Letter to the Editor

Prevalence of scars: an international epidemiological survey in adults

Dear Editor,

Skin is the most vulnerable organ that is constantly exposed to potential injury, and wound healing is a vital process for the survival of all higher organisms. Scarring is most noticeable in the skin, but it also affects almost all adult mammalian and human tissues and organs. They may result from surgery, skin injury, burning or inflammatory skin diseases, such as acne, chickenpox or shingles. Scars may be extensive, dystrophic, appearing on areas not covered by clothes and considered embarrassing. They may also be associated with symptoms such as pruritus, pain or other discomforts. According to a study conducted in the United Kingdom, 26% and 44% of patients reported pain and itching related to their scars, impacting their physical comfort and functioning. Usually, scars are composed of loose fibrous connective tissue and are remodelled during healing. Chronic inflammation of the dermis and uncontrolled activation of myofibroblasts may result in abnormal scar overgrowth leading to a hypertrophic scar or a keloid with an excess of extracellular matrix proteins. Despite being common throughout the world, the epidemiology of scars has not yet been properly investigated.

The aim of this international epidemiological study was to assess the prevalence of scars worldwide. The present article describes the general population with participants reporting at least one scar having appeared during the year prior to this study.

Our participants were selected via a stratified random sampling method of internet users who agreed to participate in panel surveys. Data about sociodemography, presence, origin and symptoms of scars using an internet survey were collected between April and May 2020. The survey focused on the most recent scars reported in order to simplify data collection.

Table 1 Sociodemographic data and general data about scars

| Age range (years) | Global | Men | Women |
|------------------|--------|-----|-------|
|                  | Mean ± SD | N = 11 100 | N = 5486 | N = 5614 |
|                  | n | % | n | % | n | % |
| 18-24            | 1367 | 12.32 | 694 | 12.65 | 673 | 13.67 |
| 25-34            | 2430 | 21.89 | 1214 | 22.13 | 1216 | 24.30 |
| 35-44            | 2289 | 20.62 | 1126 | 20.52 | 1163 | 22.89 |
| 45-54            | 2093 | 18.86 | 1036 | 18.88 | 1057 | 20.93 |
| 55-64            | 1781 | 16.05 | 893 | 16.27 | 888 | 17.81 |
| >65              | 1140 | 10.27 | 523 | 9.53 | 617 | 11.40 |
| Mean number of scars ± SD | 4.1 ± 4.9 | 4.0 ± 4.5 | 4.2 ± 5.0 |
| Number of scars | < one year | 1196 | 22.2 | 602 | 22.7 | 594 | 21.7 |
|                  | > one year | 4186 | 77.8 | 2046 | 77.3 | 2140 | 78.3 |
| Time since presence, if > one year (years) | 12.4 ± 12.7 | 12.5 ± 13.0 | 12.3 ± 12.4 |
| Origin of scars | Accident | 2992 | 55.59 | 1604 | 60.57 | 1388 | 50.77 |
|                  | General/orthopaedic surgery | 1712 | 31.81 | 741 | 27.98 | 971 | 35.52 |
|                  | Skin excision | 299 | 5.56 | 132 | 4.98 | 167 | 6.11 |
|                  | Restorative/cosmetic surgery | 251 | 4.66 | 125 | 4.72 | 126 | 4.61 |
|                  | Cosmetic procedure | 128 | 2.38 | 46 | 1.74 | 82 | 3.00 |
| Type of scars | Hyperthropic or keloid scar | 671 | 12.47 | 335 | 12.65 | 336 | 12.29 |
|                  | Did not know | 1897 | 35.25 | 1897 | 35.25 | 949 | 34.71 |

SD, standard deviation.
Overall, 11 100 individuals from Brazil (2000), China (3050), France (2000), Russia (2000) and the United States (2050) answered the survey; 48.5% of subjects reported at least one scar, and in 22%, the most recent scar was less than one-year-old. The most often reported location of recent scars in women was the abdomen (20.4%) and face (15.9%); in men, it was the face (18.7%) and abdomen (13.2%). Significantly more men (13.3%, $P < 0.0001$) than women (8.4%) reported scars on their hands. For 50.8%, the origin of the most recent scar was accidental or due to a disease (women: 50.8%, men: 60.5%, $P = 0.03$). Table 2 provides details about symptoms. In 2014, international guidelines on the management of scars were issued. However, these guidelines have not yet been updated. Currently, some procedures are available to manage scars, such as intralesional injections of corticosteroids and/or 5-fluorouracil, cryotherapy, radiotherapy, laser therapy and surgical interventions, together with additional measures such as sun protection, silicone-based dressings or gels. Scar management mainly consisted in the use of topical products such as healing creams (13.2%), antiseptic solutions (11.2%) or a topical antibiotic (11.9%). Medical care was significantly ($P < 0.0001$) more frequently provided to subjects with painful scars.

To our knowledge, this is the first international epidemiological survey on the prevalence, origin, location and impact of scars. Further investigations need to be performed.

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### Conflict of interest
S. Saiet, AL Demessant-Flavigny and C. LeFloc’h are employees of La Roche-Posay.

### Table 2 Prevalence of clinical symptoms

| Presence of cracks or fissures | Global (n = 1774) | Men (n = 963) | Women (n = 1198) |
|--------------------------------|------------------|---------------|------------------|
| % Intensity>5 (0-10)           | 32.96%           | 36.37%        | 43.82%           |
| Presence of visible detachment of thin skin flakes | 2067 | 58.41% | 15.09% |
| % Intensity>5 (0-10)           | 36.17%           | 21.30%        | 43.60%           |
| Redness                        | 2712             | 50.39%        | 52.45%           |
| % Intensity>5 (0-10)           | 15.09%           | 21.30%        | 20.90%           |
| Drought or dryness             | 2519             | 46.80%        | 48.35%           |
| % Intensity>5 (0-10)           | 19.18%           | 20.43%        | 19.18%           |
| Pruritus                       | 2446             | 45.45%        | 47.36%           |
| % Intensity>5 (0-10)           | 17.58%           | 18.73%        | 17.58%           |
| Burning sensation              | 1631             | 30.30%        | 33.80%           |
| % Intensity>5 (0-10)           | 10.18%           | 12.01%        | 10.18%           |
| Pulling                        | 2453             | 45.58%        | 47.39%           |
| % Intensity>5 (0-10)           | 18.80%           | 19.86%        | 26.66%           |

### Data availability statement
The data that support the findings of this study are available from the corresponding author upon reasonable request.

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