METHODOLOGICAL ISSUES IN ABORTION ESTIMATION

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PREFACE

Abortions have been around forever. But at different points of time in history it has received attention for differing reasons, some in support of it, but often against it. Abortion is primarily a health concern of women but it is increasingly being governed by patriarchal interests which more often than not curb the freedom of women to seek abortion as a right.In present times with the entire focus of women's health being on her reproduction, infact preventing or terminating it, abortion practice becomes a critical issue. Given the official perspective of understanding abortion within the context of contraception, it is important to review abortion and abortion practice in India. The Abortion Assessment Project India (AAP-I) has evolved precisely with this concern and a wide range of studies are being undertaken by a number of institutions and researchers across the length and breadth of the country. The project has five components:

I. Overview paper on policy related issues, series of working papers based on existing data / research and workshops to pool existing knowledge and information in order to feed into this project.

II. Multicentric facility survey in six states focusing on the numerous dimensions of provision of abortion services in the public and private sectors

III. Eight qualitative studies on specific issues to compliment the multicentric studies. These would attempt to understand the abortion and related issues from the women's perspective.

IV. Household studies to estimate incidence of abortion in two states in India.

V. Dissemination of information and literature widely and development of an advocacy strategy.

This five-pronged approach will, hopefully, capture the complex situation as it is obtained on the ground and also give policy makers, administrators and medical professionals' valuable insights into abortion care and what are the areas for public policy interventions and advocacy.

The present publication is the sixth in the AAP-I series of working papers. Shelley Saha has systematically reviewed methodological issues pertaining to abortion estimation using community based surveys.

We look forward to comments and feedback which may be sent to cehat@vsnl.com Information on this project can be obtained by writing to us or accessing it from the website : www.cehat.org.

Ravi Duggal
Coordinator, *CEHAT*

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ABSTRACT

Interest in abortion research is emerging as a public health issue, as there is increasing evidence of the contribution of induced abortion in maternal morbidity and mortality. While there is no reliable estimate of the magnitude of abortions that take place, a few sporadic studies tend to suggest that the proportion of women resorting to abortion could be high. Due to inconclusive nature of most of the incidence studies on abortion, it became important to come up with reliable estimates on incidence of abortion in India. The paper reviews the methodological issues that are peculiar to abortion estimation using community based surveys.

The main sources of information are examined, and their relevance in assessing rates of induced abortion is addressed. In India one can get information on abortion from the Family Welfare Programme Year book. This contains information on a yearly basis on reported Medical Termination of Pregnancies, conducted at registered centers. Abortions based on reporting often are an underestimate because even in countries which have legalized abortion the mechanisms for regulation and reporting are poor. Thus various other methods like indirect estimation techniques are used in calculating abortion rates. Besides the above two methods, official records and indirect estimation techniques, abortion rates are also estimated through surveys, both prospective and retrospective.

This paper mainly deals with methodological issues related to community based abortion estimation surveys. Review of literature shows that there are various factors which affect estimation of abortion. One of the important factors that affect abortion estimates is accuracy in identification of pregnancy. But in retrospective community based surveys, identification of all pregnancies is not possible and therefore most of the time the estimates are based on reported pregnancies.

Many of the abortion estimation surveys suffer from reporting errors, both non-intentional and intentional. Intentional mis-reporting may be improved to some extent by improving methodologies like ensuring privacy and confidentiality. Number of abortion estimation surveys suffer from under reporting due to recall error, though the extent of under reporting is not known. Some studies have tried to minimize under reporting by having filter questions between two pregnancy outcomes. One of the most challenging parts of abortion rate estimation surveys is to determine the required sample size, which would enable generalization of the findings. Moreover, studies should take into account factors like design effects, under reporting and non-response rates. Determining population estimate for induced abortion is a more difficult task than that based on spontaneous loss, as the determinants of the induced loss vary greatly across populations and across regions within a country. In the Indian context, in the absence of any other estimate, the formula adopted by the Shah Committee in 1966 has been widely used for population estimate of pregnancy wastage. Though both probability and non-probability sample design has been used by surveys estimating pregnancy wastage, it is better to

use a probability sample design as it leads to better generalisation. This review suggests that there is a need that surveys undertaken to estimate abortion rate should be sensitive to elicit better information. Besides survey questionnaire, other data collection methods like use of randomised response technique or self-administered questionnaire have also been reviewed. The paper concludes with information on further strategies that might be adopted for future research on this sensitive and stigmatised issue.

ACKNOWLEDGEMENTS

GLOSSARY OF TERMS AND ACRONYMS

ANM	Auxiliary Nurse Midwives
DQ	Direct questioning
Hhds	Households
ICMR	Indian Council of Medical Research
IIPS	International Institute of Population Sciences
KAP	Knowledge, Attitude and Practices
MOHFW	Ministry of Health and Family Welfare
MTP	Medical Termination of Pregnancy
NFHS	National Family Health Survey
PHCs	Primary Health Centres
PSUs	Primary Sampling Units
RCH	Reproductive and Child Health
RRT	Randomised response technique
TFR	Total Fertility Rate
WFS	World Fertility Survey

Estimating Abortion Rate Through Community Based Studies Methodological Issues

I. Context

Induced abortion is an ancient practice, experienced by women all over the world. Among the issues related to reproductive health, none has more controversial connotations than abortion, nor carry a heavier burden of stigma, including moral or religious condemnation. It's exact incidence, therefore, as well as that of abortion-related morbidity and mortality is difficult to ascertain. But information on abortion incidence is required to evolve appropriate management strategies for unwanted pregnancies. Abortion has important public health concerns that are often overlooked.

Abortion rate is one of the less studied areas within abortion research in India and whatever work has been done on this topic is through a few community-based studies (ICMR 1989; Ganatra et al 2000; Nair and Kurup 1985). Recently though, national level fertility surveys like National Family Health Survey (NFHS) and Reproductive and Child Health (RCH) have come out with percentages of abortion (IIPS 1995; IIPS 2000a; IIPS 2000b). It is necessary to know the correct rate of abortion, as it will help the policy makers and planners to provide safe abortion services. Other reasons for interest in accurate information on abortion incidence are to estimate fecundity and understand the fertility dynamics of population.

In the light of the global demand for accurate estimate of abortion rates and due to the sensitiveness of the topic, various studies have experimented with different methodologies to estimate rate of abortion. This paper is an attempt to understand the implications of various methodologies adopted in community-based abortion rate studies and the methodological issues innate in carrying out such studies, in order to guide further research to improve accuracy in estimates of abortion. The paper reviews the available literature on abortion research, both national and international, with focus on estimates of abortions, based on published and unpublished studies. The paper is divided into following sections:

l   Estimating abortion rates: different sources

l   Factors affecting abortion estimates

l   Conclusions

II. Estimating Abortion Rates : Different Sources

Information on number of abortions can be gathered from three sources - government statistics, indirect estimates, and fertility surveys.

A. Government Statistics

Statistics of induced abortions are published periodically in countries with liberal abortion laws. India legalised abortion by passing the Medical Termination of Pregnancies Act in 1971. According to the Act pregnancies could be terminated legally only under certain circumstances and for certain reasons only by a registered Medical Practitioner and at a place where the facilities

available are in keeping with the standards prescribed in the Act. Ministry of Health and Family Welfare (MOHFW) annually publish the Family Welfare Programme Yearbook, which contains information on the number of Medical Termination of Pregnancies (MTPs) conducted at registered centres during the year. These centres performing abortions report to the Directorate of Health Services of respective states the number of MTPs performed. But the completeness and accuracy of the information is far from satisfactory. Also non-registered abortion centres and traditional abortionists undertake large scale abortions which are never reported. Therefore, estimating abortion rates from government statistics in a country like ours would lead to under reporting of induced abortions. This is evident from the fact that though there has been a substantial increase in MTP centres since 1982-83 there is no corresponding increase in numbers of MTPs performed (Mathai 1997).

B. INDIRECT ESTIMATION TECHNIQUE

Indirect estimation technique is another way of estimating abortion rates as estimates from clinic and survey data are usually considered to be underestimates. Singh and Wulf estimated rate of induced abortion for six Latin American countries by adjusting data on abortion related hospitalisations. The technique used data on hospitalisations related to abortion to estimate the number of additional, uncomplicated abortions. This approach assumed that the number of abortion-related hospitalisations could be weighed up, or inflated, to produce an estimate of the total number of abortions. For example, if one woman in three who have an abortion is hospitalised, the total number of abortions can be estimated to be about three times the number hospitalised (Singh et al. 1994). In general, the safer abortion services are the higher the multiplier that is needed, because for every woman hospitalised, many have abortions that do not result in complications or hospitalisations. Besides safety, the multiplier is also a function of the general availability of health care services (Singh et al. 1997).

Johnston and Hill criticised this method on the ground that to implement this technique, researchers must develop and continually update a wide range of assumptions and adjustment factors like data on abortion related hospitalisation, availability of safe abortion. Therefore maintaining the necessary information for calculating abortion rate is daunting even at the regional level and more so at the global level. They suggested using Bongaart's proximate determinants model for estimating abortion rate (Johnston and Hill 1996). This model is based on the defined fact that socio-economic factors affect fertility through a set of intermediate variables starting from exposure to intercourse up to a pregnancy ending in a live birth as defined by Davis and Blake (Kanitkar and Radkar, 2000). Bongaarts refined this model and identified eight proximate determinants of fertility, which would allow calculation of the index of abortion. The determinants are based on biological and behavioural factors like marriage, frequency of intercourse, spontaneous intrauterine mortality, induced abortions, post-partum insusceptibility, use and effectiveness of contraception, permanent sterility and duration of fertile period. This method is based on the concept that all socio-economic, cultural and biological variables that influence fertility work through a limited number of proximate factors. He has observed differentials in the values of indices of proximate determinants by stage of fertility transition and says that role of induced abortion increases as fertility declines (Bongaarts 1982).

Using Bongaart's proximate determinants model to estimate abortion has its own limitations. An error in any of the determinants would result in incorrect estimation. For example, Bongaart's model is highly de-

pendent on Total Fertility Rate (TFR) and India as a whole still has large fertility differentials and therefore while estimating abortion rate this factor needs to be taken into account. Therefore these indirect techniques of estimations cannot be a substitute for empirical research, at least in the present context.

Another method of indirect estimation was employed in a study in Nigeria. The physicians (mostly senior gynaecologist or owner of the facility) from 672 selected health facilities were interviewed to estimate annual number of abortions. The facilities were selected through a systematic stratified random sampling from a national list of health care facilities, which provided abortion services and treated abortion complications. The assumption for adopting this approach was that the facility-based estimate of the number of abortions provided by physicians could then be combined with an estimate of the likely number of abortions performed by non-physicians. These could be projected from the data regarding the number of complications treated in health facilities (Henshaw et al. 1998). The latter estimate was based on the number of abortion complications requiring medical treatment, and provider assessments of the percentage of non-physicians abortions that are likely to result in health complications requiring medical treatment, and provider assessments of the percentage of women with abortion complications who actually receive medical treatment.

Use of hospital data for indirect estimation of induced abortion has its own limitations. Firstly, there exists inconsistency in classification and reporting of the cases of post termination complications across various health centre facilities. Secondly, there is an absence of an appropriate sampling denominator for computing abortion ratio because people from different geographical areas may access those health centres. Thirdly, selection of appropriate health centre facilities for data collection as of today is not possible in our country due to large presence of non-legal abortion providers. Fourthly, there is also a high possibility that providers of abortion service facilities may under report the number of abortions they performed, especially in the Indian context, where there is a need to register a facility to provide abortion services and that too under certain specified conditions. Finally, it is very difficult to estimate number of abortions that take place outside formal health care facilities. Therefore if induced abortions were estimated from hospital data, there would be a gross error in estimation.

C. ABORTION ESTIMATION SURVEYS

The third and widely used method of estimating abortion rates is through health care facility or community based surveys, adopting both retrospective and prospective study designs. This being the major thrust of the paper we would deal with various issues related to surveys in detail in Section 2.

1   **Facility-based studies :**

In most of the facility-based surveys, abortion rates are calculated on admissions for pregnancy termination and births taking place in that hospital, or those who came to the facility for treating abortion complication (Ahmed et al. 1999; Lin et al. 1999). Facility-based studies suffer from number of disadvantages over community-based studies, some of which is already discussed in the above section on indirect estimates. Facility based surveys would underestimate the extent of abortion where abortion is non-legal or highly stigmatised. In Indian context, where access to abortion health care facilities is problematic, surveys conducted in hospitals would miss the high proportion of women who do not access hospital care due to variety of reasons. Also facility -based surveys show a bias towards severe cases and urban population (Barreto et al. 1992).

Community-based studies :

Such studies can be of two types – retrospective and prospective. Community based studies are more cost-effective as they allow data collection on a wide range of issues and also permit a study of trends of a particular behaviour over a period of time. Though retrospective surveys have advantages, they also have built in limitations. One of the major problems of retrospective surveys is the bias due to omission of pregnancies (Casterline 1989). Prospective studies on the other hand can effectively address this problem of recall bias and are also better suited to capture early (first 6 weeks) pregnancy losses. In India, Auxiliary Nurse Midwives (ANM) maintain lists of women in reproductive age group including pregnant women and hence through the present system a good prospective study is feasible in rural areas if good training are given to ANMs. But prospective studies have their own limitations. The prospective studies are feasible in countries where abortion is legal. They also suffer from the problem of case loss during follow-up (Ahmed et al. 1999) introducing a selection bias in the study. Moreover multiple visits make the study expensive and are thus not feasible to carry out in large sample sizes. Moreover early abortion would not be covered (say the first one month), as they may not be noticed by the health worker.

In the following sections we will restrict ourselves mainly to issues related to community based retrospective surveys.

III. FACTORS AFFECTING ABORTION ESTIMATES

A. IDENTIFYING PREGNANCY LOSS :

Pregnancy loss is of two types: a) spontaneous losses, which are involuntary and b) induced losses, which involve a conscious effort to terminate a pregnancy. The foremost issue in community based abortion research is to identify all pregnancy losses, as it is the basis on which rates are estimated. Therefore, to be in a position to acknowledge pregnancy loss, a woman should be able to recognise early enough that she is pregnant. Usually in non-clinical surveys recognised pregnancy is defined as a gestation resulting in at least one missed or delayed menstrual period (Casterline 1989). In practice this becomes quite difficult. For instance, from a bio-medical perspective, approximately half of fertilised ova do not survive to develop into a pregnancy. Clinical studies suggest that approximately 60 per cent of fertilised ova do not result in live births. Of fertilised ova that implant in the uterus, approximately 35 per cent do not survive long enough to cause a delayed or missed menstrual period (Casterline 1989). These may be seen as 'spontaneous abortions', which cannot be identified in non-clinical studies. Another percentage of fertilised ova abort after implantation, within a week or so after the first missed menstrual period, although many women consider this as 'late period' it may also be considered as a spontaneous abortion (Huntington et al. 1996a; Llovet and Ramos 1998). This has implications for capturing the appropriate denominator of all conceptions. Thus in retrospective studies, the denominator would consist of ***recognised pregnancy*** and not all clinically diagnosed pregnancy. Moreover current pregnancies at the time of survey are not taken into account to avoid truncation bias, as their outcomes are not known.

B. REPORTING ERRORS

Another factor affecting abortion estimate is that an abortion may be misclassified as a spontaneous or an induced abortion due to various types of reporting errors – unintentional and intentional. Unintentional error can happen when a woman says that she had used some traditional method to induce an abortion, but instead of an induced abortion (which she wanted to

have but was unsuccessful) she subsequently had a spontaneous abortion. This would then be incorrectly classified as induced abortion (Barreto et al. 1992) or, in menstrual regulation, bringing on a delayed period may not be perceived as induction. Delayed menstrual periods unrelated to a pregnancy may be perceived as indicative of foetal loss.

Besides unintentional error, studies mostly suffer from intentional misreporting of abortion, especially when pregnancies are intentionally terminated. Huntington and others based on the abortion data from the World Fertility Survey (WFS), note that deli-berate abortion is acknowledged less frequently than spontaneous losses (Huntington et al. 1993). Barreto in his communication reported of a study in Hungary where half the women identified from facility records to have undergone an induced abortion did not report the abortion when they were interviewed at home.

Though one cannot do much to lessen unintentional error in reporting, the error involved in intentional reporting may to some extent be improved by improving methodologies like adopting sensitive tools, employing well-trained interviewers and guaranteeing privacy and anonymity as its prerequisites.

C. UNDER REPORTING OF PREGNANCY LOSSES :

Regardless of whether abortion is legal or widely practiced, substantial under reporting of pregnancy losses have been widely acknowledged (Casterline 1989; Huntington et al. 1993). Researchers engaged in fertility surveys have observed different and at times opposite views about patterns and trends in memory lapse on part of the respondents while responding to the set of questions formulated to trace pregnancy history. In that, sequence and nature of events – live birth, spontaneous abortion, induced abortion, and later death of a child – play a role. There is evidence of omission of live births (especially of those who later died) in the data from most

surveys, and pregnancy losses are probably more easily forgotten than live births (Casterline 1989). The WFS, a large, multipurpose survey, questioning women retrospectively, estimated that 20-50 per cent of recognisable spontaneous abortions were unnoticed and that the percentage of induced abortion omitted was higher (Barreto et al. 1992).

In order to reduce under reporting due to recall error, a few studies have tried out different methods like recording pregnancy outcome for a fixed recall period like the RCH study in India (IIPS 2000b). In this study, respondents were asked about whether they had had an abortion since Jan 1995. The study captured a total pregnancy loss of only 6 per cent as against another nation-wide comparable study (IIPS 2000a), which got a lifetime pregnancy loss of 8 per cent, conducted more or less at the same time. Therefore, one cannot say with emphasis that problem of recall amounts to large scale under reporting. In an abortion incidence study conducted in Estonia, it is observed that under reporting of lifetime abortion is about the same as that of recent abortions (Anderson et al. 1994). For pregnancy history few studies resorted to a reference period of 5 or 6 years for collecting data on pregnancy outcomes (Magnani et al. 1996; Ping et al. 1995). However, the WFS analysis of data from 40 developing countries observes that in 17 out of 22 countries, the percentage of abortion in the last 5 years exceeds that for the period 5 to 9 years prior to the survey (Casterline 1989). Whereas other studies resorted to a lesser reference period of one year to 18 months (Ahmed et al. 1998; Ganatra et al.2000; Khan et al. 1986). A way of obtaining an estimate degree of recall error of unintentional nature is by subdividing the total recall period into equal sections and to ask about events that occurred within that time period separately (Ross and Vaughan 1986). Under reporting due to recall error can also be minimised by having filter questions

like probing about spacing between two pregnancies (IIPS 2000a; Huntington et al. 1996).

D. SAMPLING FRAME :

Various surveys used different sampling frames for selecting the respondents. Population-based surveys aimed at measuring induced abortion rates can sample either women of reproductive age or women at an early stage of pregnancy (Barreto et al. 1992). Most of the community based surveys reviewed had ever married women in the reproductive age group as the sampling denominator (I-Cheng et al. 1972; ICMR 1989; IIPS 1995; IIPS 2000a; IIPS 2000b; Tezcan et al. 1981) or by having 'women at risk' as the denominator i.e., those who have been pregnant at least once and who are sexually active (Zamudio et al. 1999). Different population based surveys used different age groups. In the study in Columbia the women were aged 15-55 (Zamudio et al. 1999) whereas other studies interviewed women in the age group of 15-49 years (I-Cheng et al. 1972; Singh et al. 1994). An abortion study in China included married women less than 35 years in their sample as most women aged 35 and older would be sterilised and thus were not liable to get pregnant during the period under study (Ping et al. 1995). Few studies interviewed women both currently married and not married (widowed, separated and never married) in the reproductive age group (Ganatra et al 2000; Okonofua et al. 1999).

E. ESTIMATION OF SAMPLE SIZE :

Objectives of any study play a major role in determining the required sample size. If the aim of the survey is just to estimate mean prevalence of morbidity and utilisation of health care then one can have a relatively simple and small sample size. However, if one wants to estimate the incidence of abortion then the sample size should be large enough to allow for generalisation. Furthermore, studies undertaking the task of estimating abortion rates should take into account fac-

tors like design effects, under reporting and non-response rates. If these issues were overlooked then the study would not be able to capture adequate number of abortion incidence to enable it to calculate rates. In calculating abortion rates through retrospective household surveys, while estimating sample sizes from estimated pregnancy losses, one should consider *recognised pregnancy* during calculation, as otherwise one might not be able to capture the required number of abortions. One of the important aspects required to arrive at appropriate sample size is to know the 'population estimate', of the phenomenon under study. Here a brief discussion of sample size is called for.

1 **Population estimate :**

Study undertaken to estimate the rate of abortion, both spontaneous and induced abortion, should know the occurrence of both types of abortions for that specific population. But most of the times it happens that this estimate is not known for the study population as a whole and we have to rely on other small-scale studies or other estimates from pregnancy outcome studies from other areas.

It is comparatively easy to arrive at a population estimate for spontaneous abortion because to a great extent the determinant of spontaneous abortions is mostly biological, and therefore remains roughly the same across populations. Data suggest that there are high rates of foetal loss (33/100 pregnancy) due to high prevalence of venereal diseases among some groups in Central Africa and a loss of 30 per 100 pregnancies among poorly nourished Indian women (Casterline 1989). Casterline in his review concluded that after 6th week of gestation the rate of pregnancy wastage is approximately 150 per 1000 conceptions. Accepted estimate of overall spontaneous loss is stated to be 20 per cent of recognised pregnancies (Bongaarts and Potter, 1983). Based on the above figures, community based retrospec-

tive surveys can consider the population estimate for spontaneous abortion as 15-20 per cent of recognised pregnancies.

Determining population estimate for induced abortion is a more complex job than that based on spontaneous loss, as the determinants of the induced loss would vary greatly across populations and across regions within a country. To arrive at population estimates various methods were used by different studies. For instance in a hospital based study, sample size was drawn based on statistical data on the estimates of total induced abortion for married women in Shanghai in 1990 ($\mu = 0.05$). The sample was divided proportionately between urban and rural areas (Shi-xun, 1999). A study in Columbia, in the context where no nation-wide reference data existed on the abortion experience, therefore, developed an initial hypothesis that 3 out of 10 women of reproductive age would have experienced an abortion using data from hospital studies (Zamudio et al. 1999). In yet another technique, in the absence of any previous estimate of abortion, a population estimate of 30 per cent was used for calculating the sample size for the study. This figure was derived from the clinical caseloads of women whose records present complications of induced abortion in the regions (Okonofua et al. 1999).

In the Indian context, in the absence of any other estimate, the formula formulated by the Shah Committee is widely used for population estimate for pregnancy wastage. According to his formula, there is about one third pregnancy loss of which two fifth (13 per cent of reported pregnancy outcome) is due to spontaneous and the rest three fifth (20 per cent) is due to induced abortions (MOHFW 1966). Literature review shows that there exits a wide range of estimates of induced abortions (See Appendix 1 and Table 1).

Kanitkar and Radkar (2000) projected an increasing trend in number of induced abortions, which according to them is because of the small family norm and fertility decline.

Table 1. Estimates of Number of induced abortions nation-wide annually

Source	Number of Induced Abortions Nation-wide (Millions)
Shah, 1966	3.9
IPPF, 1970	6.5
Goyal et al, 1976	4-6
Unicef, 1991	5.0
GOI, 1991-92	0.6
Chhabra and Nuna, 1994	6.7

Source : Chhabra and Nuna, 1994

This kind of discrete data with wide variation makes it difficult to come up with a population estimate of induced abortion.

1   ***Under reporting***:

One concern that is uniformly stated by researchers, irrespective of hospital or community based providers are that any estimate of induced abortion would be an underestimate of the phenomena. Researchers have different estimates of such under reported abortions which results in making a population estimate for induced abortion more difficult (discussed in the earlier subsection). Without any proper reference on the extent of under reporting, one has to adjust the sample size based on informed guesses.

There are mechanisms to estimate under reporting like administering self-administered questionnaires or the method employed by Jones and Forrest for estimating under reporting of abortions in US surveys (Jones and Forrest, 1992). Jones and Forrest evaluated the level of reporting by comparing the number of abortions reported in the surveys with the number estimated as actually having occurred among comparable groups of women according to national counts external to the surveys. In Indian contexts,

these methods have their own constraints in the sense that self administered technique questionnaires can only be administered to literate woman and counts external to surveys estimated from government records are highly inadequate. Kanitkar and Radkar estimated the percent of unreported abortion as against estimated abortion rates based on the NFHS-I data (Table 2) by using the Bongaart's model of proximate determinants of fertility. The data reveals a rising trend in proportion of unreported abortions.

l   **Non-response rate :**

This is yet another factor that can affect sample size and subsequently the significance of the study. There can be discrepancies between the estimated sample size and the achieved sample size, especially due to the confidential nature of the study. The difference could be due to dropouts in the prospective surveillance studies or non-participation of the selected respondents in the study. High percentage of non-response in a study, planned to be representative of the population, can affect the generalisation of the study findings due to possible under representation of a specific group of research participants and can introduce selection bias. Except some studies

(I-Cheng et al. 1972; Ganatra et al. 2000; Okonofua et al. 1999; Parikh et al.; Srinivasa et al. 1997; Younis et al. 1993; Zamudio et al. 1999) others have not reported, the number of respondents or households that could not be interviewed (See Annexure 1). It would have been useful if the literature reviewed had stated the mechanisms they adopted to reduce non-response.

F. METHODS OF SAMPLING :

l   **Studies with non-probability sample design :**

Most of the facility-based studies have used a purposive sample design (Ahmed al.1999; Lin et al 1999). For example, a study in rural Bangladesh selected all women who came to the 6 selected facilities for abortion related reasons (Ahmed et al. 1999). Due to the adoption of non-random selection procedure these findings are subject to a selection bias. But alternative methods were also tried out. A facility-based study in China used simple random technique to select women for the study. The universe consisted of all women who registered in the hospitals selected requesting an induced abortion (Shi-xun 1999). Another study in Kenya adopted a sequential sampling

Table 2. Estimates of induced abortions, India, 1988-92

Year	Estimated induced abortions	Reported MTPs	Estimated unreported abortions	Percent unreported abortions in total induced abortions
(1)	(2)	(3)	(4) = (2) –(3)	(5) = (4)/(2)*100
1988-89	794347	582161	212186	26.7
1989-90	882769	596357	286412	32.4
1999-91	901610	581215	320395	35.5
1991-92	920854	636456	284398	30.9
1992-93	940508	606015	334493	35.6

Source: Kanitkar T. and Radkar A. (2000). 'Unwanted pregnancies and role of Induced abortions in India'.

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of 1:3 of all abortion admissions (Aggarwal et al. 1982).

How the sample is selected assumes importance in the sense that it has a bearing on the generalisation of the findings. Studies (Baker et al. 1992; Ganatra et al. 2000) that used non-probability sampling method, for instance, the 'snowball' method, for sample selection are difficult to interpret because the denominator cannot be readily described, and therefore can suffer from selection bias. Moreover, in such study designs the population mean or the population total could be biased.

1 ***Studies with probability sample design:***

Community based studies have used various sampling techniques: simple random sample, multistage sampling, stratified sampling in their study design (I-Cheng et al. 1972; ICMR 1989; Nair and Kurup, 1985; Okonofua et al. 1999; Srinivasa et al. 1997; Tezcan et al. 1981; Zamudio et al. 1999). In order to bring in comparable estimates for different types of regions different characteristics of the areas like physical geography, status of development, total population, presence of health care facilities were used for stratification.

The Columbia study used census data, which was stratified by sectors and by blocks, to select 22 cities and their surrounding metropolitan areas, and within each, a representative sample of all households were subsequently selected. In short, a specially stratified random sample procedure, with fixed proportions, including clusters of unequal size and quotas were used (Zamudio et al. 1999). In a study in Nigeria, a systematic simple random sampling procedure was used to identify the eligible respondents using the National Survey data of households as the sampling frame. It adopted a two stage stratified random sample (stratified by urban-rural residence and by health wards) within the urban and rural strata. All eligible women in the households were interviewed (Okonofua et al. 1999). The Indian Council of Medical Research (ICMR) study employed the stratified random sampling technique to select districts (based on performance of health and family planning statistics) and Primary Health Centres (presence of MTP facility) whereas the villages for study were selected through simple random sampling (ICMR 1989). Stratified random sampling technique was also used for selecting study units for both rounds of NFHS and RCH studies (IIPS 1995; IIPS 2000a; IIPS 2000b). A study in Tamil Nadu employed a two stage sampling procedure. In the first stage, a total of 10 PHCs were selected, distributing the number of PHC areas to each district, proportionate to its population size. In the second stage, two villages were selected randomly from each selected PHC area. As far as urban areas is concerned, a list of all the residential streets of the district headquarter town were prepared and then from the list two streets were then selected at random from each town (Nair and Kurup, 1985).

When the study units are selected consideration should be given to the design effect, under reporting and sample loss, which also have implications in terms of sample size. Systematic selection of Primary Sampling Units (PSUs) in many cases ensures better representation. However, this does not counter the design effect. Surveys under review had mostly resorted to stratified random sampling (cluster sampling) rather than adopting simple random sampling, and are thus more prone to sampling error and therefore suffer from design effect, though this is true for any survey. But most large-scale surveys like the RCH or NFHS surveys (IIPS 1995; IIPS 2000a; IIPS 2000b) resorted to cluster sampling as it is cost effective but took a large sample to neutralise the cluster effect.

G. TOOLS FOR DATA COLLECTION :

Tools for data collection are an important component in any study and review of litera-

ture shows that over the years conscious efforts have been taken to formulate better methods of eliciting information about abortion. Abortion being a sensitive and stigmatised issue, how the tools are administered to the respondent may have an influence on data quality. Experience shows that direct questioning or the survey method about induced abortion often result in under reporting even in countries with liberal abortion laws (Huntington et al. 1996; Okonofua et al. 1999; Paxman et al.; IIPS 2000a; IIPS 2000b). In order to overcome this problem, various methods of indirect questioning have been used like Random Response Technique (RRT) (I-Cheng et al. 1972; Tezcan et al. 1981), the self-administered questionnaire method (Zamudio et al. 1999) and the value free survey technique (Okonofua et al. 1999). The literature reviewed shows that 3 major methods of data collection had been used in abortion estimation surveys.

1 ***Survey Interview schedules :***

This method of data collection has been widely used by many studies. A structured interview schedule was administered by many studies (IIPS 1995; IIPS 2000a; IIPS 2000b; International Statistical Institute and WFS 1975; Nair et al.), with few studies resorting to both - structured interview schedule and qualitative techniques like unstructured interview schedule (Ganatra et al. 2000; ICMR 1989; Zamudio et al. 1999). A few studies that mentioned the type of tool used for data collection reveal that usually for recording abortion experiences like abortion decision-making processes semi-structured questionnaire or qualitative tools are used (Ahmed et al. 1999; Baker et al. 1992; Zamudio et al. 1999).

Most of the survey questionnaires of pregnancy outcome studies collected pregnancy history of women including pregnancy losses. It is observed that quality of data could be improved by careful formulation of the tools. Wording and sequence of questions; ensuring consistency checks; and the use of innovative alternative methods like the calendar method to record pregnancy history which improves accuracy of dates and various events in woman's lives. It has been noticed that when questions about abortion are introduced in an apparently non-threatening manner, survey respondents are forthcoming in their answers.

The order of questions within the questionnaire is of great importance; for instance the sensitive questions should be put at the end (Ross et al. 1986). Questions on abortions were asked at the end of the pregnancy history rather than asking them together with live births (Srinivasa et al. 1997). The WFS and Demographic Health Survey had experimented with two types of approach to record pregnancy history:

1 *forward* – where tracing of the lifetime pregnancy begins from the first one to the last one, and the other is

1 *backward* – here it is tracing the pregnancy from the most recent one to the first one.

In WFS, under some formats, the questioning about non-live births followed the completion of the live birth history, whereas under other formats, information on live and non-live births was obtained in an integrated pregnancy history. No marked association was found between the two formats (Casterline 1989).

Similarly to get accurate data of age at pregnancy loss, various studies had tried out various methods. For instance when calendar data could not be obtained, the woman was questioned about the number of years since the last loss (Casterline 1989). To capture non-intentional under reporting of pregnancy losses, various studies used checks in case of long gaps between live births. These would be pregnancy terminations that are not explained by contraceptive use or by

periods of non-exposure to the risk of pregnancy (for example, through marital dissolution). On these one needs to probe further (Casterline 1989; IIPS 2000a; Magnani et al 1986; Nair and Kurup).

It is generally believed that if a pregnancy is unwanted or is a result of contraceptive failure, it is more likely to be induced (Magnani et al. 1996). Also a study in China shows that the probability of aborting a pregnancy is strongly related to parity (Ping et al. 1995). As a result many studies have asked the respondent if they had wanted the pregnancy. But this method of collecting information through (un-wanted status of the pregnancy) is critiqued on the ground that this question may result in underestimation of unwanted pregnancies due to rationalisation as mothers in India would be reluctant to label their pregnancies as unwanted.

A comparison of questionnaires of NFHS-1 and NFHS-2, RCH Household Survey and WFS – all large-scale retrospective household surveys, shows that capturing abortions through surveys is not a suitable tool (IIPS 1995, IIPS 2000a; IIPS 2000b; International Statistical Institute 1975). To minimise under reporting the survey questions on abortion should be introduced by a filter question to broach the subject in a non-stigmatising manner (Huntington et al. 1996). In order to desensitise the unwanted pregnancy topic and minimise under reporting a non-referent question needs to be introduced. Furthermore, when the filter is used, the following question about the respondent's option for action should include miscarriage and stillbirth in addition to induced abortion, because many women prefer to respond indirectly to the question about pregnancy termination (Table 4).

Table 4. Variants of the Filter Questions Used in the Indirect Method of Enquiry into Abortion

Sr. No.	Study/Country	Filter question and their sequence in case of multiple filters	Follow up question
1	Estonia (Anderson et al., 1994)	Whether ever given a birth? If yes – Had you ever had a pregnancy that did not result in a live birth?	If yes – • Whether, the outcome was a result of an abortion, a miscarriage or a stillbirth
2	Cote d'Ivoire (Huntington et al., 1993)	In the past, have your ever been pregnant when you did not want to be?	If yes – What did you do? Responses offered are: • nothing • attempted to stop the pregnancy, but did not succeed and gave birth • attempted to stop the pregnancy and succeeded
3	Indonesia (Hull et al., 1993)* and Senegal (Macro International, 1994)* – part of DHS III series	Sometimes a woman becomes pregnant when she does not want to be. Have you ever become pregnant when you did not want to be?	If yes – • When was the last time this happened to you? • When that happened to you, what did you do about it?

Source : Huntington et al. 1996.

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Assuming that NFHS-1 data on abortion was an underestimate, NFHS-2 in their protocol developed a check between each live birth, but still could only capture the same per cent of pregnancy loss (pregnancy loss of 8 per cent). In the WFS a woman was asked, 'whether she ever had a pregnancy that lasted for a few weeks or a few months' (ISI 1975). In different countries this question captured a wide range of pregnancy losses from 3.7 per cent in Nepal to 18.3 per cent in Korea among the 13 Asia and Pacific countries included in the survey (Casterline 1989).

l   ***Randomised response technique (RRT):***

This technique was developed by S.L. Warner to assist in obtaining valid answers to questions that respondents may be reluctant to answer in an interview situation. This technique enables a respondent to provide truthful information on a sensitive or highly personal question and yet not reveal her identity to the interviewer (I-Cheng et al. 1972). It is based primarily on the probability theory. Thus only a pair of questions could be posed to the research participants. Of these, one is with known probability of occurrence of an event across the population and other under investigation whose probability could then be found out by simple subtraction. It has been used in some countries like Taiwan, Turkey and Brazil to study frequency and correlates of sensitive issues, to cope with the unwillingness of reporting abortion. These studies compared RRT with conventional interview technique, and the findings show that estimate of the incidence of abortion is more when RRT is used (I-Cheng et al. 1972; Tezcan and Omran 1981; Llovet and Ramos 1998). Advantages of RRT over direct questioning is that in case of the latter the induced abortion can be recorded as spontaneous abortion, thus underestimating the rate of induced abortion (Tezcan and Omran 1981), and it also guarantees confidentiality (Huntington et al. 1993).

Aside from practical difficulties, the RRT has disadvantages similar to those using mathematical demographic models. Moreover it is probable that in this technique some women were unable to understand the RRT technique, but out of courtesy might have pretended that they understood and may have given an abortion number that had no bearing on their actual abortion experience (Tezcan and Omran 1981). The major disadvantages of RRT are that though it might yield higher estimates of induced abortion, their reliability cannot be tested. In absence of knowledge about the individual woman in the sample, further analysis is not possible. The RRT technique may not be useful in Indian situation due to extreme heterogeneity of the sample population and the fact that it works better among women who are educated and live in the developed countries.

l   ***Self-administered questionnaire :***

Another innovative strategy of self-administered questionnaires was adopted in a study in Columbia. According to this method all literate women in the selected households were administered a questionnaire inside an envelop and instructed to place their replies in it, seal it and then deposit it in order to ensure confidentiality (Zamudio et al. 1999). The study registered a high incidence of abortion. Advantage of this technique can be used in areas where abortion is stigmatised and non-legal. But one should be cautious in adopting this approach, as no other studies are there to collaborate this method of data collection. Moreover this technique is well suited to urban populations and was fairly easy to carry out despite the large sample needed to obtain sufficiently large abortion cases for statistical analysis. Limitation of this method is that the questionnaire has to be short to make it easier for respondents to fill on their own with minimum

individual bias. This restricts detailed enquiry on the range of variables to enable analysis of range of co-relates. This method has its limitations in the Indian situation as more than 50 per cent of the female population is non-literate.

As is evident through the reviews the indirect techniques of data collection are yet to establish their superiority over direct techniques. Therefore one needs to be cautious while adopting and administering it.

H. *TRAINING :*

Training of investigators is an important aspect in any research but due to the sensitivity of the topic and the stigma attached to it, skilful training assumes even more importance. The main purpose of such training is to understand the scope of the study and development of interviewing skills. Yet in an abortion study, in addition to the above aspects, training should also focus on issues of confidentiality and reliability. The need is to probe for correct answers to questions and most important aim at imparting skills so that the investigator is able to make the woman feel comfortable while answering the queries in the schedule. The fact is that using the same tool in various countries with similar type of back ground characteristics, different abortion rates were recorded. For instance in WFS which administered almost a standard tool for data collection, if we see 2 African countries with more or less the same TFR– Ghana (TFR of 5.5 in 1991) and Cameroon (TFR of 5.8 in 1991), the findings of induced loss was quite different. Ghana recorded an induced loss of 1.0 per cent whereas Cameroon recorded a loss of 2.1 for the same time period (4 years preceding the survey). This difference to some extent may be the result of the training imparted to the investigators, though there is no empirical evidence for the same.

I. *ISSUES IN MORBIDITY MEASUREMENT :*

Though this was not the focus of the review, quite a number of abortion rate stud-ies (IIPS 2000b; Paxman et al 1993) undertaken for the review had also recorded data on abortion morbidity and therefore it is appropriate to mention a few issues regarding data collection of abortion morbidity. Recording abortion complications through retrospective studies has its inherent problems, as interpretation of complication rates of abortion will depend on a number of variables. These include the woman's prior state of health, the gestation age of the foetus, the abortion method used, the type of abortion provider, the conditions under which the abortion was performed and the method of data collection. Post abortion complication can be an immediate complication like uterine perforation or mid term complication like vaginitities or can even be long term complications like secondary infertility. **Consequently, due to varied timings of the onset of the complications, it becomes difficult to collect abortion morbidity data through retrospective studies. Adopting a prospective study design for recording abortion morbidity seems to be a better alternative.**

J. *ETHICAL CONCERNS :*

The nature and content of a study poses a range of ethical dilemmas. Community-based large scale surveys brings down the scope to have time for better rapport establishment. There are number of ethical issues which are common to any community based large scale surveys like compensation to research participants, confidentiality of the information received through translators, quality of data, about finding appropriate method in which research findings can be shared with the research participants and the community, and the important aspect of privacy and informed consent at a true sense.

In addition to these general ethical issues, there are also issues specific to surveys, which undertake to estimate abortion rate. One of the important issue that many a times a researcher in developing countries

is the issue of consent from women who are yet to attain 18 years. In developing countries women get married at a very early age and they enter their reproductive life quite early and thus to estimate pregnancy wastage it becomes imperative to collect data from them. Studies reviewed here do not throw much light in the process of informed consent form these minor women.

In order to maintain privacy, one community-based study in rural Maharashtra, conducted dummy interviews with women who did not have induced abortion to camouflage that the study is only interviewing women who had induced abortion (Ganatra et al. 2000). Case finding method was used in this study to identify women with induced abortion[1]. Besides the ethical problem in the use of such method of identification, which violates privacy. The other ethical concern is that the information collected through dummy interviews was not used. In order to understand the how privacy affects quality of data, future studies can collect information on people who were present during the interview, which might give some idea how the presence has affected the interview.

Any study collecting information on pregnancy wastage, might lead to situations of emotional distress and mental fatigue for the research participant. Thus this type of surveys should ensure that the field researchers are sensitive enough to handle those stressful situations. Much of the studies reviewed here do not talk much about the ethical problems they encountered, but future studies need to ponder over and work through better mechanisms.

IV. CONCLUSION

The paper highlights the methodological issues in conducting abortion research undertaken so far and hopes to provide useful lessons for future research. As evident from the review most of what we know of abortion estimates in India is either from large-scale fertility surveys or from a few small-scale surveys. Due to absence of accurate abortion incidence data, there is a need to conduct large-scale studies focussing on abortion incidence and its complications, which would further guide intervention strategies. Till date no single large-scale facility based survey has been conducted in India, from which per abortion provider rates can be calculated. Data from large-scale fertility studies are helpful both for planning as well as for conducting regional analysis. However, these studies also have potential drawbacks. In general estimates of abortion has been higher in focused studies than in surveys designed with broader objectives (see Appendix 1). One possible explanation for this discrepancy may be that the focused studies were able to develop better rapport with the respondents, knowing the sensitivity of the topic, enhancing disclosure. Talking about abortion can be a distressing experience for the respondent. Large-scale surveys are generally unable to address such concerns due to time pressure. But one cannot do away with large surveys, as derivation of estimates of abortion rates need a fairly large representative sample size.

Therefore, there is a need to assess whether large-scale fertility surveys do, in fact, yield lower estimates of induced abortion than do focused studies. This can be done through the comparison of multiple sources of data for abortion estimates from single setting. There is a need to assess different methodologies together with analysis of the conceptual understanding based on which indicators for data collection is formulated in order to improve the validity and quality upon which the findings are built. Future studies should make a conscious effort to capture the extent of under reporting

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[1] *Information was collated through self-reporting, snowball sampling, community women's groups, school teachers and health functionaries within the community to identify women with an induced abortion.*

by using different methodologies of data collection. Ethnographic studies are needed in order to understand the socio-cultural complexity of induced abortion that leads a woman to report an induced abortion as spontaneous or not report it at all. Most studies do not report details about how privacy is ensured or the setting in which information is sought. Guidance on the wording and ordering of questions in surveys on induced abortion is sadly lacking in the studies reviewed, which could otherwise have given a good insight for future research on this sensitive and stigmatised issue.

Another area that needs attention in estimating abortion rates is knowledge of the number of abortions taking place to terminate unwanted pregnancies among unmarried adolescents, as usually these abortions would occur in a clandestine unsafe manner. Most of the studies reviewed have kept out the unmarried population from the purview of their research due to the stigma attached to abortion. Instead of making them a part of large-scale surveys, this group can be studied through qualitative focused studies. Future studies on abortion estimates should take into account sex selection as a cause and extent of induced abortion.

The review thus brings forth the challenge that researchers face in abortion incidence estimation surveys. There are no easy answers to these problems. In this light, it seems that more such documentation of methodological problems faced and the strategies used to solve them would help to address these issues in a better way in future.

ANNEXURE

ANNEXURE I : Estimates of Abortion levels through Surveys

Year of study and source	Type of the study	Place of Study	Findings
Studies not focusing on abortion: In India			
1986-87 (Duggal and Amin 1989)	A population-based cross-sectional survey to study health expenditure. Study area: Sample size: 590 households (hhds) (1% hhds of the taluka)	One taluka of Jalgaon district in Maharashtra.	45.2 abortions per 1000 births for the year 1986-87. (For the reference period of 18 months, there were 153 live births, 2 still births and 7 abortions)
1992-93 (IIPS 1995)	A cross-sectional sample survey to arrive at estimates at national and state level and for rural and urban areas regarding fertility related measurements. Multi-stage stratified random sampling procedure was adopted. Sample size: 88562 hhds 89777 ever-married women from 13-49.	All States	Among all the pregnancy outcomes reported, 8 % was pregnancy loss (still births – 2.3%; spontaneous abortion – 4.5%; and **induced abortion – 1.3%)**
1992-95 (Srinivasa et al 1997)	A population-based cross-sectional survey. Sample size: 4000 pregnancies in the last 2 years.	45 villages and 3 towns of a district in Tamil Nadu and Pondicherry.	2 % of 3844 pregnancies resulted in still births, 6.8 % in spontaneous abortion and **3.5 % in induced abortion.**
1996 (Madhiwalla et al 2000)	A community based survey on morbidity, utilisation and expenditure. Sample size: 1200 hhds	Nashik city and villages from Igatpuri taluka of Nashik district in Maharashtra.	Pregnancy wastage – out of 105 pregnancies in the reference period of 1 year, 16 pregnancies (15.2%) were wasted of which **12 pregnancies ended up in induced abortion**, 1 was spontaneously aborted and 3 could not be specified.
1998-99 (IIPS 2000 a)	Same objective as NFHS – I.	All states	Among all the pregnancy outcomes reported, 8 % was pregnancy loss (still births –

Year of study and source	Type of the study	Place of Study	Findings
	Sample size: 4,063 households; 4, 480 women (ever-married women from 15-49).		2.0%; spontaneous abortion– 4.4%; and **induced abortion – 1.7%**)
1998 (IIPS 2000 b)	A national level household survey on RCH to arrive at district level estimates adopted multi-stage stratified random sampling procedure was. Sample size – 262,329 hhds; 232,241 women (married women 15-44yrs);102,638 men (20-54yrs)	251 districts from all states	Pregnancy loss is 6 per cent (still births 1%; spontaneous abortion – 4%; and **induced abortion – 1%**)
Focussed abortion studies: in India			
Pre 1966 (MOHFW 1966)	Informed guess drawn from a hospital based study and a small-scale community based study.	A hospital in Delhi and a community in Madras	One third pregnancy loss (Spontaneous – 2/5th; **induced - 3/5th)**
Pre 1985 (Nair and Kurup 1985)	Study to elicit prevalence, knowledge and attitudes regarding induced abortion. Sample size – 2940 couples with wife aged 15-45.	3 districts of Tamil Nadu	7% of women reported a history of induced abortion Abortion ratio: 9.1/100 live birth
1983 - 1985 (ICMR 1989)	The study was conducted to assess the magnitude of illegal abortion and abortion behaviour (KAP[1]) in rural areas. Sample Size: 10000 women	5 states: Two districts each from the states of UP, Rajasthan, Orissa, Haryana and Tamil Nadu	Illegal abortion- 13.3 per 1000 pregnancy outcomes Legal abortion- 6.1 per 1000 pregnancy outcomes **Induced abortion rate - 19.0** per 1000 pregnancy outcomes Spontaneous abortion rate – 42.0 per 1000 pregnancy outcomes
1988 (Bhalerao et al. 1990)	Hospital based study Sample size - 200 consecutive cases of pregnancy in women less than 19 years admitted in the hospital.	A hospital in Mumbai	8% had spontaneous abortion, 2% fresh still birth and 2% macerated still birth.
1989 –90 (Mondal 1998)	It was a prospective study carried out in two adjoining villages in a PHC in West Bengal on induced abortion.	1 PHC in West Bengal	During the period of 15 months, 300 women had 372 induced abortions.

Year of study and source	Type of the study	Place of Study	Findings
1995-97 (Ganatra et al. 2000)	Community based survey to explore abortion behaviour through case finding method using multiple sources and informants. Sample size: 1853 women (both married and unmarried who had an abortion during the last 18 months).	139 villages from 3 districts in western Maharashtra	**Induced abortion rate: 19.1** per 1000 women in the age group of 15-45 Abortion ratio: 141 induced abortion per 1000 live births.
Large scale surveys focusing on abortion estimate: outside India			
1971 (I Cheng et al. 1972)	KAP study on family planning and induced abortion using stratified probability sample and collecting data using RRT and direct questioning (DQ) tech-nique. Sample size: 2497 currently married women aged 15-49	Taiwan	Through RRT method, **28.2 %** women reported one or more abortions. Through direct questioning method, **12.7%** reported one or more induced abortions.
1975 (Tezcan and Omran 1981)	To estimate rate of induced abortion and the data was collected using 2 methods: RRT and Direct questioning Sample size – 4465 married women under 45 years	Turkey (13 districts)	Through RRT method, **33.1%** women reported one or more abortions. Through direct questioning method, **13.9%** reported one or more induced abortions.
1992 (Zamudio et al. 1999)	A national level household survey for estimating urban induced abortion rate through self-administered question-naire. Sample size – 33275 women aged 15-55	Columbia	For the year 1992 the rate calculated was **24.6/1000** urban women.
1995 (Okonofua et al. 1999)	To estimate the incidence of induced abortion among a random sample of women using a value-free structured ques-tionnaire. Sample size – 1516 women aged 15-45	Nigeria (2 areas)	20 % of the women reported having experienced an unwanted pregnancy and of these nearly 58% had an induced abortion success-fully and another 9% had an unsuccessful abortion. **10.8% women reported induced abortion**.

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