

Medication consumption in the Spanish paediatric population: related factors and time trend, 1993–2003

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WHAT IS ALREADY KNOWN ABOUT THIS SUBJECT?

- Health authorities undertake specific campaigns targeted at making the population more keenly aware of the need to use medications rationally.
- Parents are increasingly turning to medications prescribed for the 'over-the-counter' (OTC) specialties as substitutes, using them – not always correctly – to treat symptoms such as acute cough, fever or pain.

WHAT THIS STUDY ADDS?

- Our study constitutes an approach to self-reported drug consumption in the Spanish paediatric population, based on a representative nationwide sample.
- There was a significant decline in overall drug consumption in the Spanish paediatric population from 1993 to 2003.
- Nevertheless, the prevalence of consumption of analgesics, antipyretics and antibiotics has risen.

AIMS

To ascertain the prevalence of consumption of medications in the Spanish paediatric population and to identify the factors associated with such consumption.

METHODS

This was a descriptive, cross-sectional study covering the Spanish adult population, using data drawn from the 1993 and 2003 Spanish National Health Surveys (SNHS). The 1993 and 2003 SNHS include data on 5280 and 6463 children, respectively, age range 0–15 years. The independent variables were sociodemographic and health-related, and the dependent variable was medications use. Using logistic multivariate regression models, we analysed the temporal evolution of medication consumption between 1993 and 2003.

RESULTS

The 1993 SNHS data revealed that 36.81% of the paediatric population had consumed some type of medication, whereas in 2003 this figure had dropped to 34%. Over the decade of study, there was a significant decrease in use of medications for catarrh, influenza, throat ($P < 0.05$), and an increase in consumption of pain-relieving drugs and/or fever-lowering, antibiotics and anti-allergy remedies. Multivariate analysis highlighted the association between medication consumption, negative perception of the child's health [odds ratio (OR) 2.84, 95% confidence interval (CI) 2.16, 3.72 in 1993, and OR 3.54, 95% CI 2.74, 4.56 in 2003] and medical visits to the physician across the 2 years (OR 12.09, 95% CI 10.13, 14.42 in 1993, and OR 7.17, 95% CI 6.06, 8.47 in 2003).

CONCLUSIONS

Although there was a significant decline in overall drug consumption in the Spanish paediatric population from 1993 to 2003, the prevalence of consumption of certain groups, such as analgesics, antipyretics and antibiotics, has risen.

Introduction

The importance of medications as determinants of a person's health is an aspect that calls for special public health attention [1, 2], fundamentally to establish whether consumption patterns reflect rational use by the population.

This circumstance assumes still greater relevance when it involves the health of the childhood population due to this group's vulnerability vis-à-vis consumption of the greater part of medications, bearing in mind that despite being administered to children, most of these drugs have been researched and tested for use on adults. A number of studies have been conducted with the aim of describing and assessing medication prescription patterns among children and adolescents, and any possible repercussions on their health [3–13]. Other studies have focused on identifying the pattern of use of so-called 'over-the-counter' (OTC) specialties in the paediatric population. Parents are increasingly turning to medications prescribed for these types of specialties as substitutes, using them – not always correctly – to treat symptoms such as acute cough, fever or pain [14–16].

Featured among the OTC specialty drugs most consumed by the childhood population are some antipyretics, widely used by parents to treat high temperature symptoms in their children [17–19], as well as cough suppressants (antitussives) and mucolytics to treat acute cough [20].

This scenario has led health authorities to undertake specific campaigns targeted at making the population more keenly aware of the need to use medications rationally [21].

Accordingly, the objectives of our study were to ascertain the prevalence of consumption of medications in the Spanish paediatric population, and to identify the factors associated with such consumption. Lastly, we analysed the time trend from 1993 to 2003 in consumption prevalence among Spanish children, controlling for sociodemographic variables and health profiles that might influence overall drug consumption.

Methods

A descriptive, cross-sectional epidemiological study was conducted on consumption of medications by the Spanish paediatric population from 1993 to 2003. Data were drawn from the 1993 and 2003 Spanish National Health Surveys (SNHS) conducted by the Ministry of Health & Consumer Affairs [22, 23]. Using direct home-based interviews, these surveys covered a large sample of the non-institutionalized Spanish population. For the SNHS03, the period for the information collection covers the second, third and fourth quarters of 2003 and the first of 2004. The temporal scope corresponds to each quarterly cycle as of the second quarter of 2003 [23].

The procedure used was probabilistic multistage cluster sampling, with proportional random selection of primary units (towns), secondary sampling units (sections), and final units (individuals) by means of random routes and sex- and age-based quotas. The surveys for these years had to be weighted by province and autonomous region, respectively.

No ethical approval was required due to the fact that the database provided by the National Statistics Institute (INE) was anonymous and publicly available.

The 1993 and 2003 SNHS include data on 5280 and 6463 children, respectively, age range 0–15 years. The childhood questionnaires were answered by the mother, father or guardian. The methodology has been described in detail elsewhere [22, 23].

Our study population was made up of children of both sexes aged ≤ 15 years. As dependent dichotomous variables, we took the answers 'yes' or 'no' to the question, 'During the last two weeks has your son/daughter consumed the following medications, and were these prescribed at any time by the physician?' referring to a list of drugs that could be consumed by the childhood population. The dependent variable, self-medication, indicated consumption of these drugs without medical prescription [24].

As independent variables, we recorded certain sociodemographic characteristics of the person having responsibility for the child, e.g. degree of relationship, age, educational level, and work status. Note was also taken of the interviewee's positive or negative perception of the child's health. As regards children's lifestyle and health-profile variables, we studied leisure-time physical, body mass index, and limitation on the child's main activity in the preceding 2 weeks ('Has the child had to reduce or limit his/her normal activities for at least half a day due to one or several pains or symptoms during the last two weeks?'). To assess use of health resources, respondents were asked about medical visits to the physician for any complaint, disorder or disease suffered by the child in the preceding 2 weeks, whether the child had been hospitalized (with 'hospitalization' being construed as a minimum of one night in the preceding 12 months), and if emergency services had been used in the preceding 12 months. The latter two were regarded as dichotomous variables.

Statistical analysis

For the purpose of data analysis, we calculated the prevalence of total (defined as both prescribed and self-medicated) consumption of medications for each of the two surveys. Pearson's χ^2 test was used for bivariate comparison of proportions, with a value of $P < 0.05$ being deemed significant.

To estimate the independent effect of each of these variables on the consumption of such drugs, we also obtained the corresponding adjusted odds ratio (OR) by means of multivariate analysis, using logistic regression

models for the purpose. All variables that showed a significant association on bivariate analysis were included in the multivariate models, along with those variables of adjustment that were considered relevant in the scientific literature.

To assess the trend in consumption of drugs over the period 1993–2003, we combined the respective databases of the two SNHS and calculated the crude and adjusted OR of having consumed drugs in 2003 vis-à-vis 1993. For calculation of the adjusted OR, all variables that proved to be predictive in either of the SNHS were included in the multivariate logistic regression.

Estimates were generated by incorporating the sampling weights, using the 'svy' (survey command) functions of the STATA program, which enabled the sampling design to be incorporated into all our statistical calculations (descriptive, χ^2 , logistic regression).

Results

This study was based on data on 11 716 children of paediatric age, whose parents answered the question referring to consumption of any type of medication in the 2 weeks preceding the date of the survey. This amounted to a response rate of 99.4% for the 1993 and 100% for the 2003 SNHS.

When it came to describing the sociodemographic characteristics of the study population, we observed that whereas mothers had essentially answered the interview in 1993 [83.20%; 95% confidence interval (CI) 80.96, 85.13], by 2003 this percentage had fallen considerably, with mothers accounting for just 58.91% (95% CI 56.22, 61.55). Parents'/guardians' mean ages were similar for both years, namely 37.9 years (SD \pm 10.8) in 1993 and 38.5 years (SD \pm 9.9) in 2003.

The 1993 SNHS data revealed that 36.81% (95% CI 35.29, 38.36) of the paediatric population aged ≤ 15 years had consumed some type of medication in the 2 weeks

preceding the date of the survey, whereas in 2003 this figure had dropped to 34% (95% CI 32.55, 35.48), a difference that proved statistically significant ($P < 0.05$). As regards drugs which parents reported having administered to their children without medical prescription, self-medicated consumption was 8.42% (95% CI 7.56, 9.38) in 1993 vs. 9.42% in 2003 (95% CI 8.57, 10.34) ($P < 0.05$).

Table 1 shows drug consumption prevalence in the paediatric population by type of medication for each year of study. Over the decade of study, there was a significant decrease in use of medications for catarrh, influenza, throat ($P < 0.05$), and an increase in consumption of pain-relieving drugs and/or fever-lowering, antibiotic and anti-allergy remedies.

Drug consumption prevalence, broken down by the population's sociodemographic, lifestyle and health-profile characteristics, with their corresponding 95% CIs, is shown in Tables 2 and 3. Consumption prevalence registered a significant decrease with age from 1993 to 2003, with the youngest children consuming most medications ($P < 0.05$). Parents' negative perception of their children's health, and use of health services led to higher consumption values in both study years ($P < 0.05$).

The results of multivariate logistic regression analysis show the independent effect of each study variable, adjusted for the remaining variables, on drug consumption in our sample. These estimates were computed for both surveys and are shown in Table 4.

In 1993, the variables that were independently and significantly associated with a higher probability of consumption of medications in the paediatric population were: parent's work status; the sex of the child; a negative perception of the child's health; and medical visits to the physician. In 2003, negative perception of the child's health and medical visits to the physician reappeared as predictive variables, with use of other healthcare services being incorporated as a new predictor. It is important to note the high adjusted OR values registered in both surveys by the paediatric population who reported making medical visits

Table 1

Prevalence of consumption of medications in the Spanish paediatric population; Spanish National Health Survey (SNHS) 1993 and 2003

Type of medication	SNHS 1993 % (95% CI)	SNHS 2003 % (95% CI)
Medicines for colds, influenza and sore throat*	24.40 (23.06, 25.79)	14.80 (13.75, 15.93)
Medicines for pain relief and lowering temperature*	8.65 (7.80, 9.59)	12.04 (11.06, 13.10)
Vitamins, minerals, tonics	3.05 (2.54, 3.65)	3.44 (2.94, 4.01)
Laxatives*	0.11 (0.00, 0.29)	0.24 (0.13, 0.43)
Antibiotics*	4.36 (3.74, 5.08)	5.33 (4.66, 6.10)
Tranquillisers, muscle relaxants, sleeping pills	0.42 (0.26, 0.68)	0.36 (0.23, 0.56)
Medication for allergy*	1.93 (1.52, 2.43)	3.53 (3.02, 4.12)
Medication for diarrhoea*	0.78 (0.53, 1.16)	0.53 (0.25, 0.62)
Medication for vomiting*	0.57 (0.37, 0.89)	0.39 (0.25, 0.62)
Other	2.72 (2.21, 3.34)	5.51 (4.85, 6.26)

*Statistically significant association, $P < 0.05$ on comparing the 2 years studied.

Table 2

Prevalence of consumption of medications in the Spanish paediatric population by sociodemographic variables; Spanish National Health Survey (SNHS) 1993–2003

		SNHS 93 (% and 95% CI)		SNHS 2003 (% and 95% CI)	
Educational level of mother, father or guardian*	Up to 16 years of age	35.95	(34.02, 37.93)	34.55	(32.59, 36.56)
	Over 16	38.44	(35.95, 41.00)	33.35	(31.22, 35.55)
Occupational status of mother, father or guardian†	Employed	36.11	(34.51, 37.75)	33.98	(32.45, 35.55)
	Unemployed	39.65	(34.03, 45.55)	33.69	(27.54, 40.45)
	Inactive	47.14	(38.55, 55.91)	34.69	(29.00, 40.85)
Age of child‡*	0–2 years	44.81	(40.63, 49.07)	46.60	(42.73, 50.52)
	3–5 years	45.98	(42.15, 49.85)	40.44	(36.79, 44.20)
	6–9 years	35.26	(32.30, 38.35)	29.39	(26.51, 32.43)
	≥10 years	31.60	(29.39, 33.89)	29.70	(27.64, 31.84)
Sex of child†	Male	34.99	(62.86, 67.11)	34.07	(32.08, 36.12)
	Female	38.94	(36.73, 41.19)	33.92	(31.84, 36.7)

*Statistically significant association on analysing prevalences of consumption between SNHS 93 vs. SNHS 03. †Statistically significant association on analysing prevalences of consumption in SNHS 93. ‡Statistically significant association on analysing prevalences of consumption in SNHS 03.

Table 3

Prevalence of consumption of medications in the Spanish paediatric population by lifestyle and health profile variables; Spanish National Health Survey (SNHS) 1993–2003

		SNHS 93 (% and 95% CI)		SNHS 2003 (% and 95% CI)	
Physical activity of child**	Inactive	35.56	(33.01, 38.14)	31.87	(30.10, 33.69)
	Moderate	37.27	(35.34, 39.23)	37.82	(35.34, 40.36)
Body mass index†	<25	36.69	(34.73, 38.70)	33.84	(32.30, 35.40)
	≥25	38.88	(32.06, 46.17)	35.88	(29.18, 43.16)
Limitation of the principal activity of child**	Yes	88.71	(85.6, 91.21)	85.87	(82.43, 88.73)
	No	28.38	(26.83, 29.98)	26.15	(32.55, 35.48)
Self-assessment of health status**†	Fair/poor/very poor	64.19	(59.31, 68.80)	67.81	(63.27, 72.04)
	Very good/good	33.62	(32.04, 35.23)	29.94	(28.46, 31.47)
Medical consultation**†	Yes	76.89	(74.28, 79.31)	69.19	(66.29, 71.95)
	No	20.77	(19.25, 22.38)	21.06	(19.62, 22.57)
Hospitalization in preceding 12 months**†	Yes	43.17	(33.87, 50.78)	44.14	(37.96, 50.50)
	No	36.51	(34.96, 38.09)	33.36	(31.88, 34.88)
Emergency visit in preceding 12 months**†	Yes	47.79	(43.97, 51.64)	45.21	(42.63, 47.81)
	No	34.46	(32.81, 36.14)	27.93	(26.24, 29.68)

*Statistically significant association on analysing prevalences of consumption in SNHS 03. †Statistically significant association on analysing prevalences of consumption between SNHS 93 and SNHS 03. **Statistically significant association on analysing prevalences of consumption in SNHS 93.

to the physician (OR 12.09, 95% CI 10.13, 14.42 in 1993, and OR 7.17, 95% CI 6.06, 8.47 in 2003).

Taking 2003 as reference for having a lower consumption, analysis of the trend in drug consumption from 1993 to 2003 yielded a crude OR of 1.13 (1.03, 1.24). On controlling for possible confounding variables, this statistical significance was maintained (OR 1.22, 95% CI 1.09, 1.36), meaning that in 2003 drug consumption in the paediatric population was 22% less than that reported in 1993.

Discussion

Published studies addressing the use of medications in the childhood population target a diversity of objectives with

different methodologies and report results that are difficult to compare. The use of National Health Surveys by different researchers in different countries has become a valid and widely used tool for ascertaining drug use patterns, particularly in the adult population [25, 26], although it has been used with less frequency in the child and adolescent populations [3, 27]. In the latter respect, our study constitutes an approach to self-reported drug consumption in the Spanish paediatric population, based on a representative nationwide sample.

A difference between the two study periods was that the respondent was more commonly the father in the SNHS03. The increasing entry of Spanish women into the labour market has been very important, and men's involvement in household tasks and the distribution of family demands is greater now [28].

Table 4

Association between overall consumption of medicines in the Spanish paediatric population aged ≥ 15 years, and sociodemographic, lifestyle and health profile variables; SNHS 1993 and 2003

		SNHS 93		SNHS 2003	
		Adjusted OR	95% CI	Adjusted OR	95% CI
Occupational status of interviewee	Employed	1.00	–		
	Unemployed	1.16	(0.86, 1.57)		
	Inactive	1.70	(1.13, 2.55)	NS	–
Sex of child	Male	1.00	–		
	Female	1.21	(1.03, 1.42)	NS	–
Self-assessment of health status	Very good/good	1.00	–	1.00	–
	Fair/poor /very poor	2.84	(2.16, 3.72)	3.54	(2.74, 4.56)
Medical consultation	No	1.00	–	1.00	–
	Yes	12.09	(10.13, 14.42)	7.17	(6.06, 8.47)
Hospitalization in preceding 12 months	No			1.00	–
	Yes	NS	–	1.48	(1.05, 2.08)
Emergency visit in preceding 12 months	No			1.00	–
	Yes	NS	–	1.49	(1.26, 1.75)

Adjusted odds ratio (OR) and 95% confidence intervals (CI). OR adjusted by all variables included in the study using logistic regression models. NS, not significant.

Our results show that there has been a decrease in medication use among the Spanish childhood population in the last decade, yet we nevertheless regard the consumption percentages as important. In 2003, prevalence of consumption in the Spanish population aged ≤ 15 years was 34%, a value considerably lower than the 50.6% observed in the study conducted in Denmark by Traen and Sorensen [9], or that of 60% observed in Holland by Schirm *et al.* using prescription data [12].

As shown by various studies [5, 6, 8], respiratory-system drugs, especially those intended to treat catarrh or combat acute cough, frequently register the highest consumption figures among the childhood population. According to our data, this is also the most consumed group in Spain, although there was a decline in the use of such medications over the 10-year study period (24.4% in 1993 vs. 14.8% in 2003). These results are in line with those obtained for the Spanish population in a survey undertaken by Sanz *et al.* on drug prescription indications among children in five European countries [3].

In contrast, consumption of analgesics and antipyretics has increased in Spain. Different studies have identified pain in the paediatric population as an important public health problem [29, 30] linked to significant drug consumption, as reported in the questionnaire-based study undertaken by Roth-Isigkeit to assess pain-related limitations on activities of daily living among German children and teenagers. A total of 51.5% of subjects reported having consumed some pain-relieving drug in the 3 months preceding the date of the study. Insofar as fever is concerned, this is the most common disease symptom in children and one of the most frequent reasons for medical consultation, with antipyretics being one of the drug groups most widely used by the paediatric population. In this connection, a recent study conducted in France indicated that 80% of children with fever attending an emergency service

had consumed an antipyretic before going to the physician [31]. This circumstance is very relevant, since parents resort to OTCs for different reasons [14]. These specialty drugs are frequently used, as shown by the results of The Avon Longitudinal Study of Parents and Children, where >95% of children had consumed some type of OTC medication, although not always correctly [32].

A finding of special relevance indicated by our data is that antibiotic consumption among the paediatric population in Spain had risen over the 10-year study period. A Spanish Ministry of Health study into the consumption of antibiotics, based on a comparison of retail-pharmacy prescription and sales data, reinforces our result, attributing the rise in antibiotic consumption to, among other things, the increase in consumption among the childhood population, and self-medication [33]. Along these same lines, Sommet *et al.*'s study, based on French national health survey data, failed to observe a decline in consumption of antibiotics from 1992 to 2000 [34]. In contrast, however, other studies undertaken in the USA at the end of the 1990s, using data on antibiotic prescriptions and physician visits, reported a significant decrease in the consumption of these medications [35, 36].

Although the use of OTC medications for the treatment of diseases among the youngest children is very widespread, it is evident that this is related to parents' perception of their children's state of health. Yet this in no way implies that parents possess adequate knowledge regarding the use of such medications [37, 16]. Poor perception of children's health was associated with higher drug consumption in Spain over the decade of study. In this respect, various authors claim that, on turning to medications as a possible way of improving lifestyles, we are witnessing a progressive medicalization of present-day society [15]. In this context, community pharmacists are important members of the healthcare team. The pharmacists are

probably the health professionals who are closest and most accessible to patients and the general population. Their opinions related to health education have an important impact on the health of the population [38, 39].

Finally, and in line with other studies, the variable that displays the highest degree of association is the medical visit to the physician. The prescribing of medications is one of the most frequent interventions in medical practice, as shown by Cazzato *et al.*'s study, which analysed the prescribing habits of Italian paediatricians and pointed to high prescription rates in the youngest children, not always in strict compliance with prescription guidelines [5]. Along the same lines and by way of example, the European study by Sanz *et al.* considers the indications for prescribing antibiotics to be incorrect in 24.1% of the total of such antibiotic medications prescribed in Spain, and in 67.4% of those prescribed in Slovakia [3]. In the year 2003, our results show significant association in the use of specific healthcare resources such as hospital emergency services and medication use in the paediatric population. This association was not found 10 years previously. The lower influence of medical consultation in 2003 may be due to a greater influence of these emergency visits. The ease of access and availability of hospital emergency services for parents has produced greater use of this service in recent years in Spain.

A significant limitation of the health surveys derives from the use of self-reported data, so that prevalence of drug consumption may be undervalued because, owing to the socio-cultural characteristics that surround drug consumption, there may be a tendency for individuals to give socially desirable responses, and parents might be expected to be reluctant when it comes to openly confessing use of medications that they administer to their children. Also, all information obtained within an interview context may be subject to recall errors.

Another possible limitation is the fact that, rather than identifying specific active ingredients, Spanish National Health Surveys identify groups of medications for specific diseases or disorders.

In conclusion, although there was a significant decline in overall drug consumption in the Spanish paediatric population from 1993 to 2003, the prevalence of consumption of certain groups, such as analgesics, antipyretics and antibiotics, has risen. In parallel, parents' negative perception of their children's health, coupled with visits to the physician, are linked to a greater use of medications in Spain.

Greater involvement and training are needed to ensure rational use of medications in children by both parents and health professionals.

Competing interests

None declared.

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