Using condom data to assess the impact of HIV/AIDS preventive interventions

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Abstract

The effective evaluation of preventive activities depends on the identification of indicators and the selection of appropriate outcome measures which reflect the goals of the intervention. An increase in condom use has been seen as a positive sign of the impact of HIV/AIDS public education. This paper examines possible sources of data relating to condom use in the context of assessing public response to the AIDS epidemic, with particular reference to methodological challenges presented by each; issues relating to the validity of data, problems of interpretation and the scope for improvement. A multiple indicator approach, using several types of data in unison, is advocated. Conclusions drawn from the multiple indicator approach are likely to be firmer and sounder than those drawn from the single indicator approach, and are more likely to offer insight into the mechanisms which influence particular outcomes.

Introduction

The effective evaluation of preventive activities depends on the identification of indicators and the selection of appropriate outcome measures which reflect the goals of the intervention. In the case of AIDS this task is made more difficult by the nature of the syndrome. The use of measures relating to morbidity and mortality is less feasible in the case of HIV infection because of the time lag between infection and appearance of symptoms of HIV-related illness, and the difficulties of collecting accurate data. STD incidence is a possible proxy indicator of programme impact, and is one of 10 indicators of progress and outcomes of programme impact and prevention activities developed by the WHO's then Global Programme on AIDS. However, given the relative inadequacy of epidemiologic indicators, data on risk behaviour and protective strategies comprise important intermediate and surrogate indicators (Stroobant, 1994). Behavioural measures will therefore be the primary outcome variables for most AIDS intervention programmes and accurate measurements of these behaviours will often be the most relevant indicators of the success of a programme in slowing the spread of HIV transmission (Coyle \textit{et al.}, 1991).

Modification of the behaviours which influence HIV transmission has formed the basis of risk reduction advice to the general public (Wellings, unpublished). In relation to the sexual transmission of HIV the two messages which have predominated in AIDS public education have been to use a condom and to restrict the number of sexual partners. On both scientific and practical grounds, the condom message seems most likely to be effective (Blaxter, unpublished). Epidemiological evidence suggests that it is not primarily the number of sexual partners that creates the risk of infection, but rather the exchange of body fluids in unprotected intercourse. Moreover, health educational messages most likely to meet with compliance are those which provide more easily actionable advice for preventive action. An under-
standing of 'safer sex' in the context of the AIDS epidemic, at least for heterosexual relations, most usually means using a condom for protection against HIV transmission.

An increase in condom use has, therefore, been seen as a positive sign of the impact of HIV/AIDS public education. This paper examines possible sources of data relating to condom use in the context of assessing public response to the AIDS epidemic, with particular reference to methodological challenges presented by each; issues relating to the validity of data, problems of interpretation and the scope for improvement.

Sources of data

Behavioural surveys

Questions about condom use are routinely collected in surveys of contraception, e.g. in the British General Household Survey. Measures taken from repeat surveys show large increases in condom use in recent years; as shown in the comparison of data from the 1986 and 1993 surveys (Figure 1).

In addition, condom use has featured prominently as a variable in surveys of knowledge, attitudes and behaviour which have been conducted specifically to provide data to assist in monitoring public response to the AIDS epidemic (Matthews et al., unpublished). Typically, questions have been asked about attitudes towards condom use, knowledge of their protective effects and recent practice.

Such surveys used alone have certain limitations. A problem intrinsic to studies of behaviour generally, but heightened in sexual behaviour research, relates to possible reporting bias (Catania et al., 1990). Reliance on reported behaviour is susceptible to a social desirability effect resulting from a possible tendency to produce responses which are socially valued. Where condoms are heavily promoted, people may feel compelled to report their use, to conform to the perceived expectations of the researcher (Zenilman et al., 1995).

A further bias may be associated with problems of recall, which raises difficulties in relation to questions about the timing and frequency of use. Since the aim of most HIV preventive interventions is to motivate those at risk to use a condom on every occasion, what needs to be assessed is the tendency to systematic use among susceptible groups. Yet in order to avoid undue demands on the memory, surveys most commonly ask about condom use on the last (i.e. most recent) sexual occasion. Increase in condom use at the population level then appears to be modest when looking at year on year changes. However, when assessing changes from the beginning of 1988 to May 1992 in the UK, for example, there has been a significant increase ($P < 0.05$) in condom use, from 23 to 32% (Figure 2).

An improvement on this is to include in the KABP survey, questions distinguishing consistent, sporadic and never-use of condoms. Such questions have been used, for example, in the KABP surveys used to evaluate the Swiss HTV prevention programme and, as Figure 3 shows, have demonstrated a discernible shift towards more consistent use over the period of AIDS prevention, particularly amongst those at higher risk. The proportion of people reporting that they always use a condom with a casual partner has more than doubled in the 31–45 age group (from 22% in 1989 to 52% in 1992), and in the 17–30 age group, consistent use has increased from 8% in 1987 to 61% in 1992. Coinciding with this is a decrease in the proportion of people who never use a condom, from 67% in 1987 to 20% in 1992 in the 17–30 age group and from 62% in 1989 to 33% in 1992 in the 31–45 age group (Dubois-Arber et al., 1993).

Condom sales

An alternative to the use of self-reports of condom use from survey research is the use of condom sales.
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Fig. 2. Condom use on last sexual occasion. Percentage of 16–34 year olds answering 'yes' (base: sexually active). Quarters (n = approximately 715 per quarter). Source: HEA/BMRB.

Fig. 3. Use of condoms with casual partners in the previous 6 months (percentage rounded up). Source: Institut universitaire de médecine sociale et préventive, Lausanne 1991/94. Evaluation mandated by the Swiss Federal Office of Public Health.

Condum data, potentially representing a more objective source of data. The AIDS evaluation literature contains several examples of condom sales figures being used as objective measures of behavioural changes to validate self-reported behaviour change. In the Netherlands, for example, successive population surveys have been conducted to assess the effect of AIDS prevention campaigns. Researchers have reported an increase in the number of people who expressed an intention to use condoms or who already use them, observing that these findings were confirmed by condom sales figures (and STD incidence) (de Vroome, 1990). In the USA, condom sales in drug stores (representing 60% of the market) increased steadily during the time of combined AIDS intervention activities. Data from a national probability sample of US drug stores show that condom sales rose from 240 million annually in 1986 to 299 million in 1988, the greatest increase following the release of the Surgeon General's report on AIDS in 1987 (Moran et al., 1990).

Condum sales data may be from one or more of several sources. Information on volume of sales may be obtained direct from the manufacturer in the form of ex-factory figures and/or index-linked figures, or from selected retail outlets in the form of sales data. These data have the advantage of being freer from individual reporting bias, but present further challenges in terms of acquisition and interpretation. First, these data will be of considerable commercial significance, because of their potential value to competitors, and as such are highly sensitive and not generally published. Index-linked figures are usually more accessible but will give no information on the total volume of sales, only on whether or not there has been growth or decline over time. Ex-factory figures represent an improvement on index-linked figures in this respect, but may reflect the output of only one manufacturer, with obvious problems of generalizability. (Data shown in Figure 4 relate to condom sales for the whole market, not one particular manufacturer.)

With regard to the collection of information on retail sales, the source of information here is the
audit of a number of 'typical' sites. In the UK, for example, sales figures are collected from selected pharmacists by market research companies such as Nielssen and Infoscan. A further problem with data from this source is that it does not reflect the relative popularity of different outlets, nor the development and growth of new ones. A sample of pharmacists, for example, will not reflect the growth in sales through such outlets as garages and groceries, and should be augmented with trade sector data, which shows that both of these outlets have increased their share in recent years (London Rubber Company, unpublished). The increase in sales through grocery stores and garages accounts for much of the overall increase in condom sales, and offers valuable insights into the impact increased availability and increased social normalization of the product has had on uptake.

A key issue in relation to condom sales data, from whichever source, is that little is known about what happens to condoms once they are bought, i.e. whether they are used or not, since only the total volume of condoms is being measured. (For example, now that packets containing larger numbers of condoms are available, it may mean that more of the condoms purchased are never used.) This methodological challenge has only rarely been addressed. An innovative approach to measuring actual use is demonstrated in a research project in the Dominican Republic. Project staff visited hotels used by sex workers and their clients to check the rooms and waste-paper baskets for discarded condoms after couples left (AIDS Health Promotion Exchange, 1993). Similarly, in Managua, Nicaragua, researchers searched rooms in motels to find out whether the condoms which are issued to the commercial sex workers using the premises had actually been used (Gorter et al., 1993). Since the scope for this sort of exercise is clearly limited, it is necessary to rely on people's accounts of what they do with condoms having bought them, research which is generally commissioned by manufacturers.

**Service data**

A further source of information on condom use may be derived from records relating to service provision. Family planning clinic data is routinely collected in Britain. Statistics from family planning clinic services in England show a revival in the popularity of the condom (Figure 5a–c). Although oral contraception remains the most popular method of birth control, chosen by 54% of all attenders in 1992/93, its popularity has declined steadily since 1982, while that of the condom has increased markedly. Condoms were the contraceptive of choice for 25% of clinic attenders in 1992/93 compared with 11% in 1982 (DoH SD2B, 1994).

Interpretation of this information needs to take account of the changing patterns of use of family planning clinic services in England. Attendance has declined in recent years, from 14.6% of women in 1982 to 10% in 1992/93 (Figure 6). Within this overall trend, however, there are age-related variations which will affect patterns of contraceptive use. The most marked decline has been in the 20- to 34-year-old age group, among whom prevalence of use of oral contraception is highest. Attendance by under 16 year olds, known to be bigger users of condoms, increased from 4.2% to 10.3%, and there is also a recent increase in 16–19 year olds after a decline in the mid-1980s. One of the targets set out in the government White Paper, *The Health of the Nation* (a strategy to improve health in England), was to reduce the number of conceptions in the under 16s. This means that more health authorities are now providing special family planning services for young people (Brook, 1994) and the figures from
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Fig. 6. Percentage of female population attending family planning clinics by age in England 1982-93. Source: KT31, DH Statistics Division (SD2B) 1994. Base: women attending family planning clinics.

Impact upon contraceptive choices within clinics. Many more women now go to their GP rather than to a family planning clinic for contraceptive advice, and this is most likely to be for medically prescribed methods such as the pill and IUD, since GPs do not usually dispense condoms. This trend then could be expected to lead to a decline in provision of condoms. The total number of people attending community and hospital family planning clinics in 1992/93 was 1,075,000 compared with 2,900,000 women who consulted their GP for contraceptive advice and treatment in 1992/93 (DoH, 1994).

Condom use and HIV Interventions

In general, as the graphs from these various sources show, the trend in condom use has been upward in the past decade. This trend is particularly marked among those who are young and in non-steady relationships. The most attractive conclusion is that this increased use is the result of concern for HIV infection. We know that men who have sex with men have increasingly used condoms as protection against HIV infection (and this will have had an impact on condom sales) (HEA, 1996). Before making such claims for heterosexual adults, however, an important task lies in ruling out other possible explanations, i.e. to what extent might an observed effect in terms of trends in condom sales be attributed to factors other than an increased concern for protection against infection. Fluctuations in condom use will occur in response to other influences apart from

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Condom use is certainly a measure of risk reduction behaviour, though it may not be entirely clear which adverse outcomes are being prevented. One of the difficulties with many surveys is that no distinction is made in the questioning as to whether the condom is used as a method of birth control or as a means of preventing sexually transmitted infection (i.e. as prophylaxis) and indeed many users may not themselves make this distinction. An exception was the Health Education Authority’s Health and Lifestyle Survey (HEA, 1995) which did specifically ask respondents in the UK why a condom was used. In the vast majority of cases it was for contraceptive purposes, though more than one in 10 claimed they used it to protect against infection (Figure 7). It has been possible in survey research to examine the subgroup in the sample, of those who have used both a reliable method of contraception in a particular recent time period and who also report having used a condom (Wellsings et al., 1994). The assumption here is that the condom is then being used prophylactically, but there is no certainty that the two have been used concurrently and not consecutively, unless the respondent is specifically asked for this information.

Evidence from other surveys shows that only very small proportions of those adopting condom use as their main method of contraception do so additionally for protection against HIV (Blacksell, 1992). A national survey of young adults showed the most important considerations when choosing contraception (in order of frequency) to be prevention of pregnancy, with prevention of risk from AIDS and prevention of risk of infection from other diseases in second and third place, and ease of use in fourth (HEA, 1992). In a further survey of the general population (aged 16–54), 24% stated that they had used a condom on the last occasion that they had sexual intercourse, and of these 85% stated that the most important reason for doing so was for contraception, for 12% it was for prevention against HIV and for 3% it was for prevention against other infections (HEA, 1995). None of these data provide insights into how the purpose of condom use changes over time.

The use of a condom as contraception can vary with perceptions of health risks associated with the oral contraceptive pill. Publicity given to possible adverse side effects—the association of oral contraception with, for example, cervical cancer, or breast cancer, thrombosis or arterial disease has an appreciable effect on the numbers of women taking the pill. Troughs in pill usage trends have been shown to coincide fairly consistently with emerging epidemiological evidence demonstrating possible adverse side effects (Wellsings, 1985). Anxieties about the risks and side effects of the pill are the most common reason given for changing to condom use (UK Family Planning Research Network, 1989; Blacksell et al., 1992).

Findings from the 1993 General Household Survey show that although there was a slight increase (from 23 to 25%) in Britain in the proportion of women, predominantly those in their 30s, using the pill between 1991 and 1993; this followed a period of little change between 1986 and 1991. By contrast, condom use among the partners of women of all ages has increased steadily during this period; 17% of women in 1993 cited the condom as their usual method of contraception, compared with 13% in 1986. The increase in condom use occurred predominantly in age groups under 30, with the largest increase being among the partners of women in the 18–19 age group (from 6 to 22%). Condom use among 16–17 year olds did not begin to increase until 1991, but this
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has been followed by the largest rise in an individual age group between 1991 and 1993 (from 10 to 17%). Use of the condom was highest among those aged 16–19. This marks a change since 1991 when condom use was most prevalent among those aged 35–39 and 40–44. Overall, 9% reported having changed from some other method to the condom. Single women were more likely than married or cohabiting women to have changed to the condom (19%) (OPCS, 1995). Service data also suggests that increases in condom use are greater than the decline in the use of oral contraception (Figure 5a).

Condom use also fluctuates with a number of additional factors, such as the level of sexual activity and the proportion of the population who are sexually active. [There have been no important changes in the actual size of the working age population in the UK since 1981 (Armitage, 1995).]

In Britain there has been an increased likelihood of partner change during the lifecourse and an increase over time (more markedly in women than men) in the number of lifetime partners reported (Wellings et al., 1994). The evidence is that condom use with a new partner has increased, especially among those who report two or more partners in the last year (HEA/BMRB, unpublished).

Age at first intercourse has fallen over recent decades, e.g. in Britain, for men and women now in their late 50s the median age at first intercourse was 20 and 21 years, respectively. The median age for today’s 16–24 year olds (male and female) is 17 so that more sexual activity needing protection is taking place among the young. This overall increase in sexual activity would not affect the proportion of young people reporting condom use on their first occasion of sex, which shows a sharp increase, however, since the mid-1980s and coincides with the start of the AIDS epidemic (Figure 8) (Wellings et al., 1994).

**Discussion**

Each of the sources of data on condom use presents problems of validity (the extent to which the indicator measures what we intend it to measure) and generalizability (the extent to which the patterns revealed might be typical of the population as a whole). Nevertheless, a strong case might be made for using all of these sources in order that each might to some extent correct and compensate for the deficiencies in another. ‘Triangulation’ of data from several sources is an accepted approach to problems of validity and reliability in social science research. Survey data will potentially be strengthened where they are augmented by data from other sources such as service provision (family planning clinic records and from the commercial sector (sales figures).

As with all such attempts, agreement is easier to interpret than divergence. Three clocks telling the same time provide some assurance of both the correct time and the reliability of the instruments, whilst three clocks telling different time provide no way of telling what is the correct time nor which is the most reliable instrument. These data
can also be checked against data further ‘downstream’ in the sequence of events. STD incidence has been checked against self-reported condom use (during the same period for which condom use is reported) in clinic settings to assess the validity of self-reported condom use (Zenilman, 1995). The use of condom and STD is as yet a relatively unexploited data partnership.

Aside from the validation function, the collection of alternative forms of data offers a richer resource with which to assess the outcome of preventive interventions. Sales figures not only offer a source of validation for survey data, but they also provide insights into factors relating to availability and accessibility which influence uptake. Service related data provides valuable trend data which is not reliant on individual reports.

Thus, while there are problems with using all these data on their own, some of these are remedied by using them in unison, especially where they point to similar trends over time. Conclusions drawn from the multiple indicator approach are likely to be firmer and sounder than those drawn from the single indicator approach, and are more likely to offer insight into the mechanisms which influence particular outcomes (Dubois-Arber et al., 1994; Stroobant, 1994).

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