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ORIGINAL ARTICLE

Predictors of the use of healthcare services in children and adolescents in Spain

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Abstract
Objective To assess medium to long term predictors of healthcare services use in a population-based sample of children/adolescents in Spain.
Methods A sample of children and adolescents aged 8–18 and their parents were evaluated at baseline (2003) and follow-up (2006). Total use of healthcare services and visits to specialist and dentists at the follow-up were analyzed.
Results Four hundred fifty-four children/adolescents completed baseline and follow-up assessments (response rate 54 %). 90 % of respondents reported at least one visit during the 12 months previous to the follow-up. Low socioeconomic status (beta coefficient = 0.30; 95 % CI = 0.02–0.57), double healthcare coverage (0.41; 0.17–0.66), parental use of services, poor mental health and activity limitation were associated to the total number of visits. Access to specialist was associated to double healthcare coverage (OR = 1.77; 1.01–3.07) and parental primary level of education (OR = 0.51; 0.32–0.81). Age and low family affluence predicted visits to dentists (OR = 0.38; 0.19–0.73).
Conclusion No barriers to healthcare services use were found. Family level of education, family affluence and double healthcare coverage predicted the use of specialists and dentists.

Keywords Adolescent · Equity · Follow-up studies · Health services use

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Introduction

Predicting the access to and use of healthcare services in children is challenging. The findings to date suggest that child health status, parental health, and family characteristics and behavior patterns are predictors of children future healthcare use (Forrest et al. 2004; Janicke et al. 2001). Self-perceived poor physical well-being and burden of symptoms in children and the child's health status as perceived by parents (Berra et al. 2006; Woodward et al. 1988) are reported to be major predictors of health service use. Younger age, having double health insurance, maternal education, smaller family size, more frequent maternal use of services, and parental psychopathology have consistently been linked to higher pediatric use of healthcare services (Berra et al. 2006; Woodward et al. 1988; Sills et al. 2007).

According to the Andersen's model of healthcare use, predisposing factors (demographic, socio-economic status and health beliefs), enabling factors (insurance status, family pattern of use) and need factors (perceived and evaluated need) all play a part (Andersen 1995). In countries without universal healthcare coverage, such as the United States, the family socio-economic status (SES) is a significant barrier to healthcare access (Newacheck et al. 1998; Mulvihill et al. 2007). Persons with higher SES are more likely to visit a healthcare professional than those from lower SES, even when their healthcare needs are similar. In contrast, studies carried out in countries with universal coverage, such as the UK and Spain show no inequity in the use of these services according to need and even report the opposite trend: children with poor self-perceived health from disadvantaged families use healthcare services more often than their advantaged counterparts (Rajmil et al. 2000; Saxena et al. 2002; Cooper et al. 1998). Moreover, a recent comparative study in Europe has shown that a higher percentage of public health expenditure is associated with more equitable health service use according to children/adolescents' health needs (Berra et al. 2009).

In Spain, primary healthcare services for almost all children under 15 years are provided by pediatricians working in primary care (PC) centers, and having a double healthcare coverage has been shown to be a predictor of a greater utilization of specialists and dentists, and social class differences were found in waiting time and specialist visits in adult population (Garrido-Cumbrera et al. 2010).

The few prospective longitudinal studies on this subject stand out that child's perceived health collected from both children and parents can predict future health service use (Forrest et al. 2004), determine the influence of past use of these services on future use (Janicke et al. 2001), and predict pediatric healthcare costs over a 2-year period (Seid et al. 2004). None of these studies was carried out in a population-based sample of user and non-user children/adolescents. The follow-up periods in these studies ranged from 1 to 2 years.

The objective of the present study was to assess medium to long-term predictors of the use of healthcare services in a population-based sample of children and adolescents in Spain, a country with universal healthcare coverage. It was hypothesized that the health service use would be higher among children/adolescents with poor self-perceived health status, and poor mental health and HRQoL at baseline. It was also expected that the parental pattern of healthcare use would be a predictor of the child's use. None of the SES-related factors was expected to be associated with health service use among children/adolescents from a longitudinal perspective. Nevertheless, some inequalities would be expected in the use of the dentist, according to the family SES and healthcare coverage.

Methods

Population studied

The Spanish KIDSCREEN baseline sample was recruited between May and November 2003 as part of the European KIDSCREEN fieldwork (Palacio-Vieira et al. 2010). A representative household sampling of children/adolescents 8–18 years old and their parents was conducted using a computer-assisted telephone interview with random digit dialing. Questionnaires were sent by post to families who agreed to participate. The questionnaires were completed in the respondent's home and sent back to the Spanish coordinating center in a prepaid envelope. In cases of non-response, two reminders were sent (after 2 and 5 weeks). Participation in the sample at baseline was 47.2 % ($n = 926$ of 1,956 families). Participants and non-participants at baseline were compared and also with the national census data from Spain. Similar patterns of distribution by age group and gender and slightly over-representation of families with highest level of education were found (Berra et al. 2007).

For the follow-up, between May and November 2006, questionnaires were posted by mail to all children/adolescents and their parents who had previously agreed to participate in the follow-up ($n = 840$ of 926 participants at baseline).The fieldwork followed the same methodology applied at baseline (Berra et al. 2007). Postal reminders were sent 4 and 8 weeks after the first mailing to those who had not returned their questionnaires. A third reminder was sent after 20 weeks, and the remaining non-respondents were contacted by phone. Information on the pilot test, questionnaires' content and details, fieldwork and analysis

Table 1 Factors analyzed as predictors of the use of healthcare services and outcome of the study: source of the information, and period of data collection

The Spanish KIDSCREEN follow-up study, 2003–2006

HRQOL health-related quality of life, *USH* use of healthcare services

Factors	Source (children/parent)	Data collection (baseline/follow-up)
Predisposing		
Socio-demographics (age and sex)	Children	Baseline
Family socio-economic status	Children	Baseline
Previous UHS by children and adolescents' UHS	Parents	Baseline
Enabling		
Parental level of education	Parents	Baseline
Healthcare coverage	Parents	Baseline and follow-up
Parental use of healthcare services	Parents	Follow-up
Need		
Children's/adolescents' chronic conditions	Parents	Baseline
Children's/adolescents' mental health	Children and parents	Baseline
Children's/adolescents' days of missed school	Parents	Baseline
HRQOL (KIDSCREEN-52)	Children	Baseline
Outcome of the study		
Use of healthcare services	Children	Follow-up

of respondents is available in a manuscript previously published (Palacio-Vieira et al. 2010).

All procedures were carried out following the data protection requirements of the European Parliament (Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data). The ethical and legal requirements in Spain were adhered to, and signed informed consent was obtained from all study participants.

Measures

The predisposing, enabling, and need factors analyzed in the present study as predictors of the health service use, the source of information (child vs. parent report), and whether the data were collected at baseline or at follow-up are shown in Table 1.

Use of healthcare services

All contacts with healthcare services were collected. The total number of visits was collected from the child/adolescent self-report at follow-up (2006), and it included visits to any healthcare professional [pediatrician and/or general practitioner (GP), visits to the emergency department, specialists, phone contacts, etc.]. In the case of reporting visits to a specialist, children and adolescents were asked the type of specialist visited (cardiologist, dermatologist, orthopedist, etc.,) as well as the number of visits to each specialist. Visits to the dentist were collected as a dichotomous variable (visits vs. no visits). The recall period for all visits was the 12 months prior to the follow-up interview. The total use of healthcare services was analyzed in two ways: 'any use' (no visits vs. one or more visits) and 'intensity of use'; that is, the number of visits children/adolescents did at least once during the period of interest. Visits to the specialist and the dentist were analyzed comparing users versus non-users.

Parents were also asked to report on the number of visits they had during the past 12 months at the follow-up evaluation. Parents were categorized as non-users (0 visits) or users (1 or more visits). Baseline information on children/adolescents visits to healthcare services was collected from parents.

Socio-economic status and other measures

Socio-economic and family-related variables included age (stratified into three categories: 11–12, 13–17, and 18–21 years old at follow-up), sex, and the family SES. SES was measured using the Family Affluence Scale (FAS) a valid and reliable measure to assess children's self-reports about their family wealth (Boyce et al. 2006; Currie et al. 2004). FAS scores were categorized as high, middle, and low affluence level. The highest family level of education according to the International Standard Classification of Education (ISCED) was collected from parents at baseline and categorized as low (a maximum of lower secondary level, ISCED 0–2), medium (upper secondary level, ISCED 3–4), and high (university degree, ISCED 5–6) (Eurostat yearbook '96 1996).

Family healthcare coverage was collected from parents at baseline and follow-up, and categorized as only public if they reported public coverage at both baseline and follow-up or as double coverage if they reported having additional private health insurance at either of these time points.

Child health status, mental health and health-related quality of life

Information on chronic conditions, children's/adolescent's mental health, activity limitation (number of missed school days), and HRQoL (KIDSCREEN-52 questionnaire) was collected at baseline. Chronic conditions (yes/no) were collected from the parents' report. Children/adolescent's mental health was assessed with the Strengths and Difficulties Questionnaire (SDQ), a brief behavioral screening tool that includes 25 items on psychological attributes. Responses by adolescents and their parents were elicited separately. For the present analysis, the total combined difficulties score on the SDQ from adolescents and their parents was categorized as unlikely or possible/probable case (Goodman 2001).

Health-related quality of life was measured at baseline using the generic self-reported KIDSCREEN-52 questionnaire, which includes 52 items assessing 10 HRQoL dimensions. Higher scores indicate better HRQoL and well-being (Ravens-Sieberer et al. 2008; Tebe et al. 2007). The KIDSCREEN-52 was stratified as low HRQoL (scores 1 SD below the population mean) versus the rest of the distribution.

Statistical analysis

Users and non-users of total healthcare services and specialist were compared by SES, family, and health status variables using the Chi-square or *t* test. The mean number of visits and visits to specialists among users were also compared between categories of SES, family, and health status variables. Multivariate negative binomial regression (NBR) models were adjusted to predict the total number of visits. NBR is commonly used when Poisson estimation is inappropriate due to over-dispersion (*P* value of the dispersion test was significant, reinforcing the need of NBR models). NBR models were stratified by gender. Logistic regression models (LR) were adjusted to assess use versus non-use of specialist and dentist. NBR and LR were adjusted by those independent variables, which showed statistically significant differences in the bivariate analysis and those considered as possible predictors of healthcare and specialty services use. Almost 90 % of the sample reported at least one contact with healthcare services and none of the factors analyzed were found to have statistical significance on access (use vs. non-use); for this reason, NBR was only adjusted for the total use of services.

Results

A total of 454 children and adolescents participated at follow-up (response rate 54 %). When compared with non-respondents at follow-up, respondents were younger (12.7 vs. 13.1 years, $P = 0.03$) and had a slightly higher parental level of education (48 % of primary level of education among non-participants vs. 39 % among participants; $P = 0.03$).

Table 2 shows the total use of healthcare services, specialist, and dentist according to the analyzed factors. Ninety-two percent of the sample declared at least one visit to a healthcare professional, with a mean of 5.7 visits in the past 12 months among users. These figures were 53.1 and 3.32 % for visits to a specialist, respectively. About two-thirds of the sample (68.8 %) reported having visited a dentist.

The NBR model of visits to healthcare services among users in the overall sample and stratified by gender is shown in Table 3. A higher likelihood of visits was associated with low FAS category (beta coefficient, 0.30; 95 % CI, 0.02–0.57), having double healthcare coverage (0.41; 95 % CI, 0.17–0.66), parent user of services in the previous 12 months (0.68; 95 % CI, 0.38–0.92), reporting 1 or more missed school days (0.24; 95 % CI, 0.03–0.45), and scoring as a possible or probable case of poor mental health (0.40; 95 % CI, 0.15–0.65). A low number of visits was seen in boys (0.22; 95 % CI, −0.41 to −0.04). Stratifying by sex, most of previously mentioned factors were associated only with boys, while parental use of services was found to be associated with both sexes.

Results of the logistic regression modeling are shown in Table 4. Visiting to a specialist was associated with a parental higher level of education (Odds ratio [OR] = 0.51; 95 % CI, 0.32–0.81 for families with primary level of education) and having a double healthcare coverage (OR = 1.77; 1.01–3.07). Factors associated with visiting a dentist were: the age group (OR = 0.25; 0.11–0.55 for 18–21 years, and OR = 0.38; 0.17–0.82 for 13–17 years), the low FAS category (OR = 0.38; 0.19–0.73), parents being users of health services (OR = 1.88; 1.08–3.25), and being a possible or probable case of poor mental health (OR = 0.49; 0.29–0.85).

Discussion

The present study is one of the few to analyze predictors of the use of healthcare services in a longitudinal general population sample of children/adolescents. The intensity of use in the 3-year follow-up period was mainly related with health needs (reporting poor mental health status and limited activities) and with enabling factors (having double healthcare coverage and parental use in the previous year). Moreover, children/adolescents from the lower SES and reporting poorer health declared more visits than their counterparts in the higher SES, supporting the idea that in general, the Spanish healthcare system achieves equity in

Table 2 Percentage of users and intensity of health service use by socio-demographic and health status variables

	Sample, *n* (%)	Total use of healthcare services (%)	Number of visits to any healthcare professional, mean (SD)	Total use of specialist (%)	Number of visits to specialist (SD)	Total use of dentists (%)
Total	454 (100)	376 (92.5)	5.70 (6.3)	241 (53.1)	3.32 (5.4)	305 (68.8)
Sex						
Girls	236 (52)	192 (88.5)	6.14 (6.7)	133 (55.2)	3.60 (6.2)	161 (69.7)
Boys	218 (48)	184 (90.6)	5.28 (5.9)	108 (44.8)	2.97 (4.2)	144 (67.9)
Age						
11–12 years	71 (15.6)	61 (89.7)	**5.27 (5.13)**	39 (54.9)	**2.19 (3.5)**	**60 (85.7)**
13–17 years	257 (56.6)	215 (88.1)	5.71 (5.7)	137 (53.3)	3.33 (4.1)	177 (70.8)
18–21 years	126 (27.7)	100 (92.6)	5.95 (8.1)	65 (51.6)	3.90 (7.9)	68 (55.3)
FAS						
High	137 (30.2)	115 (91.3)	**5.24 (5.5)**	71 (51.8)	**3.14 (3.5)**	**100 (75.2)**
Medium	224 (49.3)	183 (88.8)	5.42 (6.2)	117 (52.2)	3.08 (6.1)	159 (72.3)
Low	83 (18.3)	71 (89.9)	6.98 (7.7)	49 (59.1)	4.11 (6.3)	40 (49.4)
Parental level of education						
High	153 (33.7)	130 (89.7)	**5.56 (7.3)**	**97 (63.4)**	**3.80 (6.7)**	**114 (75.5)**
Medium	119 (26.2)	97 (89.8)	5.72 (5.9)	62 (52.1)	2.97 (4.5)	79 (70.5)
Low	177 (38.9)	146 (90.7)	5.84 (5.8)	79 (44.6)	3.05 (4.1)	108 (61.7)
Healthcare coverage						
Only public	384 (84.6)	311 (88.7)	**5.23 (4.9)**	**193 (50.2)**	**2.69 (2.8)**	**248 (66.5)**
Double	70 (15.4)	65 (92.9)	8.03 (10.7)	48 (68.6)	5.77 (9.3)	57 (81.4)
Parental UHS at the follow-up						
No	76 (16.7)	59 (83.1)	**3.44 (3.4)**	35 (46.1)	2.45 (3.6)	**42 (56.0)**
Yes	378 (83.3)	317 (90.8)	6.12 (6.7)	206 (54.5)	3.47 (5.6)	263 (71.5)
Chronic condition at baseline						
No	255 (56.2)	210 (88.6)	5.33 (5.8)	**123 (48.2)**	3.39 (4.5)	169 (67.9)
Yes	193 (42.5)	163 (91.6)	6.19 (7.1)	115 (59.6)	3.31 (6.4)	131 (69.7)
Children/adolescents UHS at baseline						
0 visits	155 (34.1)	122 (87.1)	5.08 (6.1)	**65 (41.9)**	3.56 (4.7)	96 (62.7)
1 or more	299 (65.9)	254 (90.7)	6.02 (6.5)	176 (58.9)	3.23 (5.6)	209 (72.1)
Child/adolescent mental health						
Unlikely	364 (80.2)	307 (88.7)	**5.19 (8.9)**	195 (53.6)	**2.89 (3.44)**	**256 (71.9)**
Possible/probable case	82 (18.1)	62 (92.5)	8.16 (10.9)	42 (51.2)	5.40 (9.4)	44 (55.1)
Child/adolescent missed school days						
0 days	159 (35.1)	131 (90.9)	**4.67 (4.2)**	76 (47.8)	2.43 (2.3)	106 (69.3)
1> days	293 (64.4)	245 (88.8)	6.26 (7.1)	165 (55.9)	3.73 (6.3)	199 (68.6)
KIDSCREEN physical well-being						
Low	46 (10.1)	40 (88.9)	**8.25 (11.3)**	29 (63.4)	**6.41 (11.8)**	27 (58.7)
Medium/high	386 (85.1)	319 (90.4)	5.48 (5.5)	202 (52.3)	2.93 (3.69)	263 (70.1)
Psychological well-being						
Low	49 (10.8)	38 (86.4)	**8.26 (11.0)**	28 (57.1)	**5.84 (10.9)**	32 (65.3)
Medium/high	400 (88.1)	334 (89.8)	5.30 (5.3)	210 (52.5)	2.84 (3.60)	270 (69.4)
Moods and emotions						
Low	57 (12.6)	46 (88.5)	7.26 (10.5)	33 (57.9)	4.13 (10.1)	37 (66.1)
Medium/high	383 (84.4)	317 (89.3)	5.47 (5.4)	200 (52.2)	3.2 (4.26)	257 (68.7)
Self-perception						
Low	52 (11.4)	40 (80.1)	**8.51 (11.1)**	30 (57.7)	**5.88 (10.9)**	35 (67.3)
Medium/high	397 (87.4)	331 (90.7)	5.26 (5.1)	207 (52.1)	2.83 (3.60)	268 (69.4)

Table 2 continued

	Sample, *n* (%)	Total use of healthcare services (%)	Number of visits to any healthcare professional, mean (SD)	Total use of specialist (%)	Number of visits to specialist (SD)	Total use of dentists (%)
Autonomy						
Low	39 (8.6)	28 (84.8)	7.35 (6.3)	20 (51.3)	3.41 (4.8)	**20 (51.3)**
Medium/high	408 (89.9)	342 (89.4)	5.61 (6.4)	218 (53.4)	3.33 (5.5)	283 (71.3)
Parents relations						
Low	51 (11.2)	38 (84.4)	5.73 (5.7)	31 (60.8)	3.06 (2.85)	32 (62.7)
Medium/high	396 (87.2)	332 (90.2)	5.65 (5.6)	206 (52.1)	3.94 (5.77)	270 (70.1)
Peer relations						
Low	23 (5.1)	18 (85.7)	**9.16 (15.1)**	15 (65.2)	**7.01 (16.4)**	16 (72.7)
Medium/high	421 (92.7)	351 (90.2)	5.57 (5.6)	222 (52.7)	3.16 (4.17)	283 (68.8)
School environment						
Low	47 (10.3)	36 (83.7)	7.30 (11.9)	27 (57.4)	**5.87 (11.4)**	33 (70.2)
Medium/high	395 (87.1)	331 (90.1)	5.60 (5.5)	209 (52.9)	3.03 (4.10)	269 (70.1)
Social acceptance						
Low	108 (23.8)	97 (93.3)	5.76 (5.6)	64 (59.3)	2.88 (3.42)	75 (74.3)
Medium/high	341 (75.1)	276 (88.5)	5.71 (6.6)	176 (51.6)	3.49 (5.96)	229 (67.9)
Financial resources						
Low	48 (10.6)	43 (93.5)	5.27 (5.5)	32 (66.7)	3.37 (5.61)	31 (68.8)
Medium/high	395 (87.1)	323 (88.7)	5.73 (5.7)	204 (51.6)	3.33 (5.45)	267 (68.9)

Statistically significant differences are shown in bold

The Spanish KIDSCREEN follow-up study, 2003–2006

Missing values: FAS, 10 cases (2.2 %); parental level of education, 5 cases (1.1 %); children's chronic conditions, 6 (1.3 %); children's mental health, 8 (1.7 %); activity limitation at the baseline, 2 cases (0.5); physical well-being, 22 cases (4.9 %); psychological well-being, 5 cases (1.1 %); moods and emotions, 14 cases (3.1 %); self-perception, 5 cases (1.2 %); autonomy, 7 cases (1.4 %); parents relation, 7 cases (1.6 %); peer relation, 10 cases (2.2 %); school environment, 12 cases (2.6 %); social acceptance, 5 cases (1.2 %); financial resources, 11 cases (2.4 %). Factors statistically significant at 0.05 level are shown in bold

FAS family affluence scale

children's/adolescent's healthcare services use. Nevertheless, social inequalities still remain in the use of the specialist and the dentist, where predictors were related to predisposing (level of education) and enabling (double healthcare coverage) factors.

The results of this study show that need-related factors (children's/adolescents poor mental health and activity limitations at baseline) have a strong influence on the future use of health services. Children's externalizing and internalizing problems are frequently linked to an increased use of pediatric services (Woodward et al. 1988; Lavigne et al. 1998). Moreover, this association persists over a longer-term follow-up (3 years). In a previous cross-sectional study, low scores on physical well-being, psychological well-being, and moods and emotion were associated with more intense healthcare use (Rajmil et al. 2006). Forrest et al. (2004) found that children reporting low satisfaction with health and self, and those reporting a larger number of physical and emotional symptoms had more ambulatory physician visits in the year after health assessment. The differences between our findings and the results from Forrest et al. (2004) and Janicke et al. (2001) may be related in part with characteristics of the sample and study design. In those studies, the children studied had ages 5–11 (as compared with 8–18 in the present study), and the use of health services was evaluated 12 months after baseline. Moreover, we analyzed a general population sample of users and non-users 8–18 years old at baseline; our follow-up period was longer than that of either study, and we did not include information from clinical records.

A previous study showed that parental use of health services was a predictor of children' use of these services (Riley et al. 1993). This finding highlights the influence of the pattern of family healthcare use, particularly maternal use, and may be linked to parental attitudes and beliefs towards healthcare. Our findings are consistent with that study and reinforce the importance of the family context and behavior in relation to healthcare use. In contrast to the study of Janicke et al. (2001), our results do not find any influence of the child's baseline pattern of use on follow-up use.

Table 3 Negative binomial regression analysis of total visits to healthcare services, beta coefficients (95 % confidence interval)

Factors analyzed (reference category)	Any healthcare service		
	Overall sample	Girls	Boys
Gender (girls)	Ref.	Ref.	Ref.
Boys	**−0.22 (−0.41 to -0.04)**	–	–
Age (11–12)	Ref.	Ref.	Ref.
Age (13–17)	–	–	–
Age (18–21)	–	–	–
FAS (high)	Ref.	Ref.	Ref.
FAS (medium)	0.03 (−0.19 to 0.25)	–	0.09 (−0.23 to 0.41)
FAS (low)	**0.30 (0.02 to 0.57)**	–	**0.40 (0.03 to 0.76)**
Parental level of education (university degree)	Ref.	Ref.	Ref.
Secondary education	–	–	–
Primary education	–	–	–
Healthcare coverage (only public)	Ref.	Ref.	Ref.
Double healthcare coverage	**0.41 (0.17 to 0.66)**	–	**0.55 (0.21 to 0.88)**
UHS by parents (none)	Ref.	Ref.	Ref.
1 or more visits	**0.68 (0.38 to 0.92)**	**0.56 (0.20 to 0.92)**	**0.74 (0.33 to 1.15)**
Children' UHS at baseline (none)	Ref.	Ref.	Ref.
1 or more visits	–	–	–
Children's mental health status (Unlikely)	Ref.	Ref.	Ref.
Children's mental health status (Possible/probable case)	**0.40 (0.15 to 0.65)**	–	**0.43 (0.11 to 0.75)**
Days of missed school at the baseline (0 days)	Ref.	Ref.	Ref.
1 or more days of missed school	**0.24 (0.03 to 0.45)**	–	**0.46 (0.16 to 0.76)**

Statistically significant differences are shown in bold

The Spanish KIDSCREEN follow-up study, 2003–2006

FAS family affluence scale, *Ref* reference category

Only factors statistically significant at 0.05 level are shown

The fact that 90 % of children/adolescents declared at least one visit and the absence of influence of family SES and other factors on the model of visits versus no visits may reflect the easy access to healthcare services in Spain, which has also been found in previous cross-sectional studies (Rajmil et al. 2000). This accessibility is seen as a clear advantage when comparing the Spanish healthcare system with other countries where the lack of universal coverage is a barrier to access and a source of inequities in health and health service use (Newacheck et al. 1998; Mulvihill et al. 2007). Recent cross-sectional studies carried out in Spain also found that persons in the lowest socioeconomic position used these services more often than their counterparts in the highest position (Garrido-Cumbrera et al. 2010; Regidor et al. 2008). Moreover, the strong primary care orientation of the Spanish system, including easy access, continuity of care, comprehensive primary care, and focus on health needs may have contributed to achieve these results.

The fact that children/adolescents from families with double healthcare coverage reported more frequent visits may be related with inequities if these individuals circumvented some of the limitations of public healthcare system, such as avoiding waiting lists for specific specialists, surgical procedures or waiting times (Garrido-Cumbrera et al. 2010; De la Peña-Mayor et al. 2005). Moreover, parental level of education was also a factor associated with the use of specialty care. Future studies should analyze in depth the mechanisms by which this factor has an independent influence on the use of specialists.

Influences of SES on the use of the dentist have been consistently reported in Spain (Rajmil et al. 2000) and worldwide (Pizarro et al. 2009; Pavi et al. 2010). Public coverage of dental care is only partial and primarily directed towards some preventive measures during school age. Those families from advantaged SES are able to use private services beyond those offered by the NHS. The present study confirms that these social inequalities persists in a long time prediction and reinforces the need to revise health policy and management of dental care services addressed to children and adolescents. The unexpected result of less likely use of the dentist in those children/

Table 4 Logistic regression models of visits to specialist and dentist

Factors analyzed (reference category) Gender (girls)	Specialist Ref.	Dentist Ref.
Boys	–	–
Age (11–12)	Ref.	Ref.
Age (13–17)	–	**0.38 (0.17 to 0.82)**
Age (18–21)	–	0.97 (0.56 to 1.65)
FAS (high)	–	**–**
FAS (medium)	–	**0.38 (0.19 to 0.73)**
FAS (low)	–	**0.25 (0.11 to 0.55)**
Parental level of education (university degree)	Ref.	Ref.
Secondary education	0.65 (0.08 to 1.07)	–
Primary education	**0.51 (0.32 to 0.81)**	–
Healthcare coverage (only public)	Ref.	Ref.
Double healthcare coverage	**1.77 (1.01 to 3.07)**	–
UHS by parents (none)	Ref.	Ref.
1 or more visits	–	**1.88 (1.08 to 3.25)**
Children' UHS at baseline (none)	Ref.	Ref.
1 or more visits	–	–
Children's mental health status (unlikely)	Ref	Ref.
Children's mental health status (possible/probable case)	–	**0.49 (0.29 to 0.85)**
Days of missed school at the baseline (0 days)	Ref.	Ref.
1 or more days of missed school	–	

Statistically significant differences are shown in bold

Odds ratio (95 % confidence interval). The Spanish KIDSCREEN follow-up study, 2003–2006

FAS family affluence scale. *Ref* reference category. Only factors statistically significant at 0.05 level are shown

adolescents with a probable mental health problem deserves further investigation.

Some limitations of the study deserve comment. The appropriateness of visits could not be analyzed because of the lack of information from clinical records, diagnoses, etc. Nonetheless, the set of health status and mental health instruments, and the HRQoL measures included can help to determine if children/adolescents in greater need have more visits than their healthier counterparts do. However, it was not possible to analyze the cause of visits and determine if they were due to preventive of health promotion causes. Other factors that might influence the healthcare service use, such as parental mental health, family conflicts (Riley et al. 1993), and ethnic minority origin (Saxena et al. 2002), were not included in the analysis and should be taken into account in future studies. The parental use of services was collected at follow-up, and the retrospective nature of the data might have led to some recall bias. Although the response rate was similar to reported response rates in other longitudinal population-based studies (Hille et al. 2005) selective follow-up could have biased our assessment of the healthcare service use. Nevertheless, although those followed up were slightly younger and from more educated families than non-participants, there were no differences in their baseline assessment of age, gender, or HRQOL and it would not be expected a bias in the results of the present study. The follow-up period of the present study was considered medium to long term when comparing with earlier studies on healthcare services, with a maximum of 2 years of follow-up, or studies on other subjects with more than 5 years of follow-up (Ramón et al. 2005). Lastly, the outcome of this study included a recall period of 12 months prior the survey but the baseline assessment was 24 months before that time. Despite the gap of time between the baseline and the outcome measurement our results showed that mental health and activity limitation remain as related factors of healthcare services use. Further research is needed to determine if visits among children and adolescents are due to promotion and preventive services and to determine the actual cause of visits, especially in a free-to-access healthcare system.

Conclusions

In conclusion, this study showed that, in the context of free access to healthcare services, the child's health profile and the pattern of family use remain as main determinants of healthcare use in children/adolescents over a 3-year period. Double healthcare coverage and SES were found to be determinants on the future use of specialists and also the dentist. Attention to these factors may be of help to policy-makers, pediatricians, and families attempting to achieve effective management of the use of healthcare resources in children and adolescents.

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Conflict of interest None declared

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