

Paediatric homoeopathy in Germany: results of the German Health Interview and Examination Survey for Children and Adolescents (KiGGS)

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SUMMARY

Purpose Despite growing pressure against homoeopathy, an unexpected resurgence in the use of homoeopathy has been reported. It is of interest to examine the use of homoeopathy and user profiles among children in Germany.

Methods Last-week homoeopathy use was recorded among 17 450 children aged 0–17 years who participated in the 2003–2006 German Health Interview and Examination Survey for Children and Adolescents (KiGGS). The complex sample method was used to estimate the prevalence of, and factors associated with, homoeopathy use.

Results Nine hundred and fifty-one homoeopathic preparations were used by 718 children (weighted prevalence 4.6%). Nearly half of the homoeopathic preparations were obtained by prescriptions from medical doctors or *Heilpraktiker* (non-medical practitioners) and used most often to treat certain self-limiting conditions. About 60% of homoeopathy users concomitantly received conventional medicines. Homoeopathy use was closely related to socioeconomic factors, with a significantly higher prevalence rate found in the 0–6 year age group [prevalence 6.2%, odds ratio 2.2, 95% confidence intervals (CIs) 1.7–2.9], among children residing in the former West Germany [5.1%, 2.2(1.5–3.2)] or the south of Germany [6.6%, 1.7(1.3–2.4)], among children with a poor health status [6.8%, 3.0(2.2–4.2)], with no immigration background [5.3%, 3.7(2.2–6.1)], who received breast-feeding >6 months [7.6%, 2.1(1.6–2.9)], were from upper social-class families [7.4%, 1.8(1.1–2.8)] and whose children's mothers were college educated [7.2%, 1.6(1.2–2.2)].

Conclusions Paediatric homoeopathy is quite popular in Germany, particularly among children from families with a higher socioeconomic status. The high level of paediatric homoeopathy use in Germany warrants a critical review to determine whether it is evidence based and cost-effective. Copyright © 2009 John Wiley & Sons, Ltd.

KEY WORDS — homeopathy; paediatric; KiGGS; Germany; children and adolescents

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INTRODUCTION

Homoeopathy is a system of medicine that was founded by the German physician Samuel Hahnemann at the end of the 18th century. There are two major principles in homoeopathy. One is the 'principle of similars' which treats 'like with like'. The other and most controversial principle is what is known as 'potentisation', the process of repeated dilution and vigorous succession at each step of dilution (or trituration in case of insoluble substances), which is

claimed by homoeopaths to impart additional potencies to solutions.¹ Homoeopathic remedies are mostly made from natural substances taken from plants, minerals or animals; they are diluted to such a degree that sometimes not even a single molecule of the original natural substance remains in the final homoeopathic solution. Containing extremely low doses of drugs, but large amounts of liquids, homoeopathic remedies can be largely regarded as a conservative therapy compared to modern medicines. Yet in the early 19th century, they showed superiority over conventional medicines in the treatment of some prevalent infectious diseases such as cholera and typhus.^{1,2} This may be one of the reasons why

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homoeopathy spread so quickly soon after its emergence, becoming one of the most popularly used alternative systems of medicine in the world. In the 20th century, however, with the rise of antibiotics and other modern medical technologies, homoeopathy went into decline, due to its differences from conventional medicines in diagnosing and treating medical problems. The first principle of homoeopathy conflicts with conventional medicines, since the latter usually treat ailments with an antistatic measure (so-called allopathy). The second principle is pharmacologically implausible. Labelled as ‘anti-science’, homoeopathy has been slammed by modern mainstream medicine;³ pressures against homoeopathy have been escalating⁴ since the results of a recent major meta-analysis of homoeopathy clinical trials revealed that its clinical effects were no greater than placebo.^{5,6} Surprisingly, an unexpected resurgence of homoeopathy has been reported in recent years in some European countries⁷ and the USA.⁸

Paediatric medications require a high-safety profile, yet most conventional medications are not specifically designed for children. Unexpected effects of conventional medications—occasionally with dangerous consequences—are not rare in clinical paediatric practices.⁹ Due to their natural properties and the extremely low drug doses used, homoeopathic remedies are regarded by many homoeopaths and parents as risk free and hence as particularly suitable for children. The use of homoeopathy among child populations, as among adults, is on the increase. A recent study in Scotland showed that homoeopathic prescribing has doubled among children under 16 years since 2000.¹⁰ The proportion of children among patients consulting homoeopaths in Norway increased from 26% in 1994 to 36% in 2004.¹¹ Germany is homoeopathy’s country of origin. As a traditional folk medicine, homoeopathy is popularly used by Germany’s adult population.^{12,13} The most up-to-date data suggest that sales of homoeopathic products in Germany were worth over €235 million in 2006 and rose by 5% in 2007.¹⁴ Children are among the major users of homeopathy; yet up to now, there have been no nationwide data on homoeopathy use in the general child population, although it has been investigated in a regional birth cohort of 2-year-old children¹⁵ and among children with various medical conditions.^{16,17} Given the traditionally high level of homoeopathy use in Germany and the growing use observed in other countries, it is of great interest to examine homoeopathy use prevalence and user characteristics among children in Germany. Against this background, using the data from the latest German Health Interview and

Examination Survey for Children and Adolescents (KiGGS), we here present the prevalence and correlates of homoeopathy use among the non-institutionalised child population in Germany.

METHODS

German Health Interview and Examination Survey for Children and Adolescents (KiGGS)

The German Health Interview and Examination Survey for Children and Adolescents (KiGGS) was formally conducted by the Robert Koch Institute between May 2003 and May 2006 after a 1-year pre-test.¹⁸ The survey’s target population was all non-institutionalised children and adolescents aged 0–17 years living in Germany. The design, sampling strategy and study protocol have been described in detail elsewhere.¹⁸ Briefly, two-stage sampling procedures were applied. In the first stage, a sample of 167 German municipalities was drawn which was representative of municipality sizes and structures in Germany. Stratified by sex and age, random samples of children and adolescents between the ages of 0 and 17 years were then drawn from local population registries in proportion to the age and gender structure of the Germany’s child population. The final sample included 17641 children and adolescents (8985 boys, 8656 girls); the response rate was 66.6%. Non-response analysis showed little variation between the age groups and sexes, but marked variations between resident regions in East and West Germany, rural areas and cities, etc.¹⁹, yet no difference when it came to health-related variables.¹⁸ The survey was approved by federal data-protection officials. Written informed consent was obtained prior to the interview and examination from children’s parents and the children themselves who were over 14 years of age.

Data collection

As described elsewhere in detail,¹⁸ standard, age-specified (0–2, 3–6, 7–10, 11–13 and 14–17 years) self-administered questionnaires filled in by parents, and a parallel questionnaire filled by children over 11 years, were used to collect data on socio-demographic characteristics, family economic background, the children’s medical history, parent-rated children’s health status, health-related behaviour patterns including smoking, alcohol consumption, physical leisure-time activities, etc. Social status was defined as lower,

intermediate or upper according to the total scores of a composite social-status index integrating the parents' levels of education, household incomes and professions.²⁰ In addition, a standardised face-to-face, computer-assisted health interview with children's parents and the children themselves was conducted by trained physicians in order to obtain a detailed medical history of pre-existing, physician-diagnosed chronic health problems and any medication used during the last 7 days prior to the interview. The drug-use history covered both prescribed and over-the-counter (OTC) drugs. Parents were asked in advance to bring prescriptions or original containers to the examination sites for the purpose of verification. Drug use was measured according to the following question: *Has your child taken any medications in the last 7 days? Please also mention the use of any ointments, liniments, contraceptive pills, vitamin and mineral supplements, medicinal teas, herbal medicines and homoeopathic medicines.* Details of medication use were documented, such as brand name, condition(s) treated, daily dosage, route of application and duration of use. Specific Anatomical Therapeutic Chemical (ATC) codes were assigned to all reported medications, and WHO ICD-10 codes to the conditions for which the medications were taken. The present analysis is based on 17 450 children and adolescents (8880 or 50.9% boys, 8570 or 49.1% girls) who provided full data on drug use during the survey²¹.

Statistical analysis

Because of the differences between survey respondents and non-respondents,¹⁹ a weighting factor was computed to adjust for deviations in demographic characteristics (age, sex, residence in West or East Germany and level of urbanicity) between the survey population and official population statistics to ensure that the survey population was representative of the national child population.¹⁹ Descriptive statistics were used to analyse characteristics of the study population and use patterns of homoeopathic medications. A complex sample method was used to estimate the prevalence of, and factors associated with, homoeopathy use. Associations between the weighted prevalence estimates of paediatric homoeopathy and health-related variables were analysed by chi-square tests. Odds ratios and 95% confidence intervals (CIs) were obtained from multivariate logistic regression models. All statistical analyses were performed using SPSS statistical software (release 15.0). A probability level of $p < 0.05$ based on two-sided tests was considered statistically significant.

RESULTS

Characteristics of the study population

The gender-specified main characteristics of the study population are described in Table 1. In this study sample, the vast majority of children (>90%) reported a good/excellent health status; about 17% of boys and girls came from families with immigration background. Similar proportion was also observed for children resided in the former East Germany and in rural towns. Twenty-two per cent of boys and girls (had) received no breast-feeding. The majority of children's mothers (80–84%) never smoked or drank alcohol during pregnancy. There was no significant difference between boys and girls with regard to these selected socio-demographic and health-related characteristics, reflecting the distribution characteristic of the general child population in Germany.

Use of homoeopathic preparations

A total of 14 589 drugs were recorded among the study sample, which were used by 8899 children. Of these drugs, 951 (6.5%, 951/14 589) were homoeopathic preparations and were taken by 718 (8.1%, 718/8899) children. Among the 951 homoeopathic preparations, the most frequently used medicines were arnica (11.5%), ferric phosphate (4.5%) and Schüssler salts (4.1%), while the most common conditions for which homoeopathic medicines were prescribed included rhinopharyngitis (10.9%), preventive measures (8.2%) and cough (7.0%) (Table 2). Of the 718 homoeopathic users, 565 children (78.7%) used only one homoeopathic preparation, while 153 (21.3%) used two or more (maximum six); 297 children (41.4%) received exclusively homoeopathic remedies, while 421 (58.6%) received conventional medicines concomitantly.

Table 3 lists the use patterns of homoeopathic preparations. Almost half of homoeopathic preparations were obtained by prescriptions either from medical doctors (25.7%) or from *Heilpraktiker* (non-medical practitioners) (23.1%), while one-third of them were bought as OTC drugs (Table 3). Compared to non-homoeopathic preparations, homoeopathic preparations were more likely to be used for a shorter period of up to 4 weeks (78.8 vs. 69.5%), but less likely for a long period of over 12 months (2.4 vs. 13.5%, both $p < .001$, data not shown in the table). In the case of homoeopathic preparations, only one adverse drug reaction (ADR) (0.1%) and two cases of intolerance (0.2%) were recorded, as opposed to 88 ADRs (0.6%) and 209 cases of intolerance (1.5%) in the case of

Table 1. Socio-demographic and health-related characteristics of survey participants by gender (German Health Interview and Examination Survey for Children and Adolescents (KiGGS), 2003–2006)

	Boys		Girls	
	n	Percentage (weighted)	n	Percentage (weighted)
Age group, years				
0–2	1397	13.6	1373	13.6
3–6	1925	21.0	1907	21.1
7–10	2103	21.7	2004	21.8
11–13	1572	17.3	1468	17.3
14–17	1883	26.4	1818	26.3
Region (east/west)				
East	2889	16.5	2847	16.5
West	5991	83.5	5723	83.5
Region (north/south)				
North	2268	23.4	2185	23.5
Middle	3864	39.1	3794	39.1
South	2748	37.5	2591	37.3
Urbanicity				
Rural town	1958	17.9	1939	17.9
Small city	2337	27.6	2229	27.2
Medium-sized city	2498	29.0	2475	29.3
Large city	2087	25.5	1927	25.6
Migrant background				
Yes	1350	17.4	1230	16.8
No	7498	82.3	7292	82.7
Parent-rated health status				
Excellent	3407	37.5	3466	39.6
Good	4759	53.8	4491	53.0
Satisfied/bad	593	7.1	509	6.2
Maternal educational level				
Primary	2002	25.7	1847	25.2
Middle	3934	39.6	3902	41.1
Higher	2485	29.1	2353	28.0
Others	459	5.7	468	5.7
Paternal educational level				
Primary	2477	31.7	2355	31.7
Middle	3052	28.4	2881	27.7
Higher	2559	31.2	2541	31.3
Others	792	8.7	793	9.3
Social status				
Lower	2454	27.0	2306	26.6
Intermediate	4011	43.9	3890	44.6
Upper	2185	26.3	2181	26.4
Breast-feeding				
Never	1905	22.2	1741	21.3
<4 months	3214	34.5	3018	33.7
4–6 months	1534	16.8	1640	19.0
≥6 months	1912	22.7	1884	22.5
Smoking during pregnancy				
Yes, regularly	386	4.6	402	5.0
Yes, occasionally	1080	12.0	1009	12.4
Never	7123	79.9	6901	79.6
Drinking during pregnancy				
Yes, occasionally	1132	13.0	1161	13.8
Never	7482	83.9	7183	83.6
Total	8880	100	8570	100

The sum in each category may not be equal to the total due to missing data.

non-homoeopathic preparations (both $p < .05$, data not shown in the table). Although 53.8% of homoeopathic preparations reportedly improved the treated condition ‘greatly’, they did not differ from non-homoeopathic preparations ($p > .05$, data not shown in the table).

Prevalence of homoeopathic use and factors associated with use

The overall weighted prevalence of homoeopathic use was 4.6% (95%CI: 4.0–5.2%) with no difference

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Table 2. The most frequently used homoeopathic medicines and the most frequently mentioned indications for homoeopathic preparations in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), 2003–2006

	Most frequently used homoeopathic medicines	Frequency (%)	Most frequently mentioned indications (with ICD-10 code)	Frequency (%)
1	Arnica	109 (11.5)	J00—acute nasopharyngitis	104 (10.9)
2	Ferric phosphate	43 (4.5)	Z29.9—Prophylactic measure, unspecified	78 (8.2)
3	Biochemical cell salts (Schüssler salts)	39 (4.1)	R05—cough	67 (7.0)
4	Chamomile	36 (3.8)	K00.7—teething syndrome	34 (3.6)
5	Belladonna	35 (3.7)	R53—malaise and fatigue	33 (3.5)
6	Aconite	28 (2.9)	L20.8—neurodermatitis	27 (2.8)
7	Pulsatilla	27 (2.8)	T14.05—bruise	27 (2.8)
8	Bach flower remedies	24 (2.5)	R50.9—fever, unspecified	20 (2.1)
9	Silicic acid	18 (1.9)	R10.4—abdominal pain, unspecified	17 (1.8)
10	Echinacea	17 (1.8)	J06.9—acute upper respiratory infection, unspecified	16 (1.7)
	All others	575 (60.5)	All others	528 (55.5)
	Total	951 (100)	Total	951 (100)

between boys and girls, but marked differences between subgroups classified by other selected socio-demographic and health-related factors (Table 4). A significantly higher prevalence rate was found among children in younger age groups (for children under 6 years of age, the use prevalence was 6.2%, odds ratio 2.2 with 95% CIs 1.7–2.9, data not shown in the table), among children residing in the former West Germany, the south of Germany or rural towns, among children with a poor health status, with no immigration background, among children who

received breast feeding >6 months, children from upper social-class families, among children whose parents were college educated and whose mother never smoked or drank alcohol during pregnancy (all statistically significant, chi-square test). Multivariable regression analysis revealed that the use of homoeopathy was independently associated with above-mentioned factors except for rural areas, the paternal educational level and whether the children's mother smoked or drank alcohol during pregnancy (Table 4). Repeated analysis excluding social status or parents' educational levels did not change significances.

DISCUSSION

In a national population-representative study, we found that the overall last-week prevalence of homoeopathic use was 4.6% among children and adolescents aged between 0 and 17 in Germany. Nearly half of the homoeopathic preparations were obtained by prescription from medical doctors or *Heilpraktiker*. They were used most often to treat certain self-limiting conditions or as a preventive measure. About 60% of homoeopathic users received conventional medicines concomitantly, while 40% did not. Paediatric homoeopathy in Germany was closely associated with a higher level of socioeconomic status and health consciousness.

Little has been reported up to now on homoeopathic use by the general child population in Germany, making it difficult to compare our findings with previous results. In addition, studies vary greatly as regards data collection, target population and the time frame used to measure homoeopathic use. In a German birth cohort study, 28% of children aged 0–2 years were found to be treated homoeopathically in the second year of their life,¹⁵ much higher than our finding (5.9%) in the subgroup of the same age in our

Table 3. Use pattern of homoeopathic medications in the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), 2003–2006

	n	Percentage
Obtained from		
Medical doctors	243	25.7
<i>Heilpraktiker</i>	218	23.1
OTC	315	33.4
Other sources	168	17.8
Duration of use		
<1 week	580	61.3
1–4 weeks	166	17.5
1–12 months	177	18.7
≥12 months	23	2.4
Self-rated improvement of condition treated		
Great	437	53.8
Partial	298	36.7
Rather not	49	6.0
Not at all	29	3.6
Does not apply*	114	—
Tolerance for the drug		
Very good/good	938	99.8
Partly/no	2	0.2
Occurrence of adverse drug reaction		
Yes	1	0.1
No	950	99.9
Total	951	100

The sum in each category may not be equal to the total due to missing data.

*Drugs were used, for example, as a preventive measure or diagnosis unknown.

Table 4. Prevalence of, and factors associated with, homoeopathic use among the German child population (German Health Interview and Examination Survey for Children and Adolescents (KiGGS), 2003–2006)

	Survey participants	Homoeopathy users	Prevalence % (95%CI)	p	Adjusted OR (95%CI)
Gender					
Boys	8880	378	4.6 (4.1–5.3)	0.740	Reference
Girls	8570	340	4.5 (3.9–5.3)		0.98 (0.84–1.15)
Age group (years)					
0–2	2770	155	5.9 (4.9–7.1)	<0.001	2.13 (1.63–2.79)
3–6	3832	203	6.3 (5.3–7.6)		2.18 (1.60–2.97)
7–10	4107	178	5.2 (4.3–6.3)		1.81 (1.35–2.43)
11–13	3040	94	3.6 (2.8–4.5)		1.28 (0.95–1.73)
14–17	3701	88	2.7 (2.1–3.4)		Reference
Region (east/west)					
East	5736	98	1.9 (1.3–2.6)	<0.001	Reference
West	11 714	620	5.1 (4.5–5.9)		2.18 (1.46–3.24)
Region (north/south)					
North	4453	129	3.3 (2.6–4.2)	<0.001	Reference
Middle	7658	227	3.5 (2.8–4.3)		1.08 (0.77–1.51)
South	5339	362	6.6 (5.6–7.8)		1.73 (1.26–2.37)
Urbanicity					
Rural town	3897	171	5.6 (4.2–7.6)	0.038	1.33 (0.95–1.85)
Small city	4566	224	5.4 (4.4–6.6)		1.26 (0.94–1.69)
Medium-sized city	4973	186	4.1 (3.2–5.3)		1.08 (0.78–1.51)
Large city	4014	137	3.6 (2.8–4.5)		Reference
Migrant background					
Yes	2580	23	1.1 (0.7–1.8)	<0.001	Reference
No	14 790	690	5.3 (4.7–6.0)		3.66 (2.21–6.06)
Parent-rated health status					
Excellent	6873	260	4.2 (3.5–5.0)	0.004	Reference
Good	9250	386	4.7 (4.0–5.5)		1.43 (1.18–1.73)
Fair/bad	1102	68	6.8 (5.2–8.8)		3.04 (2.21–4.18)
Maternal education					
Primary	3849	114	3.0 (2.4–3.9)	<0.001	Reference
Middle	7836	276	4.2 (3.5–5.0)		1.14 (0.86–1.51)
Higher	4838	314	7.2 (6.3–8.3)		1.63 (1.20–2.21)
Others	927	14	1.4 (.8–2.5)		0.91 (0.47–1.76)
Paternal education					
Primary	4832	185	4.0 (3.2–5.1)	<0.001	Reference
Middle	5933	171	3.5 (2.8–4.3)		0.79 (0.59–1.04)
Higher	5100	333	6.9 (6.0–7.9)		0.97 (0.71–1.33)
Others	1585	29	2.0 (1.3–3.1)		0.87 (0.53–1.41)
Social status					
Lower	4760	86	2.1 (1.5–2.8)	<0.001	Reference
Intermediate	7901	331	4.7 (4.0–5.5)		1.58 (1.11–2.24)
Upper	4366	299	7.4 (6.5–8.5)		1.78 (1.13–2.81)
Breast-feeding					
Never	3646	91	2.6 (2.1–3.3)	<0.001	Reference
<4 months	6232	183	3.6 (3.0–4.4)		1.43 (1.07–1.90)
4–6 months	3174	166	5.9 (5.0–7.0)		1.85 (1.43–2.40)
≥6 months	3796	274	7.6 (6.5–8.8)		2.13 (1.58–2.87)
Smoking during pregnancy					
Regularly	788	17	2.5 (1.5–4.2)		Reference
Occasionally	2089	62	3.7 (2.8–5.0)	0.003	1.31 (0.72–2.39)
Never	14 024	632	5.0 (4.4–5.7)		1.33 (0.79–2.23)
Drinking during pregnancy					
Yes	2293	134	6.7 (5.3–8.3)		Reference
Never	14 665	577	4.4 (3.8–5.0)	<0.001	0.82 (0.63–1.06)
Total	17 450	718	4.6 (4.0–5.2)		—

Due to missing data, the sum of each category for survey participants and homoeopathic users may not be equal to the total number. p values: chi-square tests for prevalence difference within each category. Odds ratio (OR) and its 95%CIs were obtained from multivariable logistic regression models with use of homoeopathics as dependent variable and all other variables shown above as independent variables. Repeated analysis excluding social status or parents' educational levels did not change significances.

study (Table 4). However, we measured drug use in the previous week, not over the last 2 years. Furthermore, for lack of a clear definition, homoeopathic use in this study may be confused with other alternative methods

and therefore overstated.¹⁵ Children with chronic conditions are more likely to use complementary and alternative medicines, including homoeopathy, than those without.²² The same applies to German

children with various medical conditions such as diabetics¹⁶ and cystic fibrosis,¹⁷ but they are not fully comparable with our results.

Pediatric homoeopathy has been investigated in population-representative studies in other countries, and they largely show a lower prevalence rate than in Germany. In a population-representative UK study, use of homoeopathy was investigated among 9723 children aged between 3 and 4.5 years.²³ The results showed that 6% of the children in the study had received homoeopathic treatments over the previous 18 months,²³ compared to 6.3% of children aged 3–6 years who used homoeopathy in the previous week in our study (Table 4). A nationwide household survey in Italy reported that 7.7% of children under 14 years had used homoeopathy during the period 1997–1999.⁷ The use prevalence among children in the same age range in our study was 5.3% (95%CI, 4.6–6.0%, data not shown). Although this was lower than the figure found in Italy, again it measured last-week use, not that of last 3 years. A study in the USA reported in 1996 that 1.8% of children under 18 used complementary or alternative medicines, including homoeopathy.²⁴ Despite speculation that the figure may be understated,²⁵ homoeopathy use among children in the USA was much lower than in Germany.

Consistent with previous studies, homoeopathy use was found to be closely associated with socioeconomic background and health consciousness in studies of both children^{7,15,23} and adult populations.^{26,27} A higher prevalence rate of homoeopathic use has been constantly observed in economically stronger vs. weaker regions^{7,15} and in subgroups with higher vs. lower maternal educational attainment or more health-conscious behaviour.^{15,23} In Wye *et al.*'s²³ children study, the use of homoeopathy was found to increase with maternal educational levels and family income, but decreased with maternal cigarette smoking and the children's general health status. Interestingly, similar findings were also recorded in our study (Table 4). Both in our study and in Wye's study,²³ mother's smoking was not retained in the final regression models despite the statistical significance in bi-variable analysis.

There may be several reasons why paediatric homoeopathy is highly prevalent in Germany. One may be related to the unique medical profession of the *Heilpraktiker* (non-medical health practitioner). A *Heilpraktiker* is not a qualified medical doctor, but is allowed to practice unconventional therapy (with the exception of, for example, sexually transmitted diseases and infectious diseases) after passing an

examination set by local health authorities.^{28,29} Estimates of the number of *Heilpraktiker* in Germany vary between 10 000 and 20 000.^{30,31} Most of them practise homoeopathic therapy. In our study, nearly a quarter of homoeopathic preparations were prescribed by *Heilpraktiker*, the same percentage as by medical doctors (Table 3). Studies in UK have found that 6% of National Health Service³² and 12% of Scottish general practitioners prescribe homoeopathic remedies.¹⁰ Although the exact proportion of German medical doctors prescribing homoeopathic medicine is unclear, it is generally considered that belief in homoeopathy among doctors in Germany is comparable or even more widespread than among doctors in other countries such as the UK. The existence of the separate profession of the *Heilpraktiker* strengthens the popularity of homoeopathy in Germany.

Another reason may be the high homoeopathy use in German adult populations. Paediatric homoeopathy is often associated with issues of parental preference³³ and strongly linked with parents who have experienced homoeopathic treatments themselves.^{7,23} According to an opinion poll published in 2002, 28% of German adults had used homoeopathic remedies sometime in their life and 14% over the last 12 months.¹² This is evidenced by a survey of a nationally representative sample of 1100 men and women, in which Hartel and Volger¹³ reported that about 20% of women and 10% of men (overall 14.8%) between the ages of 18 and 69 used homoeopathic medicines over the last 12 months in Germany. These results suggest that homoeopathy use in the German adult population was much higher than that reported in other European countries and the USA.^{8,26,34,35} Furthermore, children usually made up a high proportion of homoeopathic patients in Germany. In a survey of 3981 patients who visited a homoeopathic centre for the first time during 1997–1999, it was found that 1130 patients (28.5%) were children under the age of 17.³⁶

No doubt traditions of clinical practice, cultural backgrounds and even social systems play a role in homoeopathy prescribing. As a traditional folk medicine, homoeopathy is very widespread where promoted by *Heilpraktiker* and medical doctors in German-speaking countries. In a Swiss study of an adult population,²⁶ homoeopathic use was found to be significantly higher among people who were born in Switzerland than those born elsewhere. The same held true in our study, where children with no immigration background showed a significantly higher homoeopathy use than those with such a background (Table 4), suggesting the influence of cultural backgrounds.

Homoeopathy was freely practised in the former Federal Republic of Germany (West Germany), but was very restricted in the German Democratic Republic (East Germany).²⁸ This has resulted in huge differences in paediatric homoeopathy use between the two parts of Germany, even though more than 10 years have passed since reunification, suggesting the influence of beliefs and traditions of clinical practice.

Our finding of a high level of homoeopathy use among the child population raises several concerns about outcomes. One of the major concerns is the efficacy—not so much the safety—of homoeopathy use. Homoeopathic medicines are generally regarded as safe, yet not completely risk free (Table 3).^{37,38} Although 54% of homoeopathic preparations were claimed by the users themselves to be very effective, most conditions (e.g. teething) treated by homoeopathic preparations were mild and self-limiting.³⁹ These conditions will improve or disappear over time without any medical treatments. This can also be seen from the fact that homoeopathic preparations tended to be used for a shorter period than non-homoeopathic preparations. On the other hand, the short-term use may also imply that the effects of homoeopathic preparations are not satisfactory—discouraging long-term use for lack of convincing clinical effects. Joos *et al.*³¹ compared the self-rated efficacy of various alternative and complementary therapies among patients with inflammatory bowel disease and found that homoeopathic therapy showed the highest proportion of ‘no change/no efficacy’ and ‘unsatisfied’ among all the methods compared. It is hardly surprising, then, that many health professionals, including homoeopaths themselves, have admitted concerns about a lack of efficacy.³⁹ Several hundred clinical trials have been carried out on the effects of homoeopathy up to now. Because the overall quality of these trials is low,¹ it is difficult for homoeopathy proponents and opponents alike to draw firm conclusions. Nevertheless, systematic reviews restricted to the best-quality trials tend to conclude that homoeopathy produces no statistical benefit over placebo.^{5,40} A similar conclusion was drawn in a system review of 16 double-blinded placebo-controlled homoeopathy trials for the treatment of nine different childhood and adolescence ailments.⁶

Although taking homoeopathic medicines that have no effect will not lead to serious outcomes, children on homoeopathy may be being deprived of proper conventional treatments, at least for a time. In our study, we found that more than 40% of homoeopathic users received homoeopathic treatments only,

suggesting that a substantial proportion of children receiving homoeopathy may have been deprived of conventional therapies. This was all the more serious if they used homoeopathy for the treatment of specific conditions that required effective conventional therapies. In addition, homoeopaths tend to have a negative attitude towards vaccines⁴¹ and may advise mothers against the immunisation of their children.^{42,43} The birth cohort study provided evidence that children who had been homoeopathically treated, or had consulted a *Heilpraktiker*, over the last 6 months were significantly less likely to be vaccinated.¹⁵

Another concern is whether homoeopathy is really cost-effective. Currently, no physiological and pharmacological foundation can give a convincing interpretation of the effects of homoeopathy—unless it is a placebo effect, as claimed in a statement by German Pharmaceutical Society (Deutsche Pharmazeutische Gesellschaft) in 2005.⁴⁴ Yet sales of homoeopathic products in Germany were worth over €235 million in 2006 and rose by 5% in 2007.¹⁴ This raises considerable concerns as to whether homoeopathy is cost-effective, given the fact that it is an unproven medical system.

Homoeopathy is scientifically implausible. Our results, and those of others,^{7,15,23} suggest that homoeopathy is quite popular among educated people and children from families with a higher socio-economic status and a higher level of health consciousness. This should be interpreted carefully, however. Most probably, it is not because of its effectiveness that these people choose to use homoeopathy; economical reasons may play a critical role in connection with such a finding. In Germany, health insurance does not cover all costs of homoeopathy. Statutory health insurance provides partial reimbursement, while private health insurance companies provide full reimbursement of homoeopathic treatment. According to a regional study conducted in the Pomerania region of Germany between 1997 and 2001, entire out-of-pocket and full reimbursement of homoeopathy cost both accounted for 36.4%.⁴⁵ Private health insurance in Germany is often associated with higher income. This is why factors associated with homoeopathy use are linked to a stable economic background. Regional differences in homoeopathy use in the former West Germany and in the southern part of Germany clearly reflect regional economic differences.¹⁵ The same is true of families with an immigration background, who generally have a lower household income and hence a lower social status in Germany. A higher education level and a higher

household income, and therefore a higher social status, as well as a greater health consciousness (less smoking during pregnancy, more breast-feeding) are often positively relevant to each other. The higher use of homoeopathy among families with a higher socio-economic status may reflect parents' underlying desire for greater self-care and a need for opportunities to address their concerns for their children.⁴⁶ Apart from which they can afford the cost of homoeopathic medications.

The main strength of our study is that we used a nationally representative large sample of non-institutionalised children. The weighted results can be generalised to the entire German child population. Recall bias was minimised by measuring drug use over the previous week instead of the last year and by asking children's parents to bring the medication containers to examination sites to verify the use of homoeopathic medications. Because the data we used were based on a national health survey, we did not investigate intensively the reasons for choosing homoeopathy or the cost of homoeopathic treatments that may be associated with homoeopathic use. In addition, the comparison of homoeopathic with non-homoeopathic preparations was crude; statistical results should be read in conjunction with clinical significances. For example, we observed in our study that more than half of homoeopathic preparations reportedly improved the conditions treated 'greatly', showing no difference from non-homoeopathic preparations. This does not imply that homoeopathic preparations are just as

clinically effective as non-homoeopathic preparations, because of the obvious differences in indication profiles and the severity of the conditions treated.

To sum up, despite the fact that homoeopathy is scientifically implausible and one of the most controversial medical systems, paediatric homoeopathy is quite popular in Germany, particularly among children from families with a higher socioeconomic status and health consciousness, for whom the economic background may play a critical role. Given the lack of proven efficacy and safety in the case of homoeopathy, the high level of paediatric homoeopathy use in Germany warrants a further review to determine whether it is evidence based and cost-effective.

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KEY POINTS

- Homoeopathy is an unproved medicine system, scientifically implausible, yet widely used, particularly among child populations.
- The overall last-week homeopathy use was 4.6% among children aged between 0 and 17 years in Germany.
- Nearly half of the homoeopathic preparations were obtained by prescriptions from medical doctors or *Heilpraktiker* (non-medical practitioners). Homoeopathic preparations were used most often to treat certain self-limiting conditions. About 60% of homoeopathy users concomitantly received conventional medicines, whereas 40% did not.
- Paediatric homoeopathy use in Germany was closely associated with children from families with a higher level of socioeconomic status and health consciousness.
- The high level of paediatric homoeopathy use in Germany warrants a further review to determine whether it is evidence-based and cost-effective.

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