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Early Human Development 2257 (2001) xxx

Early Human Development

www.elsevier.com/locate/earlhumdev

International Child Care Practices Study: infant sleep position and parental smoking

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0378-3782/01/$ - see front matter
PII: S0378-3782(01)00165-7

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Received 28 January 2001; received in revised form 26 March 2001; accepted 28 March 2001

Abstract

The International Child Care Practices Study (ICCPS) collected descriptive data from 21 centres in 17 countries. In this report, data are presented on the key sudden infant death syndrome (SIDS) risk factors of infant sleep position and parental smoking.

Methods: Using a standardised protocol, parents of infants were surveyed at birth by interview, and at 3 months of age mainly by postal questionnaire. Data entry and descriptive analysis were undertaken with Epi Info. Centres were grouped according to geographic location. Also indicated was the level of SIDS awareness in the community, i.e. whether any campaigns or messages to "reduce the risks of SIDS" were available at the time of the survey.

Results: Birth interview data were available for 5488 individual families, and 4656 (85%) returned questionnaires at 3 months. Overall, 52.5% (95% CI, 43.5–61.3) of infants were placed in the supine or back sleep position, 37.8% (95% CI, 30.6–45.7) in the side position and 13% (95% CI, 9.3–17.9) in the prone or front position. The prevalence of supine sleeping ranged from 14% (Santiago, Chile) to 89% (Tokyo/Yokohama, Japan). The prevalence of reported smoking was between 0% and 34% for mothers and 10% and 64% for fathers. In samples from Western countries, there was a trend for rates of maternal smoking to be similar to paternal smoking, whereas in other samples, low rates of maternal smoking contrasted with high rates of paternal smoking.

Conclusions: These data highlight considerable variations and interesting patterns in the prevalence of these two important SIDS risk factors in these diverse samples. Impressive differences in rates of smoking within and between these communities may reflect different stages of the inevitable progression of the smoking epidemic, but may also provide some encouragement that reduction in smoking rates, in both mothers and fathers, is possible.

Keywords: International Child Care Practices Study; Sleep position; Parental smoking

1. Introduction

Following the 2nd International Conference on Sudden Infant Death Syndrome (SIDS) in Sydney, Australia (February, 1992), a Global Strategy Task Force on SIDS

was set up and made recommendations that population-based data on child care practices in as many countries and regions of the world as possible be collected using standardised methods. The International Child Care Practices Study (ICCPS) protocol was distributed on computer diskette to 80 potential collaborators. Data on child care practices were eventually received from 21 centres in 17 countries, including those with recognised low rates of SIDS such as Hong Kong and Japan [1,2], as well as those with previously higher rates of SIDS such as New Zealand [3,4]. Although it was recognised that this ecological information would not provide any definitive answers to SIDS, it was hoped that, in addition to providing baseline data on child care, it might stimulate new hypotheses to explain persisting differences in SIDS rates between countries.

Initiatives in various countries aiming to "reduce the risk of SIDS" have been associated with dramatic reductions in SIDS rates of 50% or more [5,6]. Modification of infant sleep position has been the main factor identified with these successes. The next most important modifiable SIDS risk factor is smoking, especially smoking by the mother. However, smoking behaviour has proved to be much more difficult to change than infant sleep position [7,8]. This report presents information from the ICCPS data set on the two key SIDS risk factors of infant sleep position and parental smoking.

2. Methods

The ICCPS methods have been previously described in detail [9]. Subsequent to this publication, data from Odessa in Ukraine have been included. In summary, the study was designed to recruit families so that the infants would be 3 months of age during the coldest 2 months of the year. Parents were invited to participate in the study during the week after the birth when a "birth questionnaire", completed by interview, collected mainly socio-demographic data. The "home questionnaire" was posted to participating families when the baby was 12-weeks-old. Telephone reminders were given if the questionnaire was not returned. The home questionnaire was designed to be completed on the day that it was received, with many questions referring to "last night". Centres were advised to recruit 250 families. Not all centres achieved this target, whereas other centres recruited more families. Not all centres recorded rates of refusal to participate and some centres only submitted data where both birth and home questionnaires had been completed. A number of variations in the methods between different centres occurred, e.g. some centres conducted face-to-face interviews and others used retrospectively collected birth information data [9]. Centres coded and entered their data using Epi Info data entry programmes provided (Epi Info statistical software version 6, Center for Disease Control and Prevention, Atlanta). Analysis of the data was undertaken with Epi Info and was primarily descriptive. For this analysis, centres were grouped according to geographical location. An indication was also given for each centre as to whether SIDS was thought to be a problem in the community, and whether any specific "reducing the risks of SIDS" messages were being propagated at the time of the survey. Group A were considered to be higher awareness centres or countries (some form of SIDS awareness messages available) and Group B were considered to be the lower awareness centres or countries (no specific messages or campaigns available at the time of the survey). When available, centres were asked to provide mortality data for the geographical area from

which the study population was recruited for each year from 1985. Information requested included total live births, number of postneonatal deaths (29–365 days) and number of postneonatal SIDS deaths. Mortality rates were calculated as deaths per 1000 live births.

3. Results

Data records were submitted for 5488 infants, and 4656 (85%) had data available for the home questionnaire. Reported response rates to the home questionnaire varied from 21% to 100%. Information on infant sleep position at 3 months was available for 4639 infants (Table 1). Families were asked to select the sleeping position when the baby

Table 1
International Child Care Practices Study: infant sleep position at 3 months

	n	Back	Side	Front	Other
Americas					
Manitoba, Canada[a]	230	95 (41%)	97 (42%)	28 (12%)	10 (4%)
Buenos Aires, Argentina[b]	81	32 (40%)	23 (28%)	26 (32%)	0
Santiago, Chile	226	31 (14%)	147 (65%)	44 (19%)	4 (2%)
Northern Europe					
Copenhagen, Denmark[a]	360	119 (33%)	231 (64%)	9 (3%)	1 (<1%)
Graz, Austria[a]	199	98 (49%)	93 (47%)	8 (4%)	0
Innsbruck/Vienna, Austria[a]	200	111 (55.5%)	56 (28%)	33 (16.5%)	0
Hannover, Germany[a]	122	50 (41%)	62 (51%)	10 (8%)	0
Dublin, Ireland[a]	320	166 (52%)	120 (37.5%)	22 (7%)	12 (4%)
Scotland (three cities)[a]	219	184 (84%)	19 (9%)	16 (7%)	0
Stockholm, Sweden[a]	241	127 (53%)	86 (36%)	27 (11%)	1 (<1%)
Southern and eastern Europe					
Hungary (Budapest/other)[b]	32	15 (47%)	3 (9%)	14 (44%)	0
Istanbul, Turkey[b]	92	38 (41%)	31 (34%)	18 (20%)	5 (5%)
Florence/Naples, Italy	200	46 (23%)	87 (43.5%)	67 (33.5%)	0
Odessa, Ukraine	489	258 (53%)	171 (35%)	60 (12%)	0
Asia					
Beijing, China	306	220 (72%)	67 (22%)	19 (6%)	0
Chongqing, China	250	189 (76%)	57 (23%)	4 (1.6%)	0
Hong Kong SAR, China	198	162 (82%)	35 (18%)	1 (<1%)	0
Hong Kong Caucasian[a]	117	70 (60%)	37 (32%)	10 (8%)	0
Tokyo/Yokohama, Japan[a]	286	254 (89%)	14 (5%)	18 (6%)	0
Oceania					
Brisbane, Australia[a]	222	108 (49%)	78 (35%)	29 (13%)	7 (3%)
Dunedin, New Zealand[a]	249	111 (45%)	125 (50%)	8 (3%)	5 (2%)
Total Percentage (95% CI)	4639	52.5 (43.5–61.3)	37.8 (30.6–45.7)	13 (9.3–17.9)	3.1 (1.8–5.1)

[a]Centres with some form of SIDS awareness messages available considered as Group A, and the remainder considered as Group B.
[b]Centres with fewer than 100 respondents for the 3-month home questionnaire.

went to sleep "last night" and four options were provided (lying on front with face down, lying on front with face to side, lying on back and lying on side). An option to describe any other sleep position was also provided; 52.5% (95% CI, 43.5–61.3) of infants slept supine (range 14–89%), 37.8% (95% CI, 30.6–45.7) on the side (range 5–65%) and 13% (95% CI, 9.3–17.9) on the front (range < 1–44%). Another or a combination of positions was recorded for 3.1% (95% CI, 1.8–5.1) of infants. The latter referred to the situation where families selected more than one option or described another option. The highest rates of prone sleeping were in two of the three samples with fewer than 100 infants (Buenos Aires, Argentina and Hungary). These data are summarised graphically showing the percentage of infants sleeping non-supine in each centre (Fig. 1). Gender differences in sleep position have been previously noted [10], and our data showed that male infants were more likely to be placed non-supine (48.1%) than female infants (44.5%) ($\chi^2 = 5.75,\ p = 0.017$). The association between sleep position and smoking was also explored, and this showed that mothers who smoked were more likely to place their infants non-supine (19.1%) than supine (13.7%) ($\chi^2 = 23.5,\ p < 0.0001$).

Information on maternal smoking at the time of birth ($n = 4852$) and at 3 months ($n = 4636$) is shown in Table 2. At these time points, 22.3% (95% CI, 16.9–28.8) and 21.4% (95% CI, 16.5–27.4) of the mothers reported that they smoked, and there was wide variation between centres (0–43% at birth and 0–34% at 3 months). The median number of cigarettes smoked at 3 months ranged from 3–10, with an overall median for the whole sample of 10 (IQ range 5–15). Mothers who smoked had infants of lower mean birthweight (3213 g, SD 615) than mothers who did not smoke (3357 g, SD 552)($F = 45,\ p < 0.0001$).

Corresponding data on paternal smoking at the time of recruitment ($n = 4743$) and at 3 months ($n = 4570$) is presented in Table 3. At birth, 45.0% (95% CI, 37.5–52.6) of

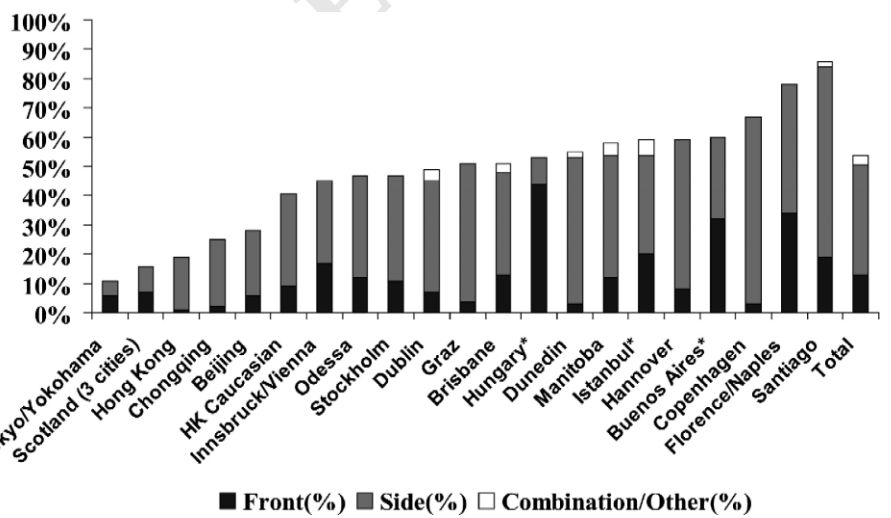

Fig. 1. International Child Care Practices Study: percentage of infants sleeping non-supine at 3 months of age.
* Centres with fewer than 100 respondents for the 3-month home questionnaire.

Table 2
International Child Care Practices Study: mother's reported smoking

Centre	Smoking at birth			Smoking at 3 months		
	Total		Number of cigarettes smoked, median (IQ range)	Total		Number of cigarettes smoked, median (IQ range)
	n	Yes (%)		*n*	Yes (%)	
Americas						
Manitoba, Canada[a]	–	–	–	226	56 (25%)	10 (5.5–13.5)
Buenos Aires, Argentina[b]	82	9 (11%)	6 (5–10)	80	8 (10%)	6.5 (4.5–11)
Santiago, Chile	252	36 (14%)	3 (2–5)	226	66 (29%)	3 (1–5)
Northern Europe						
Copenhagen, Denmark[a]	374	161 (43%)	15 (10–20)	359	121 (34%)	10 (8–15)
Graz, Austria[a]	199	29 (15%)	10 (5–10)	199	33 (17%)	10 (5–10)
Innsbruck/Vienna, Austria[a]	200	25 (13%)	8 (5–10)	200	41 (21%)	10 (5–10)
Hannover, Germany[a]	183	30 (16%)	10 (5–10)	121	21 (17%)	10 (10–20)
Dublin, Ireland[a]	397	130 (33%)	10 (10–20)	321	108 (34%)	10 (6–20)
Scotland (three cities)[a]	247	41 (17%)	10 (10–15)	219	33 (15%)	10 (7.5–15)
Stockholm, Sweden[a]	254	25 (10%)	5 (5–10)	241	16 (7%)	5.5 (4–10)
Southern and eastern Europe						
Hungary (Budapest/other)[b]	32	10 (31%)	17.5 (10–20)	32	6 (19%)	10 (10–20)
Istanbul, Turkey[b]	163	30 (18%)	9 (4–10)	90	22 (24%)	4 (2–6)
Florence/Naples, Italy	200	30 (15%)	10 (5–12)	200	24 (12%)	8 (5–11.5)
Odessa, Ukraine	488	101 (21%)	5 (2–10)	489	41 (8%)	5 (3–7)

Asia						
Beijing, China	306	0 (0%)	0	306	0 (0%)	0
Chongqing, China[c]	250	0 (0%)	0	250	0 (0%)	0
Hong Kong SAR, China	251	6 (2%)	16 (10–20)	197	11 (6%)	10 (6–10)
Hong Kong Caucasian[a]	124	8 (6%)	11 (6.5–17.5)	116	6 (5%)	7.5 (2–15)
Tokyo/Yokohama, Japan[a]	280	15 (5%)	10 (10–15)	289	27 (9%)	10 (8–15)
Oceania						
Brisbane, Australia[a]	302	94 (31%)	10.5 (7–20)	226	77 (34%)	15 (10–20)
Dunedin, New Zealand[a]	268	61 (23%)	8 (5–10)	249	56 (22%)	8 (5–10)
Total percentage (95% CI)	4852	22.3% (16.9–28.8)		4636	21.4% (16.5–27.4)	

[a]Centres with some form of SIDS awareness messages available considered as Group A, and the remainder considered as Group B.
[b]Centres with fewer than 100 respondents for the 3-month home questionnaire.
[c]Retrospective for birth data.

Table 3
International Child Care Practices Study: father's reported smoking

Centre	Smoking at birth			Smoking at 3 months		
	Total		Number of cigarettes smoked, median (IQ range)	Total		Number of cigarettes smoked, median (IQ range)
	n	Yes (%)		*n*	Yes (%)	
Americas						
Manitoba, Canada[a]	–	–	–	220	68 (31%)	10 (6–15)
Buenos Aires, Argentina[b]	80	28 (35%)	17.5 (10–20)	78	26 (33%)	15 (10–20)
Santiago, Chile	247	132 (53%)	5 (2–14.5)	225	98 (44%)	4 (2–10)
Northern Europe						
Copenhagen, Denmark[a]	359	143 (40%)	20 (10–20)	349	130 (37%)	15 (10–20)
Graz, Austria[a]	194	85 (44%)	15 (10–20)	192	80 (42%)	15 (10–20)
Innsbruck/Vienna, Austria[a]	199	84 (42%)	15 (10–20)	197	85 (43%)	15 (10–20)
Hannover, Germany[a]	181	74 (41%)	15 (10–20)	121	39 (32%)	15 (10–20)
Dublin, Ireland[a]	362	119 (33%)	10 (10–20)	313	109 (35%)	15 (10–20)
Scotland (three cities)[a]	240	71 (30%)	15 (10–20)	216	60 (28%)	10 (10–15)
Stockholm, Sweden[a]	250	37 (15%)	6 (2–15)	237	23 (10%)	10 (4–15)
Southern and eastern Europe						
Hungary (Budapest/other)[b]	32	7 (22%)	20 (10–20)	32	6 (19%)	17 (10–20)
Istanbul, Turkey[b]	163	99 (61%)	20 (10–20)	89	51 (57%)	10 (5–20)
Florence/Naples, Italy	200	65 (33%)	15 (10–20)	200	62 (31%)	10 (10–20)
Odessa, Ukraine	475	352 (74%)	10 (10–20)	478	297 (62%)	10 (10–20)

Asia						
Beijing, China	306	175 (57%)	10 (5–12)	306	168 (55%)	10 (5–12)
Chongqing, China[c]	250	161 (64%)	10 (10–20)	250	161 (64%)	11 (10–20)
Hong Kong SAR, China	250	89 (36%)	10 (10–20)	196	64 (33%)	10 (8–20)
Hong Kong Caucasian[a]	124	17 (14%)	10 (2–17)	117	15 (13%)	10 (2–15)
Tokyo/Yokohama, Japan[a]	272	135 (50%)	20 (10–20)	289	144 (50%)	20 (15–20)
Oceania						
Brisbane, Australia[a]	294	144 (49%)	15 (10–25)	220	100 (45%)	15 (10–20)
Dunedin, New Zealand[a]	265	90 (34%)	10.5 (10–15)	245	70 (29%)	10 (8–15)
Total percentage (95% CI)	4743	45.0% (37.5–52.6)		4570	41.9% (35.3–48.7)	
Group A[a] percentage (95% CI)		37.6% (29.8–46.1)			35.5% (28.5–43.2)	
Group B percentage (95% CI)		55.1% (45–64.8)			50.7% (41.5–60)	

[a]Centres with some form of SIDS awareness messages available considered as Group A, and the remainder considered as Group B.
[b]Centres with fewer than 100 respondents for the 3-month home questionnaire.
[c]Retrospective for birth data.

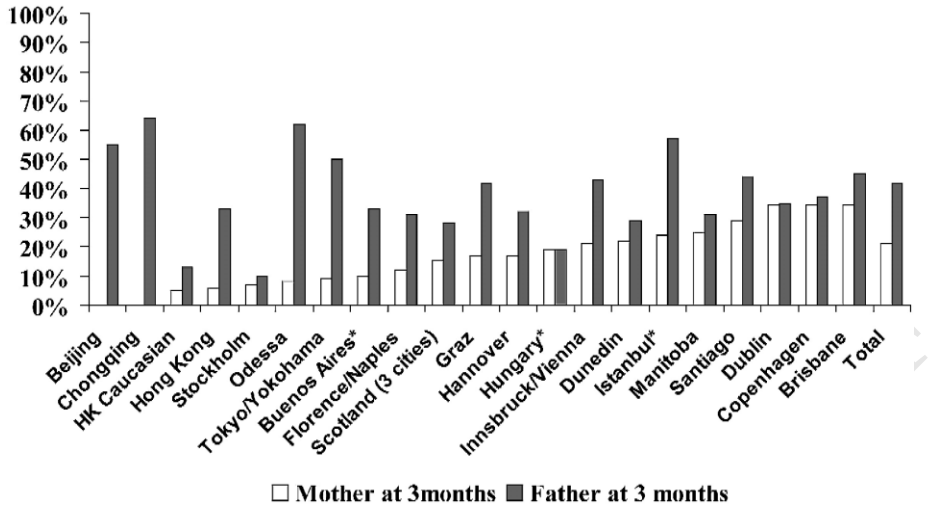

Fig. 2. International Child Care Practices Study: mother's and father's reported smoking when infant is aged 3 months, ranked by mother's smoking. * Centres with fewer than 100 respondents for the 3-month home questionnaire.

the fathers were reported to be smokers (range 14–74%), with the median number of cigarettes smoked ranging from 5–20. At 3 months, 41.9% (95% CI, 35.3–48.7) of fathers were reported to be smokers, with the median number of cigarettes smoked ranging from 4 to 20. The percentage of fathers smoking in the SIDS aware group A were 37.6% (95% CI, 29.8–46.1) at birth and 35.5% (95% CI, 28.5–43.2) at 3 months. The corresponding percentages for the lower SIDS aware group B were 55.1% (95% CI, 45–64.8) and 50.7% (95% CI, 41.5–60). Maternal and paternal smoking at 3 months are contrasted in Fig. 2. Post-neonatal mortality rate (deaths between 29 and 365 days per 1000 live births) and post-neonatal SIDS mortality rates (SIDS deaths between 29 and 365 days per 1000 live births) for centres for the 5-year period from 1991–1995 are presented in Table 4.

4. Discussion

These data emphasise the considerable variability in the two most important modifiable SIDS risk factors in these diverse populations, i.e. non-supine infant sleep position and parental smoking. The extent to which the non-supine position was used in these different centres is shown in Table 1. The Japanese samples had the highest proportion of infants sleeping supine. Japan has had a low rate of SIDS compared to many Western countries, although during the 1980s, an increased number of SIDS deaths were observed [1]. Although these increases may in part be explained by increased recognition of SIDS, the increases may have been related to such factors as increased use of the prone sleep position for infants or increased rates of smoking in mothers [11]. It is thought that, as a result of influence from Western countries, some Japanese began to

Table 4
International Child Care Practices Study: postneonatal mortality rate (deaths between 29 and 365 days per 1000 live births) and postneonatal SIDS mortality rates (SIDS deaths between 29 and 365 days per 1000 live births)

	Postneonatal mortality rate					SIDS mortality rate (28–365 days)				
	91	92	93	94	95	91	92	93	94	95
*Americas*e										
Manitoba, Canada[a]	2.6	2.2	2.4	2.6	2.5	0.9	1.0	0.8	1.0	0.8
Buenos Aires, Argentina	–	–	–	–	13.2	–	–	–	–	1.4
Santiago, Chile	6.8	6.7	6.1	5.1	5.0	–	–	–	–	–
Northern Europe										
Copenhagen, Denmark[a]	3.0	2.4	1.8	1.2	–	1.8	1.2	0.6	0.3	–
Graz, Austria[a]	2.0	2.2	1.2	1.2	0.7	1.1	0.9	1.0	1.2	0.3
Innsbruck/Vienna, Austria[a]	1.9	1.7	2.0	1.3	1.6	1.4	1.2	1.3	0.7	0.9
Hannover, Germany[a]	3.2	2.8	2.6	2.4	2.2	1.4	1.1	0.9	0.8	0.7
Dublin, Ireland[a]	2.7	2.5	1.9	1.9	1.7	1.6	1.02	0.7	0.6	0.6
Scotland (three cities)[a]	2.7	2.2	2.5	2.2	2.2	1.2	0.8	0.9	0.6	0.6
Stockholm, Sweden[a]	2.6	2.3	1.9	1.8	1.5	0.4	1.0	0.7	0.6	0.3
Southern and eastern Europe										
Hungary (Budapest/other)	4.3	3.9	3.9	3.6	3.4	0.3	0.2	0.3	0.2	0.15
Istanbul, Turkey	–	–	–	–	–	–	–	–	–	–
Italy: Tuscany (Florence)	–	–	–	–	1.6	–	–	–	–	–
Italy: Campania (Naples)	–	–	–	–	1.9	–	–	–	–	–
Odessa, Ukraine	–	–	–	–	–	–	–	–	–	0.6
Asia										
Beijing, China	–	–	–	–	–	–	–	–	–	–
Chongqing, China	–	–	–	–	–	–	–	–	–	–
Hong Kong SAR, China	2.3	1.9	1.9	1.8	2.0	0.1	0.1	0.1	0.1	0.1
Hong Kong Caucasian[a]	–	–	–	–	–	–	–	–	–	–
Tokyo, Japan[a]	1.9	2.0	2.2	1.8	2.1	0.14	0.28	0.46	0.28	0.38
Kanagawa, Yokohama, Japan[a]	2.1	2.1	1.6	1.8	2.1	0.32	0.23	0.25	0.37	0.42
Oceania										
Brisbane, Australia[a]	3.0	2.2	1.8	2.7	–	1.0	0.9	0.7	0.9	–
Dunedin, New Zealand[a]	3.3	3.3	2.8	1.1	2.2	2.8	2.2	1.7	0.6	1.1

[a]Centres with some form of SIDS awareness messages available considered as Group A, and the remainder considered as Group B.

sleep babies prone during the 1980s. Placing babies to sleep in the supine position has been the traditional child care practice in Japan, and even before the results of research on SIDS risk factors came to light, the prone position was considered by many Japanese parents to be "dangerous". Data for the present study was collected at a time when there may have been some awareness of the risks of prone sleep position in Japan, as local campaigns to teach about risk factors were launched in mid 1996. However, the high rate of supine sleeping in this population is also likely to be related to traditional cultural preference. Low rates of prone sleeping were also noted in the Hong Kong and Chinese samples, where there was little awareness of SIDS and no health messages available to parents on SIDS risk factors. Documentation of a low rate of SIDS in Hong Kong in

1987 was speculated to be related to supine sleep position, life-style factors (families living in confined spaces with the infant constantly in the presence of other people) and lower rates of preterm birth [2,12]. The present study showed that 82% of Hong Kong infants slept supine and less than 1% slept prone. In the two Chinese mainland samples, similar low rates were noted, Beijing (72% supine and 6% prone) and Chongqing (76% supine and $< 1.6\%$ prone). These high rates of supine sleeping in these lower SIDS awareness centres suggest that local cultural practice was the main factor influencing infant sleep position.

The main studies on SIDS risk factors have been undertaken in Western countries that experienced high rates of SIDS during the 1980s. For example, Dunedin, New Zealand had had a very high rate of SIDS [4]. As a result, there was a very active programme to advise parents on SIDS risk factors at the time of the survey, when 3% of Dunedin infants were sleeping prone and 50% on the side. Most infants (65%) in the sample from Santiago, Chile were sleeping on the side, resulting in this centre having the lowest rate of supine sleeping infants (14%). Recent studies undertaken after the introduction of advice against the use of the prone sleep position for infants, have shown that the side sleep position is also a risk factor for SIDS [5]. Avoidance of the side sleep position has been recommended [13], and this advice has been further supported by meta-analysis [14]. One of the highest rates of prone sleeping was identified in the small sample from Buenos Aires, Argentina. It was subsequently shown that this population had a moderately high rate of SIDS and high post-neonatal mortality rate (Table 4). These data helped to initiate a "Link" programme between New Zealand and Argentina to raise awareness of SIDS and to advise that infants should sleep "boca arriba" (face up) [15].

These data provide an interesting overview of the wide variations in this important child care practice. However, when interpreting this data, it should be noted that the data collected refers to sleep position at one point in time, at about 3 months of age. Parents may select a different position depending on whether the infant goes to sleep during the day or at night. Practices may also vary from night-to-night and as the infant gets older. Thus, the percentage of infants that ever slept prone may be higher than the percentages of infants who slept prone "last night". Gender may also play a role in determining sleep position [10], and our data supports this association, although the overall differences between male and female infants were not marked. An association was also noted between mothers' smoking habit and infant sleep position. This might be an indication of a mother's awareness of health risks. Fifteen percent of the recruited sample did not respond to the 3-month questionnaire. A slightly smaller percentage of mothers and fathers smoked at 3 months than they did at birth, suggesting that there were possibly more drop-outs in the smoking group. It is also possible that there may have been more prone sleeping infants in the drop-out group.

After infant sleep position, smoking, particularly antenatal smoking by the mother, has been the next most consistent and important modifiable SIDS risk factor [7,8]. However, although it has been relatively easy to persuade parents not to place their infants prone, it has been much more difficult to persuade them not to smoke. The wide variations in smoking rates of mothers and fathers in these different communities are shown in Tables 2 and 3. The markedly different ratios of mothers/fathers smoking are

also emphasised in Fig. 2. Particularly striking are the two Chinese mainland samples, where no mothers smoked but 64% (Chongqing) and 55% (Beijing) of fathers smoked. Big differentials were also noted in Odessa (8% of mothers and 62% of fathers) and Tokyo/Yokohama, Japan (9% of mothers and 50% of fathers). In contrast, the rates of maternal and paternal smoking in some of the Western countries tended to be more equivalent, e.g. Brisbane, Australia (34% of mothers and 45% of fathers), Copenhagen, Denmark (34% of mothers and 37% of fathers) and Manitoba, Canada (25% of mothers and 31% of fathers). The lowest rates of smoking where recorded in the sample from Stockholm, Sweden, where 7% of mothers and 10% of fathers reported smoking. These gender differences in smoking rates within and between communities may reflect differences in suggested stages of the smoking epidemic [16]. Stage 1 is where few males ($<15\%$) smoke but rates rapidly increase, and $<5\%$ females smoke (e.g. developing countries). Stage 2 is where male smoking rises to 50–80%, and smoking-related male mortality starts to appear. Female smoking rates lag 10–20 years behind (e.g. China and Japan). Stage 3 is where male smoking starts to decline, reaching around 40%, and female smoking peaks and plateaus (e.g. eastern and southern Europe). Stage 4 is where smoking starts to decline slowly in both sexes, as male mortality from smoking peaks and female mortality starts to rise rapidly (e.g. USA, UK, Canada and western Europe). Our data is generally compatible with these suggested stages. The question is whether anti-smoking interventions can speed up, or even bypass, some of the stages of this process so as to more quickly achieve smoking rates similar to those in our Swedish sample.

The accuracy of the smoking data is obviously open to some debate, as it is well recognised that self-reported rates and amounts of smoking are under-reported. It is possible that the degree of under-reporting may vary between communities, and it can be speculated that the degree of under-reporting may be greater in communities with strong anti-smoking measures than in those where smoking is socially acceptable. It is unlikely that over-reporting of smoking behaviour would have occurred, so the figures presented here can be considered as a minimum level of smoking within these communities.

In conclusion, these data highlight the considerable variations in the prevalence of these two important SIDS risk factors in these diverse samples. High rates of side sleeping were noted in some samples. High rates of supine sleeping were noted in samples from countries lacking specific information on SIDS risk, suggesting that supine sleep position is a normal cultural practice in these countries. Impressive differences in rates of smoking within and between these communities are noted. Although these differences may reflect different stages of the inevitable progression of the smoking epidemic, they should provide some encouragement that reduction in smoking rates, in both mothers and fathers, is possible.

Acknowledgements

This project was an initiative of the SIDS Global Strategy Task Force, whose support is greatly appreciated. The Research Grants Council and the Society for the Relief of Disabled Children in Hong Kong provided some funding.

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