Over-the-Counter Access, Changing WHO Guidelines, and the Prevalence of Contraindicated Oral Contraceptive Use in Mexico

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Abstract

This paper examines the prevalence of contraindications to use of oral contraceptives (OC) in Mexico by sociodemographic characteristics and whether or not this method was obtained over-the-counter. Using data on smoking behavior and blood pressure measurements from the 2000 Mexican National Health Survey, we find that, using World Health Organization (WHO) 1996 medical eligibility guidelines, the prevalence of contraindications is low and screening against inappropriate OC use is taking place at both clinics and pharmacies. However, in 2000, WHO substantially revised its criteria regarding the level of hypertension that would constitute a contraindication for OC-use. Using the new guidelines, we find that 10% of pill users under 35 and 33% age 35 and over have health conditions that are either relative or absolute (Category 3 or 4) contraindications. We close by discussing the relevance of our findings to the larger debate over screening and over-the-counter access to oral contraceptives.

Since their introduction in the 1960s, oral contraceptives (OCs) have become a safe, effective and popular form of contraceptive around the world (Grimes 1992). In the U.S. and many other countries, women must obtain a prescription from a clinician before being able to obtain the pill. In addition to screening for medical appropriateness for OC use, women are often required to undergo other examinations, such as Pap smears and breast and pelvic exams, prior to receiving the pill, despite the fact that the conditions they screen for are largely unrelated to contraceptive use (Stewart et al. 2001). Women are then required to repeat the process each year to renew their prescription. In many less developed countries, however, pills are distributed through community-based distribution (CBD) programs or pharmacies without screening or the additional examinations (Bailey et al. 1982, Zavala et al. 1987).

Whether over-the-counter (OTC) or CBD access to OCs results in substantial numbers of medically-contraindicated women using this method of contraception (FDA 2000), and whether screening for such contraindications is effective and worthwhile are old questions that have generated considerable debate over the last four decades (Huber and Huber 1975, Isaacs 1975, Atkinson et al. 1974, Rosenfield 1971, Rosenfield and Limcharoen 1972, Anonymous 1975). Rosenfield (1971) was one of the first to recognize the impracticality of requiring a medical prescription in rural areas with exceptionally low physician to population ratios and given the relative risk of maternal morbidity to the risk of OC use in developing countries. With his counsel, in 1969 the Thai government began a pilot program allowing auxiliary midwives to prescribe oral contraceptives (Rosenfield and Limcharoen 1972), which, in turn, led to universal

prescriptive rights for midwives using a simple checklist (Rosenfield 1971). Experimental distribution channels were tested throughout Latin America in the 1970s. However, early programs focused on access and did not screen women for appropriate use. For example, early initiatives in Brazil, Colombia and Honduras introduced CBD programs that did not screen women for contraindications but rather referred those experiencing side effects to nearby clinics (Isaacs 1975).

One of the few studies to examine how well women self-screen for contraindications to OC use was conducted in Mexico, where pills are essentially available over-the-counter (Zavala et al. 1987). Nurses interviewed and checked the blood pressure of OC users obtaining their pills through a CBD network and those obtaining their pills from other sources, including pharmacies (either with or without a previous doctor's consultation). The nurses found that most OC users, regardless of whether they had previously consulted a physician, were knowledgeable about their health status. Women obtaining their OCs from the different sources had similar health profiles and prevalence of risk factors, suggesting that women who had been screened by doctors were not significantly better off. Even among those who reported having been examined by a doctor, 20% said they did not have their blood pressure taken, and over half were not questioned about chest pains, leg pains, liver problems or smoking. Another recent study from Mexico also documented the poor quality of clinician screening prior to OC use (Tatum et al. 2005).

We are motivated to return to these questions for two reasons. First, several recent studies have brought into question the effectiveness of the screening procedures now in place (Tatum et al. 2005, Becker et al. 2004), and second, the medical consensus

regarding who is contraindicated has recently become more stringent. In 2000, on the basis of new evidence concerning the risk for cardiovascular events among OC users with high blood pressure, the World Health Organization (WHO) substantially revised its criteria regarding the level of hypertension that would determine both a relative and an absolute contraindication for OC use (Family and Reproductive Health Programme 2000). Both developments raise the specter that there may be a substantial number of women using the pill who would be better off using another type of contraceptive.

In this report, we examine oral contraceptive use in Mexico, a country where the pill is available OTC in pharmacies and is also supplied through a wide variety of other outlets, with varying degrees of medical supervision. We assess the prevalence of contraindications according to both the new and old criteria, and see how the prevalence of the main contraindications, hypertension and smoking, vary among OC users according to where women obtain their contraception, as well as in the general population. Our data come from the 2000 Mexican National Health Survey (ENSA), a large nationally representative survey that collected data on blood pressure, smoking, and contraceptive use from women over 20 years of age. In examining the relationship between provider and the prevalence of contraindications, we adjust for several indicators of socioeconomic status (SES). We also show how the changes made to the WHO's medical eligibility guidelines between 1996 and 2000 affect the prevalence of contraindications among OC users, and assess the magnitude of the problem that contraindications now represent in this setting.

Data

The 2000 Mexican National Health Survey is a nationally representative survey designed to estimate the frequency and distribution of health indicators, risk factors and illness in Mexico. It was further intended to aid in evaluating the healthcare system and to illuminate associations between health and socioeconomic status.

From September 1999 to March 2000, a door-to-door 4-stage probability proportionate to size sample of households was conducted. The population was stratified by urban-rural residence to ensure a sampling proportion that accurately reflected the population-at-large. Fourteen municipalities from each state were selected using probability proportionate to size according to the number of households in each municipality. Five AGEBs (census tracts), three blocks from each AGEB and seven households from each block were randomly selected according to size to create the final household sample (Valdespino et al. 2003).

ENSA consisted of five questionnaires. The first questionnaire was asked to the head of the household and covered the physical characteristics of the house and socioeconomic and general health questions about each member of the household. The second questionnaire was completed for every member of the household who had used health services in the past year. The final three questionnaires were completed for a randomly-selected 0-9 year old, 10-19 year old and adult 20 years and older in each household. The adult questionnaire covered risk factors and illness in addition to collecting various biomarkers including two blood pressure readings (Valdespino et al. 2003).

The data set is particularly well-suited for the current study because of the combination of contraceptive use data, self-reported risk factors and a blood pressure maeasurement in a nationwide random sample. Because women less than 20 years of age did not have their blood pressure taken and women over 49 are unlikely to be at risk of pregnancy, this analysis is restricted to women interviewed between the ages of 20 and 49. Additionally, pregnant women were excluded from our general population sample because pregnancy affects blood pressure and (ideally) smoking behavior, our two dependent variables of interest.

Measures

Contraceptive use: In order to assess contraceptive use and method source, respondents were asked the following questions: "What are you or your partner doing to not get pregnant?" (¿Qué están hacienda usted o su pareja para no tener hijos?), "Where did you obtain _____?" (¿Dónde consiguió (le pusieron o la operaron) _____?) The
method método

major sources of OC provision in Mexico include public institutions such as the Mexican Institute of Social Security and the Ministry of Health, non-profit clinics, private physician offices, and pharmacies. For this analysis, all public and private clinics are grouped together because they all theoretically provide some sort of physical examination and screening before providing oral contraceptives. It is important to note, however, that women obtaining their pills at a specific source did not necessarily first get their pills at that source. Using another national survey, the 2003 Mexican National Survey of Reproductive Health, we found in preliminary analyses that while 95% of women who

get their pills at public clinics initiated use there as well, 50% of pharmacy users initiated use with a private doctor or non-profit clinic.

Contraindications: In 1996, the World Health Organization developed a uniform set of medical eligibility criteria for contraceptive use. Its objectives were to create an evidence-based guide for program directors and clinicians worldwide in the provision of contraceptives, highlight risks associated with certain medical conditions and lower barriers to contraceptive use based on unproven theory or outdated medical information (WHO 1996). These guidelines were updated in 2000 to reflect new evidence. In particular, the hypertension guideline for combined oral contraceptive (COC)[i] use was tightened based on new evidence.

The WHO classifies contraindications to contraceptive use using four categories:

(1) Can use the method. No restriction on use.

(2) Can use the method. Advantages generally outweigh theoretical or proven risks.

(3) Should not use the method unless a doctor or nurse makes a clinical judgment that the client can safely use it. Theoretical or proven risks usually outweigh the advantages of the method. Method of last choice, for which regular monitoring will be needed.

(4) Should not use the method. Condition represents an unacceptable health risk if method is used.

According to the 2000 WHO guidelines, the following medical conditions are classified as Category 3 or Category 4 risks for low-dose combined oral contraceptive (COC)[1] use: smoking by women aged 35 and over, elevated blood pressure, past hypertension where blood pressure cannot be evaluated, adequately controlled hypertension where blood pressure can be monitored, breastfeeding less than 6 months post-partum, current or past breast cancer, diabetes with vascular disease or diabetes for more than 20 years, current or past thromboembolic disorder, current or past ischemic heart disease, valvular heart disease with complications, major surgery with prolonged immobilization or surgery on legs, past stroke, migraine headaches for women aged 35 or over or migraines with focal neurological symptoms for women of any age, and active liver disease (WHO 2004).

Our analysis focuses on the most common category 3 and 4 contraindications and those for which data are available in the ENSA questionnaire: hypertension and smoking.

Table 1 about here

Hypertension: The original 1996 WHO guidelines classified systolic blood pressure of 140-159 mmHg or diastolic blood pressure of 90-99 mmHg as Category 2 if monitored and Category 3 if unmonitored. Systolic levels of 160-179 mmHg or diastolic levels of 100-109 mmHg were classified as Category 3 if monitored and Category 4 if unmonitored. Systolic levels greater than or equal to 180 or diastolic levels greater than or equal to 110 were classified as Category 4 restrictions (Church 2005).

In 2000, the WHO further restricted use of combined oral contraceptives in the presence of elevated blood pressure. It categorized systolic blood pressure of 140-159 mmHg or diastolic blood pressure of 90-99 mmHg as Category 3 restrictions. Systolic blood pressure greater than or equal to 160 mmHg or diastolic blood pressure greater than or equal to 100 mmHg became Category 4 restrictions (WHO 2004).

The data used in this study were collected in 2000. Consequently, clinicians or healthcare workers who potentially screened women in the sample for the appropriateness of COC-use could only be expected to use the 1996 guidelines as the newer guidelines had not been published at the time of data collection. Thus, we could reasonably expect women with blood pressure ≥160 mmHg (systolic) or ≥100 mmHg (diastolic) to be screened and restricted from use except in exceptional circumstances where use could be closely monitored and no other contraceptive would be appropriate.

In ENSA, two blood pressure readings were taken by trained interviewers using a manual sphygmomanometer. The first reading was taken after a 5 minute rest and the second reading at least 5 minutes later (Valdespino et al. 2003). The mean systolic and mean diastolic measurements were calculated and used for determining contraindication status[2]. Women were considered to have 2000 Category 4 hypertension if their mean systolic level was ≥160 mmHg or if their diastolic level was ≥100 mmHg. Since this is the same category as the 1996 Category 3 restriction, we could expect these women, in most circumstances, to be screened against COC use. Women were considered to have 2000 Category 3 hypertension if their mean systolic level was ≥140 mmHg or if their diastolic level was ≥90 mmHg.

Smoking: The 1996 and 2000 WHO guidelines for smoking and COC use are similar. Women who smoke and are aged 35 and older are restricted (Category 3) from using COCs. Women who smoke ≥15 cigarettes a day (20 cigarettes in 1996) are unconditionally restricted (Category 4) from using COCs (Family and Reproductive Health Programme 2000).

ENSA respondents were asked a series of questions about their smoking practices. Questions relevant to this study include "Do you smoke?" (¿Actualmente fuma?), "How often do you smoke?" (¿Con que frecuencia fuma?) and "On the days that you smoke, how many cigarettes do you smoke?" (Los días que fuma ¿Cuántos cigarillos consume?). Women aged 35 and older are considered "heavy smokers" (Category 4) if they currently smoke, smoke daily and smoke ≥15 cigarettes a day or if they currently smoke and when they do smoke smoke ≥20 cigarettes a day. Women aged 35 and older are classified as "smokers" (Category 3) if they currently smoke daily or if they currently smoke more than 3 cigarettes a day when they smoke.

Socioeconomic variables: Other variables controlled for in the multivariate regression include age, education, urban residence (living in a town of greater than 15,000 people), speaks indigenous language, and household owns a telephone, a good marker of economic status in Mexico.

Analyses

In the first section of the paper, we use bivariate analyses to explore differences in sociodemographic characteristics and contraindications by provider. Multivariate regressions are then used to refine the relationship between OC provider and contraindications adjusting for differences in sociodemographic characteristics. The first analysis aims to provide an estimate of the prevalence of contraindications for pill use in this population classified according to their current source of contraception, as well as a comparison of the prevalence of these same conditions among women who were using other methods or no method at all. The second analysis provides estimates of the prevalence of contraindications adjusting for not only pill use by source, but age and socioeconomic characteristics to permit a more refined indication of the amount of screening, either by clinicians or the users themselves, that is taking place, as well as insight into how hypertension and smoking vary according to basic social and demographic groups in this highly unequal society.

All analyses were performed using Stata 8.2 (Stata Corporation, College Station, Texas, USA) and account for the sampling methods employed in ENSA.

Results

Six percent (1,246) of the 21,080 non-pregnant women aged 20 to 49 in the ENSA sample responded that they were currently using oral contraceptives for birth control. Forty percent (501) of these women obtain their pills from pharmacies while 56% (694) obtain their pills from a health clinic of some sort. Four percent (51) of pill users are excluded from the analyses because their provider is unknown.

Table 2 about here

Table 3 presents the characteristics of women surveyed divided into three categories: OC users who obtain their pills at pharmacies, OC users who obtain their pills from clinics and the non-OC-using, non-pregnant female population. There are important compositional differences among the groups. Not only are women who use pills different from non-users, but importantly women who get their pills at pharmacies are markedly different from women who get them at clinics. Women who use oral contraceptives from pharmacies are more educated, more urban, more likely to be single, less likely to be indigenous and of a higher socioeconomic status than women who get their oral contraceptives from clinics.

Table 3 about here

Prevalence of contraindications to OC-use

Table 4 presents the prevalence of specific contraindications to COC use under various medical guidelines. The variable "contraindicated" refers to women who would be contraindicated to OC use based on their blood pressure or smoking behavior. The first segment refers to women who at the time of the survey, using the criteria that were relevant at that time, would be categorized as at least Category 3 contraindicated. In other words, these are women who should have been screened for pill use and given alternative contraception except for in extreme circumstances where regular monitoring

would be possible. The Category 3 designation refers to women who *at least* meet the Category 3 restrictions but may also meet the higher Category 4 absolute prohibition against COC use.

The second and third segments of Table 4 refer to women who would be considered relatively and absolutely contraindicated to COC use respectively under the new WHO criteria.

Despite the potential for professional screening in clinics, there are no significant differences in contraindications at any level between clinic and pharmacy pill users. There are, however, differences between pill users and non-users. Three findings stand out here. First, looking at the guidelines for which providers could have been expected to screen at the time of the survey, there are low levels of contraindications in both pharmacy and clinic pill users, particularly under age 35 where only 1% of pill users have a relative contraindication to use.

Second, there is a reduced prevalence of hypertension (160/100 mmHg) in oral contraceptive users as compared to non-users (though this is significant only at the $p<0.10$ level for pharmacy users). Most of these differences are driven by differences in hypertension among women over age 35.

Third, under the new medical eligibility guidelines, there is a marked increase in the prevalence of contraindications. One-sixth of all pill users and one-third of older pill users would be cautioned against pill use by the WHO in a setting where access to clinical judgment was limited. Few pill users meet the 2000 Category 4 criteria for absolute prohibition of OC use; nonetheless, for 2% of women and 4% of women aged 35 and older using the pill, the method represents an unacceptable health risk.

Table 4 about here

Predictors of contraindications

The differences in socioeconomic characteristics and age profile seen in Table 3 can be expected to influence the levels of contraindications seen in Table 4. Moreover, one might expect that the association between these characteristics and contraindications varies across contraindications. For example, high blood pressure is usually negatively associated with education (Dyer et al. 1976, Liu et al. 1982, Stamler et al. 1991) whereas smoking is still somewhat positively associated with education in Mexico. In order to separate the effect of sociodemographic differences from the possible effect of contraceptive provision, three multivariate models were run using selected contraindications to OC-use as the dependent variables (see Table 5).

Table 5 about here

The regression results presented in Table 5 show that hypertension increases with age and decreases with education and phone ownership (a marker for socioeconomic status). Under the more liberal 1996 blood pressure criteria (column c) there is a non-significant reduction in elevated blood pressure among both clinic and pharmacy pill users. For the more conservative 2000 blood pressure criteria (column b), there is no difference in high blood pressure through the other predictors in the model stay the same.

With respect to smoking among older women, our models show that the educated are more likely to smoke than the uneducated. There appears to be an inverted U trend

with smoking peaking among women with secondary education before declining in women with higher education. Urban residence, phone ownership and not being indigenous are positively associated with smoking. After controlling for socioeconomic factors, there remains a noticeable but non-significant reduction in smoking among pharmacy users over age 35, but little effect among clinic users. The negative association with pill use appears to be stronger with respect to heavy smoking. Indeed there were no clinic users in this sample who were reported to be heavy smokers.

Discussion

The ENSA is one of very few surveys that permits an assessment of the prevalence of the two most important contraindications for oral contraceptive use with a large nationally representative sample. The main questions we have sought to address with these data concern the prevalence of contraindications, the degree to which women that use pills are screened for these contraindications, and whether screening differs between clinic users and pharmacy users. The answer to the first question turns out to be highly sensitive to how the contraindication for hypertension is defined, and there is a considerable difference between the prevalence of women who are contraindicated for hypertension based on the 1996 WHO guidelines, and the prevalence that results from applying the revised (2000) guidelines. By the 1996 criteria, only a small proportion of pill users, about four percent, are contraindicated for this method, and the largest share of contraindications is accounted for by smoking among women over age 35. However, using the 2000 criteria increases the share of users who would be contraindicated for OC use to over 15 percent, a fraction that is virtually identical among pharmacy users and

clinic users. Moreover, using these criteria, hypertension accounts for the large majority of contraindications, even among women over age 35.

The prevalence of contraindications based on the 1996 WHO criteria is significantly less among pill users than in the general population, suggesting that considerable screening using the older criteria is taking place. And, more importantly, once we adjust for the effects of age, education, residence, ethnicity and SES, the effect of OC use persists, even if it is not statistically significant. An ancillary conclusion is that when there are large socioeconomic differentials among users according to source, it is imperative to adjust for the relevant indicators since they are strongly correlated with both smoking and hypertension in a setting such as this one, albeit in opposite (and offsetting) directions. Finally, although this study provides no indication that OTC access results in a substantial number of women using a method for which they are contraindicated, just how and when the screening we detect in this population occurs is not clear. As noted earlier, original contraceptive source in Mexico is frequently not the same as regular source, and women who are classified as pharmacy pill users because of their current source, may have had an initial screening for pill use from either a private or public sector doctor. Thus, we cannot reliably distinguish between self-screening and that carried out by a provider.

The measures available to us from the ENSA are also subject to two additional limitations. First, a diagnosis of hypertension is ideally made after two or more readings on different occasions (1999a). Blood pressure measurements are also potentially susceptible to so-called "white coat hypertension", elevated blood pressure because of anxiety induced by the interview rather than by a genuine health condition. Additionally,

blood pressure can increase slightly from oral contraceptive use which may mask some screening that did occur by providers or women themselves. Second, our analysis is based on the assumption that all pill users in the sample are using low-dose combined oral contraceptives. While the vast majority of pill use in Mexico is COC, a small percentage of pill use might be progestin-only oral contraceptives for which smoking and hypertension are not contraindications.

What should be made of our finding that about one-sixth of women who were using the pill in the year 2000 would appear to be contraindicated for this method using the revised WHO guidelines that appeared in that same year? Of course, there is no way that these guidelines could have affected or oriented medical counseling or women's own decisions regarding method choice taken prior to their issuance. Indeed, the corresponding changes in the Government of Mexico's own normative guidelines were not formally approved until January 2004 (Secretaría de Salud 2004). Nevertheless, our finding provides a useful benchmark concerning the number and proportion of women who presumably would need to be counseled or informed regarding the possible health consequences of their continued use of this method, and the alternative methods that they might consider using.

In Mexico, given that COCs only account for a relatively small proportion of contraceptive use, especially among the older women who are most likely to suffer from hypertension, the challenge posed would seem to be manageable. Indeed, some of the required switching may have already taken place, and one of the major pubic providers, the Mexican Institute of Social Security, is now prescribing progestin-only oral contraceptives to pill users over age 35. Moreover, both public and private providers

may have already adopted the new criteria when counseling women regarding either the initiation or continuation of a contraceptive method. Since COCs are available over-the-counter, however, a campaign or other communication instrument to provide all women with the new criteria regarding hypertension and pill use would also seem to be warranted.

In other countries where COCs constitute a much larger fraction of the method mix such as Bangladesh, Morocco, Brazil, or Germany, the proportion of all contraceptive users who should switch methods in order to comply with the new WHO guidelines might be considerable, but not necessarily uniform across populations. The results presented here show that hypertension has a strong socioeconomic gradient in the Mexican setting, but much remains to be known about the prevalence of hypertension among COC users in other settings, as well as possible differentials across social, demographic and ethnic groups. To improve on this situation, it would be useful to include instruments or procedures for the diagnosis of hypertension in more nationally representative samples that also collect information on contraceptive use. In addition to providing information relevant to the amount of switching that might be required, such studies also have the potential to shed light on the effectiveness of screening in different contexts, and how that might be related to the institutional circumstances governing the provision of hormonal contraception. While the latter is an old question, it has gained renewed relevance due to the substantial change in the scientific consensus regarding contraindications included in the new WHO guidelines.

Notes

1 Combined oral contraceptives refer to pills that contain both estrogen and progestin, in contrast to progestin-only pills. The vast majority of pills used in Mexico and worldwide are COCs.

2 Using the mean measurements increases the consistency of the blood pressure reading. See Lloyd-Jones et al.'s (1999) paper in *Hypertension* for an example of this technique.

Table 1 WHO combined oral contraceptive medical eligibility criteria

Blood pressure level	1996 Guidelines	2000 Guidelines
SBP 140-159 mmHg or DBP 90-99 mmHg	2-monitored 3-unmonitored	3
SBP 160-179 mmHg or DBP 100-109 mmHg	3-monitored 4-unmonitored	4
SBP ≥180 mmHg or DBP ≥110 mmHg	4	4

Table 2 Contraceptive provider among pill users in the 2000 ENSA sample

Classification	Provider	%
Clinic	Mexican Institute of Social Security	11.48
	Health ministry	33.31
	Other public health institution	5.46
	Private doctor/NGO	5.46
Pharmacy	Pharmacy	40.11
Excluded	Unknown/"Other"	4.12

Table 3 Sociodemographic characteristics by pill use and provider

Sociodemographic Characteristics	**Pharmacy Pill Users**	**Clinic Pill Users**	**Non-Users**
N	501	694	19,834
Age	**(%)**	**(%)**	**(%)**
20-24	22.57	28.19	23.95
25-29	25.89	28.82	19.56
30-34	23.00	18.92	17.66
35-39	15.96	13.92	15.97
40-49	12.57	10.15	22.87
Education			
Less than complete primary	13.45	26.47	21.85
Complete primary	20.92	28.54	23.30
Some secondary	24.12	26.24	24.37
Beyond secondary	41.51	18.84	30.49
Socioeconomic status			
Household owns a telephone	50.91	19.89	36.74
Marital status			
Single	8.60	1.80	21.15
Cohabiting	13.90	27.54	16.92
Married	75.36	69.67	55.52
Divorced/widowed	2.13	0.99	6.42
Area of residence			
Urban (≥15,000 residents)	75.86	44.03	63.42
Rural (<15,000 residents)	24.14	55.97	36.58
Ethnicity			
Speaks indigenous language	0.99	8.70	6.60

Table 4 Differences in health indicators by pill use and provider

	Health Characteristics	Age	Pharmacy Pill Users, %	Clinic Pill Users, %	Non-Users, %
1996 Category 3	Hypertension (≥160/100)	total	1.70	**1.83***	**3.37***
		<35	1.15	1.08	1.33
		≥35	3.10	4.24	6.51
	Smoking	≥35	9.44	7.53	9.87
	Contraindicated	total	**4.46***	**3.58***	**7.11***
		<35	1.15	1.08	1.35
		≥35	12.77	11.62	16.09
2000 Category 3	Hypertension (≥140/90)	total	15.43	15.77	17.24
		<35	9.51	12.97	10.80
		≥35	30.31	24.72	27.30
	Smoking	≥35	9.44	7.53	9.87
	Contraindicated	total	17.81	17.35	20.22
		<35	9.51	12.97	10.80
		≥35	38.60	31.37	34.92
2000 Category 4	Hypertension (≥160/100)	total	1.70	**1.83***	**3.37***
		<35	1.15	1.08	1.33
		≥35	3.10	4.24	6.51
	Heavy smoking ≥15 cigarettes/day	≥35	0.92	0.00	1.09
	Contraindicated	total	1.97	**1.83***	**3.78***
		<35	1.15	1.08	1.35
		≥35	4.05	4.24	7.59

* indicates a significant difference from non-users at $p<0.05$ level.

Table 5 Adjusted odds ratios for selected COC contraindications

	(a) Some smoking ≥35 years of age	**(b) Hypertention (≥140/90)**	**(c) Hypertension (≥160/100)**
Age			
20-29	n/a	1.000	1.000
30-34	n/a	**1.492****	**1.842****
35-39	1.000	**2.363****	**3.575****
40-49	1.228	**4.145****	**7.585****
Education			
<complete primary	1.000	1.000	1.000
complete primary	**1.727****	0.874	**0.709***
some secondary	**2.476****	**0.715****	**0.694***
>secondary	**2.016****	**0.632****	**0.691***
Residence			
<15,000 residents	1.000	1.000	1.000
≥15,000	**2.271****	0.972	0.946
Ethnicity			
non-indigenous	1.000	1.000	1.000
indigenous	**0.201****	0.829	0.791
SES indicator			
no phone	1.000	1.000	1.000
phone in household	**1.541****	0.905	0.797
OC use			
non-OC user	1.000	1.000	1.000
pharmacy user	0.797	1.069	0.658
clinic user	0.952	1.106	0.728

* indicates significance difference at $p<0.05$ level ** indicates significance at $p<0.01$ level

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