Sudden Infant Death in Service Families

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SUMMARY: A study of all the cot deaths in infancy which occurred in Service families in British Forces Germany (BFG) from 1981-4 was undertaken in order to ascertain the frequency of these tragedies. The total number of deaths was ninety-seven and in sixty cases no cause of death was found at post mortem. The incidence in the Service community was calculated so that comparison could be made with the civilian population of England and Wales. The results of the study indicated that cot deaths occurred relatively more frequently in the Service population even allowing for socio-economic differences between the two groups. However, postneonatal deaths from causes other than cot death occurred less often in BFG. Cot deaths are therefore the cause of the higher postneonatal mortality rates in the Service community and they constitute an important target for preventive medicine. The measures which have been taken in BFG in recent years to reduce the number of cot deaths are discussed in this paper together with some further ideas which might help to solve this distressing problem.

Introduction

The Service population in (BFG) is relatively young with a general fertility rate of 140 per thousand women aged 15-44 years (compared with a rate of 60.7 in England and Wales). The result is approximately 4,500 births per annum. Many of these children are brought up by young parents without the extended family support which is available in most communities. The frequent absence of the husband on exercise or on unaccompanied tours of duty is an additional burden to the family which is required to change its location every few years and often to set up home in a foreign environment.

In view of these difficulties it is perhaps not surprising that mortality rates for infants of Service families have generally been higher than those for civilians in England and Wales. This was first demonstrated by Walters in the 1970s and subsequently confirmed by Smith¹. The greatest difference was found to be in the rate of deaths that occurred in the postneonatal period (i.e. between the end of the first month after delivery and the end of the first year). Cot death is the cause of many of the deaths in this period so a large amount of attention has been paid to this problem and to whether its frequency can be reduced.

Recently the mortality rates for infants in BFG have shown some improvement in relation to those for the civilian population of England and Wales. Since 1980 the annual infant mortality rate (deaths occurring within twelve months of delivery) for BFG has fallen steadily so that it is now similar to the civilian rate. This improvement is mainly the result of a reduction in the number of deaths occurring within four weeks of delivery. The improvement in the postneonatal mortality rate has been slower and this rate remains higher than the civilian rate for all social classes in England and Wales (Figure 1). In fact it was remarkably similar to the rate for social class V in England and Wales during the period for which this information has been made available (Figure 2). It is still appropriate,

therefore, to examine the problem of cot death and to evaluate the preventive measures introduced in BFG during the last few years.

This study examined all the cases of cot death which occurred in BFG during 1981-4 so that comparison could then be made with the civilian population. In order to do this it was necessary to be precise in defining the concept of 'cot death'. Originally the term was used to include all cases where an apparently healthy infant was unexpectedly found dead in its cot or pram. Later the term was applied only to such deaths when a thorough post mortem examination had failed to demonstrate an adequate cause of death. This was labelled 'sudden infant death syndrome' and was used interchangeably with the term 'cot death' for a time². Recently, however, the Foundation for the Study of Infant Deaths has proposed that the term 'cot death' be applied to all sudden unexpected deaths in infancy (as it originally was) and that 'sudden infant death syndrome' (SIDS) be used to describe only those cot deaths which are unexplained³. These definitions are shown diagrammatically (Figure 3) and are the ones used in this study.

Fig 1. GRAPH SHOWING COMPARISON OF POSTNEONATAL MORTALITY:
BFG WITH ENGLAND AND WALES.

Source for England and Wales: OPCS

Methods

The study examined all the cot deaths of infants of Service families which occurred in BFG from 1981-4. There were exactly one hundred cases during this period. Ninety-seven of the deaths were of babies aged under one year. In order that the results of this study could be compared directly with those civilian studies which have concentrated on cot deaths occurring in infancy the three cases in which death occurred over the age of one year were excluded.

The post mortem reports were studied to verify the diagnosis and to obtain information relating to the death. In 88 out of the 97 cases the post mortem report was available. In each of these 88 cases it was therefore possible to establish a pathological category based on

Professor Emery's classification of infant deaths⁴. According to this classification all the cases in this study fall into one of the following categories. Category A covers those cases of cot death in which there was an underlying condition associated with a poor prognosis. Category B cases are those shown at post mortem to have been suffering from a recognisable illness which is usually treatable but which was presumed to have been the cause of death: Category C cases are those suffering from illnesses which, because they are not normally fatal, were either only indirectly related to the death or unrelated to it. Category D cases are those in which post mortem has failed to reveal the cause of death. True cases of SIDS fall into this group.

It is not always easy to establish an accurate

**Fig 2. GRAPH SHOWING COMPARISON OF POSTNEONATAL MORTALITY RATES:
BFG WITH ENGLAND AND WALES SOCIAL CLASS V**

pathological category for each infant death. The accuracy of the category depends on the accuracy of the post mortem examination. Some civilian studies have benefitted from the services of specialist paediatric pathologists⁵. Other studies have used information gained from confidential enquiries⁶. This increases the accuracy of the diagnoses and results in a definite cause of death being found in a higher proportion of cases. This study is based solely on the diagnoses made at post mortem by sixteen different general pathologists so it may be that a higher proportion of deaths was put into category D – the SIDS category – than ought to have been.

After the post mortem diagnoses had been reviewed it was possible to calculate the rates of SIDS and of deaths due to respiratory illness as well as of cot deaths as a whole. This enabled comparisons to be made with civilian rates. All such rates are measured as deaths per 1000 live births. The number of births in BFG was obtained from Soldiers', Sailors' and Airmen's Families Association (SSAFA) records. It was impossible to calculate the number of infants posted into and out of BFG during this period but it seems reasonable to have assumed that this was a fairly constant number and that the BFG birth rate was a reasonably accurate estimate of the denominator population.

Information about those cases which were classified as SIDS was obtained from the antenatal records of the mothers (Forms Med 198) as well as from the post mortem reports. This enabled the epidemiological characteristics of SIDS cases in the Service population to be compared with those of SIDS cases in the civilian population.

Fig 3. DEFINITIONS

Results

Infant Cot Deaths in BFG

Table 1 shows the cot deaths which occurred in infancy in BFG (1981-4) according to the Emery pathological classification

Table 1
Deaths According to Pathological Classification

Category	1981	1982	1983	1984	Total
A	2	1	-	1	4
B/C	3	8	9	4	24
D	20	14	9	17	60
(?)	3	3	3	-	9
Total	28	26	21	22	97

Category A consisted of one case of each of the following: cerebral palsy, cystic fibrosis, microcephaly and a single ventricle. All cases in category B and C were suffering from respiratory illnesses apparent from macroscopic examination alone. These two categories were taken together because it was not always possible to tell from the post mortem report whether the respiratory illness from which the infant was suffering was one which was only occasionally fatal (category B) or not normally fatal (category C). The cases which were not given a category were the nine cases for which a post mortem report was not available.

Mortality Rates

In order to be able to calculate rates for BFG which could be compared with those produced for the civilian population of England and Wales it was necessary to aggregate the deaths for the four years 1981-4. This would have compensated to some extent for the problem of small numbers which makes the interpretation of statistics both difficult and hazardous.

(i) Cot Deaths in Infancy

There were 97 infant cot deaths in this study. The total number of births in BFG for the period was 18,047. Therefore the rate of cot deaths in infancy in BFG (1981-4) was 5.4 per thousand live births.

(ii) SIDS

There were 60 deaths in category D, i.e. those cases for which post mortem examination failed to identify a possible cause of death. Since the number of births was 18,047, the rate of SIDS in BFG (1981-4) was 3.3 per thousand live births.

(iii) Cot Deaths from Respiratory Illness

There were 24 deaths in categories B and C, i.e. those cases in which post mortem examination suggested respiratory illness as the probable or possible cause of death. The rate of sudden unexpected death in infancy due to respiratory illness was therefore 1.3 per thousand live births.

Epidemiological Characteristics of SIDS

Table 2 shows some of the epidemiological characteristics of SIDS in the BFG study compared with

recent civilian studies in England and Wales summarised by Limerick⁷. It was not possible to obtain information on each epidemiological characteristic for all of the SIDS in the BFG study. The result for each case is shown in brackets.

cot deaths has been shown to be related to maternal age, with higher rates occurring in families where the mother is young. Because the maternal ages in Service families tend to be younger than in the civilian population a higher rate of cot death would be expected. One study

Table 2
Epidemiological Characteristics of SIDS in this BFG study compared with recent studies in England and Wales summarised by Limerick.

Epidemiological Characteristics	England & Wales	BFG (1981-4)
Age 1-6 months	80%	82% (49 out of 60)
Age 2-3 months	40%	38% (23 out of 60)
Full-term	85%	82% (27 out of 33)
Male: Female	60: 40	55: 45 (33: 27)
Twin Pregnancy	1 in 25	1 in 15 (4 cases)
First Born	25%	17% (7 out of 41)
Second Born	50%	51% (21 out of 41)
Third Born	25%	32% (13 out of 41)
Death in Winter (October-March)	60%	65% (39 out of 60)

Discussion

The purpose of this study was to examine the cot deaths in Service families in BFG in order to be able to calculate the frequency of such tragedies. By producing rates per thousand live births the problem in BFG could then be compared with other communities and seen in perspective.

The frequency of cot deaths varies from one country to another and also between communities within the same country. The Office of Population, Censuses and Surveys (OPCS) is the source of information for the frequency of cot death in England and Wales. During the 1970's the number of death certificates which attributed the death of an infant to the 'sudden infant death syndrome' increased while the number which blamed 'respiratory illness' as the cause of death correspondingly declined. This suggests an increasing recognition of the syndrome and a change of registration habit on the part of doctors rather than a change in the frequency of the condition itself. Those deaths registered as SIDS together with the sudden unexpected deaths at home from respiratory illness constitute the cot death problem as a whole. The combined frequency of these has been a fairly constant rate of around 2.4 per thousand live births during the last few years in England and Wales⁸.

Since the rate for all infant cot deaths in BFG during the period 1981-4 was 5.4 per thousand it would appear that the cot death problem in BFG was twice as severe as it was in the civilian population of England and Wales. It is not, however, appropriate to compare the cot death rates in the two population groups directly, in particular because of the factor of maternal age. The frequency of

which demonstrated this was the Oxford study in which infant cot deaths in the region were linked to maternal age using the Oxford Record Linkage files⁹. The rate of cot deaths which occurred in families with mothers aged under 20 was 4.4 per thousand live births. When the maternal age was 20-24 the rate was 3.2, when it was 25-29 the rate was 1.6, when 30-34 it was 1.5, and when the mothers were aged 35 and over it was 2.0. It was not possible in this BFG study to correlate the cot death rate with maternal age. It is worrying to note, however, that the cot death rate in BFG exceeded the highest rate in the Oxford study, that is the rate for the group with maternal age below 20 years.

The rate of SIDS in BFG for the period 1981-4 was 3.3 per thousand live births. The rates for the civilian population of England and Wales during the same period were: 1.99 in 1981, 2.13 in 1982, 2.09 in 1983, and 1.95 in 1984¹⁰. These rates were calculated from the manner in which the cause of death was described on the death certificate so their accuracy depends on the accuracy of the reports. When the rate for BFG is tentatively compared with the rate for the civilian population, remembering that no adjustment has been made for maternal age, it appears that the difference in frequency of SIDS was not as great as it was for the cot death problem as a whole. It is also interesting to note that the rate of SIDS in American military communities is approximately 3.3 per thousand live births which is exactly the same rate as that for BFG¹¹. Table 2, which compared some of the epidemiological characteristics of SIDS in BFG with those in recent civilian studies, suggested that the pattern of the tragedies does not differ much between the communities.

Another comparison which can be drawn is for the rates of sudden unexpected infant deaths at home from respiratory infection. In England and Wales this is now approximately 0.5 per thousand live births¹². The rate of these deaths in BFG 1981-4 was 1.3 per thousand live births. So while the cot death rate for BFG differed from the civilian rate by a factor of 2.25, and the SIDS rate by a factor of 1.65, the rate of sudden unexpected deaths at home from respiratory infection differed by a factor of 2.6. Although it is difficult to draw firm conclusions from such statistics it may be that death at home from respiratory illness is a particular problem in the Service community. Parental recognition of illness in the infant and appropriate use of medical help are particularly important in the avoidance of such potentially 'preventable' deaths. So too is the standard of primary care once such a potentially dangerous illness has been reported by the parent.

The apparent increased frequency of cot deaths in the Service community by comparison with some other communities is obviously a cause for concern but should be seen in the context of postneonatal mortality as a whole. During the period 1981-4 there was a total of 117 postneonatal deaths in BFG of which only 20 were not due to cot death. The rate of postneonatal deaths from causes other than cot death in BFG during this period was therefore 1.1 per thousand live births which is a lower rate than for all social classes in the civilian population of England and Wales. The disappointing postneonatal mortality rates in BFG are therefore almost entirely due to the problem of cot death. If the frequency of cot deaths could be reduced to the level experienced by the civilian population the overall postneonatal mortality rates in the Service community would compare favourably with civilian rates. It therefore seems appropriate to conclude this paper by considering measures which may assist in reducing the cot death problem.

(i) Health Education

Health education for parents should be given a high priority, particularly in relation to the management of illness in infants and how best to obtain appropriate help from their doctors and health visitors. The primary health care teams are already involved in this and they should be encouraged to extend their efforts by the publication of more information leaflets and booklets. The opportunities for health education offered by radio and television should be investigated. As part of the process of health education parental participation in the health care of infants should be encouraged and parents could also be in possession of a copy of their infant's weight record as changes in weight have been demonstrated to be a sensitive indicator of illness¹³.

(ii) Health Visitor Intervention Scheme

The Health Visitor Intervention Scheme was introduced into BFG in May 1982. The Scheme is

designed to recognise infants at high risk of cot death and to prevent such deaths occurring by early awareness of danger. Health visitors see high risk infants regularly during the early months of life and pay particular attention to the infant weight pattern. The infant is immediately referred to a doctor if this or any other aspect of its progress is unsatisfactory. Infants at 'high risk' of cot death are identified by using Smith's modification of the Sheffield Scoring System¹⁴. This system was devised by Carpenter and Emery who used stepwise discriminant analysis to identify eight parameters: mother's age, number of previous pregnancies, duration of second stage of labour, mother's blood group, infant's birth weight, whether or not a twin pregnancy occurred, the mother's feeding intention and whether or not she suffered from a urinary tract infection during the pregnancy¹⁵. Smith applied the same technique and found the Sheffield determinants statistically significant in the BFG situation. He also found that the number of days a mother had to spend in hospital during the pregnancy was significant and this parameter was added.

The scheme appears to have contributed to a reduction of cot deaths in BFG. This claim is not merely based on the small reduction in the number of cot deaths which has occurred in BFG since 1982 but upon the fact that the proportion of cot deaths occurring in the 'high risk' group has also declined since the introduction of the scheme. On current evidence the scheme should continue to be used in BFG and consideration should be given to its introduction into Service garrison elsewhere.

(iii) Primary Health Care Teams

The primary health care team should be alerted to the relatively high incidence of sudden unexpected infant deaths occurring at home from respiratory illness. General practitioners must be prepared to see sick infants at short notice and to arrange early review if necessary. They should be more ready to admit to hospital those infants scored at high risk or whose parents appear unable to cope. Hospital paediatric departments should expect and tolerate such admissions.

The examination of a sick infant should always include a check of its weight so that the weight trend can be observed. If parents were in possession of a copy of their infant's weight chart then the doctor would have access to it if the infant had to be seen out of hours.

(iv) Information

More information is needed regarding the circumstances of cot deaths so that appropriate measures can be taken to reduce them. This information should include details regarding the socio-economic circumstances of the family and their access to medical care. The introduction of confidential enquiries into all cases of cot death in conjunction with the post mortem

would be a valuable source of such information. This is one of a number of reasons for establishing a post for a Community Physician for Child Health in BFG.

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CLINICAL TUTOR IN PSYCHIATRY

Director General Army Medical Services has approved the appointment of Major J S McPherson as Clinical Tutor in Psychiatry vice Lt Col R M L Anderson with effect 19 October 1986.