Original Research

Adjunctive Social Media for More Effective Contraceptive Counseling

A Randomized Controlled Trial

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OBJECTIVE: To determine whether social media, specifically Facebook, is an effective tool for improving contraceptive knowledge.

METHODS: English-speaking women aged 18–45 years receiving care at an urban academic center obstetrics and gynecology clinic were included and randomized to a trial of standard contraceptive education and pamphlet (n=74) compared with standard contraceptive education and Facebook (n=69) information for contraception counseling. Contraceptive knowledge was evaluated preintervention and postintervention by the Contraceptive Knowledge Inventory. We evaluated the effect of the intervention by raw score and percent increase in Contraceptive Knowledge Inventory score, participant satisfaction with counseling method, and contraceptive preference postintervention. All analyses were stratified by age group.

RESULTS: The median raw postintervention Contraceptive Knowledge Inventory score was significantly higher in the Facebook compared with the pamphlet group (15 compared with 12, $P<.001$) as was percentage increase in the Contraceptive Knowledge Inventory score (36% compared with 12%, $P<.001$). Participant satisfaction with counseling method was significantly higher in the Facebook group (median 10 compared with 6, $P<.001$). Participant contraceptive preference for long-acting reversible contraceptives (LARCs; intrauterine device or implant) postintervention was significantly greater in the Facebook compared with the pamphlet group (57% compared with 35%, $P=.01$). Among women currently using none or barrier contraception, contraceptive preference for implants was significantly greater in the Facebook compared with the pamphlet group (26% compared with 5%, $P=.02$), although, when analysis was extended to include implant or intrauterine device, LARCs were not significantly higher in the Facebook compared with the pamphlet group (48% compared with 33%, $P=.19$).

CONCLUSION: Social media as an adjunct to traditional in-office counseling improves patient contraceptive knowledge and increases patient preference for LARCs.

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A common concern for most obstetrician and gynecologists is ensuring that their patients use safe and effective contraception when patients are not actively trying to conceive. Young women younger than 25 years old are at high risk of unintended pregnancy and are in great need of effective contraception with which they will be compliant.[1] However, counseling patients on the risks and benefits of the numerous contraceptives available at present can be challenging. Difficulties stem from lack of time for counseling during an office visit, low baseline patient knowledge of contraceptive options, and ineffective communication between physicians and patients.[2–5] Patients routinely state that they understand their options; however, when asked subsequently to explain the risks and benefits of different contraceptive options to the health care practitioner, they are unable to do so.[2,3]

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The ability to effectively transfer information to the patient has been an issue of study and concern for decades.[6] Free and easy counseling methods have been shown to increase compliance.[7] Whether it is contraception or other medical conditions, patients need a counseling method that is familiar and accessible when seeking medical information.[8,9] Recent advances in Internet connectivity and social technology have led to the social media era of communication. Social media includes web sites such as Facebook, Twitter, MySpace, and YouTube. These web sites, with large user bases, allow user-created content to be streamed for free over the Internet and have been effectively used for patient–physician interactions.[10] As such, the goal of the present study was to determine whether use of social media in addition to standard counseling is more effective at improving patient knowledge, satisfaction, and contraceptive preference than traditional standard office counseling plus pamphlet reading. Specifically, the use of Facebook in this study was to determine the feasibility of providing vital health information in a more modern form and the effect that this presentation would have on contraceptive knowledge among patients.

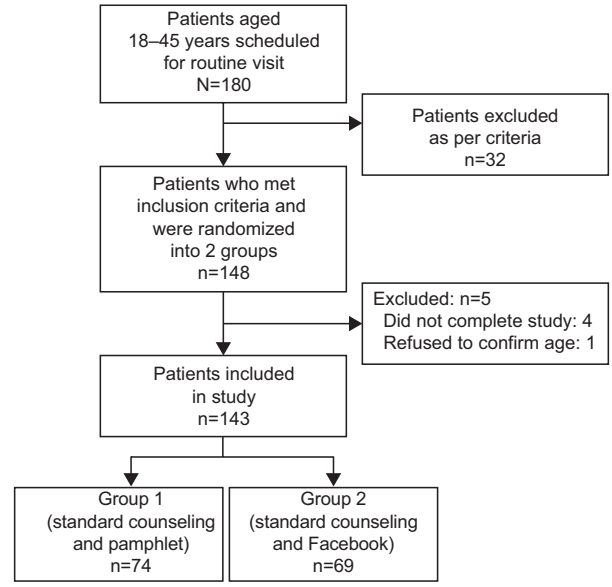

Fig. 1. Randomization flow chart. Group 1=standard counseling and pamphlet. Group 2=standard counseling and Facebook. *Four excluded for not completing study and one excluded for refusing to confirm age.

Kofinas. Social Media Contraceptive Counseling. Obstet Gynecol 2014.

MATERIALS AND METHODS

This study was performed at an urban obstetrics and gynecology clinic at New York–Presbyterian Hospital–Weill Cornell Medical Center. Institutional review board approval for this trial was obtained from the Weill Cornell Medical Center.

A total of 180 participants aged 18–45 years were approached for enrollment into this study. Participants were eligible if they were scheduled for a new gynecologic visit, follow-up gynecologic visit, or postpartum visit. Participants who did not speak English or declined participation were ineligible as well as currently pregnant participants; 32 participants were thus excluded. There were no exclusion criteria outside of age, language, currently pregnant status, and willingness to participate. One hundred forty-eight participants met inclusion criteria and were randomized. Four participants were excluded after randomization: one for not disclosing age and three for not completing the study (Fig. 1). All participants provided written informed consent before randomization. Participants were recruited from a well-educated population. In a previous study conducted in the same clinic, the majority of women had some college education (unpublished data).

Randomization was achieved through an opaque envelope system. Equal numbers of opaque envelopes contained slips of paper with the number 1 or 2 signifying to the investigators the randomization group of each participant. Participants were randomized to either standard counseling and pamphlet education (n=74) or standard counseling and Facebook education (n=69). After randomization and before any intervention, a validated contraceptive knowledge survey (Contraceptive Knowledge Inventory)[11,12] was administered to the participants. The survey contained 25 questions specifically addressing general contraceptive knowledge and risks and benefits associated with different contraceptive methods. The participants had unlimited time to complete the preintervention survey. Participants were also questioned about demographic information, including gravidity, marital status, age, race, and ethnicity, and their currently used contraceptive, including no contraceptive. A single health care provider, blinded to the study intervention arm, then provided standardized one-on-one counseling for all participants. Standard counseling included discussion of barrier, hormonal, surgical, and implantable or intrauterine devices. Fifteen minutes was allocated per participant for standard counseling in both groups. The goal of the standard counseling was to simulate a 15-minute in-office consultation specifically addressing contraception. Only American College of Obstetricians and Gynecologists (the College)-derived facts were used, and a transcript was followed by the single

health care provider, who was an MD, to guarantee uniformity. The College pamphlets were chosen for content pertaining to the Contraceptive Knowledge Inventory. Once the pamphlets were chosen, the Facebook page was constructed to be identical in content to the College pamphlets.

Depending on the randomization group, participants were given 30 minutes to review College patient education pamphlets specifically addressing contraception or to interact with a Facebook page created by the investigators using identical content but in video, diagram, and game format. The pamphlets were accessed on the American Congress of Obstetricians and Gynecologists' web site under patient education (http://www.acog.org/For_Patients). A Facebook page was chosen because it facilitates patient interaction with material and can be accessed from home or mobile devices and shared through social media networks. For this pilot study, the goal was to create a Facebook page that could be put live onto the Internet but which was only accessible to participants for 30 minutes within the confines of an office setting. The controlled environment allowed for evaluation of the Facebook page itself on contraceptive knowledge and preference.

After the intervention phase of the project, the participants were administered the Contraceptive Knowledge Inventory again to assess postintervention knowledge. At the completion of the postintervention Contraceptive Knowledge Inventory, participants were questioned regarding their preference for contraception and satisfaction with their counseling method. Patient satisfaction was measured in a similar fashion as clinical pain control. A 1–10 scale was used with 5 being neutral (ie, the participant did not feel the method improves or negatively effects their counseling). A score of less than 5 would indicate dissatisfaction and a score of greater than 5 would indicate satisfaction with the counseling method. Ten was a perfect score and meant the participant felt the intervention provided a significant improvement in counseling method.

We performed a power analysis before recruitment by means of an online statistical tool, OpenEpi (http://openepi.com/v37/Menu/OE_Menu.htm). We calculated sample size by using the mean difference. We set the power at 80% and α of 0.05. We assumed a mean score of 13 (maximum 25) postintervention on the Contraceptive Knowledge Inventory in the pamphlet group and a 3-point (raw score) increase in postintervention score in the Facebook group of 17 (maximum 25). We set the standard deviation at 5. The calculated sample size for 80% power was found to be 50 and 82 for a power of 95%. We continued enrollment until our study end date of February 2013 even after we had reached the required sample size.

The primary study outcome was to determine whether Facebook supplementation to standard counseling significantly improved contraceptive knowledge over traditional pamphlet supplementation. Because the Contraceptive Knowledge Inventory is a 25-question survey, each question correct is worth 4% of the total score. Therefore, percent change in Contraceptive Knowledge Inventory score was defined as ([raw score post-intervention–raw score preintervention] *0.04)*100. Secondary outcomes included patient satisfaction with counseling method and contraceptive preference postintervention (no method, hormonal, barrier, sterilization, or long-acting reversible contraceptive [LARC] including implant or intrauterine device [IUD]). Primary analyses were conducted for the overall study population. Secondary analyses were conducted across age groups (18–25, 26–30, 31–35, and 36–45 years old).

Participants were included in this analysis (n=144) if they completed the study and provided their age, because age was an inclusion criterion and one of the secondary outcomes evaluated age-specific associations. Bivariable analyses were conducted to determine if statistically significant differences in demographic variables existed between the Facebook and pamphlet groups at baseline. χ^2 and Fisher's exact tests were conducted to test for differences across intervention groups for categorical variables, including demographics and contraceptive preference. Wilcoxon Mann-Whitney tests were used to assess differences between Facebook and pamphlet groups for Contraceptive Knowledge Inventory raw scores, percent change in Contraceptive Knowledge Inventory score, and satisfaction with counseling method for the pre- and postintervention periods for the study sample overall and for specific age groups. Within each study arm, Kruskal-Wallis tests were used to determine if significant differences in Contraceptive Knowledge Inventory raw scores, percent changes in Contraceptive Knowledge Inventory score, and satisfaction with counseling method existed across age groups. Nonsignificant Kruskal-Wallis tests would indicate that within each study arm, the intervention had the same effect across all age groups. Relative risk regression (Spiegelman, 2008) was performed on the overall sample and for the high risk age group, 18–25 years old, to determine the risk for preferring LARC over another contraceptive for a 4%, 12%, and 36% increase in knowledge and to determine the risk for preferring hormonal method over another contraceptive for a 4%, 12%, and 36% increase in knowledge. Statistical analysis was performed using SAS 9.3.

RESULTS

The participant population was diverse with a significant percentage of African American (41%) and Hispanic (37%) patients (Table 1). Caucasian (14%), African (6%), and Asian (5%) participants completed the sample. The racial and ethnic compositions of the two study groups were not significantly different. There were no significant differences in age, marital status, or gravidity between the two study groups. Pamphlet users were more likely to use barrier methods at baseline, and no patients in either arm were using an implant.

The median raw score achieved on the preintervention Contraceptive Knowledge Inventory was significantly higher for the pamphlet compared with the Facebook group (7 compared with 6, $P=.04$; Table 2). However, although both the Facebook and pamphlet groups improved their raw scores pre- to postintervention, the median Contraceptive Knowledge Inventory score postintervention was significantly higher among the Facebook compared with the pamphlet group: 15 compared with 12 ($P<.001$). Stratified by age group, the results were similar with postintervention median Contraceptive Knowledge Inventory score significantly higher among the Facebook compared with the pamphlet group. When comparing postintervention raw scores in the 18–25, 26–30, 31–35, and 36–45-year-old age groups, the difference in raw scores was 14 compared with 11, 15.5 compared with 12, 15 compared with 12, and 15 compared with 11, respectively, all statistically significant. This same pattern was observed when percent score change from pre- to postintervention was considered. Overall, the Facebook group showed a 36% increase in Contraceptive Knowledge Inventory score postintervention compared with a 12% increase in the pamphlet group ($P<.001$; Table 2). Kruskal-Wallis tests were not significant across age groups for either the raw or percent change in Contraceptive Knowledge Inventory indicating that there was no difference in effect of intervention on Contraceptive Knowledge Inventory score across age groups in either the Facebook or pamphlet group.

Participant satisfaction with the counseling method was evaluated as a secondary outcome (Table 3). Across all age groups, participant satisfaction was significantly higher in the Facebook group compared with the pamphlet group ($P\leq.01$). Kruskal-Wallis tests

Table 1. Participant Demographics and Baseline Characteristics

Demographics	Overall (n=143)	Pamphlet (n=74)	Facebook (n=69)	P*
Age (y)				
18–25	48 (33.6)	28 (37.8)	20 (29.0)	.26
26–30	37 (25.9)	19 (25.7)	18 (26.1)	.96
31–35	40 (28.0)	18 (24.3)	22 (31.9)	.31
36–45	18 (12.6)	9 (12.2)	9 (13.0)	.87
Race				
Hispanic	59 (41.3)	32 (43.2)	27 (39.1)	.62
African American	53 (37.1)	24 (32.4)	29 (42.0)	.24
Caucasian	20 (14.0)	14 (18.9)	6 (8.7)	.08
Asian	5 (3.5)	2 (2.7)	3 (4.4)	.67†
African	6 (4.2)	2 (2.7)	4 (5.8)	.43†
Marital status				
Single	105 (73.4)	54 (73.0)	51 (73.9)	.90
Married	38 (26.6)	20 (27.0)	18 (26.1)	
Previous pregnancy				
Yes	84 (58.7)	40 (54.1)	44 (63.8)	.24
No	59 (41.3)	34 (46.0)	25 (36.2)	
Contraceptive method				
Hormonal	61 (42.7)	26 (35.1)	35 (50.7)	.06
Barrier	50 (34.7)	32 (43.2)	18 (26.1)	.03
IUD	11 (7.6)	5 (6.8)	6 (8.7)	.66
Sterilization	1 (0.7)	0 (0)	1 (1.5)	.48†
Implant	0 (0)	0 (0)	0 (0)	N/A
None	20 (13.9)	11 (14.9)	9 (13.0)	.75

IUD, intrauterine device; N/A, not applicable.
Data are n (%) unless otherwise specified.
* χ^2 unless otherwise indicated for differences across pamphlet and Facebook groups.
† Fisher's exact test.

Table 2. Comparison of Contraceptive Knowledge Inventory Score Preintervention and Postintervention by Intervention Type and by Age

	Preintervention		Postintervention		% Increase	
	Median (IQR)	*P**	Median (IQR)	*P**	Median (IQR)	*P**
Overall						
Pamphlet	7 (4–10)	.04	12 (8–14)	<.001	12 (8–20)	<.001
Facebook	6 (3–8)		15 (13–17)		36 (28–44)	
18–25 y						
Pamphlet	6.5 (4–10)	.02	11 (7.5–14)	.02	12 (8–20)	<.001
Facebook	5 (2.5–6)		14 (10–16)		32 (26–44)	
26–30 y						
Pamphlet	8 (6–10)	.10	12 (9–14)	<.01	12 (8–16)	<.001
Facebook	5.9 (3–9)		15.5 (14–18)		36 (32–48)	
31–35 y						
Pamphlet	6.5 (3–9)	.96	12 (8–15)	<.01	12 (8–24)	<.01
Facebook	6 (4–10)		15 (12–17)		28 (20–40)	
36–45 y						
Pamphlet	7 (3–9)	.86	11 (11–12)	.02	16 (12–20)	.03
Facebook	8 (6–9)		15 (14–18)		36 (28–44)	

IQR, interquartile range.
Kruskal-Wallis test for preintervention raw score across age groups: pamphlet: 0.50, Facebook: 0.18. Kruskal-Wallis test for postintervention raw score across age groups: pamphlet: 0.86, Facebook: 0.32. Kruskal-Wallis test for percent change in score across age groups: pamphlet: 0.71, Facebook: 0.35.
* χ^2 unless otherwise specified.

across all age groups for the Facebook and pamphlet groups were not significant.

Table 4 shows the postintervention contraceptive preference for both the Facebook and the pamphlet groups. Preference for implants postintervention was significantly greater in the Facebook group as opposed to the pamphlet group (35% compared with 9%, $P<.01$, Facebook compared with pamphlet, respectively). Long-acting reversible contraceptive (implant and IUD) preference was also significantly greater in the Facebook group postintervention (57% compared with 35%, $P=.01$, Facebook compared with pamphlet, respectively). Preference for IUD postintervention was not significantly different between groups (22% compared with 26%, Facebook compared with pamphlet, respectively). Thus, the significant gains in LARCs were mainly the result of increased implant preference.

The relative risk (RR) of preferring LARCs compared with another contraceptive by percent change in Contraceptive Knowledge Inventory score for several meaningful Contraceptive Knowledge Inventory cutoffs was analyzed (Table 5). Analyses were performed for a 4% increase (one more question correct on Contraceptive Knowledge Inventory), 12% increase (median increase for pamphlet group), 24% increase (difference in median scores for Facebook and pamphlet groups), and 36% increase (median increase for Facebook group) in score. A 4% increase in score on the Contraceptive Knowledge Inventory yielded a RR of 1.06 (95% confidence interval [CI] 1.02–1.10). A 12% increase in score yielded an RR of 1.19 (95% CI 1.06–1.34). A 24% increase in score yielded a RR of 1.43 (95% CI 1.13–1.80). Finally, a 36% increase in score yielded a RR of 1.71 (95% CI 1.20–2.42), indicating that women with a 36% increase in Contraceptive Knowledge Inventory score were 1.71 times more likely to choose LARCs than another contraceptive method. Interestingly, although preference for implant was increased with relatively small increases in Contraceptive Knowledge Inventory score (0–36%) and then plateaued, the increase in Contraceptive Knowledge Inventory score needed for increasing IUD preference was much larger (beginning at 36%) and then continued to rise with increasing Contraceptive Knowledge Inventory score. We also found that, as knowledge increased (measured by percent increase in Contraceptive Knowledge Inventory score), the relative risk of preferring LARCs increased. A very large increase in knowledge was needed to prefer IUD, whereas smaller increases in knowledge were needed to prefer implant (data not shown).

In the subgroup of participants who were noncontraceptive or barrier users, we observed an overall nonsignificant increase in LARC preference postintervention in the Facebook compared with the pamphlet group (48.2% compared with 32.6%, $P=.19$). When

Table 3. Patient Satisfaction With Counseling Method, by Age

	Median	IQR	P*
All ages			
Pamphlet	6	5–8	<.001
Facebook	10	10–10	
Overall	9	6–10	
18–25 y			
Pamphlet	6.5	4–8	<.001
Facebook	10	10–10	
Overall	8	5–10	
26–30 y			
Pamphlet	5	5–8	<.001
Facebook	10	10–10	
Overall	9	5–10	
31–35 y			
Pamphlet	5.5	5–7	<.001
Facebook	10	10–10	
Overall	10	6–10	
36–45 y			
Pamphlet	6	6–8	<.01
Facebook	10	10–10	
Overall	10	6–10	

IQR, interquartile range.
* χ^2 unless otherwise specified+Wilcoxon Mann-Whitney test Kruskal-Wallis test for patient satisfaction score across age groups: pamphlet: 0.49, Facebook: 0.24.

LARCs were subdivided into implant or IUD only, there was a significantly greater preference for implant in the Facebook compared with the pamphlet group (25.9% compared with 4.7%, *P*=.02). It is important to note that this represented participant choice and not actual use of this contraceptive method (Table 6).

DISCUSSION

Effective contraception counseling is essential among all women of reproductive age, although women aged younger than 25 years old are at high risk of unintended pregnancy.[13] Rates of unintended pregnancy may be decreased with proper and innovative counseling regarding contraceptive options. Studies have shown that personalization of standard in-person postabortion contraception counseling increases acceptance and use of contraceptives by patients.[9] Affecting increases in patient knowledge and retention and increasing the use of Tier I contraceptives (IUDs, implants, sterilization) should be the goal for contraceptive counseling.

We have shown that improving patient knowledge can improve contraceptive preference for LARCs, particularly among young women at high risk for unintended pregnancy. Studies have shown that increased use of LARCs can decrease unintended pregnancy rates. In fact, the College strongly supports

Table 4. Contraceptive Preference Postintervention, by Intervention Type and by Age

	Pamphlet (n=74)	Facebook (n=69)	P*
Overall			
Hormonal methods	34 (46)	18 (26)	.01
Barrier	11 (15)	5 (7)	.15
Implant	7 (9)	24 (35)	<.01
IUD	19 (26)	15 (22)	.58
Sterilization	3 (4)	7 (10)	.15†
None	0	0	—
LARC (implant % IUD)	26 (35)	39 (57)	.01
18–25 y			
Hormonal method	14 (50)	8 (40)	.49
Barrier	2 (7)	1 (5)	1.00†
Implant	2 (7)	6 (30)	.05
IUD	10 (36)	5 (25)	.43
Sterilization	0	0	—
LARC (implant and IUD)	12 (43)	11 (55)	.41
26–30 y			
Hormonal method	6 (32)	3 (17)	.45†
Barrier	5 (26)	1 (6)	.18†
Implant	2 (11)	9 (50)	.01†
IUD	4 (21)	2 (11)	.66†
Sterilization	2 (11)	3 (17)	.66†
LARC (implant and IUD)	6 (32)	11 (61)	.07
31–35 y			
Hormonal method	10 (56)	4 (18)	.02†
Barrier	2 (11)	2 (9)	1.00†
Implant	2 (11)	7 (32)	.15†
IUD	3 (17)	7 (32)	.46†
Sterilization	1 (6)	2 (9)	1.00†
LARC (implant and IUD)	5 (28)	14 (64)	.02
36–45 y			
Hormonal method	4 (44)	3 (33)	1.00†
Barrier	2 (22)	1 (11)	1.00†
Implant	1 (11)	2 (22)	1.00†
IUD	2 (22)	1 (11)	1.00†
Sterilization	0 (0)	2 (22)	.47†
LARC (implant and IUD)	3 (33)	3 (33)	1.00†

IUD, intrauterine device; LARC, long-acting reversible contraceptive.
Data are n (%) unless otherwise specified.
* χ^2 unless otherwise specified.
† Fisher's exact test.

LARC use, especially in adolescent population.[14] Thus, any method of counseling that can increase preference and ultimately use of LARCs should be strongly considered.

Patient satisfaction is also an important aspect of counseling. Patient satisfaction is not only important for compliance with a specific treatment plan, but also

Table 5. Preference for Hormonal Method and Intrauterine Device and Implant by Percentage Increase in Contraceptive Knowledge Inventory Score

All Ages	Risk Ratio	95% CI
4% increase		
Hormonal method	0.93	0.87 (0.99)
IUD or implant	1.06	1.02 (1.10)
12% increase		
Hormonal method	0.80	0.66 (0.97)
IUD or implant	1.19	1.06 (1.34)
24% increase		
Hormonal method	0.64	0.44 (0.93)
IUD or implant	1.43	1.13 (1.80)
36% increase		
Hormonal method	0.51	0.29 (0.90)
IUD or implant	1.71	1.20 (2.42)

CI, confidence interval; IUD, intrauterine device.

with retention of patients in clinician practices and overall patient outcomes.[15,16] It is clear that providing a user-friendly and fun method of contraceptive counseling will engage a higher proportion of the patient population.

Providing information through social media is simple and effective. In a broad context, physicians have the opportunity to reach millions of patients who would otherwise not have access to care and provide accurate and up-to-date medical information in a format that is easily accessible and relatable.[17–19] Facebook has users numbering 1.1 billion (most current estimate at the time of writing this manuscript, www.facebook.com), which spans across all age groups. Online users turned to Twitter (60%) and Facebook (52%) for increasing knowledge and exchanging advice.[20] Because patients use these online services for health information,[8,21,22] the potential for misinformation exists. As physicians we have a role to improve online access to patient education, and social media appears to be a viable option.

Table 6. New Contraceptive Preference by Previous Barrier or Noncontraceptive Users, by Intervention Arm

	Pamphlet (n=43)	Facebook (n=27)	*P**
Overall			
Hormonal method	17 (40)	9 (33)	.60
Barrier	11 (26)	3 (11)	.22
Implant	2 (5)	7 (26)	.02
IUD	12 (28)	6 (22)	.60
Sterilization	1 (2)	2 (7)	.55†
LARC (implant or IUD)	14 (33)	13 (48)	.19

IUD, intrauterine device; LARC, long-acting reversible contraceptive.
Data are n (%) unless otherwise specified.
* χ^2 unless otherwise specified.
† Fisher's exact test.

Although the findings of the present study are encouraging, there are limitations in the study design that merit careful interpretation of the results. It is important to note that long-term knowledge retention, actual contraceptive use, and long-term compliance were not included in the design of this study. However, we believe our results are encouraging given the significant effects on improvements in contraceptive knowledge, contraceptive preference for LARCs, and satisfaction with counseling method immediately after the intervention. We recognize the need for further study regarding this method of counseling and long-term knowledge retention and compliance with contraceptive use, and we hope the results of this pilot study will facilitate a larger study that can assess these important long-term outcomes. Participants' experience and familiarity with Facebook were not assessed. Thus, it is possible that only women who felt comfortable interacting with Facebook agreed to participate. We do not believe this affects the internal validity of the study; however, the results may only be applicable to women who feel comfortable interacting with Facebook. Despite randomization, at baseline, the pamphlet group was more likely to use barrier methods and less likely to use hormonal methods than the Facebook group. However, postintervention there was not a significant difference in preference for barrier contraception across study arms and the pamphlet group was more likely to prefer hormonal methods than the Facebook group. The small sample sizes within age strata are also a limitation of this pilot study. The nonsignificant results may well be the result of low statistical power, although even in the setting of relatively small sample sizes, we had significant results. As a result of the exploratory nature of this work, we did not apply corrections for multiple hypothesis testing. These promising findings, even with the study limitations, should prompt future research into social media as a method for increasing contraceptive knowledge among women.

In conclusion, our study demonstrates that providing information regarding contraceptive options through Facebook is an effective method to enhance contraceptive knowledge and preference for LARCs in patients. Future work should include long-term follow-up of a larger number of patients for contraceptive knowledge retention and use and continuation of contraception. Other methods of online communication should also be evaluated.

REFERENCES

1. Mosher WD, Jones J, Abma JC. Intended and unintended births in the United States: 1982–2010. Natl Health Stat Report 2012:1–28.
2. Little P, Glew C, Kelly J, Griffin S, Dickson N, Sadler C. Contraceptive knowledge: development of a valid measure and survey of pill users and general practioners. Br J Fam Plann 1998; 24:98–100.
3. Little P, Griffin S, Kelly J, Dickson N, Sadler C. Effect of educational leaflets and questions on knowledge of contraception in women taking the combined contraceptive pill: randomized controlled trial. BMJ 1998;316:1948–52.
4. Alan Guttmacher Institute. Adding it up: the benefits of investing in sexual and reproductive health care, 2003. Available at: http://www.guttmacher.org/pubs/addingitup.pdf. Retrieved November 21, 2011.
5. Smith LF, Whitfield MJ. Women's knowledge of taking oral contraceptive pills correctly and of emergency contraception: effect of providing information leaflets in general practice. Br J Gen Pract 1995;45:409–14.
6. Aghakani N, Nia HS, Ranjbar H, Rahbar N, Behshti Z. Nurses' attitude to patient education barriers in educational hospitals of Urmia University of Medical Sciences. Iran J Nurs Midwifery Res 2012;17:12–5.
7. Weisman CS, Maccannon DS, Henderson JT, Shortridge E, Orso CL. Contraceptive counseling in managed care: preventing unintended pregnancy in adults. Womens Health Issues 2002;12:79–95.
8. Janisse T. PS2-21: explanation to understanding: practices of the highest performing physicians by patient survey. Clin Med Res 2011;9:159.
9. Carneiro Gomes Ferreira AL, Impieri Souza A, Evangelista Pessoa R, Braga C. The effectiveness of contraceptive counseling for women in the post abortion period: an intervention study. Contraception 2011;84:377–83.
10. Garcia-Romero MT, Prado F, Dominguez-Cherit J, Hojyo-Tomonka MT, Arenas R. Teledermatology via a social networking web site: a pilot study between a general hospital and a rural clinic. Telemed J E Health 2011;17:652–5.
11. Peipert JF, Zhao Q, Allsworth JE, Petrosky E, Madden T, Eisenberg D, et al. Continuation and satisfaction of reversible contraception. Obstet Gynecol 2011;117:1105–13.
12. Davis MC, Yarber WL. Handbook of sexually related measures. 1st ed. Thousand Oaks (CA): Sage publications, Inc.; 153–5.
13. Dude A, Neustadt A, Martins S, Gilliam M. Use of withdrawal and unintended pregnancy among females 15-24 years of age. Obstet Gynecol 2013;122:595–600.
14. Adolescents and long-acting reversible contraception: implants and intrauterine devices. ACOG Committee Opinion No. 539. American College of Obstetricians and Gynecologists. Obstet Gynecol 2012;120:982–8.
15. Ho AL, Klassen AF, Cano S, Scott AM, Pusic AL. Optimizing patient-centered care in breast reconstruction: the importance of preoperative information and patient–physician communication. Plast Reconstr Surg 2013;132:212e–220e.
16. Rickert VI, Berenson AB, Williamson AJ, Wiemann CM. Immediate recall of oral contraceptive instructions: implications for providers. Am J Obstet Gynecol 1999;180:1399–406.
17. van der Westhuizen M, Hall D. Are affluent, well-educated, career-orientated women knowledgeable users of the oral contraceptive pill? J Fam Plann Reprod Health Care 2005;31:307–9.
18. Sokkary N, Mansouri R, Yoost J, Focseneanu M, Dumont T, Nathwani M, et al. A Multicenter survey of contraceptive knowledge among adolescents in North America. J Pediatr Adolesc Gynecol 2013;26:274–6.
19. Rosenberg MJ, Waugh MS, Burnhill MS. Compliance, counseling and satisfaction with oral contraceptives: a prospective evaluation. Fam Plann Perspect 1998;30:89–92.
20. Antheunis ML, Tates K, Niboer TE. Patients' and health professionals' use of social media in health care: motives, barriers and expectations. Patient Educ Couns 2013;92:426–31.
21. Secura G. Long-acting reversible contraception: a practical solution to reduce unintended pregnancy. Minerva Ginecol 2013;65:271–7.
22. Michie L, Cameron ST. Improving the uptake of long acting reversible contraception: a review. Minerva Ginecol 2013;65: 241–52.