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Original research article

Barriers to abortion care and incidence of attempted self-managed abortion among individuals searching Google for abortion care: A national prospective study

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ABSTRACT

Objective: Studies on self-managed abortion conducted at abortion clinics may exclude those facing the greatest barriers to care. We aimed to assess association of attempted self-managed abortion with reported barriers to abortion care.

Study Design: We used data from the Google Ads Abortion Access Study, a prospective cohort study that recruited people searching for abortion care on Google between August 2017 and April 2018. We used a stratified sampling design recruiting by state to ensure representation from all 50 states. Participants completed an online baseline survey and follow-up 4 weeks later. We modeled the adjusted odds of attempting self-managed abortion using multivariable logistic regression, with random effects for state of residence. We assessed attempted self-managed abortion at follow-up by asking: "Did you take or try to do any of the following to try to end this pregnancy?" with a closed-ended list of methods.

Results: Among 856 participants with follow-up data, 28% (95% confidence interval [95% CI]: 25%–31%) reported attempting self-managed abortion. Most common methods used were: herbs, supplements, or vitamins (52%); emergency contraception or many contraceptive pills (19%); mifepristone and/or misoprostol (18%); and abdominal or other physical trauma (18%). Participants still seeking abortion at 4 weeks were more likely to attempt self-management (33%) than those planning to carry to term (20%, $p < 0.001$). Reporting having to keep the abortion a secret, fearing for one's safety/well-being, needing to gather money for travel or the abortion, or living further from an abortion facility as barriers were associated with higher odds of attempts.

Conclusions: Attempted self-managed abortion is higher among people facing barriers to abortion care.

Implications: Reducing financial and distance barriers, such as by removing legal restrictions on abortion, could help reduce attempted self-managed abortion. Additionally, removing restrictions on telehealth for abortion could reduce attempted self-managed abortion. Efforts are needed to permanently remove United States Food and Drug Administration (FDA) regulations and state policies prohibiting telehealth for medication abortion, thereby allowing individuals to end their pregnancies without a clinic visit.

1. Introduction

Growing barriers to abortion care in the United States (US) have increased interest in self-managed abortion [1,2], defined as attempting to end one's own pregnancy without clinical supervision [3]. People report using numerous methods for self-managed abortion, including ordering mifepristone and misoprostol online and ingesting various herbs, vitamins, and supplements [1,4,5].

Most US estimates for prevalence of attempted self-managed abortion have been obtained from abortion clinic patients. One national study of clinic patients in 2014 estimated that 2% attempted self-managed abortion [6], whereas another 2012/2014 study in Texas found a 7% prevalence rate among clinic patients [5]. However, because they survey individuals able to reach an abortion facility, clinic-based studies might underestimate prevalence rates. More broadly, a 2015 representative survey of Texas women found that 2% to 4% had attempted self-managed abortion [7]. The only

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national population-based study of self-managed abortion, to our knowledge, which sampled a representative population of over 7000 women in 2017, reported that 7% attempted self-managed abortion in their lifetimes [4]. While it excluded adolescents, it provides a needed snapshot of the prevalence of attempted self-managed abortion in the general population.

Preliminary evidence, mostly from online search analysis, suggests interest in self-managed abortion may be higher in places with more barriers to abortion access [8]. In a study examining 6022 requests from US residents to an online abortion telemedicine service, 76% were from states with highly restrictive abortion laws [1]. Another reported Mississippi had the highest rate of Google searches for self-managed abortion in the nation in 2015, when that state contained only 1 abortion clinic [9].

For those facing unintended or unwanted pregnancy, rates of self-managed abortion may be higher among individuals searching for information online. A 2017 study that recruited people searching Google with self-managed abortion keywords found 11% had ever attempted self-managed abortion [10]. This study suggests that prevalence of attempted self-managed abortion among people searching online for abortion care may be higher than the general population.

Here, we used data from the Google Ads Abortion Access Study to measure prevalence of attempted self-managed abortion among pregnant individuals in the US searching Google for abortion care and considering abortion. We further assessed methods used and sociodemographic and abortion access characteristics associated with attempted self-managed abortion. By asking abortion-seeking individuals about attempts at self-managed abortion, we can obtain reports that are potentially less subject to social desirability and recall biases than national population-based surveys. Further, utilizing a remote survey allows us to reach individuals that have not (yet) visited an abortion clinic.

2. Methods

2.1. Data

We used data from the Google Ads Abortion Access Study, a prospective cohort study of women in the US searching online for abortion from August 2017 to May 2018; detailed methods are published elsewhere [11]. Briefly, we recruited participants using English advertisements in Google search results, displayed to individuals searching specific keywords, such as “abortion clinic near me.” We worked with a marketing company to target ads by state, thereby obtaining a stratified sample across all 50 states. Once individuals clicked an ad, they completed a 2-question form screening for eligibility. It asked if they were (1) currently pregnant and (2) considering abortion. There was no age restriction. If eligible, participants provided electronic informed consent, completed a short online baseline survey with sociodemographic and pregnancy questions, and provided a contact email and/or phone number.

Four weeks after completing the baseline survey, participants received an email or text-message invitation to complete the follow-up survey, which asked about outcome of the pregnancy, barriers to accessing abortion care, and self-managed abortion. All participants who completed the follow-up survey and were still pregnant or had an abortion were remunerated with a $50 gift card. We limited the analytic sample to those who completed both baseline and follow-up surveys and responded to questions related to self-managed abortion. The University of California, San Francisco (UCSF) Institutional Review Board (IRB) approved the study (#16-20627). The IRB waived parental consent for minors because all participants were pregnant and could consent for their own care, including decisions to participate in research, and the research protocol was designed for a population for which guardian permission was not a reasonable requirement in order to protect the participants. This study followed Strengthening the Reporting of Observational Studies in Epidemiology reporting guidelines.

2.2. Measures

The key outcome variable was whether participants attempted self-managed abortion for this pregnancy, assessed by 3 follow-up questions (Fig. 1). We constructed a binary (yes/no) outcome measure based on their responses. We categorized participants as “yes” if they reported: (1) having an abortion using abortion pills obtained online (Q2); (2) trying to end their pregnancy without medical help (Q19); or (3) using any of the following methods to end their pregnancy: misoprostol, emergency contraception after confirming pregnancy, hurt self in the abdomen or other self-harm, medications or herbs, or any other method (Q20). Participants could select all methods that applied to them; those selecting “some other drug, medicine, or herb” or “something else” had to specify what they did/took in the free text, which was reviewed by the first and second authors to verify participant classifications.

Those who reported being no longer pregnant and taking abortion pills obtained from the internet or another source (Q2) were coded as having taken mifepristone and/or misoprostol. Data collection was conducted before medication abortion became available through telehealth services with medical supervision, such as *via* Choix [11]. Thus, online purchases primarily represent self-managed abortion.

At baseline, we also collected age and highest level of completed education. Self-reported race/ethnicity served as a proxy for social, environmental, and structural factors/barriers individuals of different races/ethnicities may face when seeking abortion care. As a proxy for socioeconomic status, we assessed reports of difficulty meeting basic living needs. We calculated pregnancy gestation at baseline as number of weeks between the reported date of last menstrual period and baseline survey date. We also collected number of previous abortions at baseline.

We measured state-level policy environment using categories from a national advocacy organization (NARAL), based on number of laws restricting abortion access in effect for a participant’s state the year they were seeking abortion [12]. We measured abortion stigma using the validated individual-level abortion stigma (ILAS) scale [13]. We calculated distance in miles from participant residential zip code to the nearest abortion facility in ArcGIS. We approximated participants’ locations using zip codes provided at baseline from the 2010 US Census Zip Code Tabulation Areas [14]. We obtained abortion facility addresses from a US abortion facility database generated *via* systematic online search in 2017 by the UCSF team conducting this study [15]. The follow-up survey asked participants a series of yes/no questions about whether they faced specific logistical or financial barriers to accessing abortion; responses were totaled to measure barriers faced.

2.3. Statistical analysis

We first described sample baseline characteristics for those who reported and did not report attempting self-managed abortion and compared them using χ^2 tests for categorical variables and t tests for continuous variables. Next, we assessed different methods of attempted self-managed abortion, reporting prevalence of each among those who attempted self-managed abortion and the total sample. We then analyzed reported barriers to abortion, comparing results among those who reported and did not report attempting self-managed abortion using χ^2tests. Finally, we estimated adjusted odds ratios (aORs) of attempting self-managed abortion, using a multivariable mixed-effects logistic regression model to ac-

All participants received the following questions at the beginning of the follow-up survey:

1. Are you pregnant right now?
   - ☐ Yes
   - ☐ No
   - ☐ Not sure

2. (If no to Q1) What happened with your most recent pregnancy? (As a reminder, your responses are completely confidential.)
   - ☐ I had an abortion procedure done by a clinician in a clinic or doctor's office
   - ☐ I took abortion pills that I got from a clinic, doctor or nurse
   - ☐ I took abortion pills that I got from the internet or another source
   - ☐ Miscarriage (END survey)
   - ☐ Other (please explain):_____ (END survey)

All participants received the following introductory text and initial questions (19 and 20) about self-managed abortion:

People make different choices to end a pregnancy:

- Some people may go to a hospital, clinic, or doctor's office to have an abortion.
- Other people may do something to try to end a pregnancy on their own without medical assistance.

19. Did you take anything or do anything **on your own without medical assistance** to try to end your most recent pregnancy or bring back your period?
   - ☐ Yes
   - ☐ No

20. (Asked of all participants regardless of response to Q19)
   What did you take or do to try to end your most recent pregnancy? (Please check all that apply)
   - ☐ a. Cytotec or misoprostol
   - ☐ b. Emergency contraception, Plan B, or the morning after pill after confirming that you were pregnant
   - ☐ c. Hurt myself in the abdomen
   - ☐ d. Some other drug, medicine, or herb
   - ☐ e. Something else
   - ☐ f. I did not take or try anything

21. (*if d. selected in Q20*). If you took some other drug, medicine, or herb to try to end your most recent pregnancy, please explain:_____

22. (*if e selected in Q20)*. If you did something else to try to end your most recent pregnancy, please explain:_____

Fig. 1. Self-managed abortion-related survey questions, Google Ads Abortion Access Study 2017-2018

count for clustering at the state level. This included sociodemographic characteristics and statistically significant reported barriers from the bivariate analysis. We tested for collinearity and then removed any barriers that were collinear with other variables (*e.g.*, distance to the facility as a barrier and actual distance to the facility). All statistical tests were 2-tailed, with significance level of 0.05. We conducted all analyses using Stata, v.15 (College Station, TX).

3. Results

Over the 9-month recruitment period, our Google Ads made 678,256 impressions (i.e., number of times they appeared in search results), with 11,552 total clicks, representing a 2% click-through rate (CTR) (Fig. 2). A total of 1982 people were eligible, consented to participate, and started the baseline survey; 1485 (75%) of these completed the baseline survey and provided contact information for follow-up. We removed 3 participants who reported living outside the US and 21 who made multiple attempts to take the survey or were referred to the survey from an external site. In total, 1005 completed the follow-up survey, for a 69% follow-up rate. Mean time between baseline and follow-up was 4.62 weeks. Older age, white race, higher education, not having difficulty meeting basic needs, being not religious/spiritual, and having no previous births were associated with higher follow-up rates [16]. Among those providing follow-up data, we excluded 86 who reported stillbirth or miscarriage, 25 who reported never being pregnant, 14 who reported a live birth since the baseline survey, 6 whose outcomes were unknown, and 18 who did not answer questions on self-managed abortion, leaving a final analytic sample of 856.

In unadjusted analyses, individuals who reported difficulty meeting basic needs, no or undetermined health insurance coverage, and living further from an abortion facility were significantly more likely to attempt self-managed abortion (Table 1). While most participants reported at least 1 barrier to care, those who attempted self-managed abortion were more likely to report a barrier to care than those who did not (98% vs 94%, $p = 0.03$). At follow-up, those who reported attempting self-managed abortion were significantly more likely to still be pregnant and seeking abortion (39%) compared to those who did not (30%, $p < 0.001$).

Table 1
Sociodemographic characteristics and reported barriers to abortion care among those who reported attempting self-managed abortion and those that did not in the United States, Google Ads Abortion Access Study 2017–2018

	Attempted self-managed abortion (n = 242), n (%)	Did not attempt self-managed abortion (n = 614), n (%)	Total (n = 856), n (%)	p value
Baseline sociodemographic characteristics				
Age				0.06
≤18	4 (1.6)	9 (1.5)	13 (1.5)	
18–24	96 (39.7)	186 (30.3)	282 (32.9)	
25–34	114 (47.1)	328 (53.4)	442 (51.6)	
35+	28 (11.6)	91 (14.8)	119 (13.9)	
Race/Ethnicity				0.31
White	137 (56.6)	332 (54.1)	469 (54.8)	
Black/African-American	47 (19.4)	160 (26.1)	207 (24.2)	
Hispanic/Latinx	33 (13.6)	68 (11.1)	101 (11.8)	
Asian/Native Hawaiian/Pacific Islander	7 (2.9)	14 (2.3)	21 (2.5)	
American Indian/Native American, Multiracial, or Other	18 (7.4)	40 (6.5)	58 (6.8)	
Education				0.42
Less than high school	25 (10.3)	59 (9.6)	84 (9.8)	
High school graduate/GED	74 (30.6)	225 (36.6)	299 (34.9)	
Associate degree, some college, or technical school	108 (44.6)	249 (40.6)	357 (41.7)	
College graduate or professional degree	35 (14.5)	81 (13.2)	116 (13.6)	
Has difficulty meeting basic needs	125 (51.7)	270 (44.0)	395 (46.1)	**0.04**
Health insurance				**0.002**
Private	65 (26.9)	147 (23.9)	212 (24.8)	
Medicaid/Medicare/State exchange	105 (43.4)	342 (55.7)	447 (52.2)	
None/Not sure	72 (29.8)	125 (20.4)	197 (23.0)	
Gestation duration at baseline				0.49
Less than or equal to 10 weeks	194 (80.2)	483 (78.7)	677 (79.1)	
10.1–14.0 weeks	24 (9.9)	78 (12.7)	102 (11.9)	
14.1–20.0 weeks	17 (7.0)	29 (4.7)	46 (5.4)	
20.1 weeks or greater	3 (1.2)	11 (1.8)	14 (1.6)	
Missing	4 (1.7)	13 (2.1)	17 (2.0)	
Had previous abortion	63 (26.0)	190 (30.9)	253 (29.6)	0.16
Restrictiveness of state (NARAL)				0.48
Protected access	67 (27.7)	166 (27.0)	233 (27.2)	
Some access	25 (10.3)	82 (13.4)	107 (12.5)	
Restricted access	150 (62.0)	366 (59.6)	516 (60.3)	
Score on abortion stigma - worries about judgment subscale (ILAS) (mean, SD)	2.33 (0.52)	2.39 (0.55)	2.37 (0.54)	0.10
Miles to nearest abortion facility				**0.01**
Less than 5 miles	51 (21.1)	182 (29.6)	233 (27.2)	
5–24 miles	104 (43.0)	269 (43.8)	373 (43.6)	
25–49 miles	26 (10.7)	59 (9.6)	85 (9.9)	
50–99 miles	37 (15.3)	72 (11.7)	109 (12.7)	
100+ miles[a]	24 (9.9)	32 (5.2)	56 (6.5)	
Follow-up Measures				
Reported barriers to abortion care				
Number of reported logistical/financial barriers (mean, SD)	4.5 (2.3)	3.7 (2.5)	3.9 (2.4)	**<0.001**
Reported any barrier to care	236 (97.5)	576 (93.8)	812 (94.9)	**0.03**
Someone at my church/religious organization told me not to have an abortion	35 (14.5)	88 (14.3)	123 (14.4)	0.96
I had to keep the abortion a secret	167 (69.0)	327 (53.3)	494 (57.7)	**<0.001**
I was scared of violence, threats, other reactions that would affect my well-being	70 (28.9)	107 (17.4)	177 (20.7)	**<0.001**
Protestors at the clinic	79 (32.6)	179 (29.2)	258 (30.1)	0.32
I didn't know where to get an abortion	65 (26.9)	98 (16.0)	163 (19.0)	**<0.001**
I had to arrange for transport to the clinic	103 (42.6)	227 (37.0)	330 (38.6)	0.13
I had to arrange for childcare or care for another family member	75 (31.0)	182 (29.6)	257 (30.0)	0.70
I had to make multiple trips to the clinic	108 (44.6)	213 (34.7)	321 (37.5)	**0.007**
The distance I had to travel to the clinic	117 (48.4)	213 (34.7)	330 (38.6)	**<0.001**
The number of weeks pregnant I was	111 (45.9)	235 (38.3)	346 (40.4)	**0.04**
I had to gather money for travel expenses or for the abortion	195 (80.6)	381 (62.1)	576 (67.3)	**<0.001**
I had to figure out if my insurance would cover the abortion	115 (47.5)	262 (42.7)	377 (44.0)	0.20
I had to get time off work/school to get an abortion	121 (50.0)	280 (45.6)	401 (46.9)	0.25
Pregnancy status at follow-up				**<0.001**
Had abortion	119 (49.2)	289 (47.1)	408 (47.7)	
Pregnant, seeking abortion	95 (39.3)	185 (30.1)	280 (32.7)	
Plan to continue pregnancy	28 (11.6)	140 (22.8)	168 (19.6)	

Bold p-values indicate statistical significance at $p < 0.05$.
[a] Includes 2 people in Hawaii who would have to fly the straight-line distance, as there is no facility on their island.

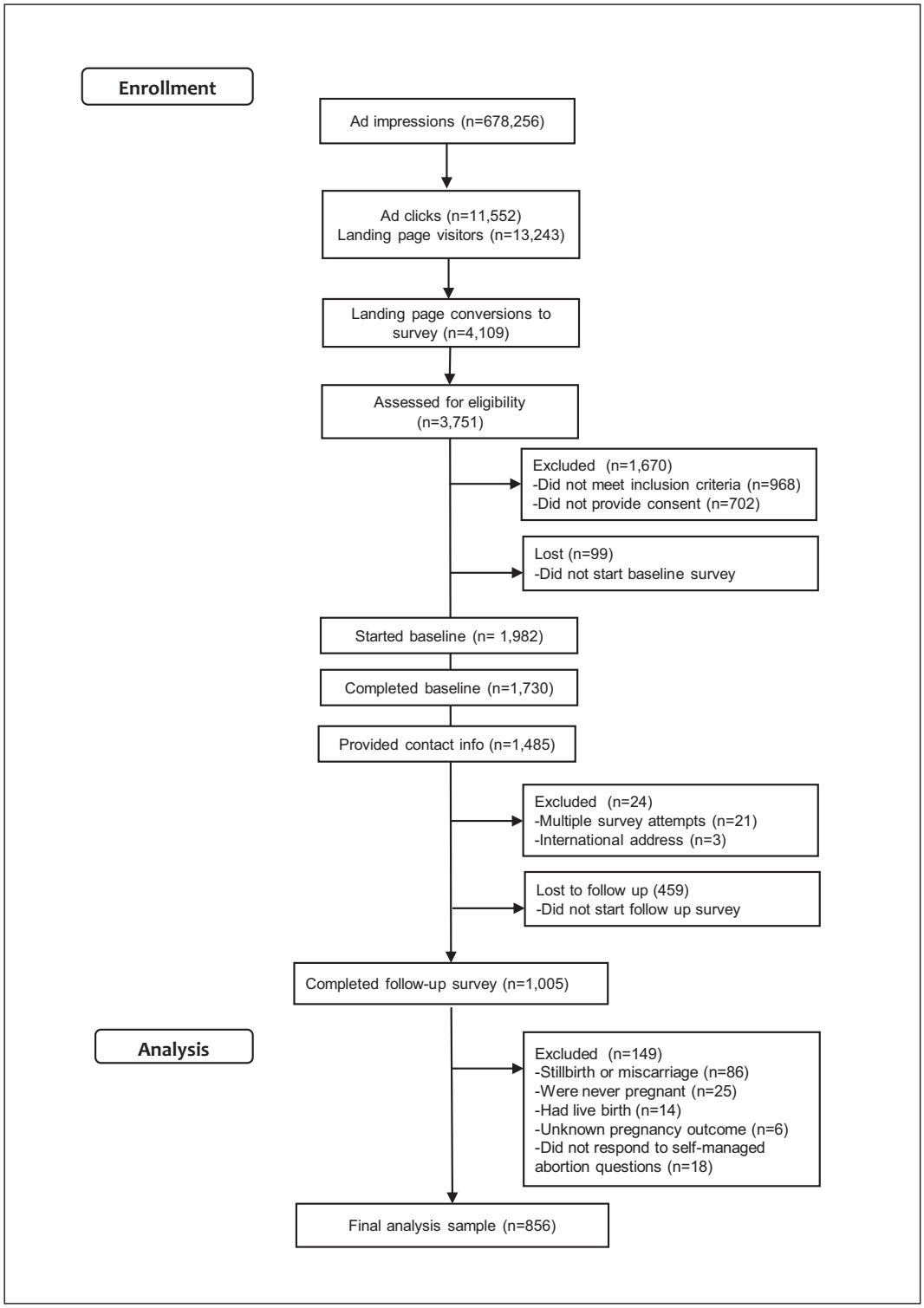

Fig. 2. CONSORT diagram for self-managed abortion analysis, Google Ads Abortion Access Study

Table 2 shows the proportion of various self-managed abortion methods attempted among those reporting an attempt and the total sample. Overall, 28% (95% CI: 25%–31%) of all respondents reported at least 1 method of self-managed abortion; 7% reported using more than 1. Over 2% of all respondents (8% of those who attempted self-managed abortion and 5% of those who had an abortion in the study) reported ordering abortion pills online, all of whom successfully ended their pregnancies.

The most commonly reported self-managed abortion method was taking herbs, supplements, or vitamins, with over half (52%) of those attempting self-managed abortion reporting this category (15% of total sample). Among these respondents, use of vitamin C, blue or black cohosh, unspecified herbs or teas, cinnamon, parsley, and fruits, including pineapple, papaya, and pomegranate, and dong quai were most commonly reported. Many who reported using herbs, supplements, or vitamins mentioned more than 1 type. Approximately 19% of those who attempted self-managed abortion

Table 2
Methods used for attempted self-managed abortion among respondents who reported using any method and among the total sample, Google Ads Abortion Access Study 2017–2018

	Attempted self-managed abortion (n = 242), % (95% CI)	Total follow-up sample (n = 856), % (95% CI)
Used any method for self-managed abortion	100.0	28.3 (25.3–31.4)
Used more than 1 method	23.1 (18.0–29.0)	6.5 (5.0–8.4)
Ordered abortion pills online and had successful abortion	8.3 (5.1–12.5)	2.3 (1.4–3.6)
Methods (not mutually exclusive)		
Herbs, supplements, or vitamins	51.7 (45.2–58.1)	14.6 (12.3–17.1)
Emergency contraception or many oral contraceptive pills	18.6 (13.9–24.1)	5.3 (3.9–7.0)
Mifepristone and/or misoprostol[a]	18.2 (13.5–23.6)	5.1 (3.8–6.8)
Abdominal or other physical trauma	17.8 (13.2–23.2)	5.0 (3.7–6.7)
Alcohol or other substances	10.3 (6.8–14.9)	2.9 (1.9–4.3)
Prescription or over-the-counter medications[b]	7.0 (4.1–11.0)	2.0 (1.2–3.2)
Other or not specified	6.2 (3.5–10.0)	1.8 (1.0–2.9)

[a] Does *not* include misoprostol or mifepristone obtained from a health facility but does include those who reported taking abortion pills obtained online or from some other source.
[b] Does *not* include mifepristone, misoprostol, oral contraceptives, or emergency contraception.

Table 3
Examples of methods used among those who reported attempting self-managed abortion in the United States, Google Ads Abortion Access Study 2017–2018

Category	Examples
Herbs, supplements, or vitamins	Vitamin C, vitamin D, niacin, blue or black cohosh, cinnamon, turmeric, celery seed and oil, pineapple, papaya, pomegranate seeds and juice, cranberry juice, orange juice, caffeine, dong quai, unspecified herbs/teas, primrose oil, vinegar, olive oil and honey, coconut and castor oil, poppy seeds, sesame seeds, chamomile, "yoni pearl detox"
Prescription or over-the-counter medications	Lexapro, Celexa, Xanax, steroids, codeine, muscle relaxers, aspirin, laxatives, Tylenol 3, NyQuil, ibuprofen, NSAIDs, "The medication I'm prescribed cannot be taking during pregnancy I kept taking it in hope my body would reject the [*fetus*]"
Mifepristone and/or misoprostol	Ordered pills online and no longer pregnant, Mifepristone, "I purchased pills that I inserted vaginally"
Abdominal or other physical trauma	"I would try hurting my stomach a lot," "Purposely not eating as much," "Tried to starve myself at the beginning of the pregnancy so I would miscarry," "Letting my kidney infection go untreated in hope it would [*end*] the pregnancy," "Tried to open and dilate my cervix," "I also tried to penetrate the cervix with a sterilized hook. Was unsuccessful"
Took emergency contraception or many oral contraceptive pills	"Plan b," "morning after pill," "multiple birth control pills at once"
Used alcohol or other substances	Alcohol, marijuana, "meth", cigarettes, "everclear/alcohol," "Drinking alcohol and taking pain meds," "used street drugs in large quantities intravenously"
Other	Excessive/vigorous exercise, "Heavy lifting," "Prayer, apparently not as effective as everyone lets on," "really hot baths and heating pads," "play-wrestled with large dogs," "I don't feel comfortable saying what I did"

took emergency contraception (after confirming their pregnancy) or many oral contraceptive pills, 18% reported taking mifepristone and/or misoprostol on their own (this includes the 8% mentioned above who ordered abortion pills online), 18% reported hurting themselves in the abdomen or other forms of physical trauma, 10% reported using smoking, alcohol, or other substance to end the pregnancy, and 7% reported taking other prescription or over-the-counter medications. Examples of responses to open-ended questions about specific methods used are listed in Table 3.

In the adjusted analysis, barriers and distance to abortion facilities were significantly associated with self-managed abortion attempts (Table 4). Respondents who reported having to keep their abortion a secret (aOR: 1.54, 95% CI: 1.09–2.17), fearing for their safety or well-being (aOR: 1.47, 95% CI: 1.01–2.15), and needing to gather money for travel or the abortion as barriers had significantly higher odds of attempting self-managed abortion (aOR: 2.00, 95% CI: 1.36–2.94). Those living 50–99 miles (aOR: 1.77, 95% CI: 1.01–3.10) and 100+ miles (aOR: 2.31, 95% CI: 1.18–4.50) from an abortion facility had significantly higher odds of attempting self-managed abortion than those living less than 5 miles from a facility. People with more education also had significantly higher odds of attempting self-managed abortion.

4. Discussion

We surveyed individuals seeking abortion services and found 28% of participants attempted to end their most recent pregnancy *via* self-managed abortion. This incidence is higher than reported in previous studies, many of which were conducted at abortion facilities. There are several likely reasons for this. First, our survey was administered within 4 weeks of the baseline survey about abortion seeking and thus was temporally close to any self-managed abortion attempts, minimizing recall bias. Second, online surveys likely offer participants greater feelings of anonymity and safety than in-person surveys, minimizing social desirability bias. Lastly, question wording deliberately sought to normalize "things people do to try to end a pregnancy on their own" and thus may have uncovered more subtle and indirect ways for attempting to end pregnancy, including "over exercise" or "play-wrestl[ing] with large dogs."

The most commonly reported method was taking herbs, vitamins, and supplements, most of which appear benign. Substantial information is available on the internet about herbs and other methods to "induce a miscarriage." Many vitamins and herbs, including vitamin C and dong quai, are traditional and indigenous approaches that people have used for hundreds of years to end pregnancy [17–19]. While scientific evidence for their efficacy is limited, some may have abortifacient properties. However, these approaches are undoubtedly less effective than mifepristone/misoprostol and in-clinic procedural abortion and may delay individuals from obtaining needed care. Indeed, 1 qualitative study reported some individuals who attempted self-managed abortion did not realize they were unsuccessful for several weeks [20].

We further identified access barriers associated with attempting self-managed abortion. In adjusted analyses, needing to gather money for travel or the abortion, having to keep the abortion a se-

Table 4
Adjusted odds from logistic regression assessing characteristics and barriers associated with attempting self-managed abortion, Google Ads Abortion Access Study 2017–2018

	Adjusted odds ratio (n = 856)	95% confidence interval
Age (ref: 25–34)		
≤24	1.34	(0.92–1.93)
35+	0.79	(0.47–1.31)
Race/Ethnicity (ref: White)		
Black/African-American	0.88	(0.58–1.33)
Hispanic/Latinx	1.17	(0.71–1.93)
Asian/Native Hawaiian/Pacific Islander	1.18	(0.43–3.20)
American Indian/Native American, Multiracial, or Other	1.12	(0.59–2.13)
Education (ref: High school graduate/GED)		
Less than high school	1.37	(0.77–2.43)
Associate degree, some college, or technical school	1.54[b]	(1.05–2.26)
College graduate or professional degree	1.88[b]	(1.07–3.30)
Has difficulty meeting basic needs	1.23	(0.88–1.71)
Health insurance (ref: Private insurance)		
Medicaid/Medicare/State exchange	0.78	(0.51–1.18)
None/Not sure	1.26	(0.79–2.01)
Gestation duration at baseline (ref: Less than or equal to 10 weeks)		
10.1–14.0 weeks	0.80	(0.48–1.36)
14.1–20.0 weeks	1.54	(0.80–2.98)
20.1 weeks or greater	0.66	(0.17–2.55)
Missing	0.84	(0.25–2.76)
Had previous abortion	0.96	(0.66–1.40)
Restrictiveness of state (NARAL) (ref: protected access)		
Some access	0.70	(0.40–1.24)
Restricted access	0.75	(0.51–1.11)
Reported logistical/financial barriers		
I had to keep the abortion a secret	1.54[b]	(1.09–2.17)
I was scared of violence, threats, other reactions that would affect my well-being	1.47[b]	(1.01–2.15)
I didn't know where to get an abortion	1.40	(0.94–2.06)
I had to make multiple trips to the clinic	1.08	(0.77–1.52)
I had to gather money for travel expenses or for the abortion	2.00[c]	(1.36–2.94)
Score on abortion stigma - worries about judgment subscale (ILAS)	0.88	(0.65–1.18)
Miles to nearest abortion facility (ref: Less than 5 miles)		
5–24 miles	1.33	(0.88–2.01)
25–49 miles	1.27	(0.69–2.33)
50–99 miles	1.77[b]	(1.01–3.10)
100+ miles[a]	2.31[b]	(1.18–4.50)

Model developed using multivariable logistic regression, with random effects for state of residence.
[a] Includes 2 people in Hawaii who would have to fly the straight-line distance, as there is no facility on their island.
[b] $p < 0.05$.
[c] $p < 0.001$.

cret, and fear of violence that would affect their well-being were significantly associated with attempted self-managed abortion. Surprisingly, people with higher levels of completed education were more likely to attempt self-managed abortion, possibly reflecting greater ability to research methods online or greater comfort disclosing attempted self-managed abortion. This differs from a recent study reporting higher lifetime prevalence of self-managed abortion attempts among participants with less than a high school education [4].

Almost 40% of those who attempted self-managed abortion were still seeking an abortion at the 4-week follow-up. Additionally, multiple harmful and physically traumatic methods for attempting to end pregnancy were reported, although these were rare; among the most extreme was trying to penetrate the cervix with a hook. Use of such methods is concerning but not surprising given the tremendous barriers to care that individuals seeking abortion face [15,21–23]. We found that attempted self-managed abortion was not directly associated with state policy environment, but rather, with other reported structural barriers to care, including having to gather money for travel expenses or the abortion and needing to travel long distances to the nearest abortion facility. This is consistent with previous findings [1,8,9], including a national study of abortion-related emergency visits that found higher rates of suspected self-managed abortion in Southern states where Medicaid does not cover abortion and individuals must travel longer distances to reach an abortion facility [24].

Notably, 2% of all participants, and 5% of those who had an abortion, ordered pills online. During data collection, telehealth for abortion was not available and mifepristone was available only on a limited basis through several online sites. While 1 study confirmed the pills sold on these sites contained actual mifepristone and misoprostol [25], these sites do not conform with FDA regulations and offer no clinical supervision. Given the interest in ordering abortion medications by mail, clinically supervised telemedicine approaches are a promising strategy to reduce attempted self-managed abortion [26]. However, as of October 2021, many state laws and U.S. Food and Drug Administration (FDA) regulations prohibit access via telemedicine and mail without in-clinic visits, despite evidence that it is safe and effective [11,27].

A major strength of this study is the assessment of attempted self-managed abortion incidence among individuals considering abortion, but not recruited in a clinic, where those facing the greatest barriers to abortion are often excluded. Indeed, only about half of those reporting attempted self-managed abortion were no longer pregnant at follow-up. Unlike previous studies, we also included adolescents who may be more likely to pursue self-care [10].

This study has several limitations. First, individuals reporting miscarriage were ineligible to provide follow-up data, as most survey questions were about barriers to abortion. Thus, if some participants conceptualized self-managed abortion as inducing a miscarriage, the incidence of attempted self-managed abortion found here may be an underestimate. Second, we did not assess whether

attempts were successful, other than those who reported that abortion pills ordered online worked. Such data could offer clues about which herbs are effective for ending pregnancy. Third, we found 5% of those who had an abortion did so by obtaining abortion pills outside of a clinic, although we do not know how or where these were obtained. Fourth, there may be some selection bias in the final sample, as those who volunteer to participate in internet research may be systematically different from those who do not; however, previous studies on selection bias with internet-based recruitment have found that the internet is no more prone to selection bias than traditional methods of recruitment and does not necessarily lead to biased measures of associations in prospective cohort studies [28,29]. Finally, we found there was greater follow-up among those who were older, white, and did not report difficulty meeting basic needs. If these groups are less likely to face barriers to care, then the rate of attempted self-managed abortion found here may be underestimated.

These results demonstrate the need to remove legal restrictions on abortion as a first step to reduce barriers to abortion. Additionally, innovative methods to expand equitable access are needed, including increasing the number/types of clinicians who can provide abortion, allowing pharmacy access to abortion pills, and approving telehealth models of abortion care, all of which would likely reduce attempted self-managed abortion [23]. The FDA can permanently remove strict and unnecessary regulations on mifepristone so that patients can have clinically supported access to abortion through telehealth and receive the medications by mail [30]. Additionally, the 19 states effectively banning telemedicine for abortion must repeal these laws [31]. Such actions would address barriers to abortion care, potentially reducing self-managed abortion attempts. In addition, research exploring over-the-counter access to abortion pills and other ways to support those wanting to manage their own abortions safely and effectively is needed. New models of care will give people more control over their abortion experience, helping them achieve greater reproductive autonomy.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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