Epidemiological trends of scabies and syphilis in Slovenia

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ABSTRACT

Background. Scabies is an infestation by the mite *Sarcoptes scabiei*, which usually spreads by skin-to-skin contact and is characterized by an intense pruritus. Sexual exposure is a common but not exclusive mode of transmission, it seems to occur in cycles. Syphilis is a well-known and extensively studied sexually transmitted disease. It is basically on decline in developed countries.

Materials and methods. Syphilis cases must be reported in Slovenia since 1948 and scabies since 1969. An attempt is being made to find out, whether do infections with scabies and syphilis in the Slovenian population show similar epidemiological trends. The 1969 - 1999 period was investigated.

Results. A major peak of scabies infections was observed in 1972 and of syphilis in 1974, a minor one for syphilis in 1979 and for scabies in 1982. Since then the course of scabies was more or less constant whereas syphilis displayed a smaller peak in the years 1993-95. The statistical evaluation according to Pearson showed similar trends in both the conditions.

Conclusion. The observed similarity of the trends should be examined carefully, as the observation period for scabies is probably to short to obtain definite evidence on its cyclic course.

KEY WORDS

scabies, syphilis, epidemiology, Slovenia

Introduction

Scabies is an infestation caused by the mite *Sarcoptes scabiei*, which usually spreads by skin-to-skin contacts and is characterized by rather high infectiousness and intense pruritus. The clinical findings are often typical, but in persons observing high hygienic standards the symptoms may be scarce. Overcrowding and sexual contacts are the most common, but not exclusive modes of transmission (1). The population at risk is the under-privileged, alcoholics, drug addicts, homeless persons, refugees, small children in day care centers, handicapped persons as well as aged people in nursing homes. Loss of immunity to scabies was also claimed to be a possible cause of epidemics, such theory being promoted by Shrank (2) as well as by Herrmann and Steigleder (3). The changed immunity might be responsible for the cycling character of epidemics with intervals of 10 to 15 years (4).

Syphilis is a clinically and immunologically well-

defined venereal disease which was dreaded in the pre-antibiotic era, because non-treated or not adequately treated it led to severe cardiac and neurological manifestations. Epidemics of syphilis are known to have occurred in Europe since the years 1494/5 when a severe epidemic erupted in Italy during the war between the kings of France and Naples (5). It is known that in the periods of World Wars I and II and also at the time of the great depression in 1929 the incidence of syphilis was high. There are no reliable data for the incidence of syphilis in Slovenia during the period of World War II, but in the early fifties about 500 cases were still registered yearly (6).

Simultaneous observations of scabies and syphilis in the same patient as well as of a certain overlapping of both the epidemics are facts familiar to dermatovenereologists and epidemiologists (7). Statistically proved data on their mutual epidemiological relationship are however lacking. The principal reason for the lack of such an information is the fact that in developed countries scabies is not a notifiable disease and therefore reliable data on the incidence are not available.

The aim of the present study was to find out whether in Slovenia during the 1970-1999 period identical or similar epidemiological trends for syphilis and scabies existed. The country with approximately 2 million inhabitants and a relatively strict reporting system for scabies and syphilis seemed to offer a good possibility for carrying out such a comparative study.

The data on gonorrhea seem to be less reliable due to it responsiveness to various antibiotics and to a less consistent reporting, for this reason they were not included into this study.

Materials and methods

Reliable data on syphilis had been available in Slovenia since 1950 as reporting became obligatory by a federal law (8). A system providing a Central Antivenereal Dispensary (CAVD, Outpatient Clinic) and a number of local antivenereal dispensaries (AVD) including a strict reporting were introduced. The data are still collected in the Registry Office at the CAVD, which is located at the Department of Dermatology of the University Medical Centre in Ljubljana. In view of the decreased number of patients with syphilis and gonorrhea during the last ten years or so, certain changes of this system took place, the reporting however still remained operational.

The data on the incidence of scabies had been available since 1970, although the official enforcement by law was introduced by the Slovenian Ministry of Health in 1977 (9). They are regularly collected at the Epidemiological Unit of the Institute of Public Health in Ljubljana. Clinical records from departments of dermatology throughout Slovenia as well as personal

observation testify that during the 1950-70 period scabies was virtually nonexistent in Slovenia.

The above mentioned data collected at the Department of Dermatology (syphilis) and at the Institute of Public Health (scabies) were used for the present comparative study. The epidemiological trends of both the diseases during a 30-year period were investigated.

For the comparative evaluation the Pearson correlation method was applied assuming a linear relationship between syphilis and scabies. Additionally the curve estimation method by calculating the best fit on the observed long-term data of two pairs of variables was examined in order to find out whether some predictions are possible.

Results

After the syphilis expansion during the post World War II period, the number of patients was on decline. A new peak emerged in 1974, which was followed again by a steep decline. A tiny peak reappeared in 1979, which was again followed by a decline, so that in the years 1992 and 1993 only two cases of early syphilis were registered in the entire country, giving an incidence of 0.10 per 100.000 inhabitants. Surprisingly syphilis reappeared in 1994 when 36 cases were reported (incidence 1.82). Such a trend continued up to the year 1997 (6,10), when a new regression became evident (Figure 1).

The peak-incidence of 432 scabies cases per 100.000 was observed in 1972 and was followed by a slow decline. A new however smaller peak with an incidence of 220 per 100 000 was observed in 1982. After that year the slow decline continued to reach a more or less stable incidence of slightly above 50 in the year 1993 (11) and such a tendency still persists.

At a quick glance, the two curves in Figure 1 representing the counts of patients with syphilis and scabies during the period under observation look similar. There may be, however, observed a time shift, the 1972 peak of scabies occurring three years earlier as that of syphilis, while the second, smaller 1979 peak of syphilis appeared three years ahead of scabies.

Nonetheless a strong linear relationship is evident (Pearson r=0.82, p>0.001). The major peaks of gonorrhea and scabies disclose a time difference of 5 years and their linear relationship is less evident (Figure 2), but is still stronger than between both sexually transmitted diseases.

In such a way the assumption of linear relationship among syphilis and scabies is proved, although in this study we were not able to detect their causal relationship because of lack of data regarding the particularity of not just time but also space. We suppose that the association among syphilis and scabies is actually

generated by different socioeconomic and geographic variables and should be just a consequence of their changes. By this we can fairly explain the moving up and down of both diseases.

The next question was the shape of relation between scabies and syphilis. The approach of the regression analysis with a single independent variable begins with the assumption of a straight-line model, which seems to be not reasonable for a whole period of 30 years. This estimation seems however, appropriate as both the diseases are on decline. We found that the small number of syphilis cases is followed by the scabies cases up to 5,000 (250 per 100 000 inhabitants). Under this limit the syphilis cases increase quite fast until the epidemic achieves its saturation and starts to decrease without respect to the possibility that further cases of scabies are added or not after the number 400 per 100 000 inhabitants.

The shape of relation between scabies and syphilis which is giving an impression of dependency, should be described by other than linear fit according to their graphical presentation (Figure 1). As we know that the coefficient of correlation is not a measure of the
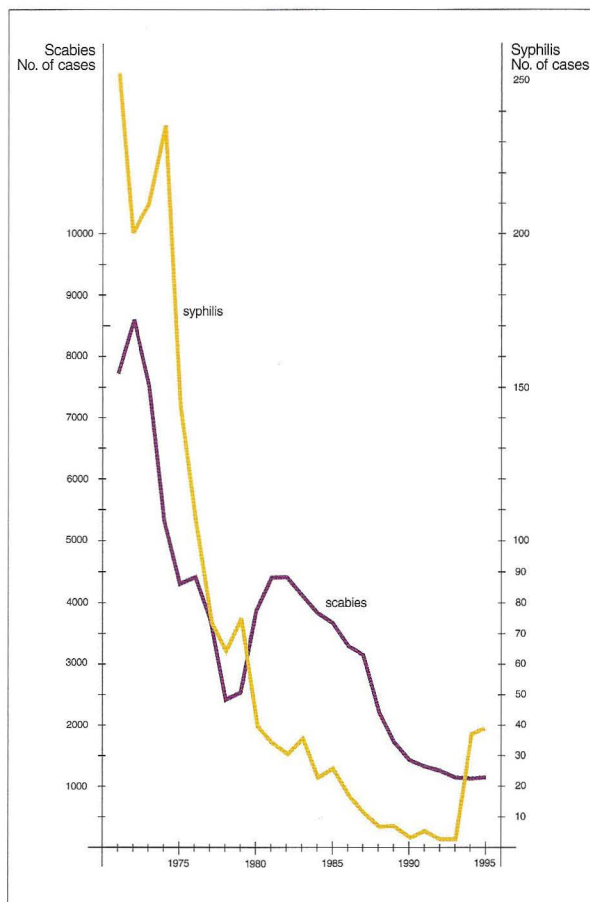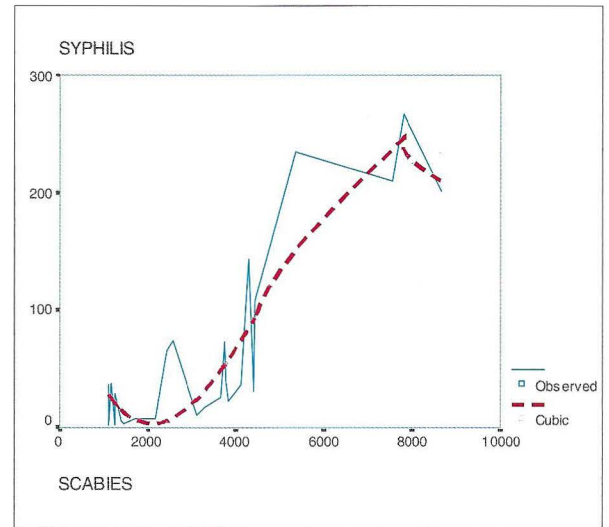

Figure 2. The curve estimation between syphilis and scabies

appropriateness of linear model fitting, the data were calculated and compared using the coefficients of determination for the straight line, quadratic and cubic fits.

The best fit obtained was cubic equation, which can explain 79% variability of the scattered data of syphilis and scabies (Figure 2 and Table 2). As follows we can predict with quite high certainty that at the constant of 93 scabies cases one syphilis case appears anew, but in the case of 1000 scabies patients we can expect cutting down the syphilis not proportionally. So unless we observe the epidemics of scabies and syphilis at the same time, we can conclude that he spread of syphilis is limited earlier than the spread of scabies what seems to be reasonable regarding the rules in population.

Discussion

Simultaneous appearance of epidemics of scabies and syphilis have been observed in the past at the times of catastrophic events like wars or earthquakes, but exact documentation confirming their coincidence is rather poor. There are some data reporting on the epidemiological situation concerning both conditions during the war from England (12) as well as from Macedonia describing the situation after the earthquake in 1962 (13).

In Slovenia during the last 60 years or so three major epidemics of scabies have been observed. The first one during the war- and postwar-years (1941-46), which is not exactly documented; the second was in the year 1972 and the third in 1982, which are both well-documented (11). The yearly incidence of syphilis, which is recorded since 1950, is also characterized by three broader peaks, which do not exactly match those

Figure 1. Number of reported cases of scabies and syphilis during the 1971 - 1995 period in Slovenia.

Table1. Pearson correlations on syphilis and scabies, covering the period of 29 years. Correlation is significant at the 0.01 level (2-tailed).

		SYPHILIS	SCABIES
SYPHILIS	Pearson correlation	1.000	0.823
	sig. (2-tailed)		0.000
	N	48	29
SCABIES	Pearson correlation	0.823	1,000
	sig. (2-tailed)	0.000	
	N	29	29

of scabies but are close to them. A close look at the curves (Figure 1) gives the general impression of a correlation. The statistical evaluation using the Pearson method revealed too a correlation between the courses of syphilis and scabies.

There is however an essential difference: The syphilis curve displays a clear tendency of decrease and except for the small raise in the years 1996-97 is close to the 0 value. On the contrary the scabies curve is also on decline, but tends to stabilize at the value of about 1000 patients yearly (an incidence of 50).

It deserves to be mentioned that there are authors who do believe, their opinions based mainly on clinical observations, that sexual contacts are not a primary cause of scabies spreading. According to Church the spreading of scabies prevails among children (14), while Anderson described an epidemic of scabies in a nursing home (15). Neither Melton who reported on an epidemic in the US Navy (16) nor Shrank from London (12) could observe a correlation between scabies and STDs. Burkhart also concluded by using apidemiologic techniques that scabies is not primarily a STD and that 30-year cycles do not exist (17). Our efforts to obtain statistically relevant data for scabies in Western European countries have failed, but it seems that such data exist in some of the former Socialist countries like Czech Republic (18) and Poland (19), which fact would probably merit a further investigation.

At last an interesting question may be raised additionally. As we know a wide epidemic of scabies took place in the former Yugoslavia. It started in Macedonia in 1963 after the terrible earthquake and was spreading slowly to the western parts reaching Slovenia by 1968, where the peak was observed in 1972. In view of the extreme sufferings and extensive migration of populations during the wars in Croatia and Bosnia in the years 1991-95 and in Kosovo in 1999, it was reasonable to expect a new wave of scabies. Up to the present day no such information became available, but as we still do not fully understand the reasons of the scabies epidemics, the epidemiologists and dermatologists should continue to stay on alert.

Conclusions

1. The present investigation produced evidence of a time-dependent correlation between the epidemics of scabies and syphilis

2. The time shift of approximately two years between the peaks of both epidemics under consideration speaks against a causative correlation.

3. Both conditions are probably triggered by similar factors like overcrowding, poor housing conditions and insufficient personal hygiene.

4. The period of 30 years is too short to produce an explicit conclusion concerning the cyclic appearance of scabies epidemics.

Table 2.The parameters of curve estimation

	RSQ	d.f.	F	Sigf	B0	B1	B2	B3
Syphilis CUB	0.784	25	30.21	0.000	93.00	-0.1004	3. 3E-05	-2. E-09

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