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REVIEW

Strategies to improve compliance among oral contraceptive pill users: a review of the literature

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Abstract: Oral contraceptive pills (OCPs) remain the most commonly used reversible birth control method. Failure to adhere to daily pill taking and gaps in use are common and contribute to the risk of unintended pregnancy among OCP users. OCP compliance is influenced by a complex interplay of cognitive, behavioral, logistic, clinical, and social factors. This review outlines the evidence base for strategies that have been studied for their impact on OCP compliance.

Keywords: adherence, continuation, unintended pregnancy, reminder system

Introduction

Oral contraceptive pills (OCPs) are widely used but incorrect and inconsistent use remain common. OCPs are currently the most popular contraceptive method among American women, with 10.6 million users.[1] Nearly one in five women of reproductive age in the USA use OCPs, including 28% of current contraceptive users.[1] When compared with long-acting or permanent contraceptive methods such as intrauterine devices, contraceptive implants, or sterilization, OCPs are used more often among young women aged 18–24 years in the USA.[2] This same age group generally demonstrates the highest rate of inconsistent contraceptive use and unintended pregnancy.[3]

Approximately 1.2 million unintended pregnancies each year in the USA are attributed to inconsistent or incorrect use of contraception.[4] Because OCPs are the most commonly used method and misuse is so common, a significant proportion of unintended pregnancies could be prevented with improved OCP compliance.[5,6] With perfect use, OCPs have less than 1% risk of failure or unintended pregnancy. However, mistimed pills, poor understanding of instructions, and gaps in use are factors that account for the 9% risk of failure during the first year of use among typical users.[7]

Research estimates that 40% of OCP users are nonadherent with the daily pill-taking regimen.[4] The proportion of OCP users who are nonadherent ranges from as low as 14% missing ≥2 pills per month based on self-report,[8] to as high as 50% missing ≥3 pills in cycle three of use based on data from electronic monitors.[9,10] Further, more than half of OCP users in a nationally representative sample experienced a gap in use over the last year, with 20% of these gaps occurring during a period of risk for unintended pregnancy.[2] At least one-third of women discontinue OCPs during the first year of use.[11] Such nonadherence increases risk for unintended pregnancy as well as side effects such as unscheduled bleeding that may increase the odds of discontinuation.[8]

Not surprisingly, OCP users are not alone in facing challenges with adherence to long-term use of daily medication. Patients with chronic conditions requiring

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daily medication as well as asymptomatic people who use medication as a preventive measure commonly experience incorrect and inconsistent use secondary to multifactorial and complex reasons.[5,12,13] Demographic characteristics associated with poor OCP compliance include minority status, lower income, lower education levels, having small children, and having an occasional partner.[10,14] More modifiable factors associated with OCP noncompliance include the cost of OCPs, the need for frequent refills requiring a visit to a medical provider or pharmacy, and side effects such as breast tenderness or unscheduled bleeding.[4,15–17] Eliminating these barriers is necessary but unlikely to be sufficient. As an example, in a research setting where OCP cost was eliminated, nearly half of the women were still late obtaining refills, underscoring the multifactorial nature of OCP noncompliance.[5]

Situational factors, such as daily routine, play an integral role in OCP noncompliance. Of OCP users who never miss a pill, 90% have a routine that involves taking their pill at the same time every day.[3,8] Likewise, significant gaps in OCP use tend to coincide with major life changes such as a move, job switch, or personal crisis.[4] Further, the clinical setting impacts adherence, as evidenced by the fact that women who report satisfaction with their health-care provider and see the same clinician at each visit feel they were involved in the choice of method prescribed by their physician and are less likely to demonstrate inconsistent use.[4,14]

Poor reproductive knowledge and underestimation of pregnancy risk with any given act of intercourse are common, though the extent to which these factors affect OCP compliance is not clear.[4,18,19] Further, a significant proportion of women incorrectly ascribe health risks such as cancer to OCP use.[18] Based on such misperceptions, women may fail to identify the importance of OCP compliance in pregnancy prevention or may discontinue their OCPs in response to unexpected side effects rather than seek guidance from a provider.

Increasingly, research in this field is beginning to address some of the complex cognitive and behavioral aspects of OCP compliance. For example, ambivalent attitudes toward pregnancy are associated with increases in the inconsistent use of OCPs.[4,20] "Ambivalence" refers to the concept that an individual could simultaneously report a strong desire to avoid pregnancy but also say they would be happy if they found out they were pregnant. Health-behavior theory provides a fresh lens through which to study OCP compliance. One study found that women's estimation of the benefits of OCP use along with their confidence in their ability to continue OCPs despite obstacles (self-efficacy) predicted the likelihood of continuing at 6 months.[21] Interestingly, the same study found that no matter the importance women placed on the disadvantages of pill use, they demonstrated similar rates of continuation, suggesting that clinician time spent dispelling myths and concerns may not be as important as helping women to problem-solve obstacles. A second study using a different health-behavior theory framework found similar results.[8]

In sum, the research indicates that OCP compliance is influenced by a complex interplay of cognitive, behavioral, logistic, clinical, and social factors. Therefore, clinicians who aim to help OCP users improve compliance must consider the multifaceted reasons why women struggle to adhere to a daily OCP regimen, including their self-efficacy, ambivalence toward pregnancy, reproductive knowledge, and the context of their daily lives. Improving adherence to OCPs, which remain popular and widely used, stands to significantly decrease unintended pregnancy along with its individual and societal costs. In this review, we outline strategies that have been studied to enhance compliance with OCP regimens. In the context of our review, we use the term "compliance" to encompass both adherence to the prescribed daily regimen of pill taking as well as avoiding gaps in use or short-term discontinuation.

Methods

A literature search was conducted using Ovid to search MEDLINE® for clinical studies published up to March 20, 2014 reporting on strategies for improving OCP compliance. The search strategy used free text terms relevant to this topic as follows: "compliance" or "adherence" or "continuation", and "oral contracep*" or "birth control pills" or "oral contracep* pills" or "oral birth control", and "intervention" or "trial" or "comparison" ("*" is treated as a wild character). The titles and abstracts were assessed for relevant articles published in English. In addition, the reference lists of pertinent review articles were examined for articles that may not have been captured in our search. Studies that evaluated interventions or compared clinical practices for their impact on OCP compliance, adherence, or continuation were chosen for inclusion in this review. We excluded studies that primarily reported on outcomes of pregnancy rate or side effects as well as those that compared OCPs with other contraceptive methods, including the contraceptive patch or vaginal ring. Finally, articles outlining national-level guidance were reviewed for potentially relevant recommendations that may not have been captured in our search.

Evidence for strategies to improve OCP compliance

Ideally, the research would identify brief and effective interventions that clinicians could employ in the clinical setting to enhance a woman's OCP compliance. The body of research on this topic has examined strategies including counseling and education, use of reminders, timing of OCP initiation, choice of OCP regimen, and pack supply.

Counseling and education

Multiple studies have examined various counseling or educational interventions designed to improve either OCP adherence or continuation. One study demonstrated that peer counseling was no better than nurse counseling with respect to improving adolescent adherence to OCPs.[22] In young women who received standard counseling from a nurse practitioner compared with those who received an additional of 45 minutes of intensive contraceptive counseling, the extra counseling added no benefit to OCP adherence, whereas the addition of intensive counseling plus monthly phone calls increased self-report of consistent use by 40% at 3 months.[23] However, this effect did not persist to 12 months. A small study focused on young postpartum women demonstrated an increase in knowledge but no increase in continuation following an intervention of counseling, video information, and written information about OCPs.[24] In contrast, Deijen and Kornaat concluded that the provision of written and recorded information improved early compliance, but the effect did not persist through the third cycle of OCPs.[25] The resources necessary to implement the practices mentioned may not be justified by the marginal improvement in compliance.

Understanding how to handle missed OCPs is a specific instructional area that has been studied in an effort to improve compliance. A systematic review on this topic suggests that written instructions about how to manage missed pills improves knowledge but may not result in women actually following the recommendations.[26] When instructions are provided, evidence suggests that graphic instructions and those with less technical information aid comprehension more than text-only or detailed instructions.[27]

Based on the lack of significant impact of counseling and educational interventions that simply provide more information and more detail, investigators have begun to design theory-based interventions that focus less on information transfer and more on how people change health behaviors. A systematic review of such interventions, which were based on multiple behavioral models and often involved multiple sessions, concluded that about half showed a positive effect on contraceptive use.[28] Many of these would be difficult to implement in a typical clinical setting. To date, no ideal counseling or educational strategy has proven particularly effective, but those based on behavioral theories appear to hold promise.[29]

Reminders

Research has documented how commonly OCP users fail to take their pill on time every day as directed. The question follows as to whether a reminder system would improve a woman's daily adherence to her OCP. In a study employing a daily electronic-mail reminder, a significantly higher proportion of reminder recipients missed no OCPs in cycles 1 through 3 than did controls.[30] Castaño et al found that daily text-message reminders that included an educational message significantly decreased the proportion of OCP users who experienced an extended 7-day gap in use during the study.[31] Conversely, using electronic monitoring devices to record adherence, Hou et al found no difference in adherence between those receiving daily text reminders (minus the educational component) and the control group.[32] The majority of participants receiving reminders found them to be acceptable and useful.[30–33]

"Bedsider.org" is an example of a publicly available, free reminder service that allows online enrollment in customized text-message or electronic-mail reminders that address adherence as well as refills and appointments. When compared with patients who were only introduced to the website, those who were actually enrolled in the reminder system while still in the office were more likely to receive a reminder and to be utilizing reminders at 3 months.[33] Other cell-phone applications, such as "Lady Pill" were listed by participants during study follow-up as useful tools for helping them track daily adherence, but these have not been tested to our knowledge. The evidence supports use of reminders, which are now available at no cost, to enhance compliance.

Timing of initiation

Historically, women have been instructed to begin their OCP with the onset of next menses, which some hypothesized served as an unnecessary barrier to initiation and possibly continuation. While participants who had directly observed OCP initiation on the day of their visit were 50% more likely to continue to the second pack, no differences in continuation persisted at 3 or 6 months compared with those who were instructed to begin during their next period.[34] A sub-analysis of the adolescents in the same study found similar results.[35] Pregnancy rates did not differ according to the timing of

initiation in either report. Although safe and acceptable, there is minimal evidence that immediate initiation of OCPs or other methods of contraception reduces unintended pregnancy or increases long-term continuation.[36,37]

Choice of pill regimen

A number of OCP regimens are currently available for provision, including progestin-only versus combined oral contraceptives containing both estrogen and progestin, monophasic (no variation in hormone dose throughout the cycle) versus multiphasic (hormone dose varies throughout the cycle), and monthly cycle (withdrawal bleeding once every 28 days) versus extended cycle (withdrawal bleeding once every 84 days) versus continuous cycle (no withdrawal bleeding). A systematic review found evidence that discontinuation rates were higher with progestin-only pills than with combined OCPs, acknowledging the limitations of this evidence base.[38] In comparisons of OCPs of various "phasic" dosing, several systematic reviews suggest that, while cycle control differs between monophasic, biphasic, triphasic, and quadriphasic OCPs, there are no significant differences in continuation rates.[39–43] Similarly, an extended cycle regimen conferred no improvement in continuation over the first year of use.[44]

The available products also vary in progestogen type. A systematic review that examined clinical trials comparing pills with varying progestogens suggested that OCPs with third-generation progestogens (eg, gestodene) had lower discontinuation rates than those with second-generation progestogens (eg, levonorgestrel), which in turn had lower discontinuation rates than OCPs with first-generation progestogens (eg, norethisterone).[45] However, the authors caution that the implications for clinical practice are limited, because very few trials were double-blinded, thus were subject to significant bias toward the more recently developed product. Currently, there is no evidence that a particular OCP regimen promotes compliance or continuation over other types.

Pack supply

Another oft-cited barrier to consistent use of OCPs is failure to obtain timely refills. Historically, prescriptions for OCPs have been restricted to monthly refills. Those sites that are able to dispense actual pill packs typically operate with protocols that limit supplies for 3 months or less, possibly due to concerns about medical side effects, compliance, or other site-specific issues such as limited supplies. A systematic review summarizes a small body of research that demonstrates that supplying a greater number of OCP packs increases continuation of use.[46]

White and Westhoff conducted a randomized trial in which they compared supplying three versus seven packs.[47] They found that the odds of continuing OCPs at 6 months were 60% higher among young adult women who received the longer supply. The impact of the longer supply was more pronounced among women younger than 18 years, who were sevenfold more likely to continue at 6 months. Although underpowered for this outcome, their data also suggest that supplying the actual packs versus a prescription increased the odds of continuation at 6 months. In a separate study, supplying more packs at the initial visit did not increase the proportion of OCP users continuing beyond 4 months but was associated with fewer OCP users returning late to obtain their continuing supply.[48]

Using a medical-claims database, another group of authors demonstrated that clients receiving 12–13 months' supply of OCPs had higher continuation rates than those receiving only 1 or 3 months' supply.[49] Extending the supply of OCPs provided or prescribed at initial or return visits should be considered in an effort to reduce gaps in use.[36]

Conclusion

Noncompliance and discontinuation remain common challenges faced by users and providers of OCPs. These challenges are related to a complex interplay of a number of cognitive, behavioral, logistic, clinical, and social factors. Although there are contraceptive methods with less challenging compliance issues, such as intrauterine devices and the implant, many women will nevertheless opt to use OCPs. For providers who are treating women who opt to use OCPs, several strategies may improve their compliance with OCPs and in turn have a larger public health impact:

- While education and counseling seem like intuitive measures to enhance compliance, no guidance can be offered for specific content, delivery mechanism, or amount. OCP providers should consider providing graphic instructions for clients about how to handle missed pills.
- Women should be informed about the potential utility of reminders, some of which are publicly available at no cost. When possible, women should be assisted with online enrollment in a reminder system while in the office.
- Immediate initiation ("quick start") may improve short-term continuation with OCPs, though no long-term impact has been demonstrated.
- When prescribing or providing OCP supplies, no preferred regimen is known to enhance compliance. However, a 1-year supply should be provided when possible.

Disclosure

The authors declare no conflicts of interest in this work.

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