

Psoriasis Incidence and Lifetime Prevalence: Suggestion for a Higher Mortality Rate in Older Age-classes among Psoriatic Patients Compared to the General Population in Italy

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Data on the psoriasis incidence and prevalence in the Italian population are limited, and a timely and accurate understanding of the disease epidemiology is needed. This *ad hoc* study investigated psoriasis incidence and lifetime prevalence in a representative sample ($n = 14,705$) of the Italian population. Information on lifetime history of skin disorders with details about their onset, duration, and treatment was collected. Psoriasis incidence showed a bimodal distribution pattern, with peaks in age classes characteristic of early-onset (35–44 years) and late-onset (65–74 years) psoriasis. Late-onset psoriasis showed some variations according to the sex, with females being diagnosed earlier than males. Lifetime prevalence of psoriasis was 2.7% (95% confidence interval: 2.5–3.0): it increased to 3.5% at age 60–64 years, then decreased steadily after age 64, to 1.7% at age >74 years. This decrease, despite a peak in incidence rates, after age 64, may suggest a higher mortality rate among psoriasis patients in older age classes, compared to the general population.

Key words: age-classes; incidence; lifetime prevalence; mortality; psoriasis.

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Despite psoriasis being a common skin disease, data on its epidemiology worldwide are still scarce. Most of the available evidence on the descriptive epidemiology of psoriasis has been summarised in a recent systematic review (1). The incidence and prevalence of psoriasis show remarkable variations by country. These variations may be explained by several factors, including geographic, environmental, and ethnic diversity, lack of standardised diagnostic criteria and variable disease presentation and clinical course.

Reliable epidemiological data are crucial to define the disease burden, and may offer clues on the aetiology of the disease (1, 2).

Limited data are available in the Italian population, with not homogenous prevalence estimates, probably

SIGNIFICANCE

Little is known about psoriasis incidence and prevalence in Italy. Such information is important in order to define the disease burden. Therefore, an accurate and timely understanding of the disease epidemiology is needed. We investigated incidence rates and lifetime prevalence of psoriasis in a representative sample of an adult Italian population, assessing the disease history through a face-to-face interview. We documented a bimodal distribution pattern in the incidence. We also observed a decrease in the lifetime prevalence after age 64. This suggests a higher mortality rate in older psoriasis patients compared to the general population.

due to different sampling procedures and case definition (3, 4).

We investigated the incidence rates and lifetime prevalence of psoriasis in a representative sample of the adult Italian population. Data were collected in the context of the Prevalence of Actinic Keratoses Italian Study (PraKtis) (5, 6). The PraKtis Study was designed to evaluate the point prevalence of actinic keratoses (AKs) and related disorders, e.g. photoaging, in the adult Italian population through a face-to-face, computer-assisted interviews and direct clinical evaluation. In addition, a thorough history of selected skin conditions was collected.

METHODS

Study design

We collected a randomised sample of the adult Italian population and assessed, through a standardised face-to-face interview, the history of skin diseases, including psoriasis, with reported age-at-onset, duration and treatment (5, 6) (**Fig. 1**).

Study population

This study was embedded within the previously described PraKtis Study (5, 6). In short, the Italian Group for Epidemiological Research in Dermatology (GISED), in collaboration with the Italian branch of the Gallup International Association (DOXA) and the Institute of Pharmacological Research Mario Negri IRCCS, conducted a survey from March 2003 through April 2004. Overall 14,705 participants aged ≥ 25 years were recruited from the general Italian population through a stratified sampling design,

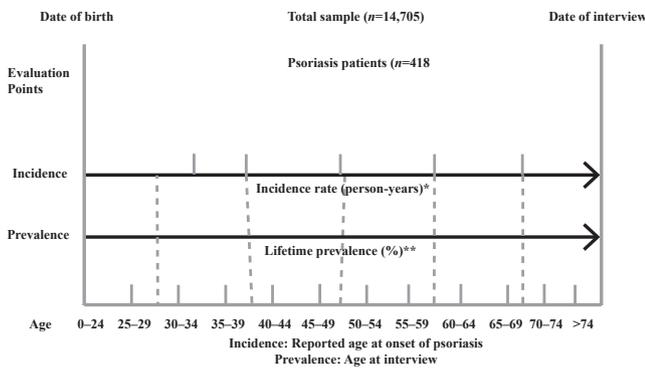


Fig. 1. Modalities adopted for calculating incidence rate and lifetime prevalence of psoriasis. *Incidence rate is the number of cases of psoriasis reporting disease onset at a given age (n) divided by the total size of the population up to that age. **Lifetime prevalence is the number of cases with a history of psoriasis at the age of the interview divided by the total size of the population with that same age at the interview.

and then questioned at home by trained interviewers. Training of the interviewers was conducted in 10 Italian dermatological centres participating in the PraKtis Study. For all participants, the interview included socio-demographic information such as age, sex, educational level, occupation and smoking habits, besides the detailed dermatological history.

Assessment of psoriasis

Psoriasis patients were identified among those participants within the Praktis Study, who reported to have ever received a diagnosis of psoriasis by a dermatologist or another physician ($n=418$). Additional information, including age at diagnosis and age at onset of the disease, was collected through computer-assisted telephone interviewing (CATI) by trained interviewers. For age at diagnosis and age at onset of the disease, we assessed the interview reliability through repeating the same interview in a sample (40%) of patients at one-week intervals. In addition, for the diagnosis of psoriasis we looked at the concordance with the dermatological examination.

The Medical Ethics Committee of the Ospedali Riuniti of Bergamo approved the protocol of the study.

Covariates

Age was categorized into 5 classes (<35 years old, 35–44 years old, 45–54 years old, 55–64 years old and 65–74 years old) for incidence estimates and in quinquennia for the prevalence data. Educational level was categorized into 3 groups, primary education or lower vocational education only (lower); secondary education or intermediate vocational education (intermediate) and higher vocational education or university (higher). Occupation was categorized into I–II level (corresponding to higher employments), III level (corresponding to intermediate employments), IV–V level (corresponding to lower employments), farmer, retiree and others. Smoking habits were categorized as: never smoked, current smokers and former smokers.

Statistical analysis

Weighted estimates of the frequency of selected items were obtained by taking into account the age, sex and geographical distribution, including the size of municipalities, of the adult Italian population. Weighing procedures were based on the following quotas: sex (male 48%, female 52%); age (15–24 years, 18.6%; 25–34 years, 18.8%; 35–44 years, 16.4%; 45–54 years, 14.7%; >54 years, 31.5%); region (northwest 27.7%, northeast 18.9%, centre 19.5%, south and islands, 33.9%); size of municipalities (up

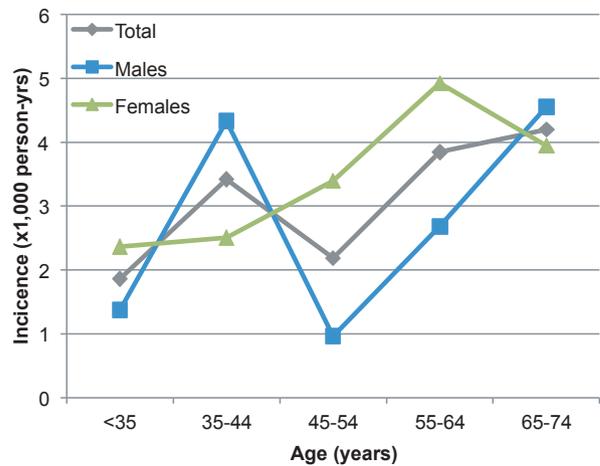


Fig. 2. Incidence of psoriasis stratified by age classes and gender.

to 10,000 inhabitants 34.4%, 10,000–30,000 inhabitants 18.7%, 30,000–100,000 inhabitants 17.5%, >100,000 inhabitants 29.4%). The agreement between interviews was assessed by calculating the Cohen's Kappa (κ) statistic for the psoriasis age at onset and age at diagnosis.

For the assessment of psoriasis incidence and lifetime prevalence estimates, data on all the 418 patients, who reported a previous diagnosis of psoriasis, were considered (Fig. 1). Psoriasis incidence rates were calculated by considering the reported age at onset of the disease and the size of the sample up to that age; they were expressed as number of cases per 1,000 person-years (Fig. 2). The psoriasis lifetime prevalence, expressed as a percentage, was calculated in classes of ages in quinquennia, by considering the number of patients reporting a psoriasis diagnosis ever in the past, up to the age at the interview (Fig. 3). For both incidence and lifetime prevalence rates, 95% confidence intervals (CI) were calculated assuming a Poisson distribution.

For descriptive purposes, the weighted distribution of covariates of interest was presented as percentages. Pearson's Chi-squared test was used to assess differences in the distribution of the variables. All tests were considered statistically significant at p -value <0.05. Analyses were performed using SPSS software version 20.0 (IBM Corporation, Armonk, NY, USA).

RESULTS

Study population

This study included 418 participants with psoriasis and 14,287 participants without psoriasis (Table I). Compa-

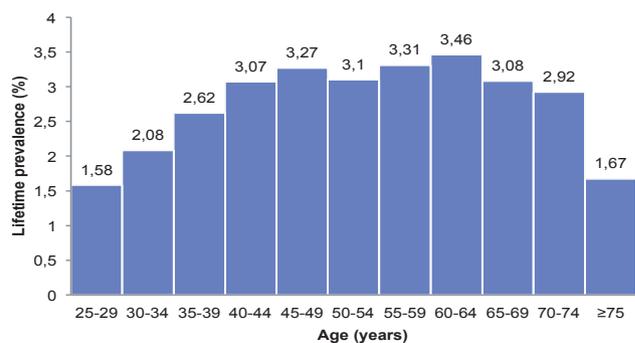


Fig. 3. Lifetime prevalence of psoriasis stratified by age classes.

Table I. Weighed distribution of selected characteristics in the overall sample and in the sample of psoriasis patients

| | No psoriasis <i>n</i> = 14,287 <i>n</i> (%) | Psoriasis <i>n</i> = 418 <i>n</i> (%) | <i>p</i> -value* |
|-------------------|---|---|------------------|
| Sex | | | |
| Female | 7,508 (51.1) | 242 (57.9) | 0.03 |
| Age | | | |
| < 35 years | 3,230 (22.0) | 64 (15.3) | < 0.01 |
| 35–44 years | 2,441 (16.6) | 74 (17.7) | |
| 45–54 years | 2,630 (17.9) | 90 (21.5) | |
| 55–64 years | 2,369 (16.1) | 87 (20.8) | |
| 65–74 years | 2,521 (17.1) | 82 (19.6) | |
| > 74 years | 1,098 (7.5) | 20 (4.7) | |
| Educational level | | | |
| Higher | 5,984 (40.7) | 192 (45.9) | 0.12 |
| Intermediate | 4,687 (31.9) | 136 (32.6) | |
| Lower | 3,617 (24.6) | 89 (21.4) | |
| Occupation | | | |
| I–II | 1,494 (10.2) | 35 (8.3) | 0.62 |
| IIIa–IIIb | 3,510 (23.9) | 107 (25.6) | |
| IV–V | 1,735 (11.8) | 44 (10.5) | |
| Farmer | 157 (1.0) | 5 (1.1) | |
| Retiree | 4,312 (29.3) | 129 (30.9) | |
| Other | 3,078 (21.0) | 98 (23.5) | |
| Smoking habits | | | |
| Never smokers | 7,762 (52.8) | 179 (42.9) | < 0.01 |
| Current smokers | 3,914 (26.6) | 130 (31.0) | |
| Former smokers | 2,611 (17.7) | 109 (26.0) | |

Percentages may not add up to 100% due to missing data. *Pearson's Chi-squared test.

red to the non-psoriasis participants, the group of psoriatic patients included a larger proportion of females (57.9 versus 51.1, $p=0.03$), a lower proportion of people aged < 35 years (15.3 versus 22.0, $p<0.01$) and more smokers (57.0 versus 44.3, $p<0.01$). For the estimation of age at diagnosis and age at onset of psoriasis, the agreement between the interviews (κ value) was 0.8.

Incidence of psoriasis

The overall incidence of psoriasis was 3.02 per 1,000 person-years (95% CI, 2.32–3.92), slightly higher in females (3.80 per 1,000 person-years, 95% CI: 2.70–5.35) than in males (2.96 per 1,000 person-years, 95% CI: 1.97–4.43). With respect to variation by age-classes, psoriasis incidence showed a strong bimodal pattern. The first peak was 3.42 per 1,000 person-years (95% CI: 1.93–6.05) at age 35–44 years, which corresponds to the age class typical for the early-onset psoriasis (up to 40 years of age). After a decline to 2.19 (95% CI: 1.10–4.35) in the interval 45–54 years, the second peak reached 4.20 per 1,000 person-years (95% CI: 2.53–6.97) at age 65–74 years, being the age class characteristic for the late-onset psoriasis. After stratifying by sex, such a bimodal distribution was maintained only in males (Fig. 2). Late-onset psoriasis, however, showed some differences according to sex, with females being more likely to get diagnosed at an earlier age (45–54 years) than males. Incidence of psoriasis stratified by age and sex is represented in **Table II**.

Table II. Incidence and prevalence of psoriasis stratified by age and sex

| | Incidence x1,000 person-years (95% CI) | Prevalence % (95% CI) |
|-------------|--|--------------------------|
| Female: Age | | |
| < 35 years | 2.36 (1.01–5.54) | 2.05 (1.54–2.73) |
| 35–44 years | 2.51 (0.98–6.42) | 3.43 (2.67–4.40) |
| 45–54 years | 3.39 (1.56–7.39) | 3.50 (2.76–4.44) |
| 55–64 years | 4.92 (2.52–9.61) | 3.40 (2.64–4.37) |
| 65–74 years | 3.95 (1.99–7.82) | 3.24 (2.56–4.10) |
| > 74 years | – | 1.85 (1.16–2.94) |
| Male: Age | | |
| < 35 years | 1.37 (0.45–4.12) | 1.66 (1.21–2.27) |
| 35–44 years | 4.33 (2.11–8.89) | 2.17 (1.57–2.98) |
| 45–54 years | 0.96 (0.22–4.19) | 2.87 (2.20–3.74) |
| 55–64 years | 2.69 (1.05–6.90) | 3.36 (2.58–4.37) |
| 65–74 years | 4.56 (2.14–9.69) | 2.67 (1.96–3.64) |
| > 74 years | – | 1.39 (0.71–2.72) |

Incident and prevalent estimates were weighted by the age, sex and geographical distribution of the adult Italian population.

Lifetime prevalence of psoriasis

The lifetime prevalence of psoriasis was 2.7% (95% CI: 2.5–3.0). After an increase with age, from 1.6% at age 25–29 to 3.1% at age 40–44 years and up to 3.5% at age 60–64, it steadily decreased to a minimum value of 1.7% at age > 74 (Fig. 3). This decrease, despite a peak of incidence after age 64, points to a depletion of the psoriasis pool in the older age-classes.

No significant difference in the prevalence of psoriasis was observed either according to sex (3.0 in females versus 2.7 in males) or in relation to occupation.

A higher lifetime prevalence of psoriasis was observed in more educated (higher secondary schools and university) compared with less educated (primary and lower secondary school) people (2.9% versus 2.3% respectively, $p<0.01$) and in former or current smokers compared to non smokers (3.8% and 3.0% versus 2.1% respectively, $p<0.01$). Prevalence of psoriasis stratified by age and sex is represented in Table II.

DISCUSSION

Based on a representative sample of the adult population, we provided estimates of the incidence and lifetime prevalence of psoriasis in Italy, and documented a bimodal pattern of distribution in the incidence of psoriasis and a decrease in lifetime prevalence after age 64, suggesting a depletion of the psoriasis pool, likely due to a higher mortality rate in older psoriasis patients compared to the general population.

Thus far, research on incidence of psoriasis in Italy has been limited. An observational study collecting data on 511,532 people, registered with over 900 primary care physicians during the years 2001–2005, found incidence rates ranging from 2.30 to 3.21 cases per 1,000 person-years (7). Conversely, a recent analysis of

administrative data in a Northeast Italian area, reported a relatively low psoriasis incidence of 0.96 cases per 1,000 person-years (8). It is well known that estimates, which use administrative data, are generally lower than those based on registries or primary care databases, and reflect the proportion of patients with a more severe disease.

We found a bimodal distribution in the psoriasis age-specific incidence. This is in agreement with other studies. One study in United Kingdom (UK) and two in the United States (US) suggested an increasing incidence in psoriasis with age, up to 39 years, and a second increase during the 6th and 7th decades, with rates appearing to decline, thereafter, toward the end of life (9–11).

We found a slightly higher incidence of psoriasis in females compared to males. Despite a lack of agreement in the worldwide literature about sex variations in psoriasis incidence, other studies from both US and Italy found a similar pattern to ours (7, 10). When looking at sex by age classes, we additionally found that the second peak of psoriasis incidence occurred a bit earlier in women compared to men, and this is in accordance with the findings from two population-based studies, one from UK and the other from US (9, 10).

As for the prevalence, we calculated a lifetime prevalence of psoriasis of 2.7%, which is in line with other European estimates, set between 1.3% and 5.2% (2), and with previous estimates from Italy, ranging from 2.9%, when examining individuals of all ages (4), to 3.1%, when limiting the analysis to people over 45 years (5).

Since psoriasis is a chronic condition lacking a cure, one would expect its lifetime prevalence to increase steadily with age (12). It is worth to note that, in spite of increasing incidence, we found a progressive reduction in the lifetime prevalence of psoriasis after age 64, suggesting a potentially higher mortality rate among psoriasis patients, compared to the general population, leading to a depletion of psoriasis patients from the older age population sectors. This is also supported by an increasing body of evidence in favour of a higher, all-cause mortality in psoriasis patients, particularly in those with severe disease, compared with the general population (12–14). The systemic inflammatory process of severe psoriasis, protracted over time seems to, at least partially, play a role in the potential direct link between psoriasis and increased mortality (13).

A strength of our study is the complex proportional stratified sampling design, with estimates deemed to be representative of the whole adult Italian population (≥ 25 years). Additionally, trained interviewers, whose training was conducted in 10 Italian dermatological centres, performed the survey. Our study was able to simultaneously examine incidence and lifetime prevalence of psoriasis with the estimate of age-standardized rates. There are also limitations to consider. Our study was retrospective and based on patient-reported diagnosis of psoriasis and may be susceptible to recall bias. Moreover, not all psoriasis cases could be identified by a physician diagnosis.

Finally, the relatively limited sample size did not allow for control of potential confounding variables, so caution is required when interpreting our results.

In conclusion, our study provides an estimate of the incidence and lifetime prevalence of psoriasis in Italy. We documented a bimodal pattern of age-specific incidence rates. The comparison of incidence and lifetime prevalence data, ultimately, suggests a possible increase in mortality in psoriatic patients compared with the general population after the age of 64. Long-term cohort studies may allow a more accurate investigation of mortality rates and associated variables.

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