

CHAPTER 5

Examples of Methods to Address Underreporting of Induced Abortion: Preceding Birth Technique and Randomized Response Technique

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The purpose of this chapter is to present examples of data collection techniques that minimize or eliminate the underreporting of induced abortion, which is particularly relevant in contexts where abortion is illegal or access is highly restricted. The methodological challenge of measuring induced abortion, which is deliberately practiced clandestinely, has led researchers to adapt estimation methods that can investigate stigmatized behaviors. The techniques described in this chapter are the Preceding Birth Technique (PBT) and the Randomized Response Technique (RRT). These methods, when combined with population and pregnancy data, can yield indicators such as abortion rates and ratios, and when applied to data for multiple years, can yield information about trends in induced abortion. However, they cannot obtain detailed information on the characteristics of women who have induced abortions. The results of RRT in particular are usually used to complement findings from other research techniques.

Part I. Preceding Birth Technique

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PBT is an estimation method that was originally developed to approximate under-two mortality in settings where the majority of births are registered (Brass and Macrae 1984; Brass and Macrae 1985). Briefly, women coming to register the birth of a child are asked whether they had given birth before; if the answer is yes, they are asked when, and whether that child survived. The resulting data are then used to estimate the rate of under-two mortality for the general population.

PBT was subsequently adapted as an alternative method of tracking changes over time in adverse pregnancy outcomes, including induced abortion. This modification was conceived for use in developing-country settings where both cross-sectional and trend data are lacking at the national and local levels. As with women who are asked about the survival of previous births, women can also be asked about outcomes of prior pregnancies. The method provides a rough approximation of the proportion of all pregnancies that end in induced abortion (referred to as an abortion ratio, or the number of abortions per 100 pregnancies). The method is applied with a convenience sample of women attending health facilities for prenatal or

delivery care, which makes identifying the target population simpler than using a community-based approach. PBT is particularly useful in documenting trends in induced abortion over time and is relatively simple to implement because it involves only a slight modification to routine facility-based data collection procedures.

Application of PBT in Ghana

A pilot test of PBT to assess its feasibility in estimating stillbirths, miscarriages and induced abortions was conducted in Accra, Ghana (Oliveras et al. 2008). Data were collected during prenatal and maternity visits made from November 2003 through January 2004 at three public and two private clinics. As such, the sample reflects women with access to prenatal and maternity services available in Accra and is not representative of the general population.

Staff nurses at the participating clinics collected the data as part of their routine care. Prenatal clients were interviewed at the time of check-in, and delivery clients were interviewed at a time that was convenient for them; all interviews were strictly confidential. All women older than 15 who came to the clinics for services were included. Since the pilot showed that the method worked better in terms of implementation and reporting with prenatal than with delivery clients (Oliveras et al. 2008), the text below describes its application in the recommended setting of prenatal care provision.

To ensure that each prenatal client was interviewed just once, clients were only eligible (and interviewed) if they were making their first visit. Women's background characteristics were collected from both health records and the study questions to allow researchers to assess any personal characteristics that could be associated with abortion.

Nurses conducting routine intake interviews incorporated four additional questions that asked about the outcome of a woman's preceding pregnancy (Table 1, see table at the end of the chapter). First, each woman was asked whether she had been pregnant before. Women who said they had were asked about the outcome of their last pregnancy. If that pregnancy did not end in a live birth, the woman was asked if she had had a stillbirth, a miscarriage or an induced abortion. Women who reported a

spontaneous or induced abortion were asked an additional question in familiar, local language to minimize any confusion between the two. In this pilot study, the phrase “put a hand to it [the pregnancy]” was used because qualitative research in Accra had found this to be a common euphemism for inducing an abortion (Aniteye 2003).

Once women who are pregnant for the first time are excluded, the remaining women’s reports of their most recent prior pregnancy provide the input data for the method. As shown in Table 1, this is straightforward for both live births and stillbirths. However, differentiating between miscarriages and induced abortions can be challenging. A pregnancy is considered to have ended in a miscarriage if the woman says it did (see below for potential data quality issues here) and if she answers “no” to the final question—whether she or someone else “put a hand to it.” If a woman does not respond to this final question, we assume that the pregnancy ended in an induced abortion since women are unlikely to overreport induced abortions.

To calculate the abortion ratio, the number of women indicating having had an induced abortion is related to the total number of reported pregnancies (the number of women surveyed minus those with no prior pregnancies). The abortion ratio is the number of abortions divided by the total number of reported pregnancies. To ensure reasonable precision for the estimated proportion of pregnancies ending in abortion, approximately 1,000 pregnancies are required, although fewer are needed if the abortion ratio is greater or less than 50%.

In the pilot test in Accra, 2,662 eligible women attended the participating clinics during the three-month study period; only two women refused to participate. Among the participating women, 1,636 reported a previous pregnancy and 229 of these pregnancies resulted in an induced abortion, which yields an abortion ratio of 14 per 100 pregnancies.

If the method’s aim is solely to estimate the abortion ratio, only responses to the four questions outlined in Table 1 are needed. However, if a description of women who resort to abortion is desired, additional information will need to be collected from the women or existing health records.

The original PBT was designed to be implemented at any level, from an individual clinic to all health facilities nationally; the same holds true for the version modified to collect information about induced abortion. If the aim is to collect data beyond a single clinic, a broader sampling strategy will need to be considered. The pilot study showed that abortion ratios varied widely between public and private clinics, which highlights the need to include the full range of facilities when representative data are de-

sired. Within a single clinic, sampling bias is not a concern because all women seeking prenatal care are included.

Two ethical issues are particularly important with regard to the implementation of this method. First, confidentiality is a priority. Because intake interviews may be conducted in relatively public settings (i.e., in front of other clients), confidentiality can be difficult to maintain. Careful training of staff can help ensure that they conduct the interviews in private. This may also require discussions with clinic administrators to reconfigure the setup for intake interviews. Second, in settings where pregnancy is common among young unmarried women, concerns may be raised about the appropriateness of including such women. Decisions about age-related eligibility for participation should take into account both international standards and the local context.

Although the questions were designed to reduce underreporting, data quality will always be a concern in studies of abortion. This method may also be subject to differences in reporting based on provider attitudes. Careful training and supervision are needed to ensure that all staff conducting intake interviews participate, and that they do not allow their personal attitudes toward abortion to affect the way they ask the questions.

Strengths and Limitations of PBT

The modified PBT has a number of advantages over other methods of collecting data on adverse pregnancy outcomes. Because it is carried out by health workers who are already providing care, it is relatively low cost and easy to implement. Since the questions are asked as part of routine care rather than as part of a household survey, it is more likely to reach women who may not participate in community-based surveys for a variety of reasons—i.e., they are isolated geographically; work long hours; live in housing unlikely to be covered by a survey, such as a university dormitory; or are unwilling to report an adverse pregnancy outcome as part of a reproductive health survey. In addition, patients seeking prenatal care for a presumably wanted pregnancy may be willing to mention a prior abortion if they fear it might affect the health of their current pregnancy in some way, which is not necessarily the case among women who are approached in household surveys.

With the modified PBT, recall bias is minimized because women are asked about the pregnancy just before their current one, and women in general are more likely to report recent abortions than abortions that occurred earlier (Johnston and Hill 1999). In addition, the questions are asked in such a way as to minimize misclassification due to misunderstanding. However, it should be noted that women may still purposefully report induced abortions as

miscarriages, which would lead to underestimates of abortions and overestimates of miscarriages.

Selection bias is also possible with a facility-based sample, particularly in settings where prenatal coverage is limited. To reduce this bias, alternative sites for data collection, such as family planning clinics, could also be considered if their coverage is higher than that of more generalized clinics. However, some selection bias is likely to occur in family planning clinics as well.

It is important to consider that the modified PBT will always fail to capture specific induced abortions. For example, abortions that resulted in complications that lead to sterility or death will not be counted, since the method is applied only to women who are currently pregnant. Also, the abortions of women who remain childless after an abortion will also be excluded. Further, repeat abortions are likely to be missed among prenatal clients, because women are unlikely to seek prenatal care for a pregnancy that they plan to terminate; however, if women have multiple abortions prior to having a full-term pregnancy, their last abortion will be included.

Despite these limitations, the modified PBT is useful in particular situations. While it may not reflect the absolute level of abortion in a given setting, it can be used to show trends over time, assuming that there are no changes in women's willingness to report past abortions. PBT provides a reasonable estimate of the frequency with which women terminate pregnancy and is most useful in countries where women commonly receive facility-based prenatal care and where women rely on abortion to delay a first birth and to space births rather than end childbearing.

Part II. Randomized Response Technique *Gobopamang Letamo*

RRT is a data collection method developed in the 1960s by Stanley L. Warner that is useful in obtaining information on sensitive issues such as illicit drug use (Goodstadt and Gruson 1975; Fisher et al. 1992), theft (van der Heijden et al. 2000), prostitution and induced abortion. It is specifically designed to protect the privacy of the respondent (Horvitz et al. 1967). The method is called "randomized response" because the respondent randomly selects a question with a known response probability without revealing to the interviewer which question has been chosen. The technique uses a combination of two questions with a yes-no response.

One of the questions, the subject of the research, is the sensitive question (in this case, whether a woman has ever had an induced abortion) for which the probability is unknown. The second question is nonsensitive and has 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, and both the respondent and the interviewer are protected by the nonspecific nature of the response.

The researcher is able to indirectly estimate the proportion of respondents reporting the sensitive event or behavior based on the following three factors: 1) the probability of selecting the sensitive question, 2) the frequency of a "yes" response to the nonsensitive question in the study population and 3) the number of respondents who answer "yes" to either the sensitive or nonsensitive question (Lara et al. 2006). The method assumes that the respondent answers truthfully and that the proportion answering the nonsensitive question (e.g. "Were you born in September?") is known in advance (Abernathy et al. 1970).

The methodology has been applied to estimate induced abortion in settings as varied as the United States (Abernathy et al. 1970), Mexico (Lara et al. 2006), Botswana (Letamo 2007), Taiwan (I-Cheng et al. 1972) and Turkey (Tezcan and Omran 1981). Generally, RRT tends to outperform other methods of estimating induced abortion such as direct questioning of women. However, implementing RRT also has drawbacks. It can be costly and time-consuming; the data are dependent on respondents establishing trust with the interviewer; sample sizes tend to need to be larger than with other indirect methods; and its application can have limited success among illiterate or rural populations.

Application of RRT in Mexico

The method was applied in 2001 with a national, multi-stage probabilistic sample of 1,827 Mexican women from 15 to 55 years of age (Lara et al. 2006). First, a household questionnaire to measure socioeconomic characteristics was administered to all adult household members. Then, a randomly selected woman in each household was asked to respond to a questionnaire, which included items on social and demographic information, a limited number of questions on the woman's reproductive history (including the number of living children, ideal number of children, number of unwanted pregnancies and whether family planning was used when they occurred) and the respondent's views about whether abortion should be legal. However, no direct questions on abortion were included in the questionnaire.

At the end of the survey, the randomized response method was applied with 1,729 women in the following manner: 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 question: "Did you ever try to 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 question: "Were you born in April?" Again, the words "yes" and "no" were printed below. The interviewer then asked the participant to take a sheet from each folder and fold them into the same shape so one could not be identified from the other, and to place them in an opaque bag.

The interviewer asked the woman whether she had understood what she was being asked to do. If the participant reported doubts, the interviewer repeated the instructions. If the participant still did not understand the technique, her response was rejected. Once the interviewer was sure that the participant understood the technique, she shook the bag and asked the woman to insert her hand and select one folded sheet of paper. The participant then unfolded it and read the question silently to herself. The interviewer did not know which question the participant chose and would answer. The woman said her answer, either "yes" or "no," out loud. The interviewer then recorded the woman's response.

The calculation of the proportion of women who had ever had one or more induced abortions over the course of their lifetime (π_1) was done using the formula

$$\pi_1 = \frac{\lambda - \pi_y (1 - P)}{P} \text{ where:}$$

λ = proportion of women who responded "yes" to the sensitive RRT item (here, $222/1,792 = 0.1238$).

π_y = proportion of the population expected to respond "yes" to the nonsensitive RRT item (born in April). National census statistics (as reported in Lara et al. 2006) indicate that 8.5% of annual births occur in the month of April.

P = probability of selecting the sensitive RRT item about induced abortion. As there were two questions, the probability = 0.5.

$1 - P$ = probability of selecting the nonsensitive RRT item asking whether the respondent was born in April (0.5).

Given these data, lifetime prevalence of induced abortion in the sample was calculated as:

$$\pi_1 = \frac{0.1238 - 0.085 (0.5)}{0.5} = 0.1626.$$

Thus, based on this indirect estimation technique, 16.3% of women in the sample have had at least one abortion over the course of their lifetime.

Application of RRT in Botswana

RRT was recently implemented to estimate abortion prevalence in Botswana with 4,676 women of reproductive age in combination with direct and indirect questioning (Letamo et al. 2007). After women were first interviewed about general background characteristics and their reproductive and abortion history (which included a filter

question about unwanted pregnancy), they then participated in the application of RRT. The technique was adapted to local conditions so its implementation did not require the respondent to be literate. Further, researchers who applied the method provided a clear definition of abortion so respondents understood fully what was they were being asked to report.

The technique was carried out as follows. Since some women were illiterate, researchers used black and red beads from the traditional game of *Khupele-Khupele* to designate the two questions. The beads were to be drawn out of a bag by participants. The black beads represented the question on abortion ("Have you ever had an induced abortion?") and the red beads represented the nonsensitive question ("Were you born in the month of Botswana's Independence?"). As recommended by research, a total of 50 beads—35 black and 15 red—were used so the sensitive question would be randomly selected 70% of the time (35/50) and the nonsensitive question, 30% of the time (15/50) (Abernathy et al. 1970; I-Cheng et al. 1972; Tezcan and Omran 1981).

The interviewers mixed the beads thoroughly and explained the process to each participant before applying the method. The interviewer repeated once more what each color bead represented. The respondent was asked to repeat what the interviewer had said to check for comprehension. In answering the selected question, the respondent said only "yes" or "no," so that the interviewer could not know which question was answered. As respondents drew their bead from the bag, interviewers were instructed to turn their heads away to avoid seeing which color bead the respondent had drawn.

In the Botswana study, RRT was implemented after the background and reproductive history interview to ensure that a good rapport between interviewers and respondents had been established and that the definition of induced abortion would be clear from items on women's knowledge of and general attitudes toward induced abortion.

The proportion of women who had ever had an induced abortion (π_1) was calculated as follows:

$$\pi_1 = \frac{\lambda - \pi_y (1 - P)}{P} \text{ where:}$$

λ = proportion of women who responded "yes" to the sensitive RRT item (here, $373/4,676 = 0.080$).

π_y = proportion of women born in the month of Botswana's Independence (i.e., $1/12 = 0.08$).

P = probability of selecting the sensitive RRT item about ever having had an induced abortion (equivalent to the ratio of black beads to total beads in the bag, or 35/50 = 0.70).

$1 - P$ = probability of selecting the nonsensitive RRT item on whether the respondent was born in the month of

the country's independence ($1 - 0.70 = 0.30$).

Given these data, the calculation was:

$$\pi_1 = \frac{0.08 - 0.08(0.3)}{0.7} = 0.08.$$

Based on this indirect estimation, 8% of women in the Botswana sample had had at least one abortion over their lifetime.

Three additional questions were asked of the RRT participants after they completed the technique to gauge their opinion of the approach. The purpose of the first two was to measure our success in convincing the respondent that our motives were legitimate and above reproach, and that there was no veiled intent to trick or mislead. These two questions were:

1) "Now, as I said, there is no way we can tell which question was selected. Do you think other women like yourself, your friends and your acquaintances will think that there is a trick to this and that we really can figure out which question was answered?"

2) "When you selected a Khupele-Khupule bead, did you think that we could figure out which question was selected?"

The third question, whose purpose was to elicit respondents' opinions on the probable validity of the direct approach in obtaining data on induced abortion, was:

3) "If an interviewer, like myself, asked one of your friends if she had ever had an induced abortion, do you think that person would answer truthfully?"

Strengths and Limitations of RRT

Generally, RRT tends to outperform direct questioning about induced abortion (Tezcan and Omran 1981; Tracy et al. 1981; Lara et al. 2006; Letamo et al. 2007), probably because it allows respondents to report on sensitive issues with their confidentiality ensured. It thus reduces the likelihood of untruthful responses. Indeed, not knowing which question the respondent is answering is a particular strength of the method, which protects both the respondent and the interviewer. As long as absolute confidentiality is ensured, one would expect participants to feel free to truthfully respond to a sensitive question regardless of how socially undesirable their response may seem.

The method has been widely used and tends to provide higher prevalence estimates than direct questioning, but likely still underestimates true prevalence in most settings. However, the opposite situation occurred in Mexico where researchers found that RRT overestimated induced abortion relative to other methods among low-educated, rural women (Lara et al. 2004). In that study, which was conducted in urban and rural settings and compared different methodologies, researchers found that for rural areas

(Chiapas), the prevalence of induced abortion attempts determined through RRT was three times higher than that from face-to-face interviews, self-administered questionnaires and audio-computer assisted self interviews (36% vs. 10–12%). RRT's relative unreliability in estimating prevalence in rural areas was confirmed by the method yielding a higher proportion in such areas of attempted abortions than of unwanted pregnancies (36% vs. 33%), a logical impossibility. Results were more logically consistent in a house-to-house survey conducted in Mexico City (i.e., RRT yielded an unplanned pregnancy prevalence of 27% and an abortion attempt prevalence of 18%). And whereas RRT resulted in the highest estimate of abortion attempts compared with the other three techniques in the Mexico City household sample, there was much less variability in estimates by method in urban areas (18% with RRT vs. 7–11% with the other three techniques) (Lara et al. 2004). Another strength of RRT is that the researcher can include a follow-up question that indirectly evaluates the reliability of responses by asking whether the woman thought a friend would answer truthfully.

A major limitation of the method is that it requires a very large initial sample size to generate a large enough sample of participants who answer "yes" to the sensitive question. For example, the sample size depends on the probability that participants select the sensitive RRT item; if researchers choose a selection probability of 0.5, then they will require twice the sample size to obtain the same power, since only half of respondents are asked about abortion. If both the probability of answering the sensitive question and the frequency of the sensitive event in the study population are low, an especially large sample size is needed to obtain enough statistical power.

Another limitation of RRT is that although the frequency of sensitive issues reported with this technique is high, research suggests that the method still tends to underestimate the event under study (Locander et al. 1976; Musch et al. 2001).

The method can be implemented relatively quickly, but the duration of an RRT interview may be slightly longer than a face-to-face interview due to the extra time needed to explain the procedure. Applying the method may require creativity on the part of the researcher, especially when used with illiterate populations.

We advise caution when using the method with illiterate or low-literacy women, women who speak a language different from that of the interviewer, and women who have problems understanding the procedure. In addition, the quality of the data collected depends on participants' level of cooperation, their suspicions of the interviewer's intentions, how clearly the method was explained to them and how well they understood it. For example, if

respondents suspect punitive or vengeful motives, they are likely to provide untruthful answers to the questions asked. Properly trained interviewers would ensure that the data collected are of high quality. The interviewers have to be able to explain how RRT works in simple terms for respondents to believe that they are not being tricked into admitting something that can be used against them. If the method is properly explained to respondents, there is a high likelihood that the responses will be truthful.

Field-staff training requires a detailed and thorough explanation of the method's application. Failure to implement it properly will render the results useless. Since the technique was first developed, several modifications have been made to increase participants' trust in the technique and enhance its sensitivity to different cultures.

Finally, RRT is limited in that it can only produce aggregated data. Even though abortion prevalence by social and demographic characteristics can be calculated, such estimates are subject to bias because they are indirect calculations based on the number of respondents who answered yes to the RRT question.

Conclusion

Both methods described here provide viable, indirect ways of estimating abortion prevalence and are particularly useful in contexts where information on abortion is scarce due to legal or moral sanctions. The strength of these methods is that they ensure confidentiality; thus, women may be more likely to answer truthfully with PBT or RRT than with direct techniques. Like any research methodology, these methods have limitations; specifically, they are unable to yield descriptive information on women who have had abortions.

According to the context, the estimates generated by the methods could underestimate or overestimate true prevalence. For example, RRT seems to provide more reliable estimates in urban areas among educated women than in rural areas among less-educated women. Ideally, the results obtained by these methods should be validated through triangulation with other data.

Like other methods that attempt to quantify induced abortion, PBT and RRT must face the challenge of correctly distinguishing between induced and spontaneous abortions. Furthermore, RRT needs to be carried out with large sample sizes to obtain statistical power. Implementing RRT may be more time-consuming and costly than the more practical and more readily implemented PBT. However, the complexity involved in applying RRT may be worth the effort when use of a high-precision method is warranted.

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TABLE 1. Questions used in the modified PBT to estimate pregnancy outcomes

Question	Response
1. Have you ever been pregnant before, even for a short while, before this current pregnancy?	1...Yes 2...No
2. Women sometimes have pregnancies that do not result in a live born child. Did your last pregnancy end in a live birth?	1...Yes→ Live Birth 2...No
3. Did it end in a stillbirth, a miscarriage or an abortion?	1...Stillbirth→ Stillbirth 2...Miscarriage 3...Abortion→ Induced Abortion
4. Did you or someone else “put a hand to it”?	1...Yes→ Induced abortion 2...No→ Miscarriage

