Published in final edited form as:

Womens Health Issues. 2008 ; 18(6): 471–481. doi:10.1016/j.whi.2008.07.011.

The Influence of Nurse Home Visits, Including Provision of 3-Months of Contraceptives and Contraceptive Counseling, on Perceived Barriers to Contraceptive Use and Contraceptive Use Self-Efficacy

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Introduction

Although safe and effective contraceptive methods are readily available, unintended pregnancy remains a serious public health problem, causing adverse health effects for thousands of women, children and families across the United States (Sheeder, Scott and Stevens-Simon, 2004, Stevens-Simon, Beach and Klerman, 2001). Unintended pregnancies account for about half of all births to U.S. women. An estimated 48% of women age 15–44 have at least one unplanned pregnancy sometime in their lives (Henshaw, 1998, Brown and Eisenberg, 1995). Women who are younger, not married, poor and non-white have higher rates of unintended pregnancy (Henshaw, 1998).

For sexually active individuals, unintended pregnancy is inextricably linked with contraceptive use and can be attributed to failure to use any contraceptive method, ineffective use of a method or method failure. The results of a recently conducted national survey revealed that over a year, approximately 40% of reproductive-aged women used no contraceptive method for at least one month and an average of 6 to 12 months. Less than 10% of the participants were pregnant or seeking pregnancy. Therefore, 30% of the participants were at risk for unintended conception during these hiatuses in contraceptive use (Frost, Singh and Finer, 2004). Three factors, difficulty obtaining contraceptive supplies and care, infrequent sexual intercourse and periodic abstinence, and ambivalence about the desirability of remaining non-pregnant accounted for 80% of the gaps in contraceptive use observed in the study (Frost, Singh and Finer, 2004). In addition, women at risk for unintended pregnancy who had less than a college education or were on Medicaid had higher likelihoods of experiencing gaps of at least one month in contraceptive use (Frost, Singh and Finer, 2004).

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Increasing effective contraceptive use could reduce the incidence of unintended pregnancies, and if provided after delivery, could reduce short-interval unintended pregnancy (Sable, Libbus and Chiu, 2000). Unfortunately, many women who are at high risk for unintended pregnancy and could receive services from publicly funded family planning programs may not be able to use them for several reasons. These include the cost of services, structural barriers such as childcare and transportation problems, the limited times that services are available, geographic location of services, waiting times at clinics and delays in obtaining appointments (Sable, Libbus and Chiu, 2000, Frost, Singh and Finer, 2004, Sable and Libbus, 1998, Radecki and Bernstein, 1989, Silverman, Torres and Forrest, 1987). Transportation has been particularly difficult for women without health insurance and for black women (Sable, Libbus and Chiu, 2000). Additional barriers accounting for infrequent contraceptive use include waiting times at clinics and delays in obtaining appointments (Sable, Libbus and Chiu, 2000). Psychological barriers such as negative attitudes toward contraception (Silverman, Torres and Forrest, 1987), embarrassment (Sable and Libbus, 1998, Libbus, 1995), fear of side effects from hormonal contraception (Silverman, Torres and Forrest, 1987, Libbus, 1995), and the belief that clinics offer less personalized and lower quality care (Silverman, Torres and Forrest, 1987, Radecki and Bernstein, 1989) also lead to infrequent contraceptive use. Furthermore, Sable and Libbus (1998) found that the pelvic exam requirement for women seeking contraceptives is a substantial barrier to access.

Social cognitive theory posits that people are more likely to engage in a behavior not only if they expect that the behavior will produce a desired outcome, but also if they believe that they can successfully carry out the behavior necessary to produce the outcome (Bandura, 1977, Bandura, 2001). Previous studies using a social cognitive theory framework have demonstrated that contraceptive self-efficacy, a belief that one can and should control sexual and contraceptive-using behavior to prevent pregnancy, predicts contraceptive behavior for adolescent and college males and females (Levinson, Wan and Beamer, 1998). Women, including adolescent women, with lower levels of self-efficacy and self-esteem often have difficulty obtaining and using contraceptives effectively (Levinson, 1986, Sable, Libbus and Chiu, 2000, Morokoff et al, 1997). Attitudes, fears, and beliefs represent cognitive perceptions that are potentially modifiable, depending on the strategies used.

Qualitative research with sexually active adolescent women has suggested that relying on a trusted adult for support may be effective in improving contraceptive use self-efficacy and helping women overcome some of the barriers discussed above (Breheny and Stephens, 2004). Other studies have demonstrated that home visit interventions by nurses during pregnancy and following delivery can reduce subsequent pregnancies and increase the intervals between subsequent births (Kitzman et al, 1997, Olds et al, 2002, Olds et al, 2004, Olds et al, 2007). In addition, these home visit interventions can increase the length of relationships with current partners and reduce the use of welfare and food stamps (Olds et al, 2004, Olds et al, 2007). Finally, nurse home visit interventions can benefit individuals with many health and social problems such as adverse birth outcomes and psychosocial risks (McNaughton, 2004). For example, studies of nurse home visit interventions during pregnancy have demonstrated fewer instances of pregnancy-induced hypertension (Kitzman et al, 1997), decreased incidence of low birth weight (Norbeck, DeJoseph and Smith, 1996), and higher average birth weight (Fetrick, Christensen and Mitchell, 2003). An intensive nurse home visiting program during pregnancy through the first year postpartum resulted in fewer days of non-birth related hospitalizations and a higher incidence of adequate immunization in the infants followed (Koniak-Griffin et al, 2002). In another study, participants with more home-nursing contact were less likely to report ongoing illicit drug use (Black et al, 1994). Additional studies found an association between nurse home visit interventions and utilization of health care services (Braveman et al, 1996), including primary care (Black et al, 1994). Although many of the above studies revealed positive treatment effects, questions remain about what specific outcomes are

amenable to nurse home visit interventions and what the dose-related effects might be (McNaughton, 2004).

Our study was part of a randomized clinical trial that involved having community health nurses dispense hormonal contraceptives in the home. Participants were randomized to one of two groups: the intensive intervention group or the minimal intervention group. During home visits, a community health nurse (CHN) provided family planning counseling to both groups. The intensive intervention group also received hormonal contraception. The family planning counseling addressed participants' concerns and beliefs regarding their ability to obtain and use contraception.

We designed our intervention to improve the link between low-income women interested in delaying pregnancy and public health programs providing family planning services. The goal of this study was to assess the effect of a nurse home visit providing family planning counseling on a number of the psychological and social barriers preventing successful use of contraception. We hypothesized that family planning counseling delivered in the home by a community health nurse accompanied by the administration/dispensing of contraceptives would improve participant contraceptive use self-efficacy and reduce barriers women perceive when attempting to obtain family planning services compared to family planning counseling delivered in the home by a community health nurse without the benefit of administration/dispensing of contraceptives.

Methodology

The Study Sample

We conducted the Effectiveness of Nurse Home Contraceptive Dispensing Study (ENHCD) within an Oregon county containing rural, suburban and urban areas. The underlying county population was 91% white and 5% Hispanic. The Oregon Health and Science University and University of Oregon Institutional Review Boards approved the study. Women eligible to participate had to live in the county; speak English or Spanish; be willing to give informed consent; and to be at-risk for pregnancy, defined as not being pregnant at enrollment, being non-sterile and of reproductive age (15–44 years of age). In addition, they needed to have had sex in the past month or be planning on having sex in the next month with at least one fertile male partner and not consistently using any birth control. We defined inconsistent use of birth control as not having used contraception during every sexual encounter within three months before enrollment. To be eligible, participants also had to be interested in delaying pregnancy for at least twelve months by using a hormonal method of contraception (e.g., oral contraceptives, contraceptive injections [depomedroxyprogesterone] or contraceptive patches).

Project staff recruited women using multiple approaches, including self-referral and community outreach activities (Rdesinski, Melnick, Creach, Cozzens and Carney, 2008). Our recruitment strategy involved identifying public and private not for profit community agencies and programs that provided services to potential participants and that allowed project staff to speak directly with potential participants. Examples of public agencies and programs included the Women Infant and Children (WIC) program, the Oregon Health Plan, a Medicaid program providing health coverage to low-income families, local Oregon Department of Human Services offices and county-based public health clinics. Examples of private not-for-profit agencies included a program providing human services for Latinas as well as Healthy Start, a program providing social services for first time low income mothers. Project staff recruited participants from the WIC waiting room and through presentations at community play groups, food banks and classes at the Department of Human Services offices. Recruitment activities included briefly describing the study, sharing eligibility criteria with potential participants, and

obtaining a phone number for scheduling a home visit if the woman expressed interest in participating. In addition project staff placed flyers at local clinics, laundry mats, apartment complexes, bowling alleys, libraries, recreation centers and grocery stores. The flyers contained contact information for potential participants to self-refer to the study. County public health nurses also provided referrals.

Based on our recruitment strategy, 245 women expressed initial interest in participating. Project staff attempted to reach all of these women to schedule a home visit with the CHN, at which time the CHN obtained informed consent and enrolled the participant in the study. Of the 245 women with initial interest, 103 participants enrolled. Of the 142 who did not enroll, 56 (39.4%) did not meet eligibility criteria, 50 (35.2%) refused to participate, 11 (7.8%) had either an incorrect phone number or disconnected phone and 11 (7.8%) failed to respond after at least 7 attempts to contact. An additional 14 (9.9%) failed to enroll for unknown reasons. Of the 103 enrolled participants, 68 (66.0%) came from WIC, 18 (17.5%) came from referrals from community agencies/programs, and the rest came from sources such as county public health nurse referrals, community outreach (presentations) and word of mouth from other participants.

A CHN employed by the local health department visited all participants in their homes. At the beginning of the visit, the CHN explained all study activities and obtained voluntary informed consent. After providing consent, participants completed a baseline survey described below. Following completion of the survey, the CHN randomized participants to one of two interventions, either the intensive or minimal intervention, by having them blindly pull a color chip out of a bag containing an equal number of chips of each color.

The Study Interventions

The time necessary for the CHN to complete the two interventions, a mean of 130 minutes for the intensive intervention (SD = 24 minutes) and a mean of 100 minutes for the minimal intervention (SD = 34 minutes), included time to explain the study, obtain informed consent, complete the study instruments and provide counseling. The difference in counseling time (mean of 60 minutes in the intensive intervention group, SD = 19 minutes, mean of 36 minutes in the minimal intervention group, SD = 11 minutes) for the two groups was due to CHN time involved in dispensing the contraception, including indicated pregnancy testing and determination of any possible contraindications as per clinical protocol. After all participants completed the study instruments, the CHN counseled them about sexually transmitted disease and pregnancy prevention and gave them a supply of condoms and a resource card listing the phone numbers of the local health department and family planning clinics. Counseling addressed the following topics in detail:

- The reproductive cycle in women
- How contraception works
- Different forms of contraception, including behavioral methods, barrier methods and hormonal contraception
- Sexually transmitted disease and prevention

In addition, the CHN showed participants pictures of the female reproductive anatomy, including visual descriptions of ovulation. The CHN encouraged women to ask questions.

Participants who were randomly assigned to the intensive intervention group also received a three-month supply of hormonal contraception of their choice (oral contraceptives, a contraceptive injection [depomedroxyprogesterone] or contraceptive patches) at no cost and were advised to schedule a follow-up appointment at a clinic within three months for a full exam. Women assigned to the minimal intervention group did not receive contraception but

were advised by the CHN to use the resource card to schedule a family planning appointment at a public health department or family planning clinic.

Data Collection

The baseline survey, completed before randomization, was self-administered by participants. After the initial CHN home visit, research staff then contacted participants by phone once every two months, beginning two months after enrollment. The only information collected during these retention phone calls was participant contact information and any changes in the participant's alternate contact information (e.g., parent, friend or employer). If a participant attempted to initiate a discussion about her contraceptive method, pregnancy or STD prevention, research staff advised her to contact one of the clinic sites on her referral card. Participants unreachable by phone received a letter asking for updated contact information.

After 12 months, an un-blinded research assistant visited the participants' homes to collect follow-up data. Participants provided the data using a self-administered survey instrument.

The initial and twelve month instruments were written at a seventh-grade level.

Measures

The initial and twelve month surveys included questions about reproductive and other health-related information (ever had a pelvic exam with a pap test, past and current contraceptive use, ever discussed contraceptives with providers, number of pregnancies, live births and abortions, date of last birth, history of HIV testing, importance of avoiding becoming pregnant, having health insurance, and type of health insurance). Both surveys also collected information on health service access barriers and contraceptive use self-efficacy, described below. In addition, the baseline self-administered survey included questions about demographic characteristics (age, marital status, race/ethnicity, highest education level achieved and annual household income).

Using a 15-item scale we adapted from Sable, Libbus and Chiu (1997), we assessed perceived barriers to contraceptive access, such as availability (e.g., it takes too long to get an appointment to get birth control), accommodation (e.g., my clinic/doctor's office hours are not convenient) and acceptability (e.g., attitudes, such as talking about birth control makes me uncomfortable, going to get birth control is embarrassing). An earlier study, based on a factor analysis and regression analyses using each of these types of barriers as the dependent variable, revealed that these factors represent valid measures of concepts underlying perceived social barriers to health services access (Penchansky and Thomas, 1981). Respondents were asked how much they agreed or disagreed with each of the 15 statements about their ability to get birth control now. The items were rated on a 5-point Likert scale (1 = strongly disagree to 5=strongly agree).

Contraceptive self-efficacy was assessed with 8 items adapted from a previous survey (Soler et al, 2000) that measured confidence in one's knowledge and abilities to use contraceptives, including condoms. The items were rated on a 5-point Likert scale (1=not at all confident to 5=extremely confident).

To evaluate whether the two scales (barriers to contraceptive access and self-efficacy) included more than one dimension in our study population, we conducted principal components exploratory factor analyses with varimax rotation on the two sets of items. We retained factors with eigenvalues greater than 1.0. Each factor included items loading at 0.50 or above on that factor. We dropped all items receiving a factor loading of less than 0.50 from further analysis. In addition, we eliminated items with loadings of 0.50 or greater on more than one factor to distill the list. Factors were deemed reliable if they met the minimum standard of reliability of > 0.60 (Nunnally and Bernstein, 1994).

For the barriers to contraceptive access scale, the factor analysis of ratings on the 15 items produced four factors that were rotated to terminal solution. These factors explained 59.6% of the variance in the ratings. A Cronbach's alpha was calculated to assess the internal consistency reliability for each of the factors. Factor 1, which accounted for 33.0% of the variance, we labeled *Time Limitations*. This factor contained three items that described difficulties finding the time to access contraception, Cronbach's alpha = 0.79. Factor 2, *Discomfort/Embarrassment*, accounted for 9.8% of the variance. The three items that loaded on this factor focus on being uncomfortable and/or embarrassed when seeing health care providers for birth control services, Cronbach's alpha = 0.74. Factor 3, *Inconvenience*, accounted for 9.4% of the variance and contained four items that focus on factors that make it inconvenient to get to a clinic or a doctor's office to obtain contraception, Cronbach's alpha = 0.60. Factor 4, labeled *Cost*, accounted for 7.4% of the variance and contained three items that reflect the expense of getting contraceptive methods, especially needing an appointment with a health care provider and having a pelvic exam, Cronbach's alpha = 0.64. The specific items used in the four subscales are presented in Table 1.

For the self-efficacy scale, factor analysis of ratings produced two factors that were rotated to terminal solution. These two factors explained 56.3% of the variance in the ratings. Cronbach's alpha was calculated to assess the internal consistency reliability for the factors. Factor 1, which accounted for 39.8% of the variance, we labeled *Assertiveness*. This factor contained four items that describe confidence in the ability to assert oneself to avoid unprotected sexual intercourse and ensure condom use, Cronbach's alpha = 0.79. Factor 2, *Pregnancy Prevention*, accounted for 16.5% of the variance. The two items that loaded on this factor concerned confidence in postponing and preventing unplanned pregnancies, Cronbach's alpha = 0.75. The specific items used in the two subscales are presented in Table 1. Subscale scores were calculated as the average of scores on the individual items that load on that factor, with higher scores indicating higher ratings for barriers and self-efficacy on that factor.

Data Analysis

This analysis focused on the impact of receiving a community health nurse home visit involving family planning counseling, with or without receipt of contraception, on two study measures, perceived barriers to contraceptive access and contraceptive use self-efficacy. Characteristics of participants by study group were analyzed categorically using Chi-square. For the measures, comparisons were made between the intensive intervention and minimal intervention groups pre- and post-test, as well as comparisons between pre and post test responses for the groups separately and combined. In addition, we performed a linear regression to compare the two groups at post test while controlling for baseline group differences on demographic, barrier and self-efficacy measures. We additionally explored pre test/post test differences for three subgroups that might potentially respond differently to the intervention: adolescent participants (those 20 years and younger), women without health insurance and women who have not completed high school. Mean scores within study groups and for both groups were compared using paired t-test and mean scores between groups were compared using the independent sample t-test. Alpha levels were set at 0.05 to assess for statistical significance and all tests were two-tailed. Statistical analyses were performed with SPSS version 15.0 for Windows.

Results

Forty-eight participants were randomized to the intensive intervention group and 55 were randomized to the minimal intervention group. The mean age of participants was 24.7 years (17–40 years), with the majority of participants (84.5%) under age 30 (Table 2). Over half of study participants were never married or divorced. More than 75% had household incomes under \$25,000, more than 50% had a high school education or less, and nearly 20% had three

or more live births. There were no statistical differences in participant characteristics between the intensive intervention and minimal intervention groups, including their perceived importance of becoming pregnant now or ever having visited a health care provider for birth control information or services (Table 2). At baseline, 60.4% of participants in the intensive intervention group and 61.8% of participants in the minimal intervention group were using one or more methods to prevent pregnancy, although they reported not using these methods consistently (defined as having unprotected sex at least once during the 3 months up to enrollment). Methods included oral contraceptives (8/103 = 7.8%), depot medroxyprogesterone injections (5/103 = 4.9%), condoms (47/103 = 45.6%), spermicide (1/103 = 1.0%), withdrawal (22/103 = 21.4%), rhythm (4/103 = 3.9%) and abstinence (8/103 = 7.8%). There were no significant differences between the two study groups in the number or types of methods used. At baseline, compared to the minimal intervention group, the intensive intervention group had a significantly higher score in one barrier measure, discomfort/embarrassment (2.33 vs. 1.97) and a significantly lower score in one self-efficacy measure, pregnancy prevention (3.34 vs. 3.78) (Table 3). There were no significant differences between the two groups in any of the other barrier and self-efficacy measures at baseline.

Only 10 participants were lost to follow-up, resulting in a retention rate of 90.3%. Of the women lost to follow-up, six were from the intensive intervention group and four were from the minimal intervention group. Twelve months following the intervention, there were no significant differences between the two intervention groups on any of the measures (Table 3). This finding persisted when we controlled for baseline differences in demographic, barrier and self-efficacy measures between the two groups.

However, the analysis comparing the changes in subscale scores from baseline to twelve months post intervention for the study groups analyzed separately revealed some differences (Table 4). Compared to baseline, the intensive intervention group had significant decreases in three of the four barrier factors, time limitations (2.84 vs. 2.22, $p = 0.001$), inconvenience (2.57 vs. 2.24, $p = 0.02$) and cost (3.15 vs. 2.50, $p = 0.001$). The minimal intervention group experienced significant decreases in only one of the four barriers, inconvenience (2.46 vs. 2.17, $p = 0.04$). Neither group had a significant decrease in subscale scores for discomfort/embarrassment. Each group individually experienced significant increases in both self-efficacy factors at twelve months compared to baseline. When both groups were combined, significant decreases were found in three of the four barrier factor subscales, time limitations (2.74 vs. 2.31, $p < 0.001$), inconvenience (2.51 vs. 2.20, $p = 0.002$) and cost (2.97 vs. 2.59, $p = 0.002$); and significant increases were found in both self-efficacy factor subscales, assertiveness (3.28 vs. 3.83, $p < 0.001$) and pregnancy prevention (3.62 vs. 4.13, $p < 0.001$).

To understand more fully the differential responses to the intervention for certain subgroups of women, we examined pre-post intervention changes specifically for adolescents, women without health insurance and women who had not completed high school. Among adolescents (age 20 or younger, $n = 22$) only, we found no significant changes from pre to post test in any of the measures. However, decreases in the time limitations subscale and increases in the two self-efficacy subscales approached significance. Women with no health insurance ($n = 47$) were not significantly different from the group as a whole in that they also reported reductions in the time, inconvenience and cost barriers and increases in the two self-efficacy subscales. Interestingly, the subgroup of women without health insurance did have a reduction in the embarrassment barrier (2.33 vs. 2.04) which was not seen in the whole group. When we examined the subgroup of women who had not completed high school, we found that, like the sample as a whole, they reported increases in the self-efficacy measures of assertiveness (3.32 vs. 3.85; $p < 0.01$; $N = 41$) and pregnancy prevention (3.67 vs. 4.24; $p < 0.001$, $N = 42$). However, we found no significant decreases in barriers for this subgroup.

Following the nurse visit, there was no significant difference between the two intervention groups in the proportion of women who reported seeing a provider for more birth control (27/41 [65.9%] in the intensive intervention group and 28/49 [57.1%] in the minimal intervention group). Also, following the intervention, there were no significant differences in the number or types of contraceptive methods used with the exception of withdrawal: 1/48 (2.1%) of participants in the intensive intervention group reported using withdrawal compared to 9/46 (20.0%) in the minimal intervention group ($p=0.018$).

Discussion

Our study was part of a randomized clinical trial evaluating the effectiveness of a home-based nurse-delivered intervention providing family planning counseling and hormonal contraception to a population at risk for unintended pregnancy. We succeeded in reaching a population at high socio-economic risk: more than 75% had household incomes under 25,000, more than half had a high school education or less, more than half were never married or divorced, and nearly 20% had three or more births. All were interested in preventing pregnancy for at least one year. We were particularly interested in the effect of the nurse home visit including family planning counseling combined with contraceptive dispensing on reducing the psychological and social barriers preventing successful use of contraception.

Given the previous qualitative research (Breheny and Stephens, 2004) demonstrating that trusted adult relationships could improve confidence in obtaining and using contraceptives and that nurse home visits could reduce health risks, we hypothesized that the nurse home visit might improve participants' self-efficacy and reduce psychological and social barriers to contraceptive access. Although our study did not include a comparison group receiving care in a clinic-based setting, our results demonstrated that both intervention groups receiving nurse home visits improved their self-efficacy in using contraception. In addition, women in both groups reported a decrease in three social barriers to contraceptive access - time limitations, inconvenience/competing demands, and cost. When analyzed separately, we found the reduction in time limitations and cost was statistically significant for the intensive intervention group only. Although the small sample size might contribute to this association, it is possible that the actual receipt of contraceptives in the home visit resulted in more favorable perceptions of contraceptive cost and the time necessary to obtain contraceptives. Future studies using larger enrollment numbers could address this possibility.

On the other hand, our results demonstrated that the both intervention groups combined did not perceive reduced barriers related to being uncomfortable and/or embarrassed when seeing providers for birth control. One possible reason for this finding is that participants received only one nurse home visit, and the counseling provided in the visit did not address intrapersonal factors, such as embarrassment or discomfort with sexuality issues related to birth control use. Instead, the home visit family planning counseling received by both groups addressed external, structural/institutional barriers to access such as cost and transportation. This is consistent with a recent study whose participants were mostly white women with a high socioeconomic status who used the Internet rather than traditional health care settings when seeking emergency contraception. Although these women experienced structural barriers in obtaining emergency contraception, they also reported negative interactions with providers and fear of stigmatization as reasons to avoid interactions with health care workers (Wu et al, 2007). Future studies should address how the nursing intervention could address these intrapersonal factors.

Despite the small sample size and other study limitations described below, we found it noteworthy that participants' scores increased in the two contraceptive use self-efficacy measures and decreased in at least three of the social barriers whether or not they had health insurance. Given that affordability is only one of the components to health care access, we are

optimistic that the nurse home visit intervention could increase contraceptive use regardless of health care coverage. Likewise, given our findings that self-efficacy factors improved in participants without a high school education and that these improvements approached significance for adolescents, we believe that nurse home visits might be found to be an effective intervention in increasing contraceptive use by adolescents and women regardless of educational level. It is unclear whether the lack of significant differences was, in some cases, due to limited statistical power because of the small sample sizes. Future studies with larger numbers should help address these findings.

Our study has several limitations that should be considered when interpreting these results. Given the lack of a comparison group, it is impossible to determine whether unidentified factors were responsible for pre- and post-intervention differences in self-efficacy and perceived social barriers to contraceptive use, especially since participants received only one nurse home visit. For example, all participants were aware that they were participating in a study addressing contraceptive access. Knowing they were involved in the study may have led some participants to report greater contraceptive use self-efficacy and diminished perceived barriers to access. To determine whether the counseling intervention itself were responsible for these findings, an adequate randomized study design would require three groups, counseling only, counseling plus contraception and contraception dispensing alone. However, dispensing contraceptives without family planning counseling would probably not be acceptable for most public health agencies. To determine whether the nurse visit itself was responsible for the pre and post intervention differences and not a maturation effect, an adequate design would require a usual care group of women receiving care in family planning clinics.

Another limitation, our small enrollment numbers, made it impossible to determine whether the intervention had an effect on contraceptive use or the likelihood of becoming pregnant. Given that Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) data in 2002 revealed that nearly 40% of Oregon pregnancies are unintended (Oregon Department of Human Services, 2007), and given that each year there are approximately 4000 births each year in Clackamas County, our sample was a relatively small proportion of women at risk for unintended pregnancy.

An additional limitation is potential selection bias. Because we could not obtain personal information on participants until they consented to participate in the study, we have no information on those who refused to participate, nor do we have information on potential participants who were difficult to reach. It is possible that those who chose to participate might have been more likely to show reductions in social barriers and improvement in contraceptive use self-efficacy over time regardless of the intervention. In addition, the research assistants who obtained the twelve month survey results were not blinded to group assignment. However, the impact of this limitation might be mitigated by using the self-administered survey to collect outcome data from participants.

To our knowledge, our study was the first to evaluate the effect of family planning counseling provided during a nurse home visit on factors that might mediate contraceptive use, specifically social barriers to contraceptive access and contraceptive use self-efficacy. Given the human and financial costs associated with more intensive home visitation programs, if a single, standard home visit from a public health nurse can significantly reduce social barriers to contraceptive use while improving self-efficacy regarding contraceptive use, and these improvements translate into improved contraceptive use and a reduction in unintended childbearing, the results could have important implications for public health. The local public health infrastructure already exists for nurse home visit services, such as case management for families with infants at risk for medical and social problems (Sable, Libbus and Chiu, 1997). Local health departments receiving Title X funding already have protocols for family planning

counseling and could make this service part of the nurse home visit. Our family planning counseling intervention alone added a mean of 36 minutes to the home nurse visit (visits involving contraceptive dispensing took an additional 24 minutes). Counseling provided over several visits would add only 5–10 minutes to each visit. Adoption of this practice by local health departments could decrease social barriers to contraceptive access and increase client self-efficacy regarding contraceptive use, which in turn could reduce unintended pregnancies and ultimately improve birth outcomes, especially for low income and minority women (Brown and Eisenberg, 1995, Sable, Libbus and Chiu, 1997, Silverman, Torres and Forrest, 1987, Mitchell and McCormack, 1997). Future studies involving larger numbers of participants could address the effects of the intervention on contraceptive use and unintended pregnancy outcomes. In addition, a randomized study comparing outcomes for family planning counseling provided by nurses on home visits or in family planning clinics would help differentiate the impact of the home visit and clinic settings on the relationship between nurse encounters and self-efficacy and social barriers to contraceptive access.

Acknowledgements

This research was supported by the National Institute of Child Health & Human Development (R01-HD042423-03) and the Family Medicine Research Program at the Oregon Health and Science University

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Table 1
Items Loading on Barrier and Self-efficacy Factors

Barrier Factors	Items	Cronbach's α
Time Limitations	<ul style="list-style-type: none"> It takes too long to get an appointment to get birth control. There is too much waiting time at my clinic/doctor's office I don't have anyone to watch my kids so I can go to my clinic/doctor's office. 	0.79
Discomfort/Embarrassment	<ul style="list-style-type: none"> Going to get birth control is embarrassing. Health care providers ask me questions that make me uncomfortable. Getting birth control pills or a shot is hard because you have to go back to the clinic/doctor's office. 	0.74
Inconvenience	<ul style="list-style-type: none"> My clinic/doctor's office hours are convenient for me (reverse scored). I have transportation problems getting to my clinic/doctor's office. It is hard for me to get time off work/school to go to my doctor's office. My clinic/doctor's office is easy to get to (reverse scored). 	0.60
Cost	<ul style="list-style-type: none"> I don't use birth control because it costs too much. I would be more likely use birth control pills if I could buy them over the counter (without having to get them with a prescription or from a clinic). If I didn't have to get a female/pelvic exam, I would be more likely to get birth control pills/shot. 	0.64
Self-efficacy Factors		
Assertiveness	<ul style="list-style-type: none"> How confident are you: That you could stop intercourse if you or your partner weren't using birth control? That you could always have condoms handy in case you needed one? That you could use condoms <u>every time</u> you have sex? That you could refuse to have sexual intercourse if your partner won't use a condom? 	0.79
Pregnancy Prevention	<ul style="list-style-type: none"> How confident are you In your <u>knowledge</u> about the various ways to prevent or postpone pregnancy? In your <u>ability</u> to protect yourself against unwanted pregnancy? 	0.75

Table 2
Demographic and Risk Characteristics of Participants (n=103)

Characteristics	Intensive intervention Group	Minimal intervention Group	p-value
Age category	(n1=48)	(n2=55)	0.86
≥15 – 20	20.8%	21.8%	
21 – 24	35.4%	32.7%	
25 – 29	27.1%	30.9%	
30 – 34	6.3%	9.1%	
35 – 39	8.3%	5.5%	
40 – 44	2.1%	0.0%	
Marital status			0.63
Never married	39.6%	49.1%	
Married	52.1%	43.6%	
Divorced/Widowed	8.3%	7.3%	
Race/Ethnicity			0.32
White	66.0%	80.0%	
Hispanic or Latino *	25.5%	12.7%	
American Indian/Alaskan Native **	4.3%	5.5%	
Black	4.3%	1.8%	
Education status			0.83
< High School	25.5%	25.9%	
High School Grad	29.8%	33.3%	
Some College	40.4%	33.3%	
College Graduate	4.3%	7.4%	
Number of live births			0.64
0	4.2%	10.9%	
1	43.8%	40.0%	
2	33.3%	32.7%	
3 or more	18.8%	16.4%	
Time since last live birth			0.326
0–6 months	14 (32.6%)	15 (30.6%)	
>6 – 12 months	6 (14.0%)	14 (28.6%)	
>12 – 24 months	9 (20.9%)	6 (12.2%)	
> 24 months	14 (32.6%)	14 (28.6%)	

Characteristics	Intensive intervention Group	Minimal intervention Group	p-value
Importance of preventing pregnancy now			0.66
Not at all or a little important	4.2%	1.8%	
Moderately important	8.3%	3.6%	
Very important	29.2%	32.7%	
Extremely important	58.3%	61.8%	
Ever seen a health care provider for birth control information or services	85.4%	92.6%	0.24
Currently using birth control to prevent pregnancy or STDs	60.4%	61.8%	0.88
Ever had a pelvic exam that included a pap smear	97.9%	96.3%	0.64
Yearly Income			
\$0 – \$5,000	22.7%	34.5%	0.61
\$5,001 – \$10,000	18.2%	12.7%	
\$10,001 – \$25,000	36.4%	32.7%	
\$25,001 – \$50,000	22.7%	20.0%	
Health Insurance	56.3%	52.7%	0.72
Of those with Health Insurance - Type			
Medicaid/OHP	55.6%	64.3%	0.324
Private Insurance	37.0%	35.7%	
Don't know	7.4%	0.0%	

* Nine of the Hispanic participants considered themselves White as well.

** One of the AI/AN participants considered herself Hispanic, two of the AI/AN participants considered themselves Hispanic and White, and two of the AI/AN participants considered themselves White, though not of Hispanic origin.

Table 3
Barriers and Self-Efficacy Scores, Intensive Intervention Group and Minimal Intervention Group, Pre- and Post Intervention.

	Pre Intervention						12 Months Post Intervention							
	Intensive Intervention Group n1=48 [§]			Minimal Intervention Group n2=55 [§]			p-value	Intensive Intervention Group n1=48			Minimal Intervention Group n2=55			p-value
	Responded	Mean (SE)		Responded	Mean (SE)			Responded	Mean (SE)		Responded	Mean (SE)		
Barrier Factors[*]														
Time Limitations	46	2.72 (0.17)		49	2.65 (0.16)		0.76	40	2.19 (0.13)		50	2.37 (0.15)		0.36
Discomfort/Embarrassment	44	2.33 (0.12)		54	1.97 (0.11)		0.03	40	2.15 (0.13)		50	2.01 (0.10)		0.40
Inconvenience	46	2.57 (0.12)		54	2.45 (0.11)		0.48	38	2.22 (0.12)		51	2.17 (0.11)		0.75
Cost	45	2.99 (0.17)		54	2.85 (0.13)		0.49	38	2.47 (0.15)		50	2.68 (0.14)		0.33
Self-Efficacy Factors[†]														
Assertiveness	46	3.09 (0.15)		52	3.46 (0.15)		0.10	41	3.63 (0.19)		50	3.99 (0.11)		0.12
Pregnancy Prevention	47	3.34 (0.15)		53	3.78 (0.12)		0.02	41	3.98 (0.15)		51	4.25 (0.09)		0.10

* Higher scores indicate greater perceived barriers.

and individual items were scored on a 5-point Likert scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly agree and averaged so that all scale scores could range between 1 and 5. Scale scores were calculated as the average of scores on the individual items that load on that factor.

Higher scores indicate greater self-efficacy

Individual items were scored on a 5-point Likert Scale with 1=Not at all confident, 2=A little confident, 3=Moderately confident, 4=Very confident, and 5=Extremely confident. Subscale scores were calculated as the average of scores on the individual items that load on that factor.

Because some participants did not answer corresponding questions on both self-administered surveys, the total number responding was less than the total number of participants.