

## Psoriasis is More Prevalent than Indicated by Egeberg et al.'s Danish Study: A Comment

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In the July 2017 issue of *Acta Dermato-Venereologica*, Egeberg et al. (1) reported a 2.2% prevalence of psoriasis in Denmark. Their study is based on data from patients of all ages diagnosed with psoriasis as inpatients or outpatients at Danish hospitals, supplemented by data on pharmacy-dispensed psoriasis-specific medication. Persons who were not treated by hospital dermatologists and/or had not been prescribed psoriasis-specific medication, i.e. presumably those with less severe psoriasis and those in long-term remission, do not appear to be included in their analyses. This limitation is not sufficiently discussed in the article, despite the well-documented fact that the majority of psoriasis cases are mild and many cases are undiagnosed (2, 3). By restricting their analyses to the chosen cohort, the authors have probably underestimated the true prevalence of psoriasis in Denmark.

Egeberg et al. (1) state that a psoriasis prevalence of 2.2% is comparable to recent studies in other Scandinavian countries. In contrast, Danielsen et al. (4) found

a prevalence of self-reported psoriasis among adults of 4.8% and 11.4% in Tromsø, Norway, in 1979 to 1980 and 2007 to 2008, respectively. Using a similar questionnaire and study design, Modalsli et al. (3) found the prevalence of self-reported psoriasis among adults in Nord-Trøndelag County, Norway, in 2006 to 2008 to be 5.8%. In order to validate their questionnaire, 110 study participants with, and 434 without, self-reported psoriasis were examined clinically by experienced dermatologists. Using a strict gold standard definition of psoriasis, they found a positive predictive value of self-reported psoriasis of 78% (increasing to 84% when the psoriasis question was combined with an additional question "Have you been diagnosed with psoriasis by a dermatologist?") and a negative predictive value of 96%. The validation-based prevalence of psoriasis in adults was then estimated to be 8.0% (3).

Egeberg et al. (1) did not compare their study with these recent Scandinavian studies among adults suggesting a higher prevalence of psoriasis.

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### Reply to the Comment by Petter Gjersvik

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Gjersvik comments that the prevalence of psoriasis may be considerably underestimated in our study (1), and compares our estimate of prevalence with that of the HUNT and Tromsø studies in Norway (3, 4). We agree that the prevalence of psoriasis in the different Scandinavian studies varies and is often higher in questionnaire-based studies. The 2 afore-mentioned studies from Norway are questionnaire-based studies and ours is a register-based study.

The Danish National Patient Register (5), from which part of our data derives, contains not only information on all visits to hospital clinics, but also data on a number of private clinics (including dermatologists) in Denmark. While we agree that additional inclusion of psoriasis-specific medication, which is used in the majority (73.5–93.9%) of patients with psoriasis (6, 7) may not identify patients with mild psoriasis who are untreated (and undiagnosed) and patients treated exclusively with topical corticosteroids, this issue was in fact discussed in

our article (1). Moreover, in order to thoroughly address this potential bias, we performed additional analyses to assess the prevalence when considering unidentified subjects with psoriasis. These data were also presented in the original manuscript and showed an estimate of 2.8%.

A recent study (8) from the UK, which utilized data collected from general practitioners, reported an overall prevalence of psoriasis of 2.8%, which is comparable to the overall prevalence of 2.2% in our study (1).

In our study, the prevalence of psoriasis ranged from 0.4% to 4.8% depending on the age group. On the other hand, the HUNT study (3), which Gjersvik refers to, displayed a self-reported prevalence of 5.8%. These subjects had a mean age of 55.2 years. Thus, we reported a prevalence of 3.4% among patients aged 50–59 years. According to the supplementary materials of the afore-mentioned publication (3) the HUNT study had a response rate of only 54.1% (50,806 responded of the 93,860 who were invited). Indeed, it is likely that the low response rate

would have introduced response bias, whereby patients with diseases would be more willing to answer the survey compared with disease-free individuals, leading to an artificially high prevalence of psoriasis in the HUNT study.

Finally, latitude has been reported to affect prevalence of psoriasis (9), and although the HUNT, Tromsø, and our study all derive from Scandinavian countries, the

HUNT and Tromsø studies were conducted at a considerably more northerly latitude. On the other hand, the UK and Denmark share a similar latitude. Consequently, we cannot refute that the reported difference between the Norwegian and Danish psoriasis prevalence, and the similarity between the prevalence in the UK and Denmark, at least in part, are explained by geographical location.

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