Social Factors and Professional Attitudes as Determinants of the Frequency of Small Surgical Procedures Among Children in Greece

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Introduction

Several authors in many countries of the world, including the USA, the UK, the Scandinavian countries and others have studied the descriptive epidemiology of three of the most common surgical procedures in childhood (Adenoidectomy (Ad), Tonsillectomy (T) and Appendectomy (Ap)), and have evaluated the importance of psychosocial, socioeconomic and medical care factors as determinants of the patterns of occurrence of these procedures [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12].

The present report is based on a study of similar objectives undertaken in Athens in 1983. Greece is a country of moderate industrial development and national wealth, characterized by a strong private health sector and traditional family values in child rearing; these two sets of factors have been reported to affect the frequency of small surgical procedures in childhood. The findings mostly contribute to the understanding of the complex interactions involved in the surgical decision making by examining the related basic issues in a population with values and health service resources different from those prevailing in most of the highly developed countries.

Materials and Methods

Between July and December 1983, interviews were conducted by one of us with a parent (94 percent) or another accompanying adult (6 percent) of 2316 children 3–12 years old (completed years) brought to the Outpatient Clinics of the First Department of Paediatrics of the University of Athens (1677 children) or the Polyclinic of the Children's Welfare Center of PIKPA in Pireaus (639 children). All interviews were administered by the same person to the escorts of successively admitted children. The interviewer was working alternatively in the above mentioned paediatric centers, which represent the largest of their kind in Athens and Pireaus respectively. There were no refusals from any of the interviewed persons who supplied the requested information promptly and eagerly. Although a few of the children were eventually admitted as inpatients, no interviews were submitted to the escorts of children who were seriously ill. Also excluded were children admitted for scheduled Ad, T or Ap. Twenty of the 2316 interviews had missing information on important variables and were not included in any of the subsequent analyses.

The questionnaire included items concerning the demographic and socioeconomic characteristics of the families of the children as well as questions concerning histories of Ad, T or Ap. Table 1 shows the distribution of the 2296 children by age, gender and social class. Social class was assessed according to the father's education which has been found to be the best such indicator in Greece [13] (Class I, up to 6 years of schooling; Class II, 7–12 years of schooling; and Class III, more than 12 years of schooling). Among these families 61 percent owned at least one car, 36 percent owned a color TV set and 75 percent were using a private telephone; there were no interview items concerning income of the family, since in Greece this question can create suspicions on the part of the interviewees. Among the children 13 percent belonged to single child families, 61 percent to families with two children, 20 percent to families with three children, and the remaining 6 percent to families with four or more children; 54 percent of the children were first born, 34 percent second born, and the remaining 12 percent were third or later born.

Social class	Males (age, years)				Females (age, years)			
	3–5	6–8	9–12	Total	3–5	6–8	9–12	Total
I (low)	217	175	190	582	146	96	129	371
II	253	138	124	515	167	107	99	373
III (high)	143	85	46	274	103	51	27	181
Total	613	398	360	1371	416	254	255	925

Table 1. Distribution of 2296 children 3–12 years old, by age at interview (completed years), gender, and social class (education level of the father).

The data were analyzed with standard stratification procedures using the chi2 tests developed by Mantel and Haenszel [14] and Mantel [15]; chi, rather than chi2, values are given in order to indicate the direction

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as well as the significance of the respective associations. Discriminant analyses were also undertaken in order to confirm independently the results obtained from the stratified analyses.

Adenoidectomy	Tonsillectomy	Appendectomy	Number	Percent
+	+	+	20	0.87
+	+	−	88	3.83
+	−	+	2	0.09
+	−	−	96	4.18
−	+	+	5	0.22
−	+	−	18	0.78
−	−	+	61	2.66
−	−	−	2006	87.37
Total			2296	100.00

Table 2. Distribution of 2296 children 3–12 years old by history of Adenoidectomy, Tonsillectomy, Appendectomy or any combination of these operations.

Results

Table 2 shows the distribution of the examined children by history of Ad, T or Ap or any combination of these operations. Among children with median age of about 6 years, 12 percent have already had at least one of these small operations. This proportion increases to about 25 percent among children with median age of about 10 years (data shown in summary form in Table 6). Table 3 shows the distribution of the 205 children who have had Ad by age, gender and social class. The cumulative incidence of Ad is significantly higher among boys than among girls. It increases with age with a particular steep slope between the ages of 4 and 7 years and shows no clear socioeconomic gradient. Table 4 shows the corresponding distribution of the 131 children who have had T. The cumulative incidence of T is higher among boys than among girls. It increases steadily with age and again shows no clear socioeconomic gradient. Finally, Table 5 shows the distribution by age, gender, and social class of the 88 children who have had Ap. The cumulative incidence of Ap is slightly higher among girls due to the marked increase of the incidence of this operation among girls of the last age group (9–12 years). There is also a statistically significant trend of Ap with social class, the incidence being higher among children of lower social class.

Table 2 allows the evaluation of the intra-individual correlations between Ad, T, or Ap or any combination of them. Thus, among 206 children with Ad, 108 had also T (52 percent), whereas among 2090 children without Ad, 23 had T (1 percent); among 206 children with Ad, 22 had also Ap (11 percent), whereas among 2090 children without Ad, 66 had Ap (3 percent); finally among 131 children with T, 25 had also Ap (19 percent), whereas among 2165 children without T, 63 had Ap (3 percent). These figures indicate strong intra-individual correlations, but the findings cannot be interpreted at face value because of the confounding effects of age and perhaps also of gender and social class. We have not examined further the intra-individual association between Ad and T, since it reflects

Adenoidectomy	Social class	Males (age, years)				Females (age, years)			
		3–5	6–8	9–12	Total	3–5	6–8	9–12	Total
Yes	I (low)	9	19	27	55	3	5	21	29
Percent		4.1	10.9	14.2	9.5	2.1	5.2	16.3	7.8
Yes	II	9	29	21	59	8	9	7	24
Percent		3.6	21.0	16.9	11.5	4.8	8.4	7.1	6.4
Yes	III (high)	8	12	9	29	1	6	3	10
Percent		5.6	14.1	19.6	10.6	1.0	11.8	11.1	5.5
Yes	Total	26	60	57	143	12	20	31	63
Percent		4.2	15.1	15.8	10.4	2.9	7.8	12.2	6.8

Mantel-Haenszel × for gender: 3.4; $p < 0.001$
Mantel-Extension × for age: 7.6; $p < 0.001$
Mantel-Extension × for social class: 1.1; non significant

Table 3. Distribution of 206 children 3–12 years old, with Adenoidectomy, by age, gender, and social class.

Tonsillectomy	Social class	Males (age, years)				Females (age, years)			
		3–5	6–8	9–12	Total	3–5	6–8	9–12	Total
Yes	I (low)	5	11	23	39	0	3	19	22
Percent		2.3	6.3	12.1	6.7	0.0	3.1	14.7	5.9
Yes	II	3	14	14	31	4	3	8	15
Percent		1.2	10.1	11.3	6.0	2.4	2.8	8.1	4.0
Yes	III (high)	4	5	8	17	0	4	3	7
Percent		2.8	5.9	17.4	6.2	0	7.8	11.1	3.9
Yes	Total	12	30	45	87	4	10	30	44
Percent		2.0	7.5	12.5	6.3	1.0	3.9	11.8	4.8

Mantel-Haenszel × for gender: 1.9; approximately 0.005
Mantel-Extension × for age: 8.7; $p < 0.001$
Mantel-Extension × for social class: 0.7; non significant

Table 4. Distribution of 131 children 3–12 years old, with Tonsillectomy, by age, gender, and social class.

Appendectomy	Social class	Males (age, years)				Females (age, years)			
		3–5	6–8	9–12	Total	3–5	6–8	9–12	Total
Yes	I (low)	3	8	20	31	2	6	16	24
Percent		1.4	4.6	10.5	5.3	1.4	6.3	12.4	6.5
Yes	II	1	2	8	11	1	1	13	15
Percent		0.4	1.4	6.5	2.1	0.6	0.9	13.1	4.0
Yes	III (high)	1	1	3	5	0	0	2	2
Percent		0.7	1.2	6.5	1.8	0	0	7.4	1.1
Yes	Total	5	11	31	47	3	7	31	4
Percent		0.8	2.8	8.6	3.4	0.7	2.8	12.2	4.4

Mantel-Haenszel × for gender: −1.1; non significant
Mantel-Extension × for age: 8.5; $p < 0.001$
Mantel-Extension × for social class: −2.9; $p < 0.01$

Table 5. Distribution of 88 children 3–12 years old, with Appendectomy, by age, gender, and social class.

to a considerable extent a well known and frequently justifiable surgical practice to remove simultaneously both the tonsils and adenoids.

Age (years)	3–5		6–8		9–12		Total	
Appen-dectomy	Tonsillectomy or Adenoidectomy or both							
	Yes	No	Yes	No	Yes	No	Yes	No
Yes	2	6	6	12	19	43	27	61
No	37	984	76	558	89	464	202	2006
Total	39	990	82	570	108	507	229	2067
Percent	0.051	0.006	0.073	0.021	0.176	0.085	0.118	0.030
Ratio	8.5		3.5		2.1		3.9	

Table 6. Distribution of children with Appendectomy by age, and coexistence or not of either or both Tonsillectomy and Adenoidectomy.

Table 6 shows the intra-individual correlation between Ad and/or T on the one hand and Ap on the other. There is no biomedical reason to expect an association between these two factors and any unconfounded correlation should reflect, at least partially, parental and/or medical attitudes leading to (excessive) medical intervention. Since gender and social class are related positively to Ad and T and negatively to Ap, they cannot be held responsible for «positive» confounding; age however is related positively to all operations and is an obvious (positive) confounder. Therefore, the association under consideration was explored in Table 6 after stratification for age alone. It is clear that within age groups there is a strong positive association between Ad and T on the one hand and Ap on the other. The weighted average of the within age ratios (8.5, 3.5 and 2,1) is 2.9 i.e. lower than the confounded crude figure of 3.9, but still clearly and significantly different from the null value of 1 (Mantel-Haenszel = 4.2, corresponding to $p<0.001$).

Discussion

The epidemiology of the common small operations in childhood and in particular the descriptive epidemiology of Ad, T and Ap has been studied extensively, mainly in highly developed countries. Among the principal findings were the remarkable variation in incidence both between and within countries; a variation which could not be accounted for by a corresponding variation in the underlying nosological spectrum. Several hypotheses have been proposed in order to explain the phenomenon, including the modulation of demand by the availability of surgeons [4, 16, 17], the generation of supplier-induced demand [7, 18], socially conditioned behavioral characteristics of the population at the family level [19, 20], variations in the accepted indications for surgery [21, 22], and variations in the infrastructure of the corresponding health services networks [23]. A common denominator in all these hypotheses is the professional uncertainty generated by the loose scientific criteria for Ad, T and Ap [8, 18, 24, 25, 26].

In the present study an effort was made to evaluate these hypotheses with data collected from a relatively large sample of children in Athens, Greece. The study sample was not representative of the underlying population but representativeness is not a prerequisite of validity for a study design focusing on associations rather than on descriptive values [27, 28]. Furthermore, any weakness due to the lack of representativeness is compensated, at least partly, by the 100 percent response rate of those who were asked to participate in the study. It should be also noted that the social class spectrum of the families of the examined children was very similar to that of the population of Athens in general [29]. Finally, the unrepresentativeness of the present sample with respect to the sex ratio of the children and their distribution by birth order (boys outnumbered girls by 60 percent to 40 percent and 54 percent of children were first born) is not peculiar to this sample, but appears characteristic of the way greek families assess the importance of minor ailments of their children.

In Greece the overall incidence of Ad and T (as assessed through hospital admission data) is higher than in the UK but lower than in the USA and Canada, whereas the incidence of Ap is considerably higher in Greece than in the three other mentioned countries or indeed most other countries of the world [16, 30, 31, 32]. In this context it may be relevant to note that Ap, the only procedure that is unusually common in Greece, is also the only one which is more common in the lower social class of the population (Table 5). It would also appear that the higher excess of Ap compared to that of Ad and T reflects the relatively higher numbers of general surgeons compared to ENT specialists in the greek population [33]. An interesting result of the present study was that the cumulative incidence of Ap was almost three times higher among children with Ad and/or T than among children without any of these operations. Since there are no strong biological reasons (except for the commonality of the lymphoid tissue) or medical indications to account for this clustering of operations, the more obvious explanation could be an unjustifiable «medicalization» generated either by the parents of the children [7, 19] or the attending physicians [34, 35, 36, 37]. Similar results have been reported from small studies in other countries and similar interpretations have been proposed to accommodate these findings [38, 39].

The intra-individual associations between small childhood operations are not limited to the described link between Ad and T on the other hand and Ap on the other, but include all other combinations as well. If these associations were indeed causal they would imply that a large proportion of the childhood surgical procedures in Greece (perhaps the majority, if the relative risk of 2.9. was reciprocally interpreted and loosely

generalized) are not biomedically justified and are performed under the psychological pressure of parents or the *ill-founded advice of some doctors*. Similar estimates have been derived in other countries, as well as in Greece, by workers following different methodological approaches [8, 40, 41, 42, 43].

In conclusion, the purpose of this study was to evaluate whether the incidence of Ad, T and Ap among children in Athens is unjustifiably high and, if so, whether social factors, parents' behaviour or physicians' attitudes are responsible. The cumulative incidence of these three operations is indeed high but social class does not appear to be an important determinant. By contrast the intra-individual correlation of these operations indicate that parents' or physicians' attitudes, in a background of professional uncertainty, may lead to unjustifiable surgery in a substantial proportion of cases (perhaps in as many as 50 percent of them or even more). Although the findings of the present study are not conclusive, they do indicate that intentional excessive surgery in childhood is not a phenomenon exclusively characteristic of wealthy, developed countries.

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Summary

Data concerning histories of Adenoidectomy (Ad), Tonsillectomy (T) and Appendectomy (Ap) were collected from the escorts (mainly mothers) of 2296 children 3–12 years-old. The children were admitted as outpatients at the First Department of Paediatrics of the University of Athens or the Polyclinic of the Children's Welfare Center of PIKPA in Pireaus, during the last six months of 1983. Among children with median age of about six years, 12 percent had already had at least one operation (Ad, T or Ap); this proportion increased to about 25 percent among children with median age of about 10 years. The cumulative incidence of Ad and/or T was higher among boys, whereas the cumulative incidence of Ap was higher among girls. The age adjusted cumulative incidence of Ap was significantly higher in the lower social class, whereas there was no social gradient with respect to Ad or T. There were strong intra-individual correlations among the three studied operations; in particular the age adjusted cumulative incidence of Ap was 2.9 times higher among children with Ad and/or T than among children without any of these operations. Since there are no apparent biomedical reasons to account for the observed intra-individual associations, it appears likely, that these associations reflect parental or physician's attitudes leading to unjustifiable operations in some of the children.

Résumé

Les facteurs sociaux et les attitudes médicales comme déterminants de la fréquence de la petite chirurgie infantile en Grèce.

Les données concernant une anamnèse d'adénoïdectomie (Ad), tonsillectomie (T) et appendicectomie (Ap) ont été obtenues auprès des proches (principalement les mères) de 2296 enfants âgés de 3 à 12 ans. Ces enfants étaient des patients ambulatoires du Département de pédiatrie de l'Université d'Athènes ou de la Policlinique du Centre d'aide à l'enfance de PIKPA du Pirée ayant consulté durant les six derniers mois de 1983. Dans le groupe d'enfants dont l'âge médiant était d'environ 6 ans, 12% avaient subi au moins l'une des opérations (Ad, T ou Ap); cette proportion augmentait jusqu'à 25% dans le groupe d'enfants dont l'âge médian était d'environ 10 ans. L'incidence cumulée des Ad et/ou des T était plus élevée chez les garçons; alors que l'incidence cumulée des Ap était plus haute chez les filles. Après élimination de l'effet de l'âge, l'incidence cumulée des Ap était significativement plus haute dans les classes sociales inférieures, alors qu'il n'y avait aucun effet de la classe sociale concernant Ad ou T. Pour un même individu, il existe une forte corrélation entre ces trois opérations; en particulier, l'incidence cumulée (après contrôle de l'âge) de l'Ap était de 2,9 fois plus haute chez les enfants avec Ad et/ou T que chez les enfants n'ayant subi aucune de ces opérations. Puisqu'il n'existe aucune raison biomédicale connue permettant d'expliquer ces associations intra-individuelles, il paraît probable que ces corrélations reflètent l'attitude des parents ou des médecins conduisant à des opérations non justifiées chez certains de ces enfants.

Zusammenfassung

Der Einfluss sozialer Faktoren und ärztlicher Einstellung auf die Häufigkeit kleiner operativer Eingriffe bei Kindern in Griechenland

Anamnesedaten zur Adenoidektomie (Ad), Tonsillektomie (T) und Appendektomie (Ap) wurden bei den Angehörigen (meist den Müttern) von 2296 3- bis 12jährigen Kindern erhoben, welche während der letzten sechs Monate des Jahres 1983 entweder die pädiatrische Abteilung der Universität Athen oder die Poliklinik des Kinderzentrums von PIKPA in Pyräus für ambulante Behandlung aufsuchten. Von den kleineren Kindern (Medianwert des Alters etwa 6 Jahre) hatten bereits 12% mindestens eine Operation hinter sich (Ad oder Ap). Dieser Prozentsatz stieg auf 25% bei der Gruppe grösserer Kinder (Medianwert des Alters etwa 10 Jahre). Die kumulative Inzidenz von Ad und/oder T war höher bei den Knaben, während die kumulative Inzidenz von Ap bei den Mädchen bedeutender war. Altersbereinigte kumulative Inzidenz von Ap war signifikant erhöht in den niedrigen sozialen Klassen, Ad oder T zeigten keinen sozialen Gradienten. Eine starke intraindividuelle Korrelation zwischen den drei untersuchten Operationstypen konnte gefunden werden; besonders die altersbereinigte und die kumulative Inzidenz von Ap war 2,9mal höher bei Kindern mit Ad und/oder T als bei Kindern, welche bisher noch nie operiert worden waren. Da keine offensichtliche biomedizinische Erklärung für die beobachtete intraindividuelle Beziehung gefunden wurde, scheint es wahrscheinlich, dass diese Beziehungen die Einstellung der Eltern oder der Ärzte widerspiegelt, die zu ungerechtfertigten Operationen bei manchen Kindern führt.

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