Prevalence of Birthmarks and Transient Skin Lesions in 1000 Spanish Newborns

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KEYWORDS
Transient skin lesion; Birthmark; Neonates; Prevalence; Newborns

Abstract

Background and objectives: Almost all newborn children have some sort of birthmark or transient benign skin lesion. Few studies, however, have analyzed their frequency, particularly in Spain. The aims of this study were to determine their prevalence in 1000 newborn children in the health care area of Ferrol in northwest Spain and to compare the results with those of 9 other studies with similar characteristics.

Patients and methods: We undertook a descriptive study of 1000 newborn infants seen in the first 3 days of life at the neonatal clinic in the Department of Pediatrics, Hospital Arquitecto Marcide, Ferrol, Spain. Each infant was examined for the presence of 19 different transient benign skin lesions and 11 birthmarks.

Results: Birthmarks or benign skin lesions were present in 994 neonates (99.4%). Transient skin lesions were present in 99.2% and birthmarks in 72%. The 5 most prevalent lesions were sebaceous hyperplasia (75%), salmon patch (64.2%), hypertrichosis (59%), sucking calluses (54%), and palatine cysts (53.7%).

Conclusions: The results of this study show that most neonates have benign skin lesions. The findings of studies to assess their frequency are influenced not only by geographic location (affecting variables such as climate, social and health care conditions, and ethnic group) but also by the timing of examination, the inclusion criteria applied, and the terminology used. © 2010 Elsevier España, S.L. and AEDV. All rights reserved.
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Introduction

The skin of newborn infants plays a fundamental role in the transition from an aqueous intrauterine environment to the outside world, where it is required to provide mechanical and immunological protection, control thermoregulation, and function as a barrier to prevent insensible fluid loss. Almost all neonates display some form of transient skin lesion or birthmark. Many neonatal skin diseases are thought to be physiological due to their benign, self-limiting nature, and they are rarely examined by dermatologists. It is nevertheless important to recognize them in order to avoid incorrect diagnosis and unnecessary tests or treatments that generate additional anxiety for parents.

Few studies have analyzed the frequency of benign skin lesions and birthmarks in newborn infants in Spain. The only study reported to date is that of Navas et al carried out in Seville. In addition, it is impossible to extrapolate results obtained in one region to the situation in another. The aim of this study was therefore to determine the prevalence of benign skin lesions and birthmarks in 1000 newborn infants from the health care area of Ferrol, in La Coruña, Spain, and to compare the results with those of 9 similar studies.

Patients and Methods

We undertook a descriptive study of 1000 live newborn infants seen in the neonatology clinic of the Department of Pediatrics at Hospital Arquitecto Marcide in Ferrol, Spain. All neonates from our health care area born in the hospital are seen in the clinic within the first 3 days of life.

Physical examination was performed jointly by a dermatologist and a pediatrician. The presence or absence of 19 transient skin lesions (marked acrocyanosis, sucking pad, sucking pad on the lip, cutis marmorata, perianal dermatitis, physiological desquamation, erythema toxicum neonatorum, genital hyperpigmentation, sebaceous hyperplasia, hypertrichosis, jaundice, miliaria, transient neonatal pustular melanosis, pallor, gingival cyst, milia, palatine cyst, generalized plethora, and vernix caseosa) and 11 birthmarks (hemangioma, venous malformation, café au lait spots, port-wine stain, mongolian spot, salmon patch, achromic nevus, epidermal nevus, congenital melanocytic nevus, sebaceous nevus, and adnexal polyp). Diagnosis of the lesions was based on clinical assessment.

To compile data from different examinations, weighted means of the proportions were calculated along with confidence intervals (CI) using the binomial method. Statistical analyses were performed with the Metagraph module of Stata 10 (StataCorp, 2009).

Results

Newborn infants were recruited over a period of 19 months between May 2008 and November 2009. The demographic characteristics of the 1000 neonates included in the study were as follows: 528 boys and 478 girls, 92.2% white infants, mean (SD) gestational age of 39.3 (1.8) weeks, mean birthweight of 3234.06 (519.67) grams, mean 1-minute
Apgar score of 8.71 (0.82), and mean 5-minute Apgar score of 9.79 (0.54). Infants were born by vaginal delivery in 78.3% of cases. In 83.5% of cases the infants were examined within the first 24 hours of life.

Some type of skin lesion was present in 99.4% of neonates. Transient benign skin lesions were present in 99.2% of newborns and birthmarks in 72%. The 5 most common lesions were sebaceous hyperplasia (75% of neonates), salmon patch (64.2%), hypertrichosis (59%), sucking pad on the lip (54%), and palatine cyst (53.7%).

Table 1 compares the characteristics of the children included in our study with those of 9 other reported studies. Table 2 compares the findings of the studies. The proportions and corresponding 95% CI are shown for the transient benign skin lesions and birthmarks, along with the weighted means and 95% CI.

**Discussion**

Our results confirm that, of the 10 most common lesions in newborn infants, 8 are transient benign skin lesions (sucking pad on the lip, physiological desquamation, erythema toxicum neonatorum, sebaceous hyperplasia, hypertrichosis, palatine cyst, generalized plethora, and vernix caseosa) and only 2 are birthmarks (mongolian spots and salmon patches). However, the frequencies observed among the different studies analyzed are highly variable. For instance, the most common finding was palatine cyst in 3 studies, mongolian spots in 2, physiological desquamation in 2 others, whereas in our study it was sebaceous hyperplasia and others have reported hypertrichosis or neonatal toxic erythema to be most prevalent.

Some of the factors that account for these differences are related to the characteristics of the study or the study population:

1. **Racial group.** Whereas mongolian spots, genital hyperpigmentation, hypertrichosis, sucking pads on the lip (in breastfeeding infants), and transient neonatal pustular melanosis are more frequent in black infants, the most common lesions in white infants are palatine cysts, salmon patch, and erythema toxicum neonatorum, perhaps due merely to the greater difficulty of identifying erythema on dark skin.

2. **Environmental factors such as climate and temperature inside the hospital.** If the study is undertaken in a hot country or if the temperature inside the hospital is high (without air conditioning), a larger number of neonates develop miliaria, whereas exposure to cold temperatures will be linked to acrocyanosis and cutis marmorata.

3. **Timing of examination or length of follow-up.**
Table 2  Proportions and 95% Confidence Intervals for Transient Benign Skin Lesions and Birthmarks. Comparison With 9 Other Studies.

<table>
<thead>
<tr>
<th>Disease / Study</th>
<th>Monteagudo et al(^a) (95% CI)</th>
<th>Boccardi et al(^b)</th>
<th>Gokdemir et al(^c)</th>
<th>Ferahbas et al(^d)</th>
<th>Navas et al(^e)</th>
<th>Mosavi et al(^f)</th>
<th>Sachdeva et al(^g)</th>
<th>Prukachatkunakorn et al(^h)</th>
<th>Rivers et al(^i)</th>
<th>Nanda et al(^j)</th>
<th>Mean(^k) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All skin diseases</td>
<td>0.994</td>
<td>0.907</td>
<td>0.957</td>
<td>0.960</td>
<td>0.948</td>
<td>1</td>
<td>0.993</td>
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<tr>
<td>Transient skin lesions</td>
<td>0.992</td>
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<tr>
<td>Sebaceous hyperplasia</td>
<td>0.750 (0.723-0.776)</td>
<td>0.335</td>
<td>0.484</td>
<td>0.318</td>
<td>0.437</td>
<td>0.214</td>
<td>0.387</td>
<td>0.480</td>
<td>0.318</td>
<td>0.429 (0.417-0.441)</td>
<td></td>
</tr>
<tr>
<td>Hypertrichosis (lanugo)</td>
<td>0.590 (0.559-0.620)</td>
<td>0.684</td>
<td>0.139</td>
<td>0.078</td>
<td>0.257</td>
<td>0.144</td>
<td>0.290</td>
<td>0.335</td>
<td>0.322</td>
<td>0.349 (0.322-0.349)</td>
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<tr>
<td>Sucking pad on the lip</td>
<td>0.540 (0.509-0.570)</td>
<td>0.119</td>
<td>0.103</td>
<td>0.098</td>
<td>0.268</td>
<td>0.268</td>
<td>0.268</td>
<td>0.252</td>
<td>0.286</td>
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</tr>
<tr>
<td>Palatine cyst</td>
<td>0.537 (0.506-0.567)</td>
<td>0.345(^c)</td>
<td>0.587(^d)</td>
<td>0.702(^d)</td>
<td>0.610(^d)</td>
<td>0.330(^d)</td>
<td>0.560(^d)</td>
<td>0.887(^d)</td>
<td>0.573</td>
<td>0.560 (0.560-0.585)</td>
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<tr>
<td>Vernix caseosa</td>
<td>0.492 (0.460-0.523)</td>
<td></td>
<td>0.142</td>
<td>0.142</td>
<td>0.358</td>
<td>0.358</td>
<td>0.358</td>
<td>0.358</td>
<td>0.382</td>
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<tr>
<td>Physiological desquamation</td>
<td>0.415 (0.384-0.445)</td>
<td>0.571</td>
<td>0.227</td>
<td>0.395</td>
<td>0.019</td>
<td>0.400</td>
<td>0.130</td>
<td>0.650</td>
<td>0.307</td>
<td>0.295 (0.295-0.319)</td>
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<tr>
<td>Plethora (neonatal erythema)</td>
<td>0.306 (0.277-0.334)</td>
<td></td>
<td>0.124</td>
<td>0.124</td>
<td>0.236</td>
<td>0.236</td>
<td>0.236</td>
<td>0.216</td>
<td>0.258</td>
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<tr>
<td>Erythema toxicum neonatorum</td>
<td>0.166 (0.142-0.189)</td>
<td>0.231</td>
<td>0.132</td>
<td>0.309</td>
<td>0.304</td>
<td>0.304</td>
<td>0.304</td>
<td>0.210</td>
<td>0.269</td>
<td>0.214 (0.214-0.233)</td>
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<tr>
<td>Milia</td>
<td>0.166 (0.142-0.189)</td>
<td>0.234</td>
<td>0.271</td>
<td>0.014</td>
<td>0.075</td>
<td>0.238</td>
<td>0.064</td>
<td>0.360</td>
<td>0.349</td>
<td>0.179 (0.170-0.188)</td>
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<tr>
<td>Genital hyperpigmentation</td>
<td>0.153 (0.130-0.175)</td>
<td>0.148</td>
<td>0.148</td>
<td>0.151</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.153</td>
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<tr>
<td>Gingival cyst</td>
<td>0.134 (0.112-0.155)</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
<td>0.134</td>
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<tr>
<td>Jaundice</td>
<td>0.057 (0.042-0.071)</td>
<td>0.058</td>
<td>0.035</td>
<td>0.291</td>
<td>0.256</td>
<td>0.256</td>
<td>0.256</td>
<td>0.256</td>
<td>0.256</td>
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<tr>
<td>Pallor</td>
<td>0.023 (0.013-0.032)</td>
<td>0.020</td>
<td>0.011</td>
<td>0.028</td>
<td>0.004</td>
<td>0.002</td>
<td>0.002</td>
<td>0.008</td>
<td>0.006</td>
<td>0.015 (0.015-0.034)</td>
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<tr>
<td>Sucking pads</td>
<td>0.008 (0.002-0.013)</td>
<td>0.003</td>
<td>0.009</td>
<td>0.181</td>
<td>0.057</td>
<td>0.049</td>
<td>0.065</td>
<td>0.057</td>
<td>0.049</td>
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<tr>
<td>TNPM</td>
<td>0.006 (0.001-0.010)</td>
<td>0.195</td>
<td>0.094</td>
<td>0.082</td>
<td>0.071</td>
<td>0.071</td>
<td>0.071</td>
<td>0.061</td>
<td>0.071</td>
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<tr>
<td>Perianal dermatitis</td>
<td>0.005 (0.000-0.009)</td>
<td>0.006</td>
<td>0.006</td>
<td>0.005</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
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</tr>
<tr>
<td>Miliaria</td>
<td>0.003 (0.000-0.006)</td>
<td>0.088</td>
<td>0.040</td>
<td>0.013</td>
<td>0.206</td>
<td>0.017</td>
<td>0.031</td>
<td>0.146</td>
<td>0.058</td>
<td>0.052 (0.052-0.064)</td>
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<tr>
<td>Cutis marmorata</td>
<td>0.001 (0.000-0.002)</td>
<td>0.065</td>
<td>0.106</td>
<td>0.035</td>
<td>0.044</td>
<td>0.037</td>
<td>0.052</td>
<td>0.016</td>
<td>0.019</td>
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<tr>
<td>Birthmarks</td>
<td>0.072</td>
<td></td>
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<tr>
<td>Salmon patch</td>
<td>0.642 (0.613-0.672)</td>
<td>0.231(^f)</td>
<td>0.031</td>
<td>0.192</td>
<td>0.156</td>
<td>0.262</td>
<td>0.138</td>
<td>0.346</td>
<td>0.338</td>
<td>0.284 (0.272-0.292)</td>
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</tr>
<tr>
<td>Mongolian spots</td>
<td>0.189 (0.164-0.213)</td>
<td>0.010</td>
<td>0.201</td>
<td>0.132</td>
<td>0.129</td>
<td>0.713</td>
<td>0.602</td>
<td>0.725</td>
<td>0.257</td>
<td>0.622 (0.381-0.403)</td>
<td></td>
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<tr>
<td>CMN</td>
<td>0.014 (0.006-0.021)</td>
<td>0.032</td>
<td>0.010</td>
<td>0.001</td>
<td>0.016</td>
<td>0.007</td>
<td>0.020</td>
<td>0.034</td>
<td>0.021</td>
<td>0.004 (0.003-0.019)</td>
<td></td>
</tr>
<tr>
<td>Adnexal polyp</td>
<td>0.010 (0.003-0.016)</td>
<td>0.010</td>
<td>0.005</td>
<td>0.018</td>
<td>0.010</td>
<td>0.005</td>
<td>0.018</td>
<td>0.005</td>
<td>0.018</td>
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</tr>
</tbody>
</table>
different studies from the first 48 hours to the first
month of life. Some conditions begin after the first
24 hours of life, including erythema toxicum neonatorum
(the majority of cases occur between 24 and 72 hours)
and physiological desquamation (except in post-term
births).

Miliaria, jaundice, and hemangiomas develop
after a few days or weeks. Clinical appearance of some
oral (submucosal) cysts is delayed. Other conditions
such as vernix caseosa, generalized plethora (due to
excess hemoglobin), hypertrichosis, transient neonatal
pustular melanosis (in relation to the pustules), or
cutaneous vasomotor instability (acrocyanosis and cuts
of the hands and feet) disappear or diminish in a few days or
weeks.

Inclusion criteria. Ferahbas et al recruited newborns in
a neonatal care unit. In that study, 42% of the infants
were premature, leading to a higher prevalence of
hypertrichosis, hemangiomas, and cutis marmorata, and a
lower frequency of desquamation (in the first few days),
sebaceous hyperplasia, erythema neonatorum, and oral
cysts. If many of the infants have a fever, the
frequency of miliaria will be increased.

Social and health care provision. The social and health
care services available in a country or region can
influence a series of factors that have consequences
for the types of lesions observed. These include
birthweight (oral cysts and neonatal toxic erythema),
mode of delivery (desquamation and erythema toxicum
neonatorum), and maternal factors such as age (nuchal
salmon patch and erythema toxicum), number of previous pregnancies (erythema toxicum
neonatorum and salmon patch), and diseases or the
use of pharmacological treatments or supplements
(multivitamins, iron, and folic acid) during pregnancy
(erythema toxicum neonatorum).

Additional complexity can be introduced by a series
of other factors. a) The first example is terminological
differences. Although oral cysts are most frequently
located on the palate, Epstein pearls differ from
palatine or gingival cysts. b) Another area of confusion is the classification
and nomenclature. In the past, studies have employed
comparing vascular lesions with those reported in studies
undertaken prior to the subdivision of these into tumors
and malformations. c) The subclassification of diagnoses
can also create problems in comparisons between studies.
In some studies they distinguish between desquamation
and xerosis and in others they employ desquamation/
xerosis. d) Another area of concern is the classification
according to lesion site. Boccardi et al, for instance,
distinguished between nuchal salmon patch and salmon
patch at other sites. e) Some studies also fail to specify
racial group, and racial categories are also subdivided
according to variables that may not be comparable
between studies, such as the geographic origin of the
parents, race, ethnicity, skin color, or phenotype.

Table 2 (Continuation)

<table>
<thead>
<tr>
<th>Disease / Study</th>
<th>Monteagudo et al (95% CI)</th>
<th>Boccardi et al</th>
<th>Goldemir et al</th>
<th>Ferahbas et al</th>
<th>Navas et al</th>
<th>Moosavi et al</th>
<th>Sachdeva et al</th>
<th>Pruskachatkunakor et al</th>
<th>Rivers et al</th>
<th>Nanda et al</th>
<th>Mean (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemangioma</td>
<td>0.009 (0.003-0.014)</td>
<td>0.014</td>
<td>0.034</td>
<td>0.013</td>
<td>0.016</td>
<td>0.018</td>
<td>0.014-0.022</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Port wine stain</td>
<td>0.008 (0.002-0.013)</td>
<td></td>
<td>0.003</td>
<td>0.009</td>
<td>0.001</td>
<td>0.005</td>
<td>0.003-0.008</td>
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<tr>
<td>Achromic nevus</td>
<td>0.003 (0.000-0.006)</td>
<td>0.003</td>
<td></td>
<td>0.008</td>
<td>0.005</td>
<td>0.004</td>
<td>0.003-0.008</td>
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<tr>
<td>Epidermal nevus</td>
<td>0.002 (0.000-0.004)</td>
<td>0.005</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
<td>0.010</td>
<td>0.004 (0.002-0.007)</td>
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<tr>
<td>Sebaceous nevus</td>
<td>0.001 (0.000-0.002)</td>
<td>0.006</td>
<td>0.003</td>
<td>0.006</td>
<td>0.004</td>
<td>0.004</td>
<td>0.002-0.006</td>
<td></td>
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</tr>
<tr>
<td>Café au lait spot</td>
<td>0.001 (0.000-0.002)</td>
<td>0.013</td>
<td>0.003</td>
<td>0.003</td>
<td>0.028</td>
<td>0.011</td>
<td>0.008-0.015</td>
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<tr>
<td>Venous malformation</td>
<td>0.001 (0.000-0.002)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>0.001</td>
<td>(0.000-0.0006)</td>
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</tr>
</tbody>
</table>

*Our study.
†Weighted mean for each lesion among the studies that make reference to it.
‡Palatine or gingival cyst.
§Epstein pearls.
This study distinguished between desquamation (22.7%) and xerosis (31.2%).
This study distinguished between nuchal salmon patch (23.1%) and capillary malformations in other regions (14.7%); other “angiomas”.
Abbreviations: CI, confidence interval; CMN, congenital melanocytic nevus; TNPM, transient neonatal pustular melanosis.
Most epidemiologists recognize the scientific limitations of the term “race” and some recommend using the term “ethnic group”. With the increasing ethnic/racial heterogeneity of different populations, it is necessary to employ an appropriate classification. Some studies did not examine the oral mucosa (oral cyst and suction pad) or assess the prevalence of certain lesions (vernix caseosa, hypertrichosis, desquamation, flushing, or genital hyperpigmentation). On occasions, studies are limited to analysis of the 103 or 312 skin diseases that are traditionally considered to be most prevalent. Finally, the use of a weighted mean for comparisons between studies is only appropriate when the grouped percentages are comparable. When this is not the case, the measure has no value.

In conclusion, we observed skin lesions in 99.4% of a group of 1000 newborn infants. The 5 most prevalent conditions were sebaceous hyperplasia (75%), salmon patch (64.2%), hypertrichosis (59%), sucking pad on the lip (54%), and palatine cyst (53.7%). Comparison of the frequency of a given lesion between studies is complicated. In addition to the influence of characteristics specific to the country in which the study was undertaken (climate, social and health care provision, and ethnic groups), we should also consider differences in the time of examination, the inclusion criteria, and the terminology used.

Conflict of Interest
The authors declare that they have no conflict of interest.

Acknowledgments
We are grateful to Dr Ignacio García-Doval from the Department of Dermatology at Complexo Hospitalario Universitario de Pontevedra in Spain, without whose help we would not have been able to carry out the statistical analysis.

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