ORIGINAL ARTICLES

Seasonal variations in sexual activity and their implications for sexual health promotion

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SUMMARY

Although seasonal variations in births are observed in all human populations, the links between calendar events and sexual activity have received little attention in relation to health promotion and service provision. We have plotted various relevant data—routinely collected data for births within and outside of marriage, abortions, sexually transmitted infections, human immunodeficiency virus tests and condom sales figures—by calendar period.

The trends point consistently to an increase in sexual activity and unsafe sex occurring at or around the Christmas period, and a longer but less pronounced subsidiary period of increased sexual activity and unsafe sex coinciding with the summer vacation.

We conclude that seasonal patterns of sexual activity have implications for provision of sexual health services and for the timing and targeting of sexual health promotional interventions.

INTRODUCTION

Seasonal variation in the distribution of births by month of delivery has been observed in every human population investigated[1,2], as has seasonal variation in the frequency of sexual activity[3,4]. Less attention has been paid to such variation in unwanted outcomes of sexual activity. Seasonal variation in sexual behaviour is more likely to be associated with environmental stimuli than physiological response; yet little attention has been paid to the coincidence between calendar event and sexual activity in the context of sexual health promotion and service provision.

METHODS

Routinely collected data sets were examined for potential indicators of outcomes of sexual activity. Birth statistics, collected by the Office for National Statistics (ONS) from registrations of live and stillborn births to women in England and Wales, were plotted by quarter for the period from 1990 to 1996[5]. Trends for births to married couples were compared with those to unmarried parents, on the assumption that a higher proportion of extramarital births were likely to be unplanned. Notifications of termination of pregnancy carried out in England and Wales, recorded by ONS[6] as quarterly rates, were used to monitor trends in legal abortion rates between 1990 and 1996, as an indicator of unsafe sexual activity leading to conception.

Data relating to sexually transmitted infections based on KC60 genitourinary medicine (GUM) clinic returns for various conditions, routinely collected by the Public Health Laboratory Service (PHLS), were plotted by quarter for England as an indicator of unsafe sexual activity leading to sexually transmitted infection. Data from human immunodeficiency virus (HIV) tests were obtained from the PHLS Collaborative Study based on subjects who consented to be tested by 17 public health laboratories in England and Wales between 1990 and 1996. The figures for the total number tested and the number positive for HIV antibodies were plotted as indicators of unsafe sex and sexual-health-seeking behaviour[7].

Condom sales figures, indexed on average weekly sales for 1995 by the London Rubber Company, were charted by week over the period April 1995 to October 1996, as an indicator of sexual activity and risk-reduction practice. All these data were examined for evidence of seasonally related variation in either sexual activity and/or unsafe sexual practice and sexual health outcomes.

RESULTS

The pattern of births exhibits a bimodal rhythm with pronounced spring/early summer and late summer/early autumn peaks (Figure 1). The average monthly number of births registered in 1995 ranged from about 4% above the average in June and September to a low of 5% below the

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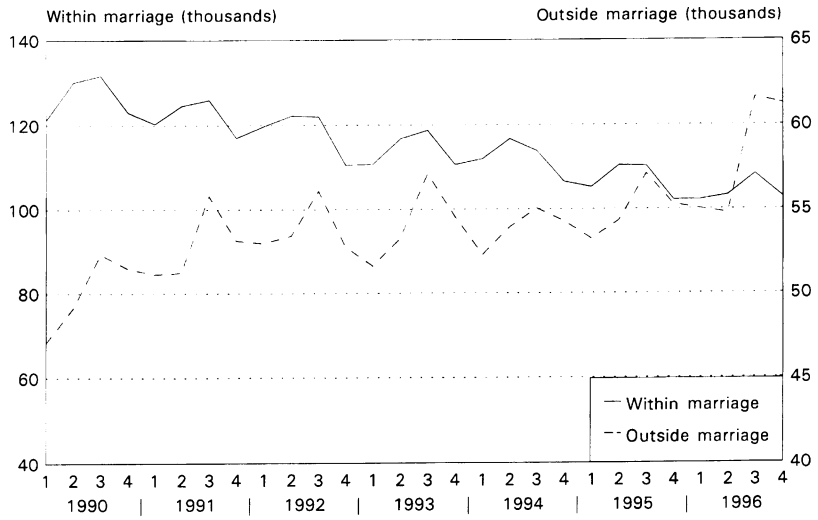

Figure 1 **Live births within and outside marriage (1990–1996 by quarter, England and Wales) [Source: ONS]**

average in December. The two-peak pattern is more striking in births occurring within marriage (for which the underlying trend is downward) than among those occurring outside marriage (for which the underlying trend is upward). A single peak is observed for extramarital births, in the third quarter of the year, reflecting an increase in conceptions at and before Christmas.

Terminations of pregnancy carried out in England and Wales reach a peak in the first quarter of each year (Figure 2). The highest quarterly abortion rate is recorded in the three months ending 31 March, and the lowest quarterly abortion rate in the quarter ending 31 December. The increase in the March quarter, however, is considerably greater than the decrease in the December quarter, indicating that any crossover in data collection would account for little of the spring peak. A smaller subsidiary peak is discernible in the third quarter of most years.

The data for sexually transmitted infections show a biphasic seasonal pattern through the year (Figure 3). Data are not available for the second, third and fourth quarters of 1994. A substantial peak in diagnoses at GUM clinics for all five conditions is seen in the third quarter of the year and a less pronounced peak in diagnoses is seen in the first quarter of the year, for all conditions other than gonorrhoea (for which there was a distinct downward trend during the first half of the period of observation).

The number of HIV tests carried out reaches a peak in the first quarter of the year and, again, a smaller peak is discernible in the third quarter of most years (Figure 4). The parallel increase in the number of positive diagnoses is less marked and the increase in HIV tests is thus likely to be largely attributable to increased attendances by the 'worried well'.

Condom sales figures reflect a similar bimodal distribution—a sharp and acute peak in Christmas week itself, followed by a trough the following week, and a more prolonged but less pronounced increase over the peak summer months (Figure 5).

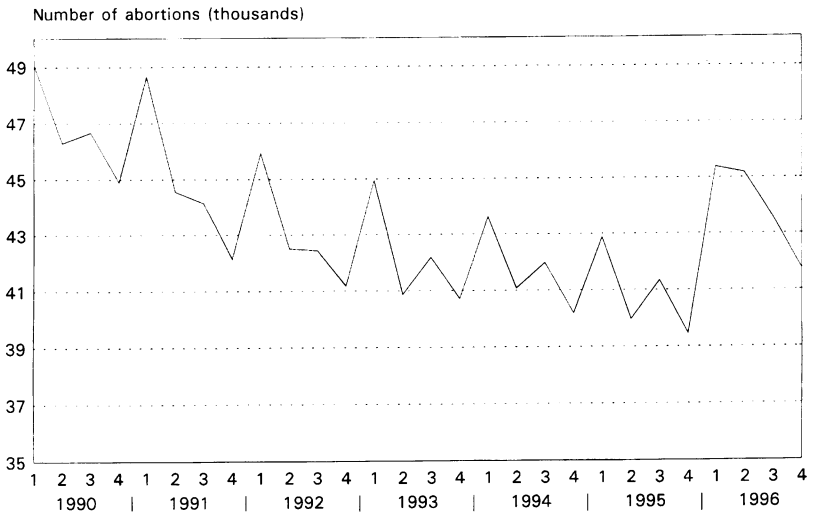

Figure 2 **Legal abortions (1990–1996 by quarter, England and Wales) [Source: ONS (1996 data—provisional)]**

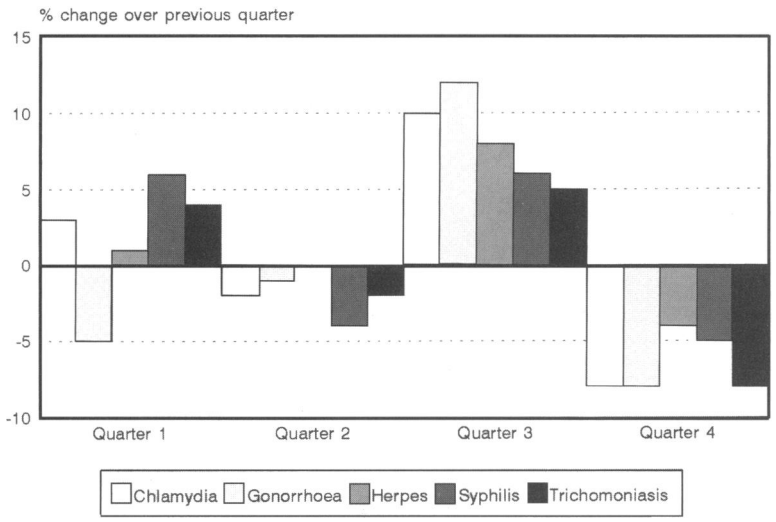

Figure 3 **Average change in case numbers on previous quarter (1990–1996, GUM clinics in England) [Source: CDSC]**

DISCUSSION

The increase in the birth rate during the summer months in cooler climates is well documented, and is likely to be associated with parental preferences for summer-born babies associated with ease of childcare. This does not explain, however, the more marked peak in the late summer months and the absence of an increase in the earlier summer months among extramarital births. If births outside marriage are more likely to be unplanned (and measures of unplanned pregnancy have been predicated on this assumption[8]) then this may reflect higher levels of unsafe sexual activity occurring nine months before the July–September peak, coinciding with the period at and immediately preceding Christmas.

The data relating to abortion, a more incontrovertible measure of unintended conception, show a clear increase in the first quarter of the year. Since most abortions are performed before the twelfth week of pregnancy, pregnancies terminated during this period could be expected to have been conceived within two or three months of the Christmas period. This pattern has been documented elsewhere[9].

Data relating to sexually transmitted infections and attendances for HIV tests similarly show an increase in the months following Christmas and again in late summer. The peak for sexually transmitted infections is less pronounced than for abortion. The interval between infection (and sexual encounter) and diagnosis is less easily determined, because of the indeterminate time taken for patients to notice symptoms and attend for treatment. For conditions such as chlamydial disease with a high frequency of symptomless infection and the potential for prolonged carriage of infection, the seasonal peaks in diagnoses may reflect seasonal variations in health-seeking behaviour as much as variations in the incidence of newly acquired symptomatic infection. For trichomoniasis, however, it is

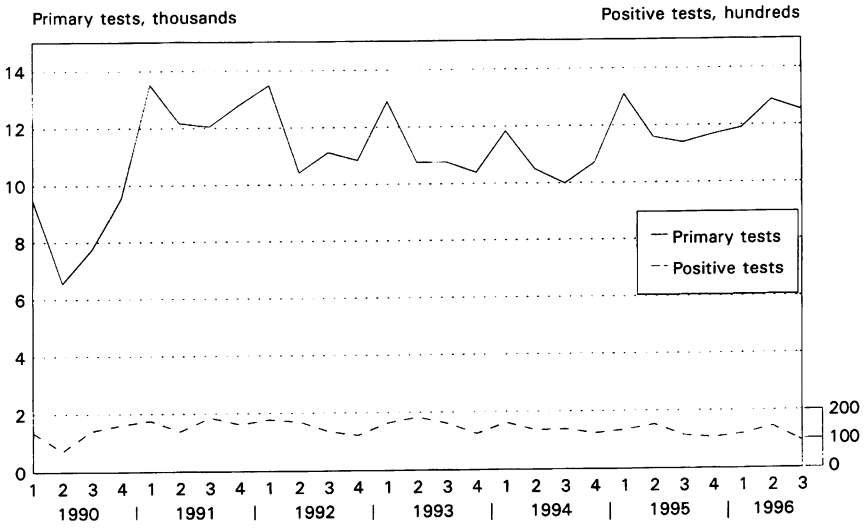

Figure 4 **Primary HIV tests (1990–1996 by quarter, 17 laboratories, England and Wales) [Source: PHLS Collaborative Study of HIV-1 tests]**

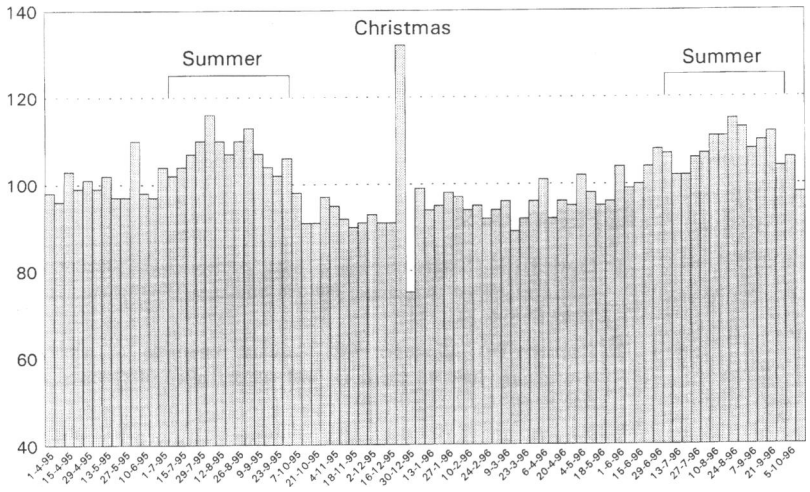

Figure 5 **Weekly internal condom sales (April 1995–September 1996) [Grocers & Co-ops—Source: LRC]**

more likely that the seasonal pattern in diagnoses reflects genuine variations in incidence of newly acquired symptomatic infection.

The summer seasonal pattern of condom sales (a greater volume of sales in the summer and a more pronounced peak in hotter years) has been described elsewhere[10]. The pattern of condom sales described here, however, is also strongly suggestive of an acute increase in sexual activity over the Christmas period. The sharp increase in sales in the week before Christmas and the sharp fall in sales in the week after Christmas indicate some stockpiling, perhaps in anticipation of reduced availability of condom outlets over the holiday period. Nevertheless, the weekly average of sales in these two weeks is higher than for either the preceding or subsequent weeks. This is indicative both of raised levels of sexual activity (or anticipation thereof) and of efforts to reduce the risk of such activity.

The pattern of seasonality seen in all these data suggests a summer peak of sexual activity augmented by another, more pronounced, peak at the turn of the year. The birth peak in the third quarter of the year, and the peaks in abortions, sexually transmitted infections, HIV tests and condom sales in the first quarter of each year, are all consistent with heightened sexual activity during the Christmas and New Year period.

The possibility that these effects might partly be artefactual cannot be ruled out, and the key question here is whether any delays—in the reporting of symptoms by clients, in the returns of clinic records, or in the reporting of data—are related to the Christmas period. It could be argued that patients might delay presenting with symptoms until after the festive season. Similarly, delay in returning the data might be associated with Christmas leave-taking. Although coding of diagnoses associated with GUM visits may not be completed until several weeks after the clinic episode, diagnoses should still be assigned to the quarter within which the diagnosis was made. Late returns for terminations of pregnancy are also assigned to the quarter in which they occurred.

The strongest support for the supposition that a higher incidence of increased sexual activity and unsafe sex is associated with the festive period is the concurrence of trends in all these indicators of unsafe sex, and in the consistency from year to year. These are not unexpected observations, nor are they unique to Britain. In the USA, a peak in births occurs in September, nine months after Christmas and the New Year, while in France the peak is in May, nine months after the August holiday[11]. European countries which celebrate Christmas have a minor peak of births in September while those who celebrate the New Year (or Christmas according to the Julian calendar) have a minor peak of births in October[9]. There has been less discussion of seasonal variation in unwanted outcomes of sexual activity—sexually transmitted infection and unplanned pregnancy.

Various theories have been advanced to explain seasonal variations in outcomes of pregnancy[12–16], invoking biological, sociocultural, hormonal and climatic determinants. The case for a behavioural explanation here, however, has intuitive appeal. The increase in sexual activity and unsafe sex has been linked with the end of the academic year (marked typically by celebrations and increased leisure time during the summer vacation[3,17,18]), and the calendar year (associated with Christmas festivities)[19].

The effect of festivals on fertility has been interpreted largely in the context of merry-making. The period from Christmas to the New Year is associated with increased opportunities for socializing and a generally more hedonistic approach to life. Intensified social activity provides greater opportunities for sexual encounters (though an alternative explanation for the increase in pregnancies is that spouses

are more likely to be together at this time[10]). It is also associated with increased alcohol use, and the link between drinking and unsafe sex, although not unequivocal, is well documented[20].

There are clearly important policy implications in these data. To the extent that increases in sexual activity and unsafe sex are a function of sociocultural events, they are likely to be amenable to interventions to prevent infection and unplanned pregnancy. Such interventions may result in considerable health gain. Fluctuations in births across seasons, for example, are quantitatively as important as differences in births associated with age and most socio-economic characteristics[19].

Awareness of seasonal effects on sexual activity has implications for service provision. Since approximately one in five pregnancies are terminated in England and Wales, any seasonal variation in pregnancy resolution will affect service delivery. There are also implications for service use. Delays in seeking preventive services may reflect the influence of seasonal barriers. Attempts to remedy this may include increasing the availability of and access to health care and counselling services during holiday periods in the summer and at Christmas and the New Year.

These data highlight the fact that seasonally related social events may increase levels of sexual activity, decrease the likelihood that it will be protected, and limit access to services, and so suggest the potential benefit of strategic targeting and heightened efforts to prevent unplanned conception and sexually transmitted infection at crucial points in the calendar. Other health-related interventions have targeted the Christmas period, most notably drink and drive campaigns. Sexual health promotional campaigns have also been mounted to coincide with summer vacations. And at least one AIDS public education campaign linked seasonal celebrations to the need for safer sex (the UK Health Education Authority ran a condom advertisement in the press in 1989, with the endline 'Just in case old acquaintances aren't quite forgot'). There is, however, considerable additional potential for the imaginative promotion of safer sex and provision of condoms over the Christmas period, in the broader context of sexual health promotion.

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REFERENCES

1 Cowgill UM. Season of birth in man: contemporary situation with special reference to Europe and the Southern Hemisphere. *Ecology* 1966;**47**:614–23

2 Peterson DJ, Alexander GR. Seasonal variations in adolescent conceptions, induced abortions, and late initiation of perinatal care. *Publ Health Rep* 1992;**107**:701–6

3 Udry R, Morris N. Seasonality of coitus and seasonality of births. *Demography* 1967;**4**:673–9

4 Parkes AS. Seasonal variations in human sexual activity. In: Thoday JM, Parkes AS, eds. *Genetic and Environmental Influences on Behaviour.* Edinburgh: Oliver and Boyd, 1968

5 Series FM1 no. 24. *Birth Statistics.* London: Stationery Office, 1997

6 Office for National Statistics. Series AB no. 22 *Abortion Statistics.* London: Stationery Office, 1997

7 Public Health Service Working Group. Prevalence of HIV antibody in high and low risk groups in England. *BMJ* 1989;**298**:422–3

8 Cartwright A. Unintended pregnancies that lead to babies. *Soc Sci Med* 1988;**27**:249–54

9 Warren CW, Gold J, Tyler CW, Smith JC, Paris AL. Seasonal variations in spontaneous abortions. *Am J Publ Health* 1980;**70**:1297–9

10 James WH. Seasonal variations in human births. *J Biosoc Sci* 1990;**22**:113–19

11 Gupthill K, Berendes M, Forman R, Chang D, Sarov B, Naggan L, *et al.* Seasonality of birth among Bedouin Arabs residing in the Negev Desert of Israel. *J Biosoc Sci* 1990;**22**:213–23

12 Shimura M, Richter J, Miura T. Geographical and secular changes in the seasonal distribution of births. *Soc Sci Med* 1981;**15**:103–9

13 Mathers CD, Harris RS. Seasonal distribution of births in Australia. *Int J Epidemiol* 1983;**12**:326–31

14 Sewer DA. Trend and variation in the seasonality of US fertility 1947–1976. *Demography* 1985;**22**:89–100

15 Bronson FH. Seasonal variations in human reproduction and environmental factors. *Quart Rev Biol* 1995;**70**:141–64

16 Warren CW, Gwinn ML, Rubin GL. Seasonal variations in conception and various pregnancy outcomes. *Soc Biol* 1986;**33**:116–26

17 Bloor M, Thomas M, Abeni D, Goujon C, Hausser D, Hubert M, *et al. Feasibility Study to Co-operative Community Activities in the Improved Targeting of HIV/AIDS Prevention Campaigns among International Travellers, Final Report to EC,* 1996

18 Gillies P, Slack R, Stoddard N, Conway S. HIV-related risk behaviour in UK holiday makers. *AIDS* 1992;**6**:339–41

19 Lam DA, Miron JA, Riley A. Modelling seasonality in fecundability, conceptions and births. *Demography* 1994;**31**:321–46

20 Plant MA. Alcohol, sex and AIDS. *Alcohol Alcoholism* 1990;**25**:293–301