Actas Dermosifiliogr. 2008;99:111-8

ORIGINAL ARTICLES

Childhood Dermatosis in a Dermatology Clinic of a General University Hospital in Spain

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Abstract. *Background and objectives.* Pediatric dermatology is a relatively new subspecialty for which few epidemiological studies are available. We aimed to determine the work load associated with this subspecialty and the most common presenting complaints among pediatric patients in the general dermatology clinic of our hospital.
Methods. A descriptive study was performed based on hospital records to analyze patients aged 16 years or under seen in our department in 2005 and their diagnoses.
Results. Pediatric dermatology accounts for 12.1% of the work load in our department (1329/10 998 patients were ≤ 16 years old). By disease groups, tumors and infections were the most common diagnoses and accounted for 55.4% of all cases. A long way behind was eczema (15.0%) and diseases affecting hair follicles, nails, and sweat and sebaceous glands (8.8%). The most common individual diagnosis was melanocytic nevus (19.8%), followed by viral warts (12.1%), atopic dermatitis (8.9%), molluscum contagiosum (8.4%), and acne (7.0%).
Conclusions. In most developed countries, atopic dermatitis is the most common dermatologic disease in children. In our study, however, melanocytic nevus was the most common presenting complaint, reflecting perhaps that there are more children in Spain with multiple nevi due to overexposure to sunlight or because of concern about melanoma among the population. Another possibility is that Spain has fewer cases of atopic dermatitis than more industrialized countries in northern Europe. Measures to avoid exposure to sunlight and use of sunscreen should be promoted during infancy. This could help slow the increase of melanoma in the adult population.

Key words: epidemiology, pediatric dermatology, melanocytic nevi, atopic dermatitis.

DERMATOSIS INFANTILES EN LA CONSULTA DE DERMATOLOGÍA DE UN HOSPITAL GENERAL UNIVERSITARIO EN ESPAÑA

Resumen. *Introducción y objetivos.* La Dermatología Pediátrica es una subespecialidad relativamente nueva sobre la que existen pocos estudios epidemiológicos. Nos proponemos determinar la carga de trabajo que representa en una consulta de Dermatología general y cuáles son los motivos de consulta más frecuentes en nuestro centro en este grupo de edad.
Métodos. Estudio descriptivo del registro del Servicio de Dermatología sobre las visitas realizadas a pacientes de ≤ 16 años de edad en el año 2005 y sus diagnósticos.
Resultados. La Dermatología Pediátrica representa el 12,1 % de nuestra carga de trabajo (1.329/10.998 visitas fueron a ≤ 16 años). Por grupos, los tumores y las infecciones fueron los diagnósticos más frecuentes, ya que entre ambos representan el 55,4 % del total. A distancia les siguen los eczemas (15,0 %) y las enfermedades anexiales (8,8 %). El diagnóstico individual más frecuente fue nevo melanocítico (19,8 %), seguido de verruga vírica (12,1 %), dermatitis atópica (8,9 %), molusco contagioso (8,4 %) y acné (7,0 %).

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Manuscript accepted for publication June 7, 2007.

Conclusiones. En la mayoría de países desarrollados la dermatitis atópica es el diagnóstico más frecuente en los niños. En nuestro estudio los nevos melanocíticos ocupan el primer lugar, lo que quizá refleje que existan más niños con múltiples nevos porque se toma el sol en exceso, o por la melanofobia existente entre la población. También es posible que en nuestra área exista menos dermatitis atópica que en países más industrializados del norte de Europa. Se deberían impulsar conductas de fotoevitación y fotoprotección durante la época infantil. Ello podría contribuir a frenar, en nuestro medio, el incremento del melanoma en el adulto.

Palabras clave: epidemiología, Dermatología infantil, nevos melanocíticos, dermatitis atópica. Key words: epidemiology, pediatric dermatology, melanocytic nevi, atopic dermatitis.

Introduction

Consultations for any type of dermatosis account for between 6% and 24% of all visits to the pediatrican[1,2]—a share that appears to be increasing[3]—and for 7.6% of visits to the family physician.[4] In studies in developing countries, the prevalence of dermatoses in children of school age ranged from 34% to 87.7%,[5-9] whereas in countries such as Romania[10] and Turkey,[11] dermatoses have been reported in 22.8% and 77%, respectively. We only found 1 study of the proportion of childhood dermatoses treated in a general dermatology clinic; in that study, pediatric patients accounted for 12.4% of the total caseload.[12]

An analysis of individual diagnoses shows that, in developed countries, atopic dermatitis is more common, accounting for 25% to 33% of all consultations, followed by melanocytic nevi, which account for 3% to 20%, and viral warts, which account for 5% to 13%.[13-15] This contrasts with the situation in developing countries, where infections and infestations predominate.[8,9,15] On the other hand, the findings vary according to whether the investigators are pediatricians or dermatologists, as the patients differ according to the type of specialist who diagnoses and treats the patients. The findings will also vary from one country to the next according to whether the health care system permits patients to visit the specialist directly or whether they have to be referred by a pediatrician. Theoretically, there will be a tendency for a dermatology clinic to see patients with rarer types of dermatoses such as hard-to-diagnose genodermatoses or chronic dermatoses that require complicated management, such as severe atopic dermatitis. In contrast, pediatricians will more often manage acute infectious dermatoses, infestations, and common dermatoses such as cradle cap or diaper rash.

The aim of this study was to calculate the caseload corresponding to childhood dermatosis and determine the most frequent diagnoses in a dermatology department of a general university hospital.

Patients and Methods

The Hospital Universitari Arnau de Vilanova, in Lleida, Spain, to which our department belongs, is the referral hospital for 29 primary health care facilities and 2 local hospitals—in Tremp and Seo d'Urgell. The hospital serves a population of approximately 450 000 inhabitants and has 478 beds shared between the internal medicine department and medical specialties, and general and gastrointestinal surgery and some of its specialties. The hospital does not have any departments that require technologically advanced equipment. Approximately 275 000 patients are attended in outpatient clinics every year (62 500 of which are first visits).

Overall, 90% of the children who attend our clinic are referred from primary health care pediatricians. The remaining 10% come from family physicians, the emergency department, or the pediatric department of our own hospital. In the Spanish national health system, patients cannot go directly to a dermatologist.

In order to estimate the caseload corresponding to pediatric dermatology in our hospital and to determine the most frequently diagnosed conditions for these patients, we undertook a descriptive study of the diagnostic records of the dermatology department for 2005. These records consist of an Excel spreadsheet in which the diagnoses were recorded along with whether the patients were consulting for the first or second time. The same spreadsheet allows for up to 3 diagnoses to be added. Sometimes a syndromic diagnosis was reported (for example, unspecified eczema) if a more accurate diagnosis could not be made. When a complementary test was requested (for example, culture or biopsy), the diagnosis was left blank until the results were available. In some instances, "no diagnosis" was recorded. The terms and coding used followed an adaptation of the International Classification of Diseases, ninth and tenth revisions, proposed by Dr Pablo Fernández Peñas, with some of our own subsections added.

For the study, we counted all entries in a file created by filtering for patients aged 16 years or less. To

determine the frequency of the different diagnoses, the spreadsheet was ordered by surnames. When a patient was diagnosed with more than 1 condition, all were counted unless the same diagnosis was repeated in the same patient, in which case it was counted only once. The corresponding Excel functions were used for calculating the mean and SD.

Results

Between January 2 and December 31, 2005, a total of 10 998 consultations were made. Of these, 1329 corresponded to patients aged 16 years or less; thus pediatric dermatology accounted for 12.1% of all patients (Table 1). In total, 991 children attended our clinic; 684 (69.0%) were visiting for the first time whereas the remaining 31% of visits were subsequent visits. Of the 684 children who attended the clinic for the first time, 504 (73.7%) were discharged and the remaining 180 required at least 1 further visit. A total of 1047 diagnoses were made for the 991 children attended (Table 1); 94 patients had 2 dermatoses and 3 patients had 3 different diagnoses each. In 37 patients, we were unable to establish a diagnosis of the dermatosis and the eruption had remitted by the time the child arrived at the clinic in 7 cases. The mean (SD) age was 9.24 (4.14) years. There was a slight predominance of boys (518 boys, 52.27%; 473 girls, 47.72%).

In the analysis of diagnoses by categories (Table 2), the most frequent were tumors and infections (302 diagnoses in each group out of a total of 1091, ie, 27.7% for each category and 55.4% overall). The next most frequent category was eczema (159 diagnoses, 14.6%), followed by skin adnexal diseases (108, 9.9%), erythematosquamous dermatoses (39, 3.6%), dyschromias (26, 2.4%), dermatoses caused by insects and mites (21, 1.9%), and reactive dermatoses (15, 1.4%). We were unable to establish a diagnosis in 37 patients (3.4%) and in 7 cases, no disease could be detected on examination (0.6%). Of note in the "miscellaneous" group were 6 keloids and 4 cases of granuloma annulare. A wide range of diagnoses were made only once in individual patients. In total, 166 different diagnoses were made.

The most common individual diagnoses were melanocytic nevus (216/1091 diagnoses, 19.8%), followed a long way behind by viral warts (12.1%), atopic dermatitis (8.9%), molluscum contagiosum (8.4%), and acne (7.0%) (Table 3). These 5 dermatoses accounted for approximately 60% of cases. Less common—that is accounting for less than 5% of the diagnoses—were tinea (3.1%), unspecified eczema (2.7%), acquired childhood hemangiomas (2.2%), seborrheic dermatitis (2.0%), psoriasis (1.6%), postinflammatory hypopigmentation and pityriasis alba (1.3%), and alopecia areata (1.1%).

Table 1. Visits to the Dermatology Department of Hospital Universitari Arnau de Vilanova, Lleida, Spain, in 2005 (Children Aged 0-16 Years).

Total Number of Visits in 2005	10 998
Total Number of Visits, Patients ≤16 y	1329 (12.1%)
First appointment	684 (69%)
Subsequent appointments	645 (31%)
Number of Children Attended	991
Children without diagnosis	37
Children with no disease	7
Children with 1 diagnosis	850
Children with 2 diagnoses	94
Children with 3 diagnoses	3
Total Number of Diagnoses	1047

The most common types of melanocytic nevi were common acquired melanocytic nevi (141 cases) followed by congenital melanocytic nevi (63 cases). These diagnoses were made clinically. The same could be said for the remaining tumors, except for 5 pyogenic granulomas, 2 dermoid cysts, 2 sebaceous nevi, 3 juvenile xanthogranulomas, 1 pilomatrixoma, and 1 neurofibroma, whose diagnoses were confirmed by excision and biopsy.

The most common types of infection were viral infections and, in particular, warts (132) and molluscum contagiosum (91). We included 5 cases of Gianotti-Crosti syndrome in this group even though serology for Epstein-Barr virus, hepatitis B and C viruses, cytomegalovirus, coxsackievirus, and rotavirus was negative. Of the 34 diagnosed cases of tinea, 18 cases of tinea corporis and 9 cases of tinea capitis are particularly worthy of mention.

We also attended 96 children with classic atopic dermatitis. Of note among the remaining cases of eczema were 17 cases of dyshydrosis and 4 cases of nummular eczema. A further 10 patients were diagnosed with contact eczema. Two of these cases were contact allergic dermatitis, confirmed by patch tests, whereas the remaining 8 cases were irritant: 1 patient had frictional dermatitis of the elbows, another lip-lick eczema, and 4 had juvenile plantar dermatitis. In 30 of the children diagnosed with eczema, we were unable to determine the diagnosis.

Discussion

In the present study, we have shown that the dermatoses in patients aged 16 years or younger accounted for 12.1% of all visits to our department in 2005. This percentage is similar to the one reported in a previous study in Singapore.[12]

We also note that on grouping the diagnoses by category the most frequent types were infections and tumors (Table 2), accounting for 27.7% of all diagnoses.

Table 2. Diagnoses, Grouped by Category, in Children (Age, 0-16 Years) Attended in the Dermatology Department of Hospital Arnau de Vilanova, Lleida, Spain, in 2005

Tumors, Cysts, and Hamartomas 302 (27.7%)

1. *Vascular* 31
   Acquired childhood hemangiomas (24)
   Pyogenic granulomas (5)
2. *Conjunctival* 7
   Acrochordons and soft fibroma (3)
   Dermatofibroma (4)
3. *Melanocytic nevi* 216
   Congenital (63)
   Common (141)
   Atypical nevus syndrome (2)
   Blue nevus (3)
   Nevus Spilus (3)
4. *Cysts* 16
5. *Hamartomas* 18
   Sebaceous nevus (6)
   Epidermal nevus (3)
6. *Adipose* 4
   Lipomas (4)
7. *Mastocytosis* 3
8. *Others* 7

Infections 302 (27.7 %)

1. *Viral* 239
   Warts (132)
   Herpes simplex (6)
   Molluscum contagiosum (91)
2. *Mycosis* 47
   Candidiasis (6)
   Pityriasis versicolor (7)
   Tinea (34)
3. *Bacterial* 16
   Folliculitis (5)
   Impetigo (7)
   Cellulitis (2)
   Pitted keratolysis (2)

Eczema 159 (14.6%)

1. *Unspecified eczema* (30))
2. *Contact dermatitis* (10)
3. *Atopic dermatitis and related eczema* (119)
   Atopic dermatitis (97)
   Dyshidrosis (17)
   Nummular eczema (4)
   Neurodermitis (1)

Skin Adnexal Diseases 108 (9.9 %)

1. Acne (76)
2. *Alopecias* (20)
   Alopecia areata (12)
3. *Nail diseases* (9)
4. *Sweat gland disorders* (2)
5. Hypertrichosis (1)

Erythematosquamous Dermatosis 46

1. *Pityriasis rosea* (7)
2. *Psoriasis* (17)
   Guttate psoriasis (12)
3. *Seborrheic dermatitis and related processes* (22)

Dyschromias 26

1. *Postinflammatory hypopigmentation and pityriasis alba*
2. *Postinflammatory hyperpigmentation*
3. *Hypomelanosis of Ito*
4. *Vitiligo* (5)

Dermatoses Due to Insects and Mites 21

1. *Scabies* (8)
2. *Insect bites* (11)
3. *Pediculosis capitis* (2)

Reactive Dermatosis 15

1. *Urticaria* (10)
2. *Lichenoid dermatitis* (4)
3. *Leukocytoclastic vasculitis* (1)

Miscellaneous 68

Undiagnosed 73

No Disease 7

The most common type of infection was viral infection, corresponding to 21.9% of diagnoses. This can probably be explained by the fact that children in Spain carry out many activities in the open air, in contact with children of their age, for example in swimming pools and changing rooms, where it has been shown that molluscum contagiosum[16] and plantar warts[17] can be more readily transmitted. Cases of tinea were relatively numerous (34 cases, 3.1%). Tinea capitis has become slightly more common in the last 10 years, an observation which can in part be

explained by increasing immigration. Immigrants currently account for 10.4% of the population in the province of Lleida according to data from the Institut Català d'Estadística (www.idescat.net, accessed August 10, 2005). There were 7 were cases of noninflammatory tinea, 4 of which were in patients of African origin. A further 18 were cases of tinea corporis, caused mainly by zoophilic fungi, because about 20% of the population in our catchment area works in agriculture and with livestock. Certain pyodermas (impetigos and folliculitis) are probably more common than reflected by our sample because these diseases are usually treated by the pediatricians themselves.

It is not easy to compare our results with those of other series because of differences in demographics and methodology. With regard to developing countries, 2 population studies have been done in Ethiopia. Figueroa et al[8] found that 81.2% of children of school age had some sort of skin infection and that 13.4% suffered from some type of mycosis, whereas in 2000 Shibeshi[18] found that 33% of the children in the study had some form of skin infection. A population study has also been done in 36 schools in the suburbs of Chandigarh, a city of more than a million inhabitants in the north of India.[9] It was found that 38.8% of 12 586 children suffered from some type of dermatosis. Skin infections were the most frequent (11.4% of the total), followed by eczemas (5.2%) and infestations (5.0%). A similar study of 1066 pupils aged between 4 and 15 years in schools in Nigeria found skin infections to be the most frequent dermatoses, accounting for 27.9% of the total (tinea represented 15.2%, a large proportion of which was tinea capitis), and 50 (4.7%) had scabies.[15] Curiously, no cases of atopic dermatitis or warts were reported. These findings are in line with studies of immigrant populations in developed countries.[19] Unlike our findings, the epidemiological pattern in which infectious dermatoses—and pyodermas, tineas, and infestations in particular—predominate, with lack of warts and atopic dermatitis, is a feature of developing countries and is related to living conditions in which clothing is shared and animals are kept in the home.

In our department, in 2005, we diagnosed 97 patients with atopic dermatitis (8.9%), the third most common diagnosis. In most studies done in developed countries, atopic dermatitis is the most frequent diagnosis in children. In the study published by Wenck and Itin[13] in Switzerland in 2003, 25.9% of children referred to a pediatric dermatology clinic had atopic dermatitis. The next most common diagnoses were melanocytic nevi (9.1%) and warts (5.0%). These results are similar to those obtained in the study by Torrelo and Zambrano[20] in a pediatric dermatology clinic in Madrid, Spain—23.9% had atopic dermatitis, 10.5% melanocytic nevi, and 7.8% and warts—and to those reported by Hon et al,[14] who found 33% of the children suffered from eczema whereas 11.5% presented with

Table 3. Most Common Diagnoses Among Children Aged 0 to 16 Years Attended in the Dermatology Department of Hospital Arnau de Vilanova, Lleida, Spain, in 2005

1. Melanocytic nevi	216	19.80%
2. Viral warts	132	12.10%
3. Atopic dermatitis	97	8.90%
4. Molluscum contagiosum	92	8.40%
5. Acne	76	7,00%
6. Tinea	34	3.10%
7. Unspecified eczema	30	2.70%
8. Hemangioma	24	2.20%
9. Seborrheic dermatitis, cradle cap, and tinea amiantacea	22	2.00%
10. Psoriasis	17	1.60%
11. Postinflammatory hypopigmentation and pityriasis alba	14	1.30%
12. Alopecia areata	12	1.10%
13. Insect bites	11	1.00%
14. Contact dermatitis	10	0.90%
15. Urticaria	10	0.90%
16. Ungeal dystrophy	8	0.70%
17. Impetigo	8	0.70%
18. Scabies	8	0.70%
19. Dermatofibroma	7	0.60%
20. Café au lait macule	7	0.60%
21. Pityriasis rosea	7	0.60%
22. Epidermal cysts	7	0.60%
23. Herpes simplex	6	0.50%
24. Postinflammatory hyperpigmentation	6	0.50%
25. Sebaceous nevi	6	0.50%
26. Keloid	6	0.50%
27. Folliculitis	5	0,40%
28. Pyogenic granulomas	5	0.40%
29. Gianotti-Crosti syndrome	5	0.40%
30. Vitiligo	5	0.40%
31. Others	86	7.90%
32. Miscellaneous	68	6.20%
33. No diagnosis	37	3.40%
34. No disease	7	0.60%

melanocytic nevi and 6% with warts. The differences with our findings could be because several of these studies classed classic atopic dermatitis and dyshydrosis, pityriasis alba, and nummular eczema as eczema-dermatitis. It may also be that in our study, the prevalence is lower than in the more industrialized areas of central and northern Europe because the climate is warmer and sunnier, and the exposure to allergens is lower, or that the diseases are less severe and more readily treated by the pediatrician. The differences compared to findings of Torrelo and Zambrano[20] are probably due to the fact that 60% of patients in that study were children under 5 years of age, in whom the prevalence of atopic eczema is greater, whereas the mean age of our patients was 9.4 years.

However, unlike the other studies we reviewed, melanocytic nevi were diagnosed more frequently in our sample—these accounted for approximately one fifth of diagnoses (216 out of 1091, 19.8%) among patients aged 16 years or less. We believe the 63 cases of congenital melanocytic nevi (5.8% of the 1091 cases diagnosed) to be a fairly faithful reflection of the prevalence of this type of nevus in our region given that pediatricians, who are well aware of the malignant potential of these nevi, will usually refer such patients to a specialist. Recent studies have found that between 3% and 7% of children have congenital melanocytic nevi,[21-23] and a metaanalysis reported that 0.7% of such nevi progress to melanoma.[24] Nevertheless, the most noteworthy finding is the high prevalence of common acquired melanocytic nevi (141 cases out of 1091 diagnosed nevi, that is, 12.9% of all nevi). We have not been able to find any other epidemiological studies on childhood dermatoses in which melanocytic nevi are the leading presenting complaint. In the study of a Turkish population published in 2002 by Inanir et al,[11] the authors remarked that nevi were the most common diagnosis, although there appears to be a typographic error in the manuscript or a mistake in the calculation of the results given that only 13 children were reported to have nevi, much less than 14.4% of the 608 children in the series. We also encountered 2 patients with clinically atypical nevi. In 2 recent series, no atypical nevi were reported among children,[21,22] probably because the target population of the 2 studies were children aged 9 years old, and dysplastic nevi rarely appear before adolescence. This high number of patients with nevi in our clinic could indeed indicate that there are more children with multiple nevi in Spain. It is widely known that the level of insolation in Spain is high—between 1500 and 3000 hours of exposure to sunlight per year—and that people sunbathe without taking protective measures. A number of recent studies have confirmed that, in addition to a genetic component, the extent of exposure to sunlight (prolonged and repeated sunbathing, spending holidays in sunny countries) is a determining factor for the number and density of nevi,[25-29] that the nevi appear in photoexposed areas,[21,26,29] and that the total number of nevi is one of the main risk factors for developing melanoma.[30,31] Of note is a study conducted by our group in 2004 that showed that 25% admitted to suffering sunburn more than 5 times during childhood even though 90% of the Spanish population has a dark skin phototype (III and IV).[32] In addition, only 14.6% used sunscreens correctly. These figures are similar to those obtained in a study of 310 children aged 6 to 14 years in Italy.[33] The authors found that 24% of the subjects had suffered sunburn on repeated occasions, that the oldest children underwent prolonged exposure to sunlight in the summer (43% for 2 to 4 hours, 38% for 4 to 8 hours), particularly around midday, and that only 38% of the Italian children used sunscreen correctly. The other factor that could account for the high number of visits for nevi is that pediatricians feel obliged to refer children with nevi due to concern about melanoma among the Spanish population.

Childhood dermatoses are very common and varied. In our study, we found a wide range of unique diagnoses, 166 in a year, a similar figure to the 154 diagnoses reported by Schachner et al[34] in the Pediatric Dermatology Clinic of the Miami School of Medicine in the United States. This diversity represents an added difficulty for the nonspecialist. However, the majority of studies of prevalence have found that most visits are for fewer than 10 types of childhood dermatosis. In our study, the 4 most frequent diagnoses were made for almost half of all the patients seen. If acne, tinea, the remaining forms of eczema, hemangiomas, and seborrheic dermatitis are also considered, these 9 diagnoses account for 70% of all visits.

The differences observed between different series are probably a reflection of the type of subject included in the study, environmental and socioeconomic factors, and how easy it is to be attended by a physician. As we commented earlier, cramped living conditions and lack of hygiene are responsible for infections and infestation in populations in developing countries, whereas industrialization appears to be associated with "allergic" dermatoses (atopic dermatitis and other eczemas) and exposure to sunlight is responsible for a substantial portion of skin tumors. The findings also depend on whether patients have direct access to dermatologists or if pediatricians act as gatekeepers. In Spain, which has universal public health coverage, children are seen first by the pediatrician, who decides whether or not to make the referral.

The aim of this study was not to study the prevalence of childhood dermatoses but rather to determine the caseload corresponding to childhood dermatologic diseases in a dermatology clinic of a general hospital. We believe that our findings are a reasonably true reflection of what Spanish dermatologists see in the clinic. At the same time, we have been able to determine the reasons for referral from pediatricians. These findings could help us to decide which

areas require most attention and investigation and to identify gaps in the training of pediatricians.

We would finally like to point out that epidemiological data on childhood dermatoses also serve to plan preventative measures. We believe that it is necessary to perform epidemiological studies to determine the actual prevalence of multiple nevi and atopic dermatitis in children. Both pediatricians and dermatologists should work together, with the support of parents, to ensure that children avoid dangerous exposure to sunlight and use sunscreens properly. This would perhaps reverse the current trend towards increasing incidence of melanoma. Prevention of melanoma and skin cancer in general should clearly begin in childhood, and every effort should be made to reduce the number of hours that children are exposed to sunlight.

Acknowledgments

We would like to thank Ms Montse Martínez, statistician of the Hospital Arnau de Vilanova, Spain, for her comments on the methodology used in the study.

Conflicts of Interest
The authors declare no conflicts of interest.

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