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Knowledge and Beliefs about Reproductive Anatomy and Physiology among Mexican-Origin Women in the U.S.A: Implications for Effective Oral Contraceptive Use

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Abstract

Inherent in many reproductive health and family planning programmes is the problematic assumption that the body, its processes, and modifications to it are universally experienced in the same way. This paper addresses contraceptive knowledge and beliefs among Mexican-origin women, based upon data gathered by the qualitative component of the Border Contraceptive Access Study. Open-ended interviews explored the perceived mechanism of action of the pill, side effects, non-contraceptive benefits, and general knowledge of contraception. Findings revealed complex connections between traditional and scientific information. Use of medical terms ("hormone") illustrated attempts to integrate new information with existing knowledge and belief systems. Conclusions address concerns that existing information and services may not be sufficient if population-specific knowledge and beliefs are not assessed and addressed. Findings can contribute to the development of effective education, screening, and reproductive health services.

Keywords

Reproductive health; family planning; oral contraceptives; Mexican women; USA

Introduction

Inherent in many family planning and women's health programmes is the problematic assumption that the body, its processes, and modifications to it (such as those caused by disease or side effects of contraceptive methods) are universally experienced in the same way. These assumptions have contributed to the under-utilisation and lessened impact of health care programmes in general, and specifically to the rejection or incorrect use of contraception. Worldwide reviews of non-adherence/use-effectiveness and discontinuation of oral contraceptives (OCs) increasingly emphasise the need to understand women's perceptions of health and contraceptive needs (Blanc, Curtis, and Croft, 2002; Ali and Cleland, 2010). While these perceptions are based on a personal evaluation of well-being, they also are influenced by information a woman receives from medical providers as well as

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friends, relatives and the media. Even in the U.S.A where family planning information is readily available from many sources, sufficient information about reproductive health and fertility regulation options has not been accessed by many sectors of the population. Notably, many immigrant groups with limited access to the healthcare system retain interpretations of the body and body processes that are based on folk beliefs and/or incomplete information from peers, family and the media. These beliefs and misinformation often contain distorted and fallacious ideas about anatomy and physiology that prevent individuals from developing an accurate comprehension of their bodies and thus correct knowledge about contraception. Understanding these beliefs and ideas can be important for health care personnel to provide appropriate and meaningful information and education about contraceptives, their effects on the body, and their correct use.

This paper examines oral contraceptive knowledge and beliefs among a Mexican origin population living on the U.S.-Mexico border, and suggests that not only are traditional beliefs retained over time in spite of new technology and information resources, but also that access to family planning information and services may not be sufficient if existing knowledge and beliefs are not assessed and addressed.

Hispanic Fertility Rates and Contraceptive Use

Hispanics, the majority of whom are of Mexican origin (Guzmán, 2001), make up 15.1% of the U.S. population and 35.9% of the Texas population (U.S. Census Bureau, 2010). In 2006, for the first time, Hispanic births numbered over one million (Martin, et al., 2008). Hispanic births in 2006 also made up nearly a quarter of all births, compared to 15% of the total in 1990. A younger age structure and higher fertility rates mean that we can expect the proportion of births to Hispanics to continue to grow. The total fertility rate (TFR) for Hispanics was 3.0 in 2006, 2.9 in 2008, and 2.7 in 2009, and was higher than all other race/ethnic groups (Hamilton *et al* 2010). Hispanics also have higher adolescent births rates than all other race/ethnic groups in the U.S.A. -- indeed Hispanics' 15- to 19-year-old birth rate is more than three times the rate for non-Hispanic whites (83.0 per 1000 compared to 26.6 per 1000) (Martin, et al., 2008).

Some of the difference in fertility rates can be attributed to the higher proportion of unintended births to Hispanics. Over half (54%) of pregnancies to Hispanics are reported to be unintended, compared to 40% for whites and 69% for blacks (Finer & Henshaw, 2006). A smaller proportion of the unintended pregnancies among Hispanics end in abortion, which leads to an estimated unintended birth rate that is 40 per 1000 for Hispanic women compared to 17 per 1000 for whites and 35 per 1000 for blacks. In addition, Hispanics have lower contraceptive use than whites—59% compared to 65% (Mosher, *et al*. 2004). Qualitative and small scale studies also suggest that Hispanics have lower levels of knowledge about reproduction and contraception (Garcés-Palacio, et al., 2008), have more concerns about contraceptive safety and negative side effects (Gilliam, et al., 2004; Guendelman, et al., 2000), and experience more barriers to effective contraceptive use (Sangi-Haghpeykar, 2006) than do non-Hispanic whites. These attitudes and experiences, in turn, may result in both lower rates of use and less effective use of contraceptives among users.

Cultural differences between Hispanics and non-Hispanics have frequently been invoked to explain these racial/ethnic differences in contraceptive use, knowledge and fertility outcomes (e.g., see Afable-Munsuz & Brindis [2006] for a review of the literature on the impact of acculturation on Latino adolescent reproductive health outcomes; see Lara, et al. [2005] on a wide range of health and behavioural outcomes). But recent studies using more nuanced approaches call into question the validity of attributing too much weight to the cultural argument. For instance, Van Hook and Glick (2007) found that high levels of non-

kin and co-residence among immigrants from Mexico is not the result of a cultural preference for such living arrangements but instead are due, at least in part, to the migration experience. Moreover, Raley and associates (2004) found that the timing of marriage, which is younger for Hispanics, does not reflect a cultural preference for early marriage but rather reflects the disadvantaged socioeconomic status of the Mexican-origin population in the U.S.A. Likewise, Frank (2008) found that high Latino fertility rates in Los Angeles were likely the result of structural disadvantages in the community that lower the cost of childbearing relative to limited educational and labour market opportunities.

Another cultural argument contends that Mexican origin women come from a context in which larger families are the norm and therefore, once in the U.S.A, women are simply fulfilling their desires for larger family sizes. It is no longer clear, however, that Mexican immigrants come from a fertility situation that differs radically from the one found in the U.S.A. The total fertility rate (TFR) in Mexico has fallen precipitously in the last three decades (from 7.3 in the 1970s) (CONAPO, 1999) to a current level of 2.0 births per woman (CONAPO, 2010) In addition, the 2008 TFRs in four of the traditional sending states to the El Paso-Ciudad Juárez region (Chihuahua, Durango, Coahuila and Zacatecas) ranged between 2..17 and 2.26 (CONAPO, 2003). Considering the similarity of fertility levels in Mexico and the U.S.A., a plausible alternative hypothesis to a cultural argument is that Mexican immigrants and Mexican-Americans have more limited access to contraceptive services, both in comparison with whites, and as compared to Mexican women who reside in Mexico.

Indeed, since the mid-1970s, contraceptive methods have been available free of cost at public health clinics and hospitals in Mexico, including methods that are sometimes rationed in publicly funded clinics in Texas such as IUDs and female sterilisation (Potter et al. 2012). However, the widespread acceptance of IUDs and female sterilisation in Mexico—methods that were vigorously promoted by the national family programme in the 1980s and 1990s (Potter 1999)—has meant that there is much less use of hormonal methods than there is in the U.S.A. The relatively infrequent use of hormonal methods may, in turn, have contributed to lack of familiarity and confidence in the methods among Mexican-origin women on the Texas-Mexico border.

In sum, while arguments mitigating the importance of cultural factors affecting contraceptive use and effectiveness are certainly valid (Vega and Amaro 1994), it would be unwise to underestimate the role of cultural factors in oral contraceptive adoption, use effectiveness and continuation. The qualitative exploration described in this paper was carried out complementary to a longitudinal empirical survey of experiences with oral contraceptives described below. These qualitative data, along with comparable data collected by one of the study team members more than 30 years ago, illustrate the persistence of traditional assumptions and beliefs about reproductive anatomy and physiology which affect the integration and interpretation of new information.

Methodology

The Border Contraceptive Access Study

The Border Contraceptive Access Study was conducted in El Paso, Texas between 2006 and 2010. The city, with a population of 800,000 people, is located on the U.S.-Mexico border directly across from Ciudad Juárez, Mexico. The majority of the El Paso population (82%) is Hispanic/Latino (US Census Bureau, 2012) and many residents regularly cross the border into Mexico for health services because of lower costs and convenience as well as social ties, cultural familiarity, and perceived quality of care (Byrd and Law, 2009, Fernández and Amastae 2007, Heyman *et al* 2009.)

El Paso, Texas is among the poorest communities in the country. According to the 2007 American Community Survey (Bishaw and Semega, 2008), El Paso county's median household income was US$34,980, which ranked among the ten lowest for areas with populations greater than 250,000. Educational attainment is also low. Fewer than 20% of El Paso's residents hold a bachelor's degree or higher, while over 17% have less than a ninth grade education (U.S. Census Bureau, 2012). Some 37% of El Pasoans between the ages of 18 and 64 lack health insurance (while the Texas average is 25%) (U.S. Census Bureau, 2005). Compared to the 14% immigrant population throughout the state of Texas, approximately 28% of El Pasoans are foreign born, of whom 86% entered the U.S.A. before 2000 (U.S. Census Bureau, 2005). Family planning services for low-income women in El Paso have historically been provided by a limited number of health care facilities, such as University Medical Center-El Paso Family Planning Clinic and Planned Parenthood (which closed permanently in 2008), with funding provided by a variety of state-administered federally-funded programmes.

Sample

The study recruited Hispanic women, ages 18 to 44, living in El Paso, who were current oral contraceptive users. Participants were stratified into two groups: 1) El Paso residents who use oral contraceptives obtained at family planning clinics in El Paso (target n=500); and 2) El Paso residents who use oral contraceptives obtained over-the-counter at pharmacies in Mexico (target n=500). Using convenience sampling, many of the clinic users were recruited from the major family planning providers in El Paso. Cross-border pharmacy users, as well as a considerable proportion of El Paso clinic users, were recruited using announcements, flyers, presentations at local community centres, and referrals from participants. Study participants resided in more than 30 zip code areas in the El Paso metropolitan area, the majority of whom lived in areas where the average household income was below the median for the City.

Data Collection

An hour-long face-to-face baseline interview was administered in either Spanish or English, after participants completed a signed informed consent. Participants were offered a small compensation for completing the baseline interview and each of three follow-up interviews conducted over a period of nine months. This study was approved by the Institutional Review Boards at the University of Texas at Austin and University of Texas at El Paso.

The baseline questionnaire contained a wide range of items related to the participant's background: marital status, parity, health status, medical history, use of health services, knowledge of pill use, contraceptive history, and reproductive intentions. The second and third interviews took place approximately three and six months after the initial interview. These interviews were administered via telephone and lasted 15–20 minutes. Women were asked about changes in their contraceptive practice during the prior three months, the source and number of pill packs obtained if they resupplied since the previous interview, and, again, how long they planned to use oral contraceptives. The final (fourth) interview was scheduled approximately nine months after the baseline interview and was conducted in person. In total, 1046 oral contraceptive users completed baseline interviews.

In the baseline instrument, a series of closed-ended questions were included to assess women's knowledge of oral contraceptive pill use and practice. These questions included knowledge of the mechanism of action of hormonal contraception, contraindications to the pill, and positive and negative side effects of pill use. A preliminary analysis of women's answers to these knowledge questions in the baseline interview found that, in general, their knowledge about the pill was very low. An additional series of open-ended questions was

then added to the final interview to further explore what women in the study believed about the pill and its effects on the body. Among a number of questions, respondents were asked to describe how the pill works in a woman's body to prevent pregnancy, if they knew of any serious health problems that could result from taking the pill, and what they knew or had heard of the positive and negative effects associated with the pill.

After approximately 50 final interviews had been completed, members of the research team, using a grounded theory approach (Glaser, 1967), developed codes for each of these questions. The codes emerged from women's responses rather than from any *a priori* assumptions about their answers. Coding descriptions were refined based on responses obtained after the first 50 interviews. Finally, after completion of the last interview, a review of all the responses and coding was undertaking in order to ensure consistency across the data collection. New codes were developed based on the "other" categories, if warranted.

Results

The open-ended questions in the final round of the Contraceptive Access Survey yielded a wealth of information regarding the women's range of knowledge and understandings about their bodies and the mechanism of action of oral contraceptives. Not surprisingly, in comparison with the Mexican women in the 1970s with access to oral contraceptives through a community-based family planning programme in their town (Shedlin 1979, Shedlin & Hollerbach 1981), the women in El Paso demonstrated a far more detailed knowledge of their bodies, a wider vocabulary for anatomy and physiology, and more, but decidedly uneven, information about hormonal contraception. However, they also demonstrated a wider range of misunderstandings and erroneous assumptions about the mechanism of action and meanings of side effects of oral contraceptives.

Assessing (and distinguishing) "knowledge" and the role of traditional beliefs in interpretation and integration of new information is inherently difficult. It is all the more so in the context of different cultural frames of reference. In this study, we dealt with (theoretically) different cultural frames with considerable overlap, reflected in the language used to probe and respond in the interviews. While the interview matched local Spanish equivalents to English, we acknowledge that all vocabulary reflects context, and that the same word, even matched by careful translation (blood = *sangre*) may not occupy exactly the same space in a semantic field. This is equally true of close cognates (medicine = *medicina*). Moreover, technical terms in either language may have been acquired informally, or formally with little explanation, resulting in inadequate understanding of their meaning within the context of medical science. Use of a technical term (hormones/*hormonas*, for example) does not guarantee underlying knowledge of all that the term implies scientifically. Moreover, in a context of bi-lingual influence and language mixing, a complex dynamic is created where cross-border service access, media, informal information channels and cultural factors all shape vocabulary, meaning and understanding.

An additional aspect of this systemic approach to understanding knowledge about the body and the mechanism of action of hormonal contraception through language use is to acknowledge the difference between denotative and metaphorical meaning. Modern science of course aspires to the exclusive use of the former, while Hispanic cultures employ metaphor to a greater degree (Berdes & Eckert, 2007; Zúñiga, 1982). Beyond the scope of this paper is the question of how knowledge changes, and how language is both an indicator of change as well as a screen for the lack of it. For example, the acquisition of new words may imply a new concept, may match to an existing, possibly erroneous concept, or may occasion some combination of semantic elements from old and new conceptual representations.

We note, therefore, the importance of viewing comments reflecting knowledge and belief as elements of a system which must be treated as such. The methodological questions raised by these language considerations are acute, but not intractable. It is in part the goal of this paper to demonstrate that comprehensive analysis can be achieved and that attention to a range of beliefs may bring an underlying system into focus.

The following categories and quotes (translated into English) are illustrative of this range of language, interpretation and understanding of what the women were told in clinics or pharmacies; or what they learned from health service providers, television, friends and family on both sides of the Border (as El Paso and Juárez have traditionally been one metro area comprised of these sister cities). Although the sample was hardly socio-demographically homogeneous, we have not, attempted to match opinions to objective characteristics. Rather, our intent is to portray the elements of the understandings of oral contraceptives that commonly surface in the border community. Often they are contradictory in multiple ways, yet revealing of how people adopt new practices. We also refrain from making claims about larger epistemological questions concerning the relationship of scientific to other knowledges and the social conditions in which they are embedded. Our intent is to identify and explore the range of culturally and linguistically common expressions of a large sample of OC users from an empirical investigation in the border context. Our use of quantitative statements concerning the prevalence of some opinions in the open-ended material are descriptive of our sample only and intended simply as an indication that these are not idiosyncratic. Our fundamental interest is the relationship between traditional and scientific knowledge, their linguistic expressions, and the potential relevance to healthcare providers and other researchers.

Beliefs About the Mechanism of Action of Oral Contraceptives

Nearly three in ten of the women (n=268/940) who answered the open-ended question about how the pill works, stated that they did not know. For those who answered this question, a frequently cited explanation of the mechanism of action of the pill was that it “tricked the body into believing it is pregnant”. This clearly repeated phrase seems an easy way for providers to “educate” their clients, but is obviously not sufficient to prepare women to make informed decisions about their contraception, to evaluate side effects or to assess the validity of what they hear from the media, friends, and other non-medical sources. “(The hormone) tricks the egg into thinking it is pregnant and does not pick up the sperm,” explained one woman.

Women were generally familiar with the term “hormones”, and many knew that somehow the hormones affected ovulation, eggs, and sperm, but many said they did not know what hormones were or where the hormones worked in the body to prevent pregnancy. Some women stated simply that hormones were “cells in the body”. “The contraceptive pill has hormones but I don’t know what they are”, explained a respondent. Hormones were said to “stay in the vagina for when the sperm enters to eliminate it”. Many of the women simply stated that they affected “all the body”.

The most frequently cited incorrect explanations for mechanism of action of the pill were that the hormones or “medicine” killed or incapacitated the eggs as well as the sperm, (“… when the sperm of the man enters the vagina, the contents of the pill kills the sperm.”), blocked the sperm, or blocked the uterus. One woman offered that the pill “forms a little fabric between what is the uterus and the ovaries so that the sperm cannot pass...”. Another stated, “the pill gets into the egg to freeze it and you don’t get pregnant”. One woman stated that the pill is made up of “curative herbs”, “it affects the strength of the sperm of the man to be able to cause pregnancy…”. An acid in the pill was also said to kill sperm as well as a “toxic substance to kill what we have”, and “a chemical” that destroys the egg. Another said

that the medicine in the pill covers the eggs so that the sperm cannot enter. One woman, however said, “kills the egg?, no…I don’t believe that… it kills the desire to have relations!” All of these explanations use common physically concrete and visualisable explanations for the action of the pill. Frequently these include images of barriers, rigidity, and conflict, in which one agent or the other wins.

While many women believed that the pill does not affect the blood, others stated, for example, “It affects the blood because it enters the blood”. One respondent offered, “it affects the blood by maybe thinning it out because of the blood clots”. Another explained that she heard that “from taking so many pills the blood carries cancer to the breasts”. Some said simply, “all pills affect the blood”. The idea that substances circulate in the body, primarily carried by blood circulation, is recognised although often imprecisely. These substances may also affect the blood.

Again, we hear that the pill is medicine “because it comes from laboratories and it’s for your well being”; “Medicine is anything that helps the body to function better; the pill is a medicine because it is prescribed to regulate the period or for cysts on the ovaries and in menopause when hormones are missing”. Another woman stated, “The pill is made of one part herbs and another of experiments that they’ve made…”. Another woman stated, however, that the pill was not medicine because she was not using it to improve her health: “…all to the contrary, I’m contaminating myself, but what else can I do?”

The relationship of length of oral contraceptive use to potential problems was salient throughout the interviews. The uterus, kidneys, liver, stomach and other organs were listed as at risk from long-term use, specifically for cancers, gall stones, headaches, blood clots and vaginal infections. At least one of the current oral contraceptive users commented that by taking pills for any length of time, they would accumulate or “fall into the same place and cause a wound/sore, like accumulating in the uterus.”

Beliefs about Non-Contraceptive Benefits of Oral Contraceptives

The most frequently noted benefit of the pill was the effect on the menstrual cycle, including regulating, shortening, and decreasing severity, cramping and bleeding. Effects on the skin were also salient in their lists, e.g. “It helps my skin; it’s no longer so dry”. Effects on weight, hair, sexual desire, headaches, breast development, mood, hormone balance and effects on symptoms of menopause were listed. Some women noted protection against vaginal infections, breast cysts, ovarian inflammation and cyst prevention or reduction. Protection from some cancers was also listed but by less than 7% of the sample. Many of the respondents listed multiple benefits:

> “They say it stops hair from falling out; if you put it in shampoo, the hair will shine more”
>
> “Yes there are times when the pill makes you thinner; you get less sick because I figure they contain something of vitamins or something like that; I even believe it takes away headaches…there are less possibilities of uterine cancer…they also help to prevent inflammation of the ovaries, breasts develop more and they are good for your health”
>
> “…it regulated the period, increases sexual desire, hair becomes very pretty”
>
> “…one feels more secure on the pill to have sexual relations without protection”
>
> “avoids uterine cancer, not that it can’t happen but it is less likely. You have less cramps, the period is more exact, it takes away pains around the waist, and the menstrual period is shorter and less heavy”

"…hormones help us in the body with the state of mind ("*estado de animo*")

Almost 14% of the respondents stated that they did not know of any benefits or that there were no benefits: "positive things? I don't think there are any"; "…never heard anything positive about the pill, only negative things but not many."

Beliefs about Negative Side Effects

Not surprisingly, the most frequently cited negative side effects of the pill were weight gain and the associated increase in appetite. Conversely, other women said weight loss and a decrease in appetite was the problem, but far fewer. Migraines and headaches were the other most cited negative effects. While some women noted improvements in their skin and hair, others complained of skin problems ("acne emerges") and hair loss. Hormone regulation was given as a positive effect by some, while hormone imbalances were identified as a negative by others. The pill was also said to decrease libido, cause vision blurring, tenderness in breasts, itching, abdominal pains, increases in blood pressure, insomnia, spotting and bleeding, thinning of the blood, fainting spells, nausea, depletion of vitamins and minerals, decrease energy, and cause reproductive cancers as well as heart attacks, strokes, palpitations, and blood clots. Aches, pains, cramps, numbness and swelling of hands, feet, legs, and uterus were mentioned. Impaired future fertility was also mentioned ("they battle more to get pregnant"), as were effects on the "nervous system" including mood swings, depression, anxiety and stress. Symptoms of pregnancy and "morning sickness" were also attributed to the pill. Less than 4% of women stated that there were no negative effects of oral contraceptives. Some of their comments included:

"I believe it is like anything, it has to cause damage in something but I don't know in what…"

"…to smoke and take the pill…more likelihood of cancer; more risk if you smoke although there are also risks if you don't smoke. Everything that enters the body (medicines, chemicals) that isn't natural has some effect. Heredity has much to do with this…"

"…causes problems in the reproductive apparatus…"

"…they lower self esteem…one feels small…it causes depression"

"First of all, what I feel when I take it, I don't have any desire to have relations… the hair begins to lose brilliance…varicose veins come out and itch…"

"…legs hurt a lot, they cause nausea, headaches, women get fat, sometimes they lose vision; they say they bring cancer in the breasts and the uterus if one takes them for many years. They can damage the blood from so much hormone in the pill, making it more red and even getting the nerves sick"

"damage the kidneys"

" First of all so many hormones produce cancer in the uterus and ovaries, the breast; hemorrhages, stops menstruation in some women, headaches, abdominal pain, poisoning of the body when too many pills are taken, vaginal infections, the body becomes addicted after one stops it, people become nervous with headaches and bad humor"

Words versus Understanding

A paradigm case of the role of language in this process, both for respondents and investigators, is the term hormone/*hormona*. Unlike blood/*sangre* or even medicine/*medicamento,* it is a relatively new term. Still, respondents use it freely. However, their

extended comments reveal a dense cognitive web that mixes isolated scientific terms and facts with traditional and individual understandings. Most agree that oral contraceptives contain hormones, which are medicines, because they improve health, and doctors prescribe them. This view is consistent with the widespread belief that the hormones in the pill are essentially spermicides. Many respondents also combine this "medicine" view with the "residual accumulation" idea, which then requires that the body rest and recover. As to where in the body the hormones act, respondents tend to agree that the hormones are somehow present in all of the body (otherwise how would they have other effects, both positive and negative, such as stimulating/impeding hair growth, acne, or general skin texture?). Opinion seems divided on the effects of hormones on other organs. Some respondents believed that the pill can cause cancer, typically of organs associated with reproduction (uterus and breasts were most often mentioned, with kidneys and liver getting an occasional mention). Yet at the same time other respondents observed that oral contraceptives apparently have no effect on other organs (stomach, lungs, heart, etc.). The relationship between hormones and blood was interesting. Hormones were carried by the blood, but did not affect it directly. Women's comments included:

> "It affects certain systems of the body, maybe the liver or kidney because of taking so many. Taking the pill for a long time affects the uterus. The uterus becomes rigid (freezes) because of the pill and it is difficult to conceive."
>
> "No, it doesn't affect anything else, I've never heard anything like that. I have heard that the pill can cause harm but it doesn't affect the blood or the organs
>
> "The pill goes from the stomach to the abdomen through an intestine, it stays there in the uterus, it goes on to the vagina and waits for the sperm there to kill it. The pill is a medicine because if you don't take it, you get pregnant. Hormones are what give energy to the body and it needs them to continue living because otherwise you would be weak and depressed. No, they don't affect blood or organs because if they did, they wouldn't be sold."

In this context, hormones as spermicides make some sense as an explanation of their ability to prevent conception. Using the word, but lacking a comprehensive and accurate picture of what hormones are and how they act, the spermicide (or alternatively, barrier) explanation allows the total picture to remain basically unchanged. At the same time, once again, the concepts of strength/weakness and energy are also used in these explanations. Suppleness and flexibility are identified with vigour and reproduction, and rigidity with weakness and sterility. Alternatives to these concrete representations of how hormonal contraceptives work tend to be abstract ("affects the blood or organs," "causes damage/problems," "increase sexual desire," and the like, all of which likely indicate lack of complete understanding, but more emotional reactions that may be used to justify one course or action or the other.

Discussion

In addition to taking into account the influence of cultural factors on body knowledge and beliefs, an examination of adherence and continuation must consider the cultural acceptability of methods. Acceptability is not acceptance, but rather the compatibility of the method with individual and group values, norms, and beliefs. Acceptability means consonance with a sense of well-being. In 1973, the World Health Organization suggested that methods are assessed by potential adopters in terms of their qualities or attributes, which include mechanism of action, mode and route of administration, effectiveness, safety, duration of action, organs implicated, provider or self-administration, requirement of an examination, frequency of use, physical attributes, ease of use, coitus-relatedness, and side effects. The importance and meaning of each attribute varies among individuals and cultures. The ultimate acceptability of each method depends on the potential user's cost/

benefit assessment of all the attributes perceived as important. In addition, health, age, parity, lifestyle, and motivation to avoid pregnancy influence how a method and its attributes are assessed (Polgar & Marshall, 1976; WHO, 1973).

If any of the important attributes of oral contraceptives are perceived negatively by a woman, this may directly affect use and effectiveness/adherence. For example, if a woman or couple are concerned that the "medicine" contained in the OC pill will harm future offspring, or that the pill is not as effective as an injection, or that the effect will be permanent or cause impairment of future fertility, or that the hormones contained in the pill will cause cancer, these fears and beliefs may influence her motivation or commitment to correct use.

Side effects have been shown to be the most salient attributes in OC acceptance and continuation. Side effects and how they are perceived, experienced, and interpreted are also important factors in use effectiveness/adherence. This, in turn, depends to a large extent on the previously mentioned issue of beliefs and knowledge of reproductive anatomy and physiology. Such knowledge and beliefs may combine correct and erroneous assumptions and may cause a woman to fear alterations in her body, such as changes in bleeding patterns. In other cases, these beliefs may be responsible for a misinterpretation of the mechanism of action of OCs. Both of these possibilities can negatively affect use because women' concerns and understanding of the method serve as barriers to appropriate action/correct use.

An interesting example of how body knowledge can influence contraceptive initiation and adherence was illustrated by research on traditional fertility regulation in Central Mexico in the 1970s. Shedlin and Hollerbach (1981) and Shedlin 1979, and Shedlin (p.c.), documented the belief that conception occurs when the "blood" of the man joins with the "blood" of the woman in the "stomach" (or uterus). The pill was believed to weaken the woman's blood so that it could not join with that of the man. Pills were thus "missed" periodically to permit the woman's blood to "get stronger" because, in most traditional cultures, weak blood is believed to cause susceptibility to illness. Cancer, and problems caused by the accumulation of pills in the body were also cited as concerns with the "medicine" in the pill (as well as in injectables). Thus, incorrect knowledge and traditional beliefs interfered with women's adoption of, and adherence to, their oral contraceptive regimen. Although instructions for use were understood literally, those instructions did not take into account the women's lack of knowledge of the internal map of their bodies, their beliefs about blood, or how conception occurred. Nor were providers aware of how women (and their partners) understood the mechanism of action of the method or their concerns about specific side effects such as cancer and even future fertility. The way side effects and therefore the risk/benefit ratio of oral contraceptive use was perceived represented an important factor in determining decisions to begin use of a method and adherence to recommended regimens.

What makes this early study especially interesting is the comparison it provides between Mexican women living in Central Mexico in the 1970s with few informational options, and findings from our study in 2006–10 among Mexican origin women living on the border with numerous sources of information (and misinformation) easily accessible. It seems clear from this limited qualitative exploration within the larger Contraceptive Access Survey, that fertility regulating behaviour in our contemporary border sample is not solely affected by structural factors in contraceptive access which include such salient obstacles as lack of documentation, lack of insurance and the closing of family planning programs for policy and other reasons. Family planning information or even much cited cultural constructs such as *familismo* (the importance of family) and related fertility desires and intentions are also not the only answers, although all are clearly important, and the relationships among them need additional investigation.

It is understandable that women in Mexico in the 1970s had limited input (information from one family planning program and a few providers) and had little formal education, and therefore their concerns were based on erroneous assumptions about how the "medicine" prevented conception, how it affected their blood, organs, health, and future fertility. It is now interesting to note that Mexican origin women today living in the U.S.A. are citing some of the same erroneous ideas about the body as they interpret risks and benefits of oral contraceptives. As before, beliefs about how hormones or "medicine" or "chemicals" in the pill, described as "toxic" by some, kill eggs and sperm as well as producing negative side effects on the body. A new element, however, is that today's pill users are also using this misinformation and lack of information to explain non-contraceptive benefits as well as health risks. Even more interesting is that the pill, or the hormones/"medicine" in the pill, are said to cause their positive and negative effects on the same organ or body part. For example, hormones make hair strong and shiny (especially when dissolved in shampoo as well as taken orally), but hormones for others make hair dull and fall out; hormones protect against reproductive cancers but cause them as well; hormones affect the libido both positively and negatively; and hormones cause weight gain and weight loss while making the skin dry and less dry.

This contradiction should not be lost on providers and educators; the words are there, but the physiology is not understood nor communicated by providers, media or friends (the "grapevine" effect). Aside from this lack of basic body knowledge, it is also obvious that concerns about such issues as duration of effect, consequences of long term use, and future fertility must still be addressed with potential adopters and users if we are to support use effectiveness, adherence and continuation of oral contraception.

The analysis of respondents' wider picture of how oral contraceptives work, and the examination of change (or lack thereof) in this picture over a period of 40 years in which new facts and new language have been introduced, are interesting and significant in themselves. They also may allow insight into ongoing discussions concerning concrete questions of oral contraceptive use and effect. These include possible explanations of (non-)continuation patterns, often argued to be due to either "cultural" or "structural" factors, how best to communicate "new information" to users (without recognising that "input" is not necessarily "intake"), and policies regarding oral contraceptives (prescription versus over the counter). Both the explanation of observed patterns of use and policy recommendations will be enriched through more exhaustive understanding of the information available.

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