THE MEASURE OF INDUCED ABORTION LEVELS IN COLOMBIA USING RANDOM RESPONSE TECHNIQUE

Compilación

Resumen. Los autores proponen utilizar la técnica al azar de la respuesta (RRT) a la medida del aborto inducido en Colombia. La aplicaron RRT a una muestra de nacional de 1.792 mujeres entre las edades 15 a 55. El RRT produjo una mejor valoración del aborto inducido comparado con otras metodologías tales como las que usa el DANE o el de la Encuesta Nacional de Fecundidad y salud. El DANE estima los abortos inducidos usando el modelo de Bongaarts y concluye que durante la última década, se ha dado una disminución de los niveles de abortos. En 1995, estimaba 110.000 abortos inducidos, que es más baja que los niveles divulgados a partir la 1993 a 1995. El ISS estimaba 200.000 abortos inducidos por en el año 1999). El instituto del ISS, usando este modelo, estimaba 533.100 abortos inducidos en Colombia en 1990 1994).

En Colombia, algunas preguntas directas sobre el aborto fueron incluidas en el la Encuesta nacional de la fecundidad y la salud en 1987. La encuesta registró que el 14.3 por ciento de mujeres entre 15 y 49 años de edad reconocían haber tenido por lo menos un aborto inducido o espontáneo. El trece por ciento indicó que por lo menos un aborto fue inducido, que se traduce a un índice de 12.2 abortos por 1.000 mujeres de edad reproductiva y de un total de 250.000 abortos inducidos en 1986 (1994).

Abstract. The authors used the random response technique (RRT) to measure frequency of induced abortion in Colombia. They applied RRT to a national, multistage probabilistic sample of 1,792 women ages 15 to 55.

The RRT produced a better estimation of induced abortion compared with other methodologies like The Colombian National Statistics Council or in the National Survey of Fecundity and Health.

The Colombian National Statistics Council —DANE in Spanish) has estimated numbers of induced abortions using Bongaarts's (1982) model. During the past decade, reported a decrease in the levels of abortions. In 1995, it estimated 110,000 induced abortions, which is lower than the levels reported from 1993 to 1995, 200,000 induced abortions per year (ISS 1999). The ISS Institute, using this model, estimated 533,100 induced abortions in Colombia in 1990 1994).

In Colombia, a few direct questions about abortion were included in the National Survey of Fecundity and Health in 1987. The survey found that 14.3 percent of women between 15 and 49 years of age reported having had at least one induced or spontaneous abortion. Thirteen percent stated that at least one abortion was induced, which translates to a rate of 12.2 abortions per 1,000 women of reproductive age and a total of 250,000 induced abortions in 1986 (1994).

Palabra clave: aborto inducido, fecundidad, the random response technique (RRT),

A compilation

The authors used the random response technique (RRT) to measure frequency of induced abortion in Colombia, where its practice is illegal under most circumstances. They applied RRT to a national, multistage probabilistic sample of 1,792 women ages 15 to 55. The distribution of women who reported having had an induced abortion was analyzed by sociodemographic characteristics. Bivariate and multiple logistic regression analyses were performed to identify factors associated with having had an induced abortion.

Overall prevalence of induced abortion was 16.3 percent. Three factors were associated with reported induced abortion: having grown up in the city (bivariate odd ratio [OR] 2.16, multiple logistic OR 2.24), having never given birth (bivariate OR 1.60, multiple logistic OR 2.06), and having had an unwanted pregnancy (bivariate OR 2.09, multiple logistic OR 2.81).

RRT produced a better estimation of induced abortion compared with other methodologies. This technique works best with urban and educated women.

Induced abortion is legally restricted and highly stigmatized in Colombia. Many Colombian women suffering unwanted pregnancies seek illegal abortions, some of them practiced in unsanitary conditions. While legal restrictions do not prevent the practice of induced abortion, they make it difficult to obtain reliable data about its frequency. Wide variations in the estimated annual level of induced abortions have been reported—from 100,000 to 500,000—in various studies in Colombia. These estimates have been generated with the use of two indirect methods: Bongaarts's (1982) model and the hospital-based method (Llovet and Ramos 1998).

Bongaarts's (1982) model measures the effects of four variables in the fertility levels of a population. The variables included are the proportion of women in union, the use of contraception, the practice of induced abortion, and lactational infecundity. Usually, the national fertility surveys gather information about all variables, with the exception of induced abortion because of the difficulty of obtaining accurate reporting of induced abortion due to the sensitive and stigmatized nature of the topic. Researchers use information on these variables to indirectly estimate the levels of abortion (Foreit and Nortman 1992). The estimations this model produces must be considered as an average of the true levels because the accuracy of the abortion level estimated depends on the quality of the data. Small variations in the other variables in the equation produce important changes in the estimated abortion rates. Some studies have reported

that the model is limited in its ability to estimate the levels of abortion and generally overestimates the effect of induced abortion on the fertility levels (Reinis 1992).

The Colombian National Statistics Council —DANE in Spanish) has estimated numbers of induced abortions using Bongaarts's (1982) model. During the past decade, reported a decrease in the levels of abortions. In 1995, it estimated **110,000 induced abortions**, which is lower than the levels reported from 1993 to 1995, 200,000 induced abortions per year (ISS 1999).

The second approach is the hospital-based method, which also employs modeling. The method assumes that a specific proportion of the total number of women who have induced abortions go to the hospitals to seek treatment for abortion complications. This model uses medical records from abortion complications, which are multiplied by a factor to estimate the total number of women in the population who have had an abortion. This factor or ''multiplier'' ranges from three to seven. Its value in each country is determined by the opinion of specialists in the field. In general, if the quality of abortion services is relatively high, then the multiplier is higher because a smaller proportion of women who have abortions suffer from complications requiring medical attention (Singh and Sedgh 1997). **The ISS Institute, using this model, estimated 533,100 induced abortions in Colombia in 1990 1994**).

The measures of induced abortion obtained by direct survey techniques generally underestimate the frequency of the event because women are not willing to report to an unknown interviewer the practice of a stigmatized behavior that is against Colombian law. However, research has suggested that surveys may have the potential to collect reasonably accurate data on the use of abortion when the questionnaire offers women differently stated opportunities to reveal having experienced an abortion by configuring the wording and ordering of questions with cultural sensitivity (Huntington, Mensch, and Miller 1996). Other factors that may

increase respondents' willingness to communicate a sensitive behavior are the degree of trust and privacy between the interviewer and the respondent (Ellsberg et al. 2001).

In Colombia, a few direct questions about abortion were included **in the National Survey of Fecundity and Health in 1987**. The survey found that 14.3 percent of women between 15 and 49 years of age reported having had at least one induced or spontaneous abortion. Thirteen percent stated that at least one abortion was induced, which translates to a rate of 12.2 abortions per 1,000 women of reproductive age and a total of 250,000 induced abortions in 1986 (1994).

Survey researchers have long searched for data collection techniques that will minimize or eliminate under reporting of sensitive behaviors or experiences by protecting their privacy and anonymity. Specifically, for the measure of induced abortion, they have used self-administered questionnaires, either in written form or by computers (Mosher 1998), as well as by telephone interviews.

Another alternative methodology is **the random response technique** (RRT), which has been used for the study of sensitive topics such as welfare fraud (Van der Heijden et al. 2000), use of illegal substances (Goodstadt and Gruson 1975; Fisher, Kupferman, and Lesser 1992), rape victimization (Soeken and Damrosch 1986), and homosexual activity (Zimmerman and Langer 1995). The RRT has been applied to the study of abortion in developed countries such as the United States (Albernathy, Greenberg, and Horvitz 1970), Canada (Krotki and Fox 1974), and Taiwan (I-Cheng, Chow, and Rider 1972) and in developing countries such as Turkey (Tezcan and Omran 1981) and Sri Lanka (Rajapaksa and Perera 1994).

In this study, we report the levels of induced abortion obtained with the use of RRT in a multistage random sample of Colombian women between 15 and 55 years old. The objectives of the study were to calculate the levels of induced abortion in

Colombia using the RRT, describe the characteristics of women who report an abortion, identify the factors significantly associated with having had an induced abortion in a multiple logistic regression model, and describe the feasibility and acceptability of the RRT in the Colombian context.

The Random Response Technique The RRT, an information-collecting technique developed by Stanley L. Warmer (Horvitz, Shah, and Simmons 1967) in the 1960s, was created to protect the privacy of the participant when talking about sensitive topics.

The technique uses both the sensitive question and also a nonsensitive question for which there is a known probability of a yes response. The interviewer does not know the nature of the question for which she or he is recording the answer. Based on (a) the probability of selecting the sensitive question, (b) the frequency of a yes response to the nonsensitive question in the study population, and (c) the number of participants who answer yes to either the sensitive or nonsensitive questions, the researcher is able to indirectly estimate the proportion of people reporting the sensitive event or behavior.

Since this technique was first developed, several modifications have been made with an aim toward increasing participants' trust in the technique and enhancing its sensitivity to different cultures. An important condition in using this technique is that it must be applied to large samples because the data analysis uses only the data from participants who answered yes. If the probability of answering the sensitive question and the frequency of the sensitive event in the study population are low, a larger sample size is needed to obtain statistical power.

COMPARING RRT WITH OTHER METHODOLOGIES

In the studies reviewed where the RRT and other methodologies were tested to measure the levels of induced abortion, it was reported that RRT reveals a twofold increase in the frequency of the event (Krotki and Fox 1974; I-Cheng et al. 1972; Tezcan and Omran 1981; Rajapaksa and Perera 1994). Even if the frequency of sensitive issues reported with this technique is higher than that obtained with other techniques, prior research

A meta-analysis reviewed seven studies on sensitive topics, in which RRT was compared with an external criterion (Lensvelt-Mulders et al. 2005) and showed that when external validation sources of the participants' answers, such as medical, banking, and police records, were analyzed, RRT was revealed to underestimate the frequency of sensitive events. However, the study also reported that RRT produces more valid data than self-administered questionnaires with paper and pencil, computer questionnaires, telephone interviews, and face-to-face interviews (Lensvelt-Mulders et al. 2005).

Before launching the present study at a national level, it performed a rigorous comparative pilot study, using different methodologies to measure the levels of induced abortion in selected sites of Colombia (2003).

The techniques tested were face-to-face interview, audio-computer assisted self-interview, self-administered questionnaire with paper and pencil, and RRT. We tested all methodologies in three settings: public hospitals in Colombia City, among low-literate women in rural areas, and in a house-to-house interview in Colombia City. In all three settings, the RRT produced the highest levels of reported induced abortion (22 percent in public hospitals in Colombia City, 36 percent in rural areas, and 18 percent in house-to-house interviews in Colombia City), followed by the self-administered questionnaire. Very low levels were obtained with the face-to-

face interview and ENSP). Other researchers have reported that the RRT method does not yield more sensitive information than direct questioning methods when the participants' privacy and anonymity is guaranteed (Linden and Weiss 1994).

METHOD OF DATA COLLECTION

Sample Selection

We used a national, multistage probabilistic sample of 2,827 women from 15 to 55 years of age. Our sampling frame was a list of municipalities from the 1985 national census conducted by the Colombian government (Instituto Nacional de Estadística).

In the first stage of selection, we randomly chose 50 municipalities across the country by the proportional probability based on the number of households in each one. Afterwards, in each municipality, we randomly selected five comunas o corregimientos (by the proportional probability based on the number of households). In each comuna we selected three clusters of eight households each. In each cluster household, we listed all eligible members and collected information on the socioeconomic characteristics of the household. Finally, using a random selection card one woman between ages 15 and 55 was randomly chosen from each selected household to be interviewed with the RRT. At the end of the interview, the interviewer filled out a questionnaire to record the presence of problems in applying the technique and to state her opinions about the participant's skill in answering the random response question. The margin of error calculated for the sample was ± 3 percent with 95 percent confidence considering a rate of induced abortion of 36 percent. This rate was the highest obtained with the random response technique in previous pilot studies performed in three different random samples of women (ENSP).

DATA COLLECTION METHODS

Interviewers were trained to apply the RRT, and a pilot test of the questionnaire was undertaken with the supervision of the project coordinators.

During October 2005, data were collected by 32 interviewers (all women), 2 supervisors, and 1 field coordinator.

After requesting and obtaining informed consent, in each household, the interviewer applied two questionnaires. First, a household questionnaire was administered to measure household socioeconomic status. This questionnaire was answered by any household adult member and was a requirement for administration of the subsequent questionnaire. The second instrument was the RRT questionnaire, which was answered by a randomly selected woman from 15 to 55 years of age. We did not offer any financial or other types of reimbursement to women who agreed to participate in the study.

Quality control measures included having supervisors carry out follow-up visits to a subsample of households to verify the correct application of the methodology, with subsequent visits to a subsample of households to ensure that the interviewer had visited the correct household and had selected the proper woman.

QUESTIONNAIRES

The household questionnaire contained 18 questions about household conditions and the availability of household utilities (electricity, water, sewage), monthly salary of the family, and age, sex and occupations of all household members.

The RRT questionnaire contained 18 questions, including (a) sociodemographic information; (b) limited questions about the woman's reproductive history, including number of live children, ideal number of children, and unwanted pregnancies; (c)

use of family planning when the unwanted pregnancy occurred; and (d) the participant's views about legalizing abortion. We did not ask any direct questions about abortion in the RRT questionnaire.

At the end of the survey, we asked the random response question, using an unrelated question with known probability (Chaudhuri and Mukerjee 1998). We used the following method: *The interviewer held out two folders*, one red and one green (with the color coding intended to help low-literacy women). The red folder contained a sheet of paper with a red dot and the following question: **''Did you ever interrupt a pregnancy?''** The words yes and no were printed below the question.

The green folder contained a sheet of paper with a green dot and the following question: **''Were you born in April?**'' Again, the words yes and no were printed below. The interviewer then asked the participant to fold the sheets of paper into the same shape, so that it was impossible to identify one from the other, and to place them in an opaque bag. The interviewer asked the woman whether she had understood the process. If the participant reported doubts, the interviewer repeated the instructions. If the participant still did not understand the technique, the questionnaire was canceled. Once the interviewer was sure that the participant understood the technique, she shook the bag and asked the woman to reach inside and select one folded sheet of paper. The participant then unfolded her chosen paper and read the question silently to herself. The interviewer did not know which question the participant had chosen and was answering. The woman would then say her answer out loud, either yes or no. The interviewer then recorded the woman's response.

After finishing the RRT questionnaire, the interviewer filled out a questionnaire with her perceptions about *(a) the place where the interview took place, (b) the presence of others (relatives or friends) while the questionnaire was applied, (c)*

participants' problems in understanding the technique (noting, for example, if the respondent appeared to be illiterate or mentally or physically disabled), (d) ability of the participant to understand and answer the RRT, and (e) the participant's reaction to the questionnaire.

RESULTS

SAMPLE CHARACTERISTICS

A total of 2,384 households were visited across the country. It was not possible to apply the household questionnaire in 527 of them because elements in the sampling frame were no longer valid (for example, a household was found to be abandoned or was now a store) because of problems in locating a proper informant inside the house or because the informant refused to give information. In 15 households, it was not possible to apply the RRT questionnaire because the woman selected was temporarily living away from the home.

A total of 1,842 women were asked to participate in the study, and only 15 refused to do so. The nonresponse rate was 0.8 percent. A total of 1,827 participants answered the questions about sociodemographic characteristics, unwanted pregnancy, and opinion about abortion, but 35 women (1.9 percent) were unable to answer the random response question. Of these, 17 women (0.9 percent) did not understand the procedure and could not answer the question, 11 (0.6 percent) refused to participate, and 7 (0.4 percent) refused to participate and told the interviewer that they had not had an abortion.

The sample was fairly evenly distributed by age, with a slightly larger proportion of women in their teens and early 20s, compared to late 30s to late 50s. The majority (51.7 percent) of women had between six and nine years of education. Most women (71.2 percent) were either married or in a common-law–type relationship.

While over half (56.0 percent) grew up in a rural area, the majority (72.4 percent) lived in an urban area at the time of the interview. Most women (69.8 percent) were not in paid employment, and most (64.7 percent) were in the lowest of three household socioeconomic categories (based on an index of household assets and income).

The majority of women were Catholic (86.3 percent).

Table 2 shows the distribution of the sample of women of reproductive age, by reproductive behavior and attitudes about abortion laws. Seventy-five percent of women had had at least one live birth. The distribution of ‘‘ideal number of children’’ roughly matched the distribution of live births to women (the mean number of children was 3.1, and mean ideal number was 3.3, suggesting that many women had achieved their desired level of

Approximately 19.0 percent of women reported that they had had at least one unwanted pregnancy, and of these, 30.5 percent reported that they had been using some form of modern contraception the last time they had an unwanted pregnancy. Stated opinions about the legal right to have an induced abortion tended toward the conservative: the majority (52.1 percent) felt that abortion should be forbidden under any circumstance, while 41.9 percent felt abortion should be permitted under certain circumstances; only 5.5 percent felt that all women should have access to abortion.

PREVALENCE OF INDUCED ABORTION

As described in the Methods of Data Collection section, our estimate of the overall prevalence of induced abortion was 16.3 percent. Using the same method for deriving this estimate, we estimated the proportions within each sociodemographic and reproductive behavior subgroup that reported having had an induced abortion

(Tables 1 and 2). As shown, descriptive statistics suggested that abortion was more prevalent among younger, unmarried women with a moderate level of education; among those who have not yet given birth; had had an unwanted pregnancy; and felt that abortion should be accessible by law. Reports of previous induced abortion appeared somewhat more prevalent among formally employed women compared to the unemployed, as well as among those of lower socioeconomic status compared to those of medium or high economic status. While these data show the proportion of those who have had an abortion within each subgroup, no conclusions can be drawn from descriptive statistics regarding associations between these characteristics and having had an abortion. For this purpose, we carried out further analyses, described in the next section.

BIVARIATE AND MULTIVARIATE ASSOCIATIONS WITH EVER HAVING HAD AN INDUCED ABORTION

Table 3 shows findings of the analyses of the relationships between women's social, demographic, and economic characteristics and reported induced abortion. Bivariate analyses, not shown in Table 3, revealed that three factors were strongly associated with reported induced abortion: place of socialization, having never given birth, and, unsurprisingly, having had at least one unwanted pregnancy. The odds of having had an induced abortion among those who grew up in the city were double (OR 2.16) the odds of abortion among those participants raised in the country.

Participants who had never given birth had 60.0 percent higher odds (OR 1.60) than those who had at least one live birth. Finally, the odds of having

FEASIBILITY AND ACCEPTABILITY OF THE TECHNIQUE

The interview lasted an average of eight minutes. Table 4 shows the interviewers' opinions about participants' problems and skills in answering the RRT and the proportions that reported ever having had an induced abortion by these characteristics. A total of 77 participants (4.3 percent) experienced problems in answering the RRT. Forty-five women did not understand the procedure explained by the interviewer, 19 did not speak Spanish and it was necessary to use a translator, 3 women were pressured by relatives to answer the RRT, 3 women were completely illiterate, and 7 were not interested in the interview. When we compared the proportions of women having had an abortion by those groupings, we did not find statistically significant differences between the groups. In the group of women who experienced some problems with the RRT, 14.9 percent had had an induced abortion compared with 16.2 percent in the group that experienced no problems.

Most participants (73.3 percent) were evaluated by the interviewers as having had good skills to understand and answer the RRT. In this group, the percentage of women having had an abortion (15.9 percent) was lower than the group possessing regular or bad skills (17.0 percent). This difference was not statically significant.

Most interviews were conducted outside the home (71 percent). In this group, the frequency of women reporting having had an abortion was higher (17.5 percent) compared with the group that answered the questionnaire at home (13.3 percent). Here the difference was significant ($p<.05$). In 23 percent of all interviews, a relative or friend was present when the RRT was applied. Interestingly, women who were alone presented a lower level of induced abortion (15.8 percent), compared with women who were not (18.1 percent); however, this difference was not statistically significant.

Table 5 shows the sociodemographic characteristics of women who experienced difficulties following the RRT. Those experiencing problems were more likely to have been socialized in the country (6.0 percent), to live in rural localities (6.1 percent), to have zero years of education (15.9 percent), to live in a household with low socioeconomic status (5.5 percent), and to be unemployed (5.0 percent).

DISCUSSION

It is common that some methodologies considered successful in developed countries produce ambiguous results or difficulties in interpretation

Our study estimates that 16.3 percent of Colombian women have had at least one induced abortion during their lifetimes. Our results are higher, compared with those obtained by a direct question included in the National Fertility Survey in 1986 (13.0 percent; but are lower compared to those obtained in other Latin American countries using a self-administered questionnaire, where 23 percent of urban women reported having had at least one induced abortion in their lifetimes (Zamudio et al. 1999).

We found in bivariate and multiple logistic regression analysis that women who grew up in the city, those who had not yet given birth, and those who have had an unwanted pregnancy, were more likely to have experienced an induced abortion.

Women who grew up in the city were likely to have had better access to abortion services than their counterparts who grew up in rural areas; they also may have greater knowledge about the availability of abortion services and a higher level of sociocultural acceptance of induced abortion compared to counterparts with potentially more conservative rural upbringings. This tendency has been reported in a study, comparing the abortion rates reported in different areas of Colombia.

Abortion rates were higher in areas with large cities (Bogotá, Medellín, Calí) than in those areas comprising smaller cities, towns, and rural settings.

Our finding that women who have never given birth were more likely to have had an induced abortion is not surprising; it suggests that abortion is used to delay the beginning of motherhood, rather than to space or limit births. This finding also may reflect more limited access to family planning information and services among women who have not yet had their first child. As postnatal care typically includes contraceptive counseling and linkages to other reproductive health services, this may provide the first point of contact with family planning services for many Colombian women. In a national fertility survey conducted in 1995, nearly half of the Colombian women sampled (46.5 percent) reported that they had begun to use a contraceptive method in the postpartum period (Celade 1997). This finding suggests a potential missed opportunity to prevent unwanted pregnancies among women who have not yet begun childbearing women who may be more likely to be younger and less likely to be married compared to women who have begun childbearing. Indeed, we found that women from 15 to 24 years of age and those who are unmarried reported more induced abortions than older and married women, although bivariate and multiple logistic regression analysis did not detect a significant association between these factors and having had an induced abortion. However, prior studies have found that abortion is more frequent in young and single women. Zamudio et al. (1999) reported that among a probabilistic sample of urban women in Colombia, single women younger than age 20 were at high risk of having undergone previous induced abortions. The Alan Guttmacher Institute (1999) also reported that in various countries, abortion rates are typically highest among the 20 to 24 age group. Another possible explanation for the high rates of induced abortion observed among younger women is that they may ave more knowledge and access to clandestine abortion providers and effective abortifacient drugs compared with women of past generations. A number of studies have documented that in the past decade, in Latin American countries, there has been

an increase in the use of the analog prostaglandin, misoprostol an effective medical abortifacient widely available in pharmacies over the counter and that women are using this drug to self-induce abortions (Barbosa and Arilha 1993; Lara et al. 2005). Additional studies are needed in Latin America to explore the relationship between access to (and demand for) family planning services for adolescents and unmarried women and abortion.

A limitation of the RRT is, of course, that the self-report of abortion for any particular woman is not linked to other reported information, particularly sociodemographic and other variables of interest. While the data generated from this study may be more subject to measurement error than are data from smaller, clinic-based studies that gather individual-level data on abortions, the data should be more generalizable and reflective of the overall prevalence of induced abortion within various population groups.

It was not possible with our data to ascertain whether a better understanding of the technique increases or decreases reporting of the sensitive event, and we did not find any consistent trend (Table 4). Nevertheless, we found a clear association between some sociodemographic characteristics and the successful use of the RRT. The most successful women in using the technique were those with higher levels of education, coming from medium or high socioeconomic levels, currently living in urban areas or having done so until 12 years of age, and currently working.

We recommend caution with random response data obtained from illiterate or low-literacy participants, those speaking a language other than the interviewer, and those with problems understanding the RRT procedure. More research is necessary about the validity of RRT with these specific groups. Also, we recommend that the RRT be applied in conditions of privacy, offering the respondent the possibility of participating outside the house if a relative or friend is in the house during the interview, or to establish a better time for the interview.

Some studies conducted in developing countries have reported that the RRT generated distrust or suspicions in participants who thought there ‘‘trick’’ involved and therefore doubted that the RRT truly was blinded.

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