss, Netherlands) was offered from the hospital free-of-charge in
105 cases of previous induced abortions. During the study period two cities of the hospital district,
106 namely Helsinki and Vantaa, were offering the first contraceptive LNG-IUS, Cu-IUD, or implant
107 free-of-charge, but the insertion occurred at the primary health care at a separate visit scheduled by
108 the woman herself. These visits may be made up to three months after the first contact. We did not
109 have access to information on these possible insertions. Thus, all verified LARC insertions in this
110 study were free-of-charge. If the woman was planning other than LARC for post abortion
111 contraception, a three-month start-up package of pills, patch, or ring was provided from the hospital
112 liberally, but otherwise the patient had to buy contraception herself.
113

114 Finnish law and guidelines on induced abortion, require contraceptive counselling before induced
115 abortion [32]. Moreover, planned contraception, along with selected sociodemographic and
116 abortion-related data are reported to the national Abortion Register. The register has been validated,
117 and proven to be reliable and of high-quality [33,34].
118

119 The abortion procedure in Finland consists of two visits: first visit occurring at the primary health
120 care or private sector, and second at the hospital outpatient clinic. All women receive contraceptive
121 counselling during both these visits, LARC presentation being an important part of the counselling.
122 Data concerning planned contraception and background factors was collected as a part of the

123 randomized study, or from electronic patient records of the hospital system, and were completed
124 from the Abortion Register. “*LARC presented*” is defined as LARC was recommended or presented
125 to the woman and this was mentioned in the electronic patient files. “*LARC planned*” means that
126 woman was recruited to the randomized study or the woman confirmed that LARC was planned for
127 post-abortion contraception. “*LARC initiated*” means that initiation was verified as a part of the
128 randomized study, or the insertion occurred in the hospital within one month following the abortion.

129

130 Marital status was divided into categories of single, cohabiting, and married. Socio-economic status
131 was presented as white-collar workers, blue-collar workers, students (level of education not
132 defined), and other or not known according to the stated occupation or the highest education level
133 reported. The coding was based on national standards (Statistics Finland). Ethnicity was available
134 from the hospital files and is presented as groups of native Finnish and others.

135

136 Information on subsequent pregnancies was derived from patient clinical records and The Finnish
137 Abortion Register at the end of 2014. If woman was requesting subsequent abortion, but the
138 pregnancy was diagnosed as a miscarriage or an ectopic, the pregnancy was defined as unwanted.

139

140 This study was approved by the hospital system of Helsinki and Uusimaa, and National Institute of
141 Health and Welfare. The clinical trial was approved by the local Ethics Committee and registered to
142 www.clinicaltrials.gov (NCT01755715).

143

144 *Statistics*

145 Categorical data were analysed by cross tabulation and p-values calculated by Chi-square test.

146 Kaplan-Meier analysis and Log-Rank test was used to describe subsequent unwanted pregnancies.

Survival analysis and hazard ratios were analysed by Cox's regression model. All analyses were performed with IBM SPSS statistical software version 24.

Results

Study Population

Total of 666 women underwent medical abortion, representing 92.2% of all women undergoing an induced abortion during the study period (Figure 1). Demographics of the women are presented in Table 1. Most women were 20 to 35 years old, of normal weight and half of them smoked regularly. Almost 60% of them had a history of previous pregnancy and one third a history of induced abortion. Three out of four underwent early medical abortion (gestational age ≤ 63 days) and one out of four participated in the randomized trial. Detailed demographics of the women participating in the randomized study have been published previously [30, 31]. Briefly, women participating in the randomized trial (n=159) compared to non-RCT-women (n=507) in this cohort belonged to older age-groups (21–24 year olds 33 [20.8%] vs. 132 [26.0%]; 25–29 year olds 47 [29.6%] vs. 94 [18.5%], other groups data not shown, $p=0.02$), had more often history of previous pregnancy (113 [71.1%] vs. 282 [55.6%], $p=0.001$), delivery (91 [57.2%] vs. 205 [40.4%], $p<0.001$) and induced abortion (70 [44.0%] vs. 159 [31.4%], $p=0.003$), and they requested the abortion at later gestational-age (≤ 63 days 108 [67.9%] vs. 399 [78.7%], 64–84 days 43 [27.0%] vs. 93 [18.3%], ≥ 85 days 8 [5.0%] vs. 15 [3.0%], $p=0.02$).

Presentation, Planning, and Insertion of Post-abortion LARC

Long-acting contraception was presented to 429 (64.4%) women (Table 2). LARC was presented more often to women older than 25 years than to women younger than 25 years of age (271/383 [70.8%] vs. 158/283 [55.8%] risk ratio [RR] 1.27, 95% confidence interval [95%CI] 1.12–1.43, $p<0.001$). Furthermore, LARC was presented more often to women who were obese and married or

172 cohabiting, had history of pregnancy, delivery or induced abortion, and were requesting second
173 trimester abortion.

174

175 After the counselling, 360 (54.0%) women were planning initiation of post abortion LARC (Figure
176 1, Table 2). The most popular method was the LNG-IUS (n=268, 74.4%) and 159 (59.3%) of these
177 women participated in the randomized study. Contraindication for progestin-containing
178 contraception was present in only one woman (newly diagnosed breast cancer), whereas
179 contraindications for intrauterine contraception occurred in four cases (one case of acute
180 gonorrhoea, two cases of submucosal myomas and one uterus bicornus).

181

182 Altogether 177 (26.6%) women received LARC at the time or within 4 weeks of medical induced
183 abortion. This represented 49.2% of all women planning LARC. Among the 159 women who
184 participated in the randomized controlled trial 141 (88.7%) received the LNG-IUS. None of the
185 women planning other forms of contraception received LARC. Most of these LARCs were LNG-
186 IUSs (n=149, 84.2%) followed by implants (n=27, 15.3%) and one Cu-IUD. Even though LARC
187 was planned more often for women older than 25 years, it was initiated similarly in younger and in
188 older women (Table 2). Women with a history of previous pregnancy (either delivery or abortion)
189 initiated a LARC more often than women with no such history. Abortion conducted at the hospital
190 ward (late first-trimester or second trimester abortion) increased the uptake of LARC. Regardless of
191 plans, native Finnish women initiated LARC more often than women of other ethnic groups. Only
192 36 of 201 (17.9%) women who planned LARC but did not participate in the randomized study
193 received LARC compared to 141/159 (88.7%) women participating in the randomized study.

194

195

196

197 ***Subsequent Abortion and Unwanted Pregnancy***

198 The median follow-up time was 649 days (IQR 614–679) (i.e. 21 months [20–22]). During the
199 follow-up, altogether 54 women (8.1%) underwent a subsequent induced abortion. The median time
200 to subsequent abortion was 336 days (246–450) (i.e. 11 months [8–15]). According to the patient
201 files, there were five additional unwanted pregnancies: three women were diagnosed with
202 miscarriage at the time they were requesting subsequent abortion; one woman had an ectopic
203 pregnancy following the use of emergency contraception; and one pregnancy was diagnosed during
204 oral contraceptive use following fibroid resection. Table 3 presents the distribution and hazard
205 ratios of subsequent abortions and unwanted pregnancies according to selected risk factors, and
206 LARC planning and initiation status. After adjustments, only initiated LARC decreased the rate of
207 subsequent abortion (hazard ratio [HR] 0.17, 95% confidence interval [95% CI] 0.06–0.48,
208 $p=0.0008$) and unwanted pregnancy (HR 0.15, 95% CI 0.05–0.43, $p=0.0004$). Four unwanted
209 pregnancies occurred in women who participated in the randomized trial following initiation of
210 LNG-IUS use. One pregnancy was recognized after an unnoticed expulsion, two LNG-IUSs were
211 removed before the subsequent pregnancy, and one abortion was performed in a case where LNG-
212 IUS had been inserted, but the patient never returned for follow-up. Age under 25 years remained
213 an independent risk factor for both subsequent induced abortion and unwanted pregnancy even after
214 adjusting LARC initiation status. Kaplan-Meier survival curves (Figure 2) display the effect of
215 LARC initiation status on subsequent unwanted pregnancy. Verified initiation of LARC reduced the
216 occurrence of subsequent unwanted pregnancy significantly during the follow-up. Conversely,
217 planned but not initiated LARC resulted more often in unwanted pregnancy when compared to
218 initiated LARC or other form of contraception.

219

220

221

222 **Discussion**

223 *Findings and Interpretation*

224 We found that during the nearly two years of follow-up, only initiated LARC decreased the need for
225 subsequent abortion and unplanned pregnancy, when compared to only planning of LARC, or
226 initiation of other contraceptive methods at the time of the abortion. Age less than 25 years was an
227 independent risk factor for subsequent abortion and unwanted pregnancy.

228

229 Previous studies have shown that young age, second trimester abortion, and history of previous
230 pregnancy, delivery, and induced abortion are risk factors for subsequent induced abortion [3, 35,
231 36,37]. LARC methods are the most effective in prevention of unintended pregnancy and subsequent
232 abortion [3,14]. For example, the contraceptive CHOICE project in the U.S. has shown counselling
233 that highlights LARC methods to be the most effective, and removing cost and access barriers can
234 increase LARC initiation rates and reduce both total and repeat abortion rates [21,38]. The CHOICE
235 investigators estimated that contraceptive policy facilitating LARC initiation could prevent up to 41%
236 to 71% of abortions performed annually in the U.S. [21]. LARC methods have long been liberally
237 recommended to all women in our clinic in need of contraception. However, in this study information
238 concerning contraceptive counselling and LARC recommendations is based on retrospective data
239 collected from patient files. Because of the clinic's long-standing tradition and parallel RCT
240 recruitment, LARCs may have been discussed more often than recorded in the patient files. Even
241 though we recommended and presented LARC more often to women older than 25 years of age
242 compared to younger women, we initiated LARC similarly to both age groups. We speculate this was
243 mostly due to easy and cost-free access to LNG-IUS insertion as part of the randomized study.

244

245 A key finding of this study is that only planning LARC does not decrease the need for subsequent
246 abortion. In contrast, the need for effective contraception was highest in this group. However, this

247 may be due to the fact that women with an increased risk of subsequent abortion were successfully
248 identified and plans to initiate LARC were made. But, as the plans did not lead to LARC initiation,
249 this resulted in the highest need for another abortion in this group.

250

251 This study has practical implications. It shows that the policy of only discussing LARC, not leading
252 into LARC initiation, is not effective. This is likely to be associated with the high up-front cost of
253 LARC methods and structure of the contraceptive service delivery system. None of the women
254 studied were willing or able to buy LARC beforehand even though this option is available. We are
255 pleased to note discussion about possible free-of-charge provision of contraception, including
256 LARC, is currently on-going in Finland [39].

257

258 *Strengths and Weaknesses of the Study*

259 The predominant strength of our analysis is that the study population is well representative of the
260 average Finnish woman seeking abortion; in 2013, the incidence of abortion in Finland was highest
261 among women aged 20–24 years (of the study population 25% were 20–24 years of age), 36% had
262 experienced abortion previously (study population 34%), and 49% had a previous delivery (study
263 population 44%) [40].

264

265 The setting of this study may be retrospective, but the important background characteristics are
266 reliable and could be identified from the hospital records as they are routinely asked. In the Finnish
267 healthcare setting, induced abortions are almost always treated in public health care (<6% in private
268 clinics) (Anna Heino, National Institute for Health and Welfare, personal communication, March
269 26, 2016) [41]. In addition, the data concerning induced abortions are accurate and reliable, thus
270 induced abortions can be identified from the Abortion Register [33,34]. Data on additional
271 unwanted pregnancies was derived from the hospital patient files only, and may thus be

272 underestimated. According to Kaplan-Meier analysis (Figure 2), more accurate detection of
273 unwanted pregnancies would have increased the differences between the initiated or planned LARC
274 and other contraceptive plans.

275

276 However, a weakness of the study is that we have no information concerning the LARC initiation
277 status in the group of women that planned LARC, but it was not initiated at the hospital. This is due
278 to the fact that women came from several communities with different electronic patient file systems
279 for which we had no access. Also, some of the LARCs might have been initiated by private
280 physicians. Furthermore, all boundaries to access of effective contraception in primary healthcare
281 could not be analysed. For example, it was unknown whether women attended a planned follow-up
282 visit at primary health care. Previous studies from our group [42] and elsewhere [43] have shown
283 that up to half of the women do not attend the scheduled post-abortion follow-up.

284

285 **Conclusion**

286 Fast-track and easy access initiation of LARC as part of the abortion service provided at the time of
287 the medical abortion is an important means to prevent subsequent abortion, especially among young
288 women.

289 **Acknowledgments**

290 We thank research nurse Pirjo Ikonen for her never failing management of the patients during the
291 randomized study, and Jennifer Rowland for language revision.

292

293 **Funding Details**

294 This work was supported by the research grants from The Hospital District of Helsinki and
295 Uusimaa, The Finnish Cultural Foundation (February 2014 and February 2017), Finnish-Norwegian
296 Medical Foundation (June 2016), and Instrumentarium Science Foundation (March 2017). The
297 funding sources of the study had no role in study design, data collection, data analysis, data
298 interpretation, or writing of the report.

299

300 **Declaration of Interest Statement**

301 OH has served on advisory boards for Bayer Healthcare and Gedeon Richter, and designed and
302 lectured at educational events connected with these companies. OH has also lectured at educational
303 events organized by Merck/MSD and Sandoz. The other authors (RK and MM) have no conflicts of
304 interest to declare.

305

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Figure 1. The formation of the study group of 666 women undergoing medically induced abortion and their planned contraception during January 17th to May 20th 2013.

444 a)

445 b)

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449 **Figure 2.** Kaplan-Meier survival without subsequent unwanted pregnancy among 666 women
450 requesting medical abortion during January 17th to May 20th 2013.
451 a) According to initiation status of long-acting reversible contraception (LARC).
452 b) According to verified LARC insertion, planning but not necessarily starting LARC, or other
453 contraceptive plans at the time of index abortion.
454 Median follow-up time was 649 days (interquartile range 614–679, i.e. 21 months [20–22]).
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457 **Table 1.** Demographics of the 666 women undergoing medical induced abortion during January
 458 17th to May 20th 2013. Data are presented as n (%) unless stated other vice.

Age (years) (median [IQR])	26.0 (22.0–32.0)
Age groups	
≤ 20 years	118 (17.7%)
21 to 24 years	165 (24.8%)
25 to 29 years	141 (21.2%)
30 to 34 years	124 (18.6%)
35 to 39 years	84 (12.6%)
≥ 40 years	34 (5.1%)
Body mass index (kg/m ²) (missing n=90 [13.5%]) (median [IQR])	22.7 (20.7–25.6)
Normal weight (body mass index <25 kg/m ²)	413 (62.0%)
Regular smoking (missing n=17 [2.6%])	308 (46.2%)
Regular use of alcohol (missing n=59 [8.9%])	407 (61.1%)
Socioeconomic status	
White collar workers	130 (19.5%)
Blue collar workers	235 (35.3%)
Students	163 (24.5%)
Others or not known	138 (20.7%)
Marital status (missing n=14 [2.1%])	
Married or cohabiting	272 (40.8%)
Single	380 (57.1%)
Ethnicity native Finnish	513 (77.0%)
Residence Helsinki or Vantaa*	517 (77.6%)
Previous pregnancy	395 (59.3%)
Previous delivery	296 (44.4%)
Previous vaginal delivery	272 (40.8%)
Previous cesarean section	45 (6.8%)
Previous induced abortion	229 (34.4%)
Previous miscarriage	97 (14.6%)
Gestational age (median [IQR])	54 (47–63)
≤63 days	507 (76.1%)
64–84 days	136 (20.4%)
≥85 days	23 (3.5%)
Abortion partially at home among gestational age of ≤63 days	437 (86.2%)

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460 * Cities offering a first intrauterine device or system or implant free of costs

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Table 2. LARC presented, planned, and inserted according to selected demographic factors among 666 women undergoing medical abortion during January 17th to May 20th 2013.

	n	LARC presented [^]	p-value	LARC planned [^]	p-value	LARC inserted [^]	p-value
Age							
<25 years	283	158 (55.8%)	<0.001	135 (47.7%)	0.005	66 (23.3%)	0.10
≥25 years	383	271 (70.8%)		225 (58.7%)		111 (29.0%)	
Body mass index (kg/m ²)							
<25	413	273 (66.1%)	<0.001	228 (55.2%)	<0.001	112 (27.1%)	0.006
25-30	108	65 (60.2%)		53 (49.1%)		32 (29.6%)	
≥30	55	46 (83.6%)		42 (76.4%)		21 (38.2%)	
Not known	90	45 (50.0%)		37 (41.1%)		12 (13.3%)	
Socioeconomic status							
White collar workers	130	83 (63.8%)	0.08	67 (51.5%)	0.15	34 (26.2%)	0.08
Blue collar workers	235	164 (69.8%)		141 (60.0%)		73 (31.1%)	
Students	163	93 (57.1%)		84 (51.5%)		44 (27.0%)	
Others or not known	138	89 (64.5%)		68 (49.3%)		26 (18.8%)	
Marital status							
Married or cohabiting	272	193 (71.0%)	0.002	159 (58.5%)	0.049	72 (26.5%)	0.38
Single	380	224 (58.9%)		191 (50.3%)		99 (26.1%)	
Not known	14	12 (85.7%)		10 (71.4%)		6 (42.9%)	
Ethnicity							
Native Finnish	513	327 (63.7%)	0.51	273 (53.2%)	0.43	147 (28.7%)	0.026
Other	153	102 (66.7%)		87 (56.9%)		30 (19.6%)	
Residence							
Helsinki or Vantaa*	517	336 (65.0%)	0.56	281 (54.4%)	0.77	137 (26.5%)	0.93
Other	149	93 (62.4%)		79 (53.0%)		40 (26.8%)	
Previous pregnancy							
Yes	395	305 (77.2%)	<0.001	256 (64.8%)	<0.001	131 (33.2%)	<0.001
No	271	124 (45.8%)		104 (38.4%)		46 (17.0%)	
Previous delivery							
Yes	296	236 (79.7%)	<0.001	202 (68.2%)	<0.001	98 (33.1%)	0.001
No	370	193 (52.2%)		158 (42.7%)		79 (21.4%)	
Previous induced abortion							
Yes	229	182 (79.5%)	<0.001	149 (65.1%)	<0.001	81 (35.4%)	<0.001
No	437	247 (56.5%)		211 (48.3%)		96 (22.0%)	
Gestational-age group							
≤63 days	507	318 (62.7%)	0.047	265 (52.3%)	0.040	114 (22.5%)	<0.001
64-84 days	136	91 (66.9%)		77 (56.6%)		48 (35.3%)	
≥85 days	23	20 (87.0%)		18 (78.3%)		15 (65.2%)	
Early medical abortion (≤63 days)							
Yes	507	318 (62.7%)	0.10	265 (52.3%)	0.10	114 (22.5%)	<0.001
No	159	111 (69.8%)		95 (59.7%)		63 (39.6%)	
Abortion partially at home among gestation of ≤63 days							
Yes	437	272 (62.2%)	0.58	226 (51.7%)	0.53	89 (20.4%)	0.004
No	70	46 (65.7%)		39 (55.7%)		25 (35.7%)	
Participated in randomized trial							
Yes	159	159 (100.0%)	<0.001	159 (100.0%)	<0.001	141 (88.7%)	<0.001
No	507	270 (53.3%)		201 (39.6%)		36 (7.1%)	

[^] 'LARC presented' was defined as it was recommended or presented to the woman and mentioned in the electronic patient file. 'LARC planned' means that woman was recruited to the randomized

466 study or LARC was planned otherwise to post abortion contraception. ‘LARC initiated’ means that
467 initiation was verified as a part of the randomized study or insertion occurred in a hospital within
468 one month following the abortion.

469 * Cities offering the first long-acting reversible contraceptives free-of-cost to their citizens.

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Table 3: Risk factors of subsequent abortion and unwanted pregnancy during the follow-up (median 21 months, interquartile range 20–22 months)

among 666 women undergoing medical induced abortion during January 17th to May 20th 2013. Cox regression model.

	Subsequent abortion					Subsequent abortion or unwanted pregnancy				
	n (%)	Unadjusted HR (95%CI)	p-value	Adjusted HR (95%CI)	p-value	n (%)	Unadjusted HR (95%CI)	p-value	Adjusted HR (95%CI)	p-value
Planned other contraception (n=306)	21 (6.9%)	Reference		Reference*		25 (8.2%)	Reference		Reference*	
Planned LARC ^a (n=360)	33 (9.2%)	1.37 (0.79–2.37)	0.26	1.22 (0.68–2.17)	0.51	34 (9.4%)	1.19 (0.71–2.00)	0.51	1.02 (0.59–1.76)	0.95
Planned other contraception (n=306)	21 (6.9%)	Reference		Reference*		25 (8.2%)	Reference		Reference*	
LARC planned, not inserted (n=183)	29 (15.8%)	2.47 (1.41–4.33)	0.002	2.22 (1.23–3.98)	0.008	30 (16.4%)	2.15 (1.27–3.66)	0.005	1.86 (1.07–3.24)	0.028
LARC inserted (n=177)	4 (2.3%)	0.33 (0.11–0.95)	0.04	0.26 (0.08–0.77)	0.015	4 (2.3%)	0.27 (0.10–0.79)	0.016	0.21 (0.07–0.62)	0.005
LARC not inserted (n=489)	50 (10.2%)	Reference		Reference*		55 (11.2%)	Reference		Reference*	
LARC inserted (n=177)	4 (2.3%)	0.21 (0.08–0.59)	0.003	0.17 (0.06–0.48)	<0.001	4 (2.3%)	0.19 (0.07–0.54)	0.002	0.15 (0.05–0.43)	<0.001
Age ≥25 (n=383)	27 (7.0%)	Reference		Reference [^]		31 (8.1%)	Reference		Reference [^]	
<25 (n=283)	27 (9.5%)	1.34 (0.79–2.29)	0.28	1.95 (1.04–3.67)	0.04	28 (9.9%)	1.22 (0.73–2.03)	0.45	1.84 (1.00–3.38)	0.049
No previous pregnancy (n=271)	18 (6.6%)	Reference		Reference [^]		19 (7.0%)	Reference		Reference [^]	
Has previous pregnancy (n=395)	36 (9.1%)	1.38 (0.78–2.43)	0.26	1.81 (0.63–5.19)	0.27	40 (10.1%)	1.45 (0.84–2.51)	0.18	1.49 (0.53–4.21)	0.45
No previous delivery (n=370)	25 (6.8%)	Reference		Reference [^]		26 (7.0%)	Reference		Reference [^]	
Has previous delivery (n=296)	29 (9.8%)	1.48 (0.86–2.52)	0.15	1.63 (0.65–4.10)	0.30	33 (11.1%)	1.62 (0.97–2.70)	0.07	1.95 (0.80–4.80)	0.14
No previous induced abortion (n=437)	37 (8.5%)	Reference		Reference [^]		39 (8.9%)	Reference		Reference [^]	
Has previous induced abortion (n=229)	17 (7.4%)	0.86 (0.48–1.53)	0.61	0.75 (0.37–1.53)	0.43	20 (8.7%)	0.96 (0.56–1.64)	0.88	0.88 (0.46–1.72)	0.72
Gestational age ≤63 days (n=507)	39 (7.7%)	Reference		Reference [^]		43 (8.5%)	Reference		Reference [^]	
64–84 days (n=136)	12 (8.8%)	1.09 (0.57–2.08)	0.79	1.15 (0.59–2.21)	0.68	13 (9.6%)	1.06 (0.57–1.98)	0.85	1.12 (0.60–2.10)	0.72
≥85 days (n=23)	3 (13.0%)	1.65 (0.51–5.34)	0.40	2.73 (0.82–9.09)	0.10	3 (13.0%)	1.49 (0.46–4.81)	0.50	2.60 (0.78–8.62)	0.12

^a Long-acting reversible contraception (copper-containing intrauterine device, levonorgestrel-releasing intrauterine system and implant)

* Adjusted by age (<25 years vs. ≥25 years), previous pregnancy (yes vs. no), previous delivery (yes vs. no), previous induced abortion (yes vs. no) and gestational-age groups (≤63 days vs. 64–84 days vs. ≥85 days).

[^] Adjusted by factors mentioned above and LARC insertion status (inserted vs. not inserted).