BULLETIN ON NARCOTICS

1 and 2, 1989

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UNITED NATIONS

DIVISION OF NARCOTIC DRUGS
Vienna

BULLETIN ON NARCOTICS

Volume XLI, Nos. 1 and 2, 1989

Double issue on drug abuse assessment

UNITED NATIONS
New York, 1989

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The survey technique in drug abuse assessment

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ABSTRACT

Surveys are now used widely in the assessment of behaviour and attitudes in many domains, including politics, economics, fertility and health. They have also come into more widespread use in the assessment of drug use, although there are some obstacles to be overcome in this area of behaviour that is not shared by many of the others. This article presents a review of how surveys fit into the larger picture of drug epidemiology, the different types of survey designs that can be used, together with the research purposes they serve, and the various advantages and limitations of the survey technique for assessing drug use in a population. Mention is also made of the current movement towards international comparability in measures and methods used in such surveys and of the advantages of this development for the comparison and integration of findings across countries.

Sample surveys

To survey is to gather information systematically on some or all of the elements in a population—in this case, a population of people. When the population is large, it is usually desirable to select a subset or sample of all the elements. Certainly the most common and most useful approach is to take a randomly generated sample, so that the results from the sample on which data are gathered will provide unbiased estimates of the characteristics of the larger population from which the sample was selected. Because not all elements can be included in the sample, there is some room for error in the estimates, but the extent of such error can be statistically estimated using the principles of sampling statistics [1]. When a large national population is being studied, most sample surveys contain at least 500 randomly selected cases; 1,500 cases is perhaps the most usual sample size. Depending on research purposes and cost constraints, however, sample sizes of 8,000 or more respondents are used at times [2].

In general, the larger the sample, the less the likelihood of error due to random sampling variations and the greater the ability of the investigator to make accurate subgroup estimates (e.g. for different age groups, ethnic groups

or regions of the country). In so far as one purpose of a drug survey is to characterize drug users, the proportion of the population thought to be using drugs will influence how large a sample is needed to yield a sufficient number of users for study.

The role of surveys in drug epidemiology

Most of the data used in the field of drug epidemiology are gathered either by social agencies or by scientific surveys, in which people usually are asked about their own behaviour and attitudes, but they may also be asked about the behaviour and attitudes of others with whom they are familiar. The agency-based data have both advantages and limitations. Both types of data are useful and complementary tools for developing a comprehensive understanding of the drug abuse problem in large populations—that is, in whole cities, regions or countries.

Among the advantages of the survey method is that it can be used with a fairly representative sample of the population, whereas the data gathered by social agencies, such as the police, treatment programmes and hospitals, derive only from that portion of the population that happens to come into contact with those agencies. Since the proportion of all drug users who come into contact with such agencies is not reliably estimable, nor is the manner in which those having such contact differ from the larger population of users, agency-based data may provide a misleading picture of the size and nature of the entire user population. Further, there tends to be a time-lag between the initiation of drug use and the initial contact with those agencies as a result of that drug use [3], which means that the agency-based data may give a particularly distorted picture of the incidence rate of new cases. The longer the average time-lag, the greater the potential distortion. Probably the most vivid example of this problem can be found in data on the cocaine epidemic that began in the United States of America in the late 1970s and continued into the 1980s. The data from repeated surveys showed a sharp increase in incidence and prevalence in the late 1970s, which levelled off in the 1980s [2, 4]. The agency-based indicator data, such as hospital admissions and cocaine-related deaths, on the other hand, showed a continuing and dramatic increase in the 1980s [5], which very likely was because of the lag between the initiation of use and problems resulting from use.

Another advantage of the survey method for monitoring the drug situation over time is that the methods used to identify cases and gather data from them can intentionally be held constant across time to prevent the occurrence of artifactual changes in the results owing to changes in the methods of gathering or processing the data. While some social agency-based data systems may be under enough central control or influence to keep methods constant (e.g. a national drug abuse treatment system), often the primary responsibility of the agency lies elsewhere (police agencies in the case of law enforcement data). Consequently, the data must often be accepted in whatever form they come and they may be inconsistent from one unit to another and/or from one point in

time to the next. In addition, the agencies may change their policies relative to acquiring "cases" from the larger population of users. For example, the police may increase the rate of apprehension of drug users in a particular year, treatment agencies may expand their capacity or criteria for admission, or hospitals and coroners may become more astute at recognizing and recording drug-related cases. Any such change in practice would give the appearance of an increase in drug use in the trend data generated by the agency, even if there had been no change at all in the underlying population of drug users. The survey method should be able to hold constant across time and place the probability of users coming into the sample and thus be able to avoid such artifactual shifts in population coverage, which can lead to misleading trend results.

Perhaps the major disadvantage of the survey method, relative to agency-based data, is that the segments of the total population selected for study omit some portions that are particularly at risk for drug abuse. Household surveys, for example, miss the homeless and those in institutions such as prisons, hospitals, mental hospitals, college residence halls and military barracks. School surveys miss the children not in school. Since the most serious drug users, particularly addicted users, occur disproportionately in these omitted segments of the population, the agency-based data may provide some of the best information available on such people. Their cases comprise largely, if not entirely, drug users. Of course, agency-based data have many important purposes in addition to epidemiological monitoring and research. Still other methods, such as the "snowball sampling" technique [6] may be considered for getting more representative samples of heavy user groups than those available from agency clientele, though they have obvious limitations.

The survey technique can complement the data available on the drug-using population in a way other than prevalence and trend estimation, which is largely what the advantages listed so far relate to. The extensiveness of the information gathered from users (and, importantly, non-users as well) is usually much greater in the survey context than in agency-based data collection systems. Data can be gathered on related attitudes, beliefs and social influences, as well as on availability, age at onset and a host of other behaviours, social conditions and life-style orientations. The range of purposes that can be pursued using the survey approach and the different types of survey designs best suited to accomplishing them are discussed below.

Different survey designs and their purposes

There are a number of different survey designs commonly used in the field of drug epidemiology, each appropriate to accomplishing certain objectives. These include the cross-sectional survey, the repeated cross-sectional survey, the panel study and the repeated panel study (or cohort-sequential design). Each of these designs, in turn, can be applied to different populations, such as the general household population, school populations and prison populations. These various survey designs are briefly discussed below.

Cross-sectional surveys

Perhaps the most commonly used survey design is the single cross-sectional survey. It is carried out in a particular delimited period of time, often over two or three months, on a single sample drawn from some defined population of people. In the drug field, such surveys in the general population have been carried out at the national level in Canada, Colombia, Ecuador, Greece, Jamaica, Mexico, Netherlands, Pakistan, Peru and United States, among others [7]. Surveys of this type usually are conducted on respondents who are sampled and interviewed in person in their households. They almost always contain questions about illegal drugs of relevance, such as cannabis, cocaine, hallucinogens, heroin and opium. Often they contain an extensive set of questions about other drug-using behaviours, usually including the use of cigarettes and alcohol and often including non-medical use of various psychotherapeutic drugs such as stimulants, sedative-hypnotics, minor tranquillizers and opiate-type drugs. Sometimes the medically supervised use of such psychotherapeutics is also included.

If the study includes nearly the whole age spectrum, that is, starting from age 12 or so, then it is possible to make estimates of prevalence and incidence for the various individual drugs not only for the population as a whole, but for important age bands such as adolescents (perhaps aged 12-17) and young adults (perhaps aged 18-25) and for all other adults. Since adolescents and young adults tend to be particularly at risk for illicit drug use and may show the first signs of any new epidemic, they are usually considered of particular importance in drug use surveys. As a result, the samples in cross-sectional studies of the entire age spectrum are often designed so that enough adolescents and young adults are secured to permit an accurate characterization of those age groups. Because more of them are included in the sample than would be included if all people received an equal probability of selection, they are "oversampled" relative to other age groups. When estimates are made for the population as a whole, the results from the oversampled segments receive a weighting that is lower than average in order to compensate for their overrepresentation in the sample relative to the population from which it was drawn.

In addition to yielding prevalence and incidence estimates for the entire population, and perhaps different age strata, sample surveys can be used to examine subgroup differences in prevalence across a host of different dimensions or potential "risk factors", usually including sex, ethnic origin, region, degree of urbanization, socio-economic level, educational status and employment status. The relationship between use of each of the various drugs and a number of other factors is often examined, including the use of other drugs, attitudes and beliefs about drugs, access to drugs, exposure to drug use, friends' usage patterns and perceived norms regarding drug use.

Thus, it is possible from the single cross-sectional survey to estimate incidence and prevalence of various drugs for the entire population and for important demographically defined subgroups, as well as to examine the extent to which drug usage correlates with a host of other characteristics of the person and his or her social environments, factors that are also measured in the same survey. Often multivariate analyses are carried out to determine the extent to

which the various correlated factors can, in combination, account for various drug-using behaviours and the extent to which the explanatory power of each is shared with the other factors. Causation is usually difficult to demonstrate because the relationship between factors over time is usually not measured. The presence or absence of an association, however, together with the strength of the association, is often helpful in eliminating some hypotheses, providing partial confirmation of others and generating new ones. A relatively new measurement approach known as "event history analysis" attempts to bring the time dimension into the single cross-sectional survey by asking respondents to reconstruct the time sequence of various events and conditions [8]. The new approach, however, is technically difficult to implement and analyse properly, and it places a special burden on respondents in terms of recall and patience in the interview situation.

Repeated cross-sectional surveys

Whenever a cross-sectional survey is conducted on a defined population using a sampling method that can be replicated, it lays the groundwork for a potential series of such surveys. The series may or may not be contemplated at the outset, but as time passes, policy makers often wish to know to what extent the drug abuse situation has changed in the population in question, resulting in the initiation of a second survey in what may become an ongoing series. Such ongoing survey series in the area of drug abuse have been conducted in recent years in a number of countries, including Canada (at the provincial level for the student population and the adult population), the Federal Republic of Germany (at the national and state levels for the young adult population), Norway (at the city level for the young adult population), Sweden (at the national level for school populations) and the United States (at the national level for the household population and at the national and state levels for the student population).

While the main objective of the cross-sectional survey is the initial assessment of the extent and nature of the drug abuse problems in a population, the main objective of the repeated cross-sectional survey is the assessment of the extent and nature of changes taking place in the drug abuse problems and in related factors. Given that the accurate assessment of change is the key objective, it follows that it is important for the methods used in the surveys to be kept as comparable as possible across time, lest changes emerge in the data that are the result of changes in methods, rather than changes in the underlying phenomena being measured. In reality, this is easier said than done, since the people influencing and/or conducting later surveys are not likely to be the same ones influencing and/or conducting earlier ones, and they are likely to have somewhat different interests, hypotheses and methodological predilections. This is probably the greatest threat to the validity, and the usefulness, of the trend results of such a series, for relatively minor changes in question wording, answer alternatives and question contexts, not to mention in sample definitions or field procedures, can significantly influence the results [9]. Those planning such survey series should take care *(a)* in developing the initial sampling methods, since they must be replicable; *(b)* in developing the original

questionnaire, since it should be held largely constant across time; *(c)* in cleaning and editing the data, since the conventions used should also be constant across time; and *(d)* in documenting the field procedures and other methods used in each survey, so that it is possible to replicate them in later surveys.

If done well, repeated cross-sectional surveys should be able to provide good estimates of changes in the incidence and prevalence of various types of drug use, not only in the study population at large, but in the many important demographic subgroups mentioned earlier. This may provide an assessment of the nature and scope of newly emerging problems, as well as an update on previously existing ones. For example, it is not uncommon to find that a drug problem has spread down the age spectrum or spread out from the major urban areas to smaller cities and towns. Changes in related risk and/or protective factors, such as attitudes and beliefs about drugs, exposure to use, norms and availability, can also be evaluated. Changes in these factors may provide some explanation of why changes in drug use are taking place. For example, in the United States, it has been shown that changes in young people's assessments of the risks associated with the use of cannabis and cocaine have played an important role in the reduction of their use of those drugs [4, 10, 11].

If planned interventions or naturally occurring historical events of importance take place between surveys, the trend results may provide some idea of what impact they may have had. It is not possible to say what would have happened in the absence of those events unless an experimental or quasi-experimental design has been used, but it may be possible to obtain some idea of the impact that at least might be attributable to those programmes or events. It is also possible to assess the extent to which the population under study has been exposed to a planned intervention, such as a media campaign or school drug-abuse curriculum, by asking the survey participants about such exposure and to determine their subjective assessment of the impact of the intervention on them or others. Their need for, or receptiveness to, various new services or programmes can also be assessed.

The countries listed above as having major ongoing survey series have made extensive use of the information they provide in the placement of the drug abuse problem within their national agendas, the assessment of their overall success in controlling drug abuse, and the planning of interventions, such as school drug-abuse curricula and media campaigns. In the planning of interventions, survey data are often used to assess the age at which young people began to use the various substances (sometimes by asking the respondent to report retrospectively on age of onset), and the results have been used to determine at which school level drug-prevention curricula should be introduced and which substances should be emphasized at different school levels. Such data have also been extremely useful in the targeting of media-based prevention campaigns, since different messages and different media are often used to reach different age groups. Further, the attitudes, beliefs, knowledge and norms regarding drug use in the different age groups provide much of the background information upon which the design of a good media campaign must be based. A single cross-sectional survey can be used for the

planning stages, but repeated surveys offer the possibility of assessing changes in exposure, personal reactions and evaluations, as well as changes in attitudes and use.

Panel studies

Repeated cross-sectional surveys assess change over time by looking at different samples of people at different points in time. By way of contrast, the panel study assesses change by looking at the same sample of people at different points in time. Very often, the purpose is to examine changes during important developmental stages such as childhood, adolescence or young adulthood; and it is on these age bands that panel studies most often focus. Often they begin with a particular birth cohort or school class cohort and then follow that cohort over time, though not all panel studies are designed that way. Another use of panel studies is the evaluation of treatment, prevention or other planned interventions, since change in the behaviour and attitudes of the participants during and after the period of intervention are usually the most important outcome factors to be assessed [12]. The most powerful of such designs have comparison groups that are followed over time as well.

The obvious strength of panel studies is that they allow the examination of the time sequence in which different kinds of changes occur in the same individual. Thus, they are often used for the purpose of examining possible causes and consequences of drug use at the individual level, as contrasted with the societal level, and may tell a lot about signals that warn of possible involvement in drugs later in life. They have helped, for example, to elucidate the sequential nature of involvement in various drugs [13, 14].

Panel studies require that respondents be identifiable for future follow-up, rendering anonymity nearly impossible. They usually require an intensive follow-up effort aimed at locating and collecting data from a high enough proportion of the original respondents to make the panel results meaningful. Those most at risk for drug abuse are likely to be among those hardest to follow and to motivate to provide data; thus, the procedures for following respondents must be well planned and vigorously pursued.

When changes in drug use are observed in a panel study, the investigator is left with some uncertainty about whether those changes are attributable to the change in the age of the respondents or to historical events between data collections that may have affected people in all age groups, including the one under study. Thus, the panel study is not ideal for assessing secular changes (those occurring in all age groups in a given period of history), since it usually focuses on a single cohort or, in any case, a narrow age band. The repeated cross-sectional survey is probably best for that purpose. It is also possible that the changes observed with age in, say, drug use are typical of only one cohort, or a few adjacent cohorts, but not of previous or subsequent cohorts. This would be an example of a "cohort effect", as distinguished from a secular trend or an age effect (i.e. a change with age consistently observable across cohorts). One research design that is particularly effective at distinguishing among these three different types of change is the repeated cohort or cohort-sequential design.

Repeated panel studies

Because the drug problem (or, more accurately, the set of drug problems) has been characterized by rapid change in recent years, the experiences and behaviours of one cohort growing up in a society may be quite different from those of subsequent cohorts. Like the cross-sectional study, the panel study of a given birth or class cohort can be repeated to look for change. If a panel study is to be conducted, the possibility of repeating it on a new cohort always exists. So far, the United States has been the only country in which such a cohort-sequential design exists in a national study of drug use [4]. In that country, each cohort is first surveyed at age 17-18 during the last year of secondary school, and a proportion of those surveyed are then resurveyed annually through the mail over an extended period. One of the advantages of that particular design is that it eventually yields a good national sample of college students, as well as young adults not in college. Such a complex design is economically feasible because of the low per-case costs of the initial school-based survey and of the follow-up surveys, which may be conducted through the mail. A procedure involving repeated in-person interviews probably would be too expensive to use in such a design, unless the interview occurred less often and covered smaller samples.

Since each panel study begins with a cross-sectional study, the repeated panel study has most of the benefits of the repeated cross-sectional design, as well as of the panel design. It also permits the separation of the three types of change or effects discussed earlier: age effects, period effects (i.e. secular trends) and cohort effects. The United States study, for example, has documented important period and age effects among adolescents and young adults for most types of drug use over the period 1975-1987, a strong cohort effect for cigarette smoking and a lesser cohort effect for daily cannabis use [4, 15]. Knowing which types of changes are being observed can be important in focusing the search for causal factors on the right domains and in the right time periods.

Populations under study

The above-mentioned four basic designs can, in principle, be applied to a number of different populations. It should be pointed out, however, that the samples selected for study may or may not be representative of a larger definable population, such as a country, region, state or community. (The considerable advantages of the sample being representative have already been discussed.) The definable population may be the general population within a geographical or political boundary or some major sector thereof, such as the household population; but it may also be a more delimited sector of particular importance, such as students in secondary school, students in college, conscripts or people in prison. Finally, the study population may be a known user population of importance, such as people in treatment programmes or people arrested for drug-related offences [16]. Obviously, the objectives that can be achieved differ for these different study populations. Surveys of the general population and the secondary school populations have received high priority in most countries that have begun to collect survey data on the

epidemiology of drug use, since they focus on the extent of the problem in the normal population and, in the case of secondary school surveys, on a high-risk age band in the normal population.

Surveys in hard-to-reach populations

As stated earlier, children not in school and those not living in households are at greater-than-average risk of drug abuse problems, but they are also much more difficult to identify, sample and motivate to respond. Thus, research in such populations is more challenging and more rare. Another type of survey approach, the ethnographic study, is sometimes used to examine the nature and dynamics of drug use in such populations or in populations defined in other ways, such as by gang membership, delinquent behaviour or drug dealing. Such studies tend to be investigator-intensive in that the researcher or field-worker stays or lives with such groups over an extended period. They also tend to be based on non-representative samples because it is so difficult to get representative ones. Sampling may be done by identifying cases in the streets of a particular neighbourhood or more systematically. One of the more creative methods of identifying cases, particularly users of illicit drugs such as heroin and cocaine, has been the "snowball sampling" technique, in which some initial cases are identified and then asked to name one or more other such cases from their social network [6]. Those nominated cases are then identified, interviewed and asked to nominate still more cases. This process continues until a sufficient number of cases have been gathered.

Generalizing about the larger population in question is much more problematic in such ethnographic studies; however, they can be very useful in providing at least qualitative data on segments of the population not easily studied in other ways. They are also likely to generate a more complete picture of the cultural complexity surrounding drug use in a given subpopulation. In so far as they use self-reports of behaviour and sometimes gather their data within the framework of a fixed-format data-collecting instrument, ethnographic studies provide a valuable complement to the more typical sample survey approach.

The move towards international comparability in measures and methods

In recent years, some of the major international organizations working in the field of drug abuse have attempted not only to stimulate and facilitate the development and utilization of survey techniques in the field of drug epidemiology, but also to encourage the adoption of common measures in order to increase the ability of all countries to compare and integrate their results. For example, the Division of Narcotic Drugs of the United Nations Secretariat published part two of its *Manual on Drug Abuse Assessment,* which deals with the use of population surveys [16]. It provides, among other things, components for an interview schedule which might be used in a general

population survey. The World Health Organization (WHO) published a monograph on general population surveys of drug abuse that, in addition to reviewing surveys in eight countries, presents a discussion on the administrative and methodological considerations that should be taken into account in designing such a survey, especially for a developing country [7]. WHO has also published manuals on the conduct of student surveys [17] and on surveys of non-student youth [18], which review methodological considerations to be taken into account in such studies and provide model questionnaire segments that use drug categorizations and prevalence periods in the drug use questions that are compatible with those used in the manual published by the Division of Narcotic Drugs. The Expert Group on Drug Epidemiology of the Council of Europe Co-operation Group to Combat Drug Abuse and Illicit Trafficking in Drugs (the Pompidou Group) is currently involved in a co-ordinated set of student surveys across a number of countries in Western Europe and North America [19] using common instrumentation and methods that are similar to those in the WHO manual [17], as well as those used in the United States student surveys [4]. In Latin America, the Pan American Health Organization and the Organization of American States are becoming increasingly involved in the development of epidemiological research on drug use, though no mechanism has yet been put in place to stimulate comparability in survey methods.

Conclusions

Because many countries are still unable to quantify the extent and nature of drug abuse in their populations [20], there is a definite need for the expansion of drug epidemiology programmes, including the use of population surveys. The technology exists; and though there are complications stemming from the illicit nature of the behaviours being self-reported, they can be overcome through the careful application of appropriate procedures. Encouraging results have been reported from a number of countries on the reliability and validity of self-report measures of drug use [4, 21-23]; and more such results will be published in the near future from the work being done by the Council of Europe. Reliability and validity will vary as a function of the field methods and measurement methods used, but a variety of techniques exist that can help to assure accuracy of reporting [16, 24].

In sum, the survey technique is a critical component in any epidemiological assessment programme in the field of drug abuse, and certainly in any national system. Such work is probably best done by professionals who have had formal training in social science research methods, particularly in survey research methods; but such work has also been conducted by people without such training. Generally, they have relied on outside technical assistance in the overall design of the study, its sampling procedures, its instrumentation and its field procedures (including interviewer training) and in the analysis and reporting of results. Whenever national samples or other complex representative samples have been used, the assistance of a professional sampling statistician has been required. And while the above-mentioned instruments available from international organizations provide a good starting-point for

interview or questionnaire content, even trained social scientists, if they are unfamiliar with the drug area, are well advised to seek some collaboration or assistance in instrument development.

Finally, there are clear advantages in being able to compare and integrate one's findings with those from other countries. Therefore, keeping the survey instrumentation as comparable as possible with the instruments being used in other countries has considerable advantages. Those advantages continue to increase as the standard measures are being used by more and more countries around the world.

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