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SHORT COMMUNICATION

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Is the incidence of SIDS increasing in Asia?

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Abstract The incidence of SIDS in western countries has decreased since the late 1980s after active SIDS prevention campaigns. By contrast, both Taiwan and Japan have reported an increase in incidences. In this report data from England, Wales, Scotland, Northern Ireland, Japan and Hong Kong are analysed. Regression coefficient and linearity of regression tests were used to determine if there was any significant increase or decrease in post-neonatal mortality (PNNM), SIDS mortality and mortality among infants 1–5 months old. A statistically significant decrease in SIDS was recognized in England, Wales, Scotland and Northern Ireland, whereas statistically significant increases were noted for Japan and Hong Kong. However in Japan and Hong Kong both the PNNM and mortality of infants between 1–5 months in age fell significantly, suggesting that the increased SIDS rates could be due to a change in diagnostic labelling. Further study will be required to determine whether this increase in the incidence of SIDS is genuine or only an artifact.

Key words Sudden infant death syndrome (SIDS) · Asia · Japan · Hong Kong · United Kingdom

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Introduction

Since the late 1980s, numerous western countries have embarked on campaigns to reduce the risk of SIDS. Following these campaigns, the incidence of SIDS has markedly decreased (by 50% or more) and it appeared that the main factor had been a reduction in the proportion of infants sleeping in the prone position. According to a comparison between two population-based studies before and after public awareness of this matter in England, the prevalence of a prone sleeping posture in the control populations fell significantly (from 60% to 28%); and almost all of the reduction in SIDS mortality (from 3.5 to 1.7 per thousand live births) could be attributed to this change (Wigfield et al. 1994). In the United States, an evident decrease in the incidence of SIDS was also reported following public awareness of the danger associated with the prone sleeping position in some places (Spiers and Guntheroth 1994). Other factors, such as changing parental smoking habits, have been more difficult to modify. Even more difficult to undertake has been monitoring changes in infants' thermal environment.

Recently, an increase in the incidence of SIDS has been reported from Taiwan (Knöbel et al. 1994) and a similar trend was also noted in Japan (Sawaguchi et al. 1994). The Taiwanese report suggests that SIDS cases in that country may often be labelled as being due to suffocation. It is important to determine if this apparent increase in the incidence of SIDS is genuine or whether it reflects a change in diagnostic labelling. To examine this issue, further data from England, Wales, Scotland, Northern Ireland, Hong Kong and Japan have been analysed.

Materials and methods

Data on SIDS mortality per 1,000 live births, post-neonatal mortality (PNNM) and mortality among infants 1–5 months old (i.e. 29–182 days) from 1980 to 1995 were collected from the Child Health Unit of the Office for National Statistics in England and Wales, the General Register Office of Northern Ireland Statistics and Research Agency, Vital Events Branch of the General Register Office for Scotland, Vital Statistics by the Ministry of Health and Welfare in Japan and the Census and Statistics Department in Hong Kong. The

Table 1 Tests of the regression coefficient and tests for linearity of regression using SIDS mortality, 1–5 months (1/5) mortality and postneonatal (PN) mortality in Hong Kong, Japan, England and Wales, Scotland and Northern Ireland

Region	Rate	Test for linearity of regression		Regression coefficient	Test of the regression coefficient	
		F	SigF	B	T	SigT
Hong Kong	SIDS mortality	4.633	0.049	0.004	2.152	0.049
	1/5 mortality	34.762	0.000	–0.062	–5.892	0.000
	PN mortality	53.789	0.000	–0.097	–7.334	0.000
Japan	SIDS mortality	174.322	0.000	0.028	13.203	0.000
	1/5 mortality	17.640	0.001	–0.140	–4.200	0.001
	PN mortality	38.249	0.000	–0.033	–6.185	0.000
England & Wales	SIDS mortality	17.647	0.001	–0.107	–4.201	0.001
	1/5 mortality	32.109	0.001	–0.082	–5.667	0.001
	PN mortality	74.224	0.000	–0.179	–8.615	0.000
Northern Ireland	SIDS mortality	40.733	0.000	–0.156	–6.382	0.000
	1/5 mortality	65.055	0.000	–0.140	–8.066	0.000
	PN mortality	146.784	0.000	–0.259	–12.115	0.000
Scotland	SIDS mortality	25.120	0.000	–0.099	–5.012	0.000
	1/5 mortality	49.712	0.000	–0.121	–7.051	0.000
	PN mortality	82.662	0.000	–0.156	–9.092	0.000

tendency toward an increase or decrease in the data from each region was assessed by tests of the regression coefficient and linearity of regression. Regression coefficients were calculated by region.

In England, Wales, Scotland, Northern Ireland and Hong Kong SIDS is entered in the record only after a full autopsy. In Japan, however, a diagnosis of SIDS is not necessarily proven at autopsy because it is performed infrequently and the attending physician may record SIDS as the cause of death without proof that might have been obtained from an autopsy.

Results

The results of tests of the regression coefficient and linearity of regression using the data from each region are shown in Table 1. All the regression coefficients, except the post-neonatal mortality in Japan, demonstrate that there has been a significant increase or decrease in mortality.

As a result of a comparison between regression coefficients of SIDS mortality and mortality among the 1- to 5-month-olds by region, a statistically significant decrease in SIDS mortality was recognized in England, Wales, and Northern Ireland, whereas a statistically significant increase was recognized in Japan and Hong Kong (Fig. 1). Figure 2 shows significantly decreasing trends in mortality in 1- to 5-month-olds in all regions. In Figure 3, significant decreases in PNNM are seen in all regions (SigT < 0.01) except Japan.

Discussion

The regression analysis indicates that there has been a statistically significant increase of SIDS mortality in Japan and Hong Kong. However, this increase may not be genuine.

Since establishing the definition of SIDS in 1969, there has been considerable debate as to what constitutes a cause of death. A high or low incidence of SIDS is often

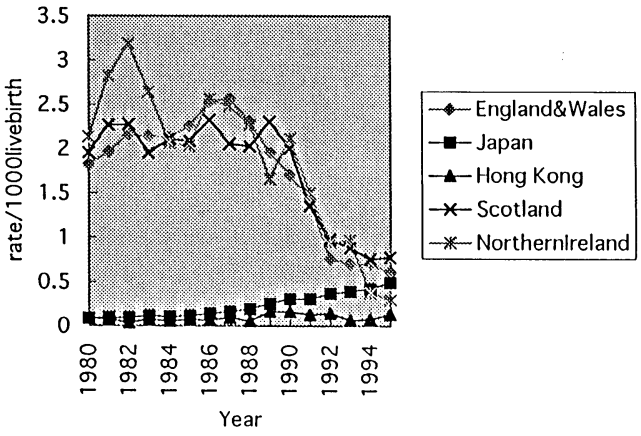

Fig. 1 Trends in SIDS mortality per 1,000 live births from 1980 to 1995 by regions in England and Wales, Scotland, Northern Ireland, Hong Kong and Japan

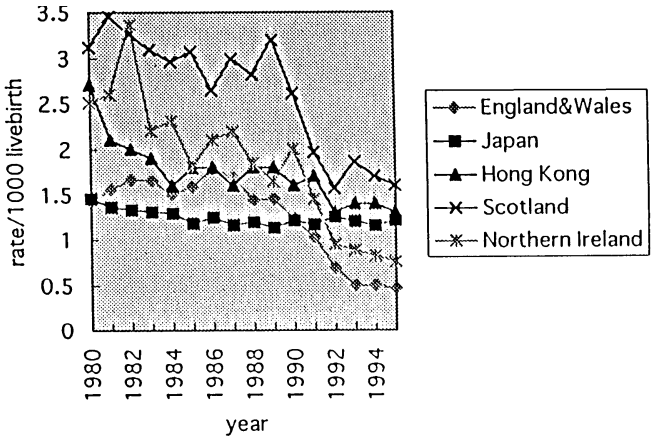

Fig. 2 Trends in mortality of 1- to 5-month-old infants by region from 1990 to 1995 in England and Wales, Scotland, Northern Ireland, Hong Kong and Japan

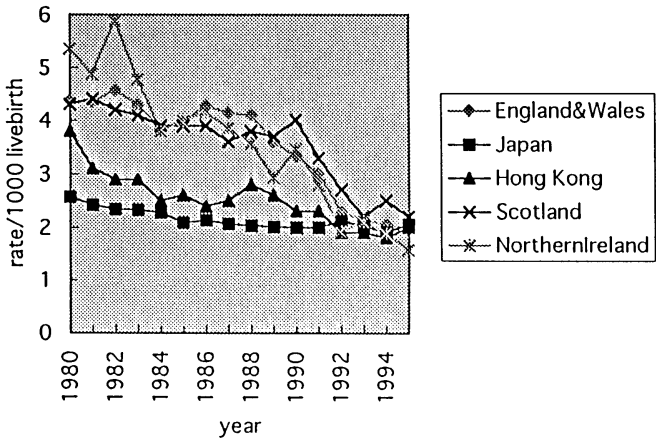

Fig. 3 Trends in post-neonatal mortality rate by region from 1990 to 1995 in England and Wales, Scotland, Northern Ireland, Hong Kong and Japan

suspected to be due to over- or under-diagnosis. The main problem in comparing the incidence of SIDS internationally or between regions or countries is the reliability of the diagnosis. In addition, the tendency for under-diagnosis of SIDS in Hong Kong (Lee et al. 1989) and in Japan (Sawaguchi and Fujita. 1996; Sawaguchi et al. 1996) has already been reported. In 1985 the incidence of SIDS reported in the official statistics of Hong Kong was 0.04 (Davies 1985) but the rate was found to be 0.29 per 1,000 live births in a prospectively designed study that was conducted later (Lee et al. 1989). On the other hand, there seemed to be a tendency to over-diagnosis in the 1980s in most western countries, including England, Wales, Scotland and Northern Ireland. This argument on over- and under-diagnosis is impossible to refute unless detailed prospective studies are conducted using standardized autopsy protocols.

Adding to this problem is the existence of the WHO coding rules which recommend that the name of another disease (in code) in boxes 1b or 1c as the cause of death will take false precedence over SIDS written in box 1a.

Against this background it is evidently difficult to monitor the incidence of SIDS. A comparison of the mortality among 1- to 5-month-olds has recently been suggested (to be called a "SIDS Surrogate" – such as asphyxia, pneumonia, and others) in countries with low infant mortality (Mitchell 1995). However, these data are not always available.

In western countries most cases of SIDS occur in the age range of 1 to 5 months. The "other deaths" in this age range are relatively rare and the mortality is assumed to be somewhat constant. This is also difficult to prove. Thus any notable difference in mortality of 1- to 5-month olds between countries or any significant change in mortality among this age group within countries is likely to be due to a difference in SIDS incidence.

Based on our data on the decline in mortality among the 1- to 5-month-olds and increasing SIDS incidence in Japan and Hong Kong, we propose two possible scenarios:

Firstly, there could be a fall in non-SIDS mortality in the 1- to 5-month-old plus a true increase in SIDS mortality. Secondly, there could be a fall in mortality in the aforementioned age group plus a static or decreasing SIDS mortality. The apparent increase in SIDS mortality may be explained by an increased awareness of physicians with regard to SIDS or a change in diagnostic labelling.

In Japan the decrease in the mortality of this age group was small and the increase in the incidence of SIDS was rather evident. In the other four countries the decrease in mortality between the ages of 1 to 5 months was remarkable and only in Hong Kong was a slight increase in the incidence of SIDS recognized. There is a possibility that the increased awareness of SIDS among clinical physicians and pathologists has resulted in the higher autopsy rate of sudden infant deaths in Japan.

As a result of comparing the mortality among 1- to 5-month-olds and SIDS mortality by region, a tendency for over-diagnosis of SIDS in England, Wales, Scotland and Northern Ireland (particularly in the early 1980s) and a tendency for under-diagnosis of the same condition in Japan and Hong Kong seem to be proven.

It is very important to determine which scenario accurately reflects the changing data related to SIDS because it is possible that Asian countries may have adopted certain western child care practices that contributed to the actual increase in the incidence of SIDS. For example in western child care practice, the role of hyperthermia in SIDS was reconfirmed by a recent German study (Kleeman et al. 1996). Excessive clothing with high environmental temperatures (from using western-type heating systems) is a custom recently adopted by the Japanese and residents of Hong Kong, which may readily cause hyperthermia in infants. The matter is yet to be investigated. Prospectively-designed studies will be required to answer these questions with greater certainty.

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