Self-Reported Skin Morbidity among Adults: Associations with Quality of Life and General Health in a Norwegian Survey

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Life-quality studies among dermatologic patients have shown that chronic skin diseases have an impact on patients' lives. The purpose of this study was to assess the burden of skin morbidity at a community level. This was presented as prevalence of self-reported skin morbidity and dermatologic life-quality items. The association of skin disease and general health measures like feeling depressed and self-reported general health were measured. The method used was a questionnaire on self-reported skin complaints, including variables such as demographic, psychosocial, general health, dermatologic life-quality items. The design of the study was cross-sectional, with answers from 18,770 adult responders. The results confirmed that skin morbidity is common; itch was the dominating symptom. Younger adults reported more social problems as a result of skin problems than older. The life-quality domain most affected by skin disease was the social one. In a regression model skin disease was as well as rheumatism more strongly associated with feeling depressed than asthma, diabetes, and angina pectoris. Skin disease was also strongly associated with reporting poor general health, although less than other nondermatologic chronic diseases. In conclusion, in this study skin morbidity was strongly associated with general health measures among adults in a population-based setting. To the best of our knowledge these associations have not been described previously at a community level.

Measuring the burden of disease implies the measure of illness (Taylor, 1979) as well as the social consequences. Most epidemiologic studies in the field of dermatology are based on clinical examination of patient populations and are disease-specific (Williams and Strachan, 1997; Williams, 1997). Some older studies have assessed the distribution of common skin diseases in the community (Lomholt, 1964; Rea *et al*, 1976; Johnson, 1978), but there are no recent population-based studies. A new questionnaire for population survey on self-reported skin complaints has recently been elaborated and validated (Dalgard *et al*, 2003), but has not yet been used in a population survey.

The measuring of the impairment and disability caused by the morbidity experience are expressed in several quality-of-life instruments elaborated and validated in the field of dermatology but all are disease-specific, for clinical use, or for patient populations (Finlay and Khan, 1994; Chren *et al*, 1996, 1997; Finlay, 1997; Mork *et al*, 2002). In the dermatologic literature no life-quality instrument for use in population surveys was found. It is known that many chronic dermatologic disorders are associated with psychiatric morbidity and that skin disease have a psychosocial impact (Ginsburg, 1996; Rook, 1998).

Generally, skin diseases have a low mortality except from melanoma and a few other rare conditions. The Global Burden of Disease enterprise introduced a standardized measure of the combined burden of death and disability to compare the burden of morbidity worldwide. Compared with other disorders worldwide, skin disorders range low (Murray and Lopez, 1997). The methodology is a construction based on diagnosis, duration, and disability severity but not symptoms. The method has been intensively debated (Murray, 1994; Sundby, 1999). Assessment of disease in the community is becoming an important field for health planning but also for research and understanding of associations of disease with factors in the environment (Wilkinson, 1996; Berkman, 2000; Marmot, 2001).

The aim of this study was to describe the burden of skin morbidity at a community level through the prevalence of self-reported skin complaints and the prevalence of dermatologic life-quality items. The effect of dermatologic morbidity on well-being was assessed with the association of skin disease with feeling depressed and self-reported general health.

Results

Of the 40,888 persons invited the total number participating was 18,770 (42.4% men and 49.9% women, in total 45.9%). Owing to the lack of data an additional 23 individuals were excluded. Hence, the number of individuals included in the analysis were 18,747. The missing percentage for each item varied between 22.2 and 24.8% for the questions on skin complaints and impairment, 6.7% for feeling depressed, and 1.9% for self-reported general health.

Population characteristics The characteristics of the population are presented in Table I. The sample was represented by 18,747 individuals, 45% men and 55% women; 22% of those were born in 1970, 35% in 1960 and

Table I. Characteristics of the population sample in the cross-sectional survey carried out in Oslo in 2000 to 2001

Variables	In the total sample	
	N = 18,747	**%**
Age (year of birth)		
1970	4106	21.9
1960, 1955	6594	35.2
1940, 1941	4469	23.8
1924, 1925	3578	19.1
Sex		
Male	8392	44.8
Female	10,355	55.2
Ethnicity		
Norway	17,089	91.2
Indian subcontinent	605	3.2
Asia	342	1.8
Sub-Saharan Africa	195	1.0
Middle East	406	2.2
Others (Central and South America)	110	0.6
Household income[a]		
<300,000 Nkr	4312	31.8
300–500,000 Nkr	4287	31.6
>500,000 Nkr	4957	36.6

[a]$1 = 6.91 Nkr.

1955, 24% in 1940 and 1941, and 19% in 1924 and 1925. Ninety-one percent of the participants were from Western countries, the reminders were from non-Western countries. Twenty-three percent of the responders report a low household income, as did 23% a middle income and 26% a higher income.

Prevalence of skin complaints and skin disease The distribution of skin complaints among women and men is shown in Table II. Itch was the dominating complaint for both men and women (respectively, 7.5 and 9.2%) and significantly more prevalent among women compared to men. Women were more often complaining about hand rash than men (3.9% compared to 2.6%) and about pimples (4.3% compared to 2.3%). Six percent of both sexes reported dry and sore skin, and 4% reported troublesome sweating and hair loss. In total, 25% females and 22% males reported the presence of skin disease (measured with skin score >1.3), with a significant difference between the genders.

Dermatologic life-quality impairment indicators across age and sex The distribution of affected quality of life because of the skin across age and sex are described in Table III. Only 2.9% of men age 30 reported problems being in the company with others because of their skin condition, compared to 3.9% of women. Only 0.8% of older age group reported social impairment because of their skin. Between 1 and 2% of both sexes reported problems in daily activities but there was no significant difference between age categories. Of men age 30, 2.8% reported problems during leisure activities compared with 3.0% of the women in the same age category. Both elderly men and women reported less impairment in their leisure activities than the younger group.

Crude and adjusted odds ratios for feeling depressed and self-reported general health Table IV presents odds

Table II. Prevalence of skin complaints[a] and skin disease[b] in percentage for men and women in the population sample from Oslo

	Men[c] (n = 8392)	**Women[c] (n = 10,355)**	**p value**
Self-reported skin complaints			
Itch	485 (7.5)	747 (9.2)	<0.001
Dry and sore skin	394 (6.2)	503 (6.3)	0.68
Scaly skin	321 (5.0)	313 (3.9)	0.002
Hand rash	167 (2.6)	310 (3.9)	<0.001
Pimples	149 (2.3)	345 (4.3)	<0.001
Face rash	104 (1.6)	168 (2.1)	0.03
Warts	61 (1.0)	95 (1.2)	0.17
Sweat	279 (4.4)	395 (4.9)	0.10
Hair loss	250 (3.9)	371 (4.6)	0.03
Other skin complaints	181 (2.9)	241 (3.1)	0.49
Skin disease	1355 (22.1)	1912 (25.1)	<0.001

[a]Variables dichotomized no/yes (quite a lot and very much).
[b]Skin disease measured by skin score >1.3; for definition of skin score, see Materials and Methods.
[c]Number (%).

Table III. Life-quality impairment indicators[a] by sex and age in the sample from Oslo

	Age (years)									
	Men					Women				
	30	40–45	59–60	75–76	p value[b]	30	40–45	59–60	75–76	p value[b]
The past week I had problems[c]										
Being in the company of others because of my skin	41 (2.9)	38 (1.7)	17 (1.0)	9 (0.8)	<0.001	70 (3.9)	58 (2.0)	16 (0.9)	10 (0.7)	<0.001
Working or doing daily activities because of my skin	21 (1.5)	32 (1.5)	15 (0.9)	14 (1.3)	0.48	36 (2.0)	40 (1.4)	28 (1.5)	24 (1.8)	0.46
During leisure activities because of my skin	40 (2.8)	42 (1.9)	17 (1.1)	19 (1.8)	0.005	55 (3.0)	56 (2.0)	30 (1.6)	22 (1.6)	0.009

[a]Dichotomized no/yes (sometimes, often, and very often).
[b]p value, significance between age groups for each sex separately.
[c]Number (%).

Table IV. Crude and adjusted[a] odds ratios (OR) for feeling depressed and self-reported general health (95% confidence interval)

	Feeling depressed		Self-reported poor general health	
Self-reported diseases	Crude OR	Adjusted OR	Crude OR	Adjusted OR
Skin disease				
No	1.00	1.00	1.00	1.00
Yes	2.80 (2.38–3.29)	2.26 (1.88–2.72)	1.98 (1.81–2.16)	1.77 (1.57–2.00)
Asthma				
No	1.00	1.00	1.00	1.00
Yes	1.99 (1.65–2.39)	1.33 (1.01–1.74)	2.50 (2.25–2.78)	2.22 (1.87–2.63)
Diabetes				
No	1.00	1.00	1.00	1.00
Yes	1.66 (1.20–2.29)	1.42 (0.85–2.38)	5.02 (4.21–5.99)	2.53 (1.86–3.43)
Osteoporosis				
No	1.00	1.00	1.00	1.00
Yes	1.87 (1.42–2.46)	1.69 (1.06–2.69)	4.72 (4.05–5.51)	2.16 (1.63–2.85)
Rheumatism				
No	1.00	1.00	1.00	1.00
Yes	3.81 (3.17–4.58)	2.21 (1.65–2.95)	10.81 (9.41–12.42)	6.55 (5.31–8.07)
Angina pectoris				
No	1.00	1.00	1.00	1.00
Yes	1.86 (1.42–2.44)	1.48 (0.90–2.45)	6.49 (5.53–7.62)	3.76 (2.91–4.87)
Feeling depressed				
No			1.00	1.00
Yes			2.61 (2.47–2.75)	2.45 (2.26–2.66)

[a]In the adjusted models, we adjusted for age, sex, ethnicity, and household income.

ratios for feeling depressed and self-reported general health adjusted for age, sex, ethnicity, and socioeconomic status. The crude odds ratio (confidence interval) for feeling depressed was 2.80 (2.38–3.29) for skin disease and in the adjusted model 2.26 (1.88–2.72). In the adjusted model the odds ratios for rheumatism were 2.21 (1.65–2.95), but

lower for asthma and osteoporosis, respectively, 1.33 (1.01–1.74) and 1.69 (1.06–2.69). The crude odds ratio for self-reported general health was 1.98 (1.81–2.16) for skin disease and 1.77 (1.57–2.00) in the adjusted model. In this model, the odds ratios for the nondermatologic chronic diseases were 2.22 (1.87–2.63) for asthma, 2.53 (1.86–3.43)

for diabetes, 2.16 (1.63–2.85) for osteoporosis, 6.55 (5.31–8.07) for rheumatism, 3.76 (2.91–4.87) for angina pectoris, and 2.45 (2.26–2.66) for feeling depressed.

Discussion

In this study the burden of skin disease was assessed using the associations of self-reported skin complaints, well-being, and quality of life in a population based setting. There was a significant and independent association of skin disease and feeling depressed and having poor general health at a community level. The prevalence of self-reported skin morbidity has been measured with a newly validated instrument (Dalgard *et al*, 2003). This questionnaire was used for the first time in this study, and the results show that skin disease was common in the general population (22% of men and 25% of women reported skin disease within the previous week). The reported prevalence of dermatologic life-quality impairment was generally low, but the younger individuals reported significantly more impairment than the elderly.

Limitations of the study The instrument skin score was validated in a Norwegian sample (Dalgard *et al*, 2003) but not among non-Western individuals, which made it difficult to interpret the responses from the latter group. The main drawback of the study was the low response rate and the additional proportions of missing from the questionnaire. Such a high loss clearly affects the representativeness of the sample and the validity of the final estimates. Nevertheless, a nonresponder study was conducted based on a linkage between sociodemographic data from public registers in Statistics Norway and data from this study. The observed values of self-rated health and mental health differed only slightly from the estimated prevalence values in the target population when weighted for these variables. The study concluded that the effect measures were to a minor extent influenced by selection bias, but the prevalence rates were influenced by social and ethnic factors and probably more affected by the low response rate than the measures of associations (A.J. Sogaard *et al*, submitted for publication).

Skin disease was measured with skin score >1.3, a newly validated instrument describing the most common skin diseases. It is a questionnaire on self-reported skin morbidity elaborated for use in the general population and not for clinical purposes (Dalgard *et al*, 2003). Nevertheless, the measured prevalence of skin morbidity gave a result quite close to the measures from earlier studies based on a clinical examination: 22.5% in Lambeth and 25% when based on self-report (Rea *et al*, 1976; Meding, 1992). These results appear to confirm the usefulness of this dermatologic instrument in population surveys.

From previous population studies it is known that the chronic skin diseases such as psoriasis, eczema, and acne are common (Lomholt, 1964; Rea *et al*, 1976; Johnson, 1978) and that the psychosocial impact of skin disease is associated with the severity of disease, the personality, and the cultural environment (Rook, 1998).

Describing the burden of skin disease through the prevalence of dermatologic impairment of life quality (Table III)

showed a low impairment across age groups, compared with the high prevalence of skin morbidity taken as a whole. The three life-quality items were adapted from instruments designed for dermatologic patient populations, such as the Dermatology Life Quality Index (Finlay and Khan, 1994) and Skindex (Chren *et al*, 1997). At a population level the measurement of skin morbidity includes mild cases as well as moderate and severe cases. The dermatologic life-quality items were designed for more severe cases of skin disease encountered in clinical populations (Lasek and Chren, 1998). In the regression models (Table IV) the two measures of well-being, feeling depressed and self-reported general health, showed a significant and independent association with skin disease, after adjusting for sociodemographic variables. Comparing with the nondermatologic chronic diseases skin disease was more associated with feeling depressed than asthma, diabetes, or angina pectoris, all known as potential disabling diseases, but was as much associated with depression as rheumatism. On the other hand, skin disease was less associated with reporting poor general health than asthma, diabetes, osteoporosis, rheumatism, angina pectoris, and feeling depressed.

The strong associations between skin disease and feeling depressed are in agreement with earlier findings in patient studies (Ginsburg and Link, 1989; Gupta and Gupta, 1996). Several studies have shown that chronic skin disorders might also be a consequence of psychosocial suffering (Panconesi and Hautmann, 1996). In a cross-sectional design it is not possible to distinguish skin disease as a consequence or cause of psychosocial factors.

This study can only highlight the association of skin disease and other factors at a population level. The burden of disease not only involves symptoms physical and mental impairment but also the relationship between the individual and the environment including cultural influences (Taylor, 1979; Sackett *et al*, 1991). For instance for women the desire to live up to cultural standards of beauty probably explains the difference of reported morbidity between sexes. The expansion of cosmetic treatment and services probably contributes to many individuals' dissatisfaction and frustration with their own body image and increases the demand for assistance from dermatologists (Cotterill, 1981; Rook, 1998; Reid *et al*, 2001). These cultural aspects are of increasing importance in the western societies and create new dermatologic needs and services.

In conclusion, in this study self-reported skin disease was strongly associated with feeling depressed and reporting poor general health among adults in a population-based setting. Compared to other chronic diseases, skin disease was as strongly associated with depression at a population level as rheumatism but more strongly associated to depression than asthma, diabetes, and angina pectoris. To the best of our knowledge these associations have not been described previously but additional community studies in dermatology should be encouraged.

Materials and Methods

Design The study was a cross sectional study. In 2000 to 2001 the Oslo Health Study was conducted under the joint collaboration of

the Norwegian Institute of Public Health, the University of Oslo, and the Municipality of Oslo. The study population included all individuals in Oslo County born in 1970, 1960, 1955, 1940 to 1941, and 1924 to 1925. A total of 40,888 individuals were invited to participate. One self-administered questionnaire was part of the letter of invitation, whereas two supplementary questionnaires were handed out at the screening and returned in prestamped self-addressed envelopes. The questionnaires provided information on sociodemographic factors, self-reported health various aspects of health behavior, and psychosocial factors.

Up to two reminders were sent to the nonresponders of the invitation to participate in the survey. The second reminder invited those living in the suburban parts of the city to mobile screening units parked in the neighborhood. Those unable to attend the screening in person in these suburban parts were requested to return the main questionnaire by mail. In this second reminder assistance from field workers to complete the questionnaires was offered to immigrants with poor Norwegian language skills. All those attending the screening, but not sending back the supplementary questionnaires, received a reminder within 3 to 12 mo.

The study protocol was reviewed by the Regional Committee for Medical Research Ethics and approved by the Norwegian Data Inspectorate. The study has been conducted in full accordance with the World Medical Association Declaration of Helsinki.

Variables Sociodemographic variables were limited to sex, age, ethnicity, and household income. Ethnicity was categorized in six groups referring to skin color and cultural background (Bhopal and Donaldson, 1998), but in the final regression model the variable was dichotomized Western (Norway/Western countries) and non-Western (Indian Subcontinent, Asia, Sub-Saharan Africa, Middle East, Others). Socioeconomic status was measured by self-reported household income, with low income ($<300,000$ Nkr), middle income (300–500,000 Nkr), and higher income ($>500,000$ Nkr).

Skin morbidity was measured with 10 items on self-reported skin complaints from a newly published questionnaire with a scale from 1 to 4 (1 for no complaint, 2 for yes a little, 3 for quite a lot, 4 for very much) (Dalgard *et al*, 2003). The time interval was "within the past week." The items were developed and validated against a clinical dermatologic examination in a Norwegian population sample; they refer to frequent complaints from the most common chronic skin diseases. The total skin score was calculated as the mean of the 10 items with a scale from 1 to 4. The validation study showed that in a non-health-care-seeking population, skin score above 1.3 gave the best predictive value for presence of skin disease. This variable was used dichotomized: no skin disease skin score <1.3 and presence of skin disease skin score $\geqslant 1.3$.

Three dermatologic life-quality impairment indicators were adapted from the Dermatological Life Quality Index (Finlay and Khan, 1994). They covered the following domains: social life (Have you in the previous week had problems being in the company of others because of your skin?), work (… problems with daily activities because of your skin?) and leisure activities (… problems during leisure activities because of your skin?). The scale was from 1 to 4 and in the analysis the answers were dichotomized no/yes (sometimes, often, and very often). The other nondermatologic chronic diseases were self-reported asthma, diabetes, osteoporosis, rheumatism (and chronic pain syndrome), and angina pectoris (all items: Have you or have you had…? Yes/no).

To measure depression one item from the Hopkin Symptom Check List (Derogatis *et al*, 1974), a validated instrument measuring distress, was used, "feeling depressed the past week" (no, a little, quite much, very much). This variable was dichotomized in the analysis no/yes (a little, quite a lot, and very much depressed).

Self-reported general health was described with the variable "How would you describe your present state of health?": bad, not so good, good, or very good. In the analysis this variable was dichotomized poor general health (bad and not so good) and good general health (good and very good).

Statistical analysis The study was mainly descriptive and all calculations were performed with the statistical software package SPSS version 11.0. The data were explored with frequencies and cross tables with Pearson chi-square test (Altman, 1991). A logistic regression model was performed with crude and adjusted odds ratios with 95% confidence interval as well as goodness of fit test with Hosmer and Lemeshow test.

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