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INVESTIGATIVE REPORT

Prevalence, Correlates and Characteristics of Chronic Pruritus: A Population-based Cross-sectional Study

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Pruritus is the most frequent symptom in dermatology. Its impact on quality of life is substantial. Epidemiological data on chronic pruritus (> 6 weeks) at the population level is sparse, but is important in order to understand the burden and risk factors of this distressing symptom. The aim of this population-based cross-sectional study was to estimate the point, 12-month and lifetime prevalence of chronic pruritus, assessing its association with sociodemographic variables and describing its characteristics. A validated postal questionnaire was sent to 4,500 individuals in from the German general population. Three contact attempts were made. The response rate was 57.8% (*n* = 2,540). The point prevalence of chronic pruritus was 13.5% (95% confidence interval (95% CI) 12.2–14.9%), 12-month prevalence 16.4% (15.0–17.9%) and lifetime prevalence 22.0% (20.4–23.7%). Multivariate analyses found only ethnic origin independently associated with chronic pruritus. The impact of chronic pruritus on quality of life and emotional well-being appears to depend on severity rather than on the presence of the symptom alone. This is the first study to investigate various prevalence estimates of chronic pruritus at the population level. Despite its limitations (self-report and potential self-selection) this study indicates a high burden of chronic pruritus in society. *Key words: epidemiology; chronic pruritus; population; quality of life; prevalence*.

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Pruritus is not only the most common symptom in dermatology; it is also frequently encountered in various systemic, psychiatric and neurological conditions. It also occurs as a result of drug and medication intake (1, 2) and is a common side-effect in patients on haemodialysis (3). Several studies suggest a high impact on quality of life (4–6).

Although there are data on the occurrence of pruritus in patient samples (6–10), epidemiological data on the occurrence and characteristics of chronic pruritus (defined as lasting for at least 6 weeks (11)) at the population level do not exist (12, 13), but are important in order to understand the burden of this distressing symptom. A focus on symptoms in dermato-epidemiology provides a new contribution to the assessment of the burden of skin morbidity in the community (13).

Population-based studies, such as the Lambeth study (14), have shown a prevalence of prurigo and allied conditions of 8.2%, while a Norwegian study (15, 16) reported a prevalence of acute pruritus within the last week of 8.4% in an urban population aged 30–76 years. A population-based study in France estimated the prevalence of pruritus at 12.4% during a 2-year period (17); however, no description was provided of how chronic pruritus was defined. Neither of these population-based studies assessed chronic pruritus (point, 12-month, lifetime prevalence) or used well-defined criteria for the assessment of chronic pruritus. To our knowledge there is only one study (*n* = 11,732) measuring chronic itch in a non-diseased population (18). However, only an estimate of the point prevalence of chronic pruritus (16.7%) was given and the population under study were employees seeking early detection cancer screenings. To date, no study has ascertained the point, 12-month and lifetime prevalence of chronic pruritus (defined as lasting for at least 6 weeks) at the population level at large. The present study, conducted by the Epidemiology of Chronic Pruritus Research Group (ECPRG) based at the University Hospital Heidelberg, Germany, aimed to determine prevalence estimates of chronic pruritus in the general population, to assess its association with sociodemographic variables, and to describe its characteristics.

METHODS

The study was approved by the ethics committee of the University of Heidelberg (S-120/2008). The study was conducted in full accordance with the World Medical Association's Declaration of Helsinki. Results were reported in line with the "Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)" recommendations (19). The minimum sample size needed to detect a prevalence of 10% with 95% confidence and

2% precision is 864 (20). Expecting a response rate of 60% would require 1,440 individuals in each group. This estimate was increased to 1,500 per group. Hence, addresses of 4,503 individuals aged > 18 years were drawn randomly from the Community registries in two cities (Heidelberg and Ludwigshafen) and six surrounding rural communities in Southwest Germany. Registration with the local authorities is compulsory in Germany. A previously validated questionnaire, developed for the assessment of the prevalence and characteristics of chronic pruritus in the general population (21), was sent by post. All non-responders received one postal reminder after 2 months. Based on the results of a pre-test (22), those who remained non-responders after the first reminder were either contacted by telephone if their number was listed in the telephone directory or received a second postal reminder, including a shortened version of the questionnaire, if no telephone number could be obtained. Data collection took place between November 2008 and July 2009. Data was entered twice by two independent persons and all observed random or potentially systematic inconsistencies between and within resulting data were solved to maximize data quality.

The questionnaire (21) was structured into five sections. All participants completed the first section on sociodemographic characteristics (sex, age, occupational status, education and ethnic origin) and a second section on the three prevalence (point, 12-month, lifetime) items. Only individuals who reported current chronic pruritus continued with the remainder of the questionnaire, which contained another three sections dealing with the experience of current chronic pruritus that lasted for at least 6 weeks. The third section (characteristics of chronic pruritus) measured the duration, frequency of occurrence and localization of chronic pruritus. Fourthly, a visual analogue scale, ranging from zero to ten assessed the average subjective severity of experienced chronic pruritus. The fifth section inquired about pruritus-related quality of life (PrQoL) impairments and the effect that chronic pruritus has on emotional well-being. A final question in this section assessed whether health status was affected by other conditions. Finally, respondents were asked whether they were aware of the cause of their chronic pruritus, whether treatment by a physician was ongoing or had previously occurred, and whether this treatment had resulted in alleviation of the pruritus.

Statistical analyses were conducted using SPSS 19. Data are described by absolute and relative frequencies, or by means and standard deviations, respectively, and 95% confidence intervals (CI) for these coefficients estimates were computed. Comparisons between respondents, and non-respondents and those refusing to participate, were carried out by independent *t*-tests for the continuous variable age and by χ^2-test for the sex distribution. Correlations between pruritus severity, duration, and quality of life (QoL) and emotional well-being are reported by Pearson's correlation coefficients. Associations of chronic pruritus with sociodemographic variables were evaluated by binary logistic regression analysis, adjusting for confounding in multivariable analysis.

RESULTS

Response rate, drop-out analyses and sample description

Of the 4,503 individuals contacted, 105 individuals were excluded due to death, an unknown address or their inability to participate in the survey as a result of severe dementia or cognitive impairment. Of the remaining 4,398 individuals, 2,540 (57.8% response rate) agreed to participate in the study, 128 (2.9%) refused to participate, and 1,730 (39.3%) did not respond after two reminders (Tables I and II). Participants were significantly younger than those who actively refused participation and significantly older than those who did not respond at all. The proportion of females was significantly higher among participants than among non-respondents (Table I). Table III provides the demographic characteristics of the sample. Slightly more women than men responded to the survey. Half of the sample was working, while approximately one-third was retired.

Table I. *Attrition and drop-out analyses*

	Subjects *n* (%)	Age, years Mean ± SD	Sex, female (%)
Total contacted	4,503 (100)	48.6 ± 18.5	52.4
Excluded	105 (2.3)		
Deceased	14 (0.3)	78.2 ± 8.5	21.4
Unknown address	83 (1.8)	50.4 ± 22.5	59.0
Unable to participate[a]	8 (0.2)	68.3 ± 13.5	62.5
Total included	4,398 (100)		
Agreed to participate (participants)	2,540 (57.8)	51.7[b] ± 17.8	55.3[b]
Refused to participate	128 (2.9)	58.4[b] ± 19.5	56.3
Did not respond	1,730 (39.3)	43.2[b] ± 17.6	48.0[b]

[a]Due to severe dementia or cognitive impairment.
[b]Significantly different at $p < 0.001$.
SD: standard deviation.

*Prevalence of chronic pruritus within the total sample (*n *= 2,540) and as a function of sociodemographic variables (univariate analyses)*

Of the total sample, 13.5% reported current chronic pruritus, 16.4% reported chronic pruritus within the previous 12 months, and 22.0% reported having had chronic pruritus at least once in their lives (Table IV).

The lifetime prevalence of chronic pruritus decreased with each contact wave (Table II).

Females were more likely to suffer from current, 12-month and lifetime pruritus (Table SI (available at: http://www.medicaljournals.se/acta/content/?doi=10.2340/00015555-1159). However, only the difference with regard to lifetime pruritus was significant. Age was not significantly associated with chronic pruritus when the outcome was current pruritus or pruritus within the last 12 months. However, a significant association of age with lifetime pruritus was observed. The trend appeared

Table II. *Response rate by contact wave*

Contact wave	Sample[a] *n*	Cumulative Response rate *n* (%)	Lifetime prevalence of chronic pruritus (%)
First postal	4,472	982 (22.0)	31.4
Second postal	4,467	1,453 (32.5)	29.5
Third (postal)	4,467	1,694 (37.9)	22.0
Third (telephone)	4,398	2,540 (57.8)	22.0

[a]4,503 minus those excluded (deceased, unknown address, unable to participate).

Table III. *Demographics of respondents (*n = *2,540)*

	Relative frequency	95% CI
Sex, %		
Female	55.3	53.3–57.2
Male	44.7	42.8–46.7
Age, mean ± SD	51.7 ± 17.8	51.0–52.4
Occupational status, %		
Working	51.0	49.0–53.1
Retired	32.6	30.7–34.5
Other[a]	16.4	14.9–18.0
Schooling, %		
Elementary	40.8	38.8–42.9
Secondary (ordinary)	25.3	23.5–27.1
Secondary (advanced)	32.5	30.6–34.5
Other	1.4	0.9–2.0
Origin, %		
German	86.7	85.3–88.1
Other	13.3	11.9–14.7

[a]Paternity leave, housewives, unemployed, students.
SD: standard deviation; 95% CI: 95% confidence interval.

to be non-linear, but in a bimodal fashion with peaks for age groups 31–40 and 51–60 years, respectively. No significant differences in prevalence estimates emerged as a function of occupational status, schooling or place of residence. However, individuals with a non-German ethnic origin were significantly more likely to have experienced current, 12-month and lifetime pruritus (Table SI).

*Association of chronic pruritus with sociodemographic variables in multivariable analyses (*n=*2,540)*

Three multivariable logistic regression analyses, with current, 12-month and lifetime pruritus as the dependent variables, and sex, age, occupational status, schooling, ethnic origin and place of residence (urban vs. rural) as predictors, were conducted (Table V). Only ethnic origin emerged as a significant correlate of current pruritus and pruritus within the last 12 months, while a marginally significant association was found with lifetime pruritus. Non-German ethnic origin increased the odds of having chronic pruritus in comparison with German origin.

*Characteristics of chronic pruritus and impact on pruritus-related quality of life and emotional well-being (*n = *343)*

All participants who reported current chronic pruritus ($n = 343$) were asked to provide additional information on their pruritus. The characteristics of chronic pruritus are displayed in Table VI. The mean severity

Table IV. *Prevalence of chronic pruritus for total sample (*n = *2,540)*

	% (*n*)	95% CI
Total		
Point	13.5 (343)	12.2–14.9
12-month	16.4 (413)	15.0–17.9
Lifetime	22.0 (559)	20.4–23.7

CI: confidence interval.

Table V. *Results from multivariable logistic regression with point, 12-month and lifetime prevalence of chronic pruritus regressed on sociodemographic predictors (*n = *2,540)*

	Point OR (95% CI)	12-month OR (95% CI)	Lifetime OR (95% CI)
Sex			
Male	1.00	1.00	1.00
Female	1.01 (0.79–1.31)	1.12 (0.89–1.42)	1.21 (0.98–1.50)
Age, years	1.00 (0.99–1.01)	1.00 (0.99–1.01)	1.00 (0.99–1.01)
Occupational status			
Working	1.00	1.00	1.00
Retired	1.27 (0.87–1.87)	1.18 (0.83–1.68)	1.08 (0.78–1.48)
Other	1.19 (0.83–1.70)	1.04 (0.74–1.45)	1.07 (0.80–1.44)
Schooling			
Elementary	1.00	1.00	1.00
Secondary ordinary	0.97 (0.69–1.34)	0.96 (0.70–1.30)	1.05 (0.78–1.39)
Secondary advanced	1.02 (0.75–1.40)	1.09 (0.81–1.45)	1.25 (0.97–1.63)
Other	0.57 (0.17–1.91)	0.67 (0.22–1.97)	0.81 (0.33–2.03)
Origin			
German	1.00	1.00	1.00
Other	1.46 (1.04–2.06)	1.56 (1.19–2.14)	1.35 (1.00–1.80)
Place of residence			
Urban	1.00	1.00	1.00
Rural	0.91 (0.70–1.20)	0.99 (0.78–1.27)	1.05 (0.85–1.31)

OR: odds ratio; 95% CI: 95% confidence interval.

measured by visual analogue scale (VAS) on a scale from 0 to 10 was 5.3 (SD = 2.13). PrQoL, measured by four items on a scale from 1 (no impact) to 4 (extreme impact) was 1.7 (SD = 0.65), and the effect of pruritus on emotional well-being (four items, same scale) was 1.53 (SD=0.68). Chronic pruritus severity measured by VAS was significantly associated with impaired PrQoL (r = 49, $p < 0.001$) and emotional well-being ($r = 0.45$, $p < 0.001$). The duration of chronic pruritus had a marginal effect on PrQoL ($r = 0.11$, $p = 0.08$), but no significant effect on emotional well-being. The chronic pruritus duration was significantly associated with chronic pruritus severity ($r = 0.20$, $p = 0.001$).

The cause of pruritus was known by 50.5% of the respondents. The majority attributed chronic pruritus to skin conditions, some to psychosomatic and a few to systemic causes. Fifty percent of respondents reported having sought treatment for their chronic pruritus. Treatment was largely perceived to alleviate the symptom in 21%, while 48% reported at least some alleviation of the symptom with treatment.

DISCUSSION

While there are some data regarding the prevalence of chronic pruritus in specific conditions or populations, no data exist about how common the symptom chronic pruritus is at the population level. Because pruritus is a symptom associated with many medical conditions, and because not everyone with chronic pruritus may present the symptom to a physician, the need for population-based studies estimating the prevalence of the symptom

Table VI. *Characteristics of current chronic pruritus (*n = *343)*

	Relative frequency (%)
Duration, months	
1.5–3	13.3
>3–6	9.5
>6–12	9.5
>12–24	12.9
>24–36	8.0
>36–96	14.1
>96	32.7
Pruritus during the day	
Never	0.3
Rarely	4.3
Every now and then	27.2
Occasionally	32.9
Often	30.9
Always	4.3
Pruritus during the night	
Never	19.8
Rarely	20.5
Every now and then	20.1
Occasionally	16.4
Often	19.5
Always	3.7
Pruritus every day	71.9
Localization of chronic pruritus[a]	
Mostly in same localizations (localized)	91.4
Mostly in different localizations (generalized I)	25.9
Mostly whole body affected (generalized II)	14.6
Anatomical localization[a]	
Face/neck	25.9
Back	32.7
Chest/belly	20.4
Anogenital	19.0
Scalp	44.6
Arms	28.6
Hands	21.0
Legs	30.9
Feet	16.6

[a]Multiple responses possible.

becomes apparent. Compared with other large-scale studies measuring prurigo and allied conditions (14), acute pruritus within the last week (15, 16), or undefined chronic pruritus within the past 2 years (17), the estimates arrived at in this study are higher. Chronic pruritus requires pruritus to be present for a minimum of 6 weeks (11), hence one could argue that the point, 12-month and lifetime prevalence of chronic pruritus should be lower compared with, for instance, acute pruritus within the last week assuming the study populations are otherwise comparable. However, the present study used a previously validated questionnaire, lending support to the obtained results. In addition, another large-scale study (18) investigating 11,732 employees, participating in a skin cancer screening reported a point prevalence of chronic pruritus (>6 weeks) of 16.7%; a result that exceeds even the point prevalence estimate obtained in this study. We also found the prevalence of chronic pruritus to decrease with each contact wave. Assuming the most extreme scenario of no single additional case to be detected if a 100% response rate was achieved, a lifetime prevalence of 12.6% (556/4,398) would still result.

Although univariate analyses revealed prevalence estimates to be higher for females, a significant sex difference was found only for lifetime chronic pruritus. This result confirms previous research in acute pruritus (15) and chronic pruritus (23), while multivariable regression failed to find an association with sex in the present study.

Similarly, although some research indicates that the prevalence of chronic pruritus increases with age (18, 24), the present study did not find such an association in multivariable analysis. Dalgard et al. (15) found a clear linear decrease in non-chronic pruritus with increasing age, while the present study found a bimodal distribution of current, 12-month and lifetime pruritus as a function of age. More research is needed in order to fully establish how pruritus is related to age.

Multivariable logistic regression analyses revealed only ethnic origin to be a significant correlate of chronic pruritus. The majority of the respondents of non-German ethnic origin were of Turkish orgin. Whether the prevalence of chronic pruritus varies across ethnicities, perhaps due to varying risk factors or differing socio-cultural constructs of the symptom or varying norms, remain open questions that future studies need to address. Differential reporting of the symptom may also have occurred. Dalgard et al. (16), using univariate analyses, found the prevalence of pruritus within the last week (rather than chronic pruritus) to differ among ethnic groups. However, these differences were confined to men only.

The present study found no significant differences in prevalence estimates as a function of urban vs. rural residence. Direct comparisons with other studies are not possible, since the effect of residential category was not addressed previously. Dalgard et al. (15, 16) and Rea et al. (14) studied urban samples. Analyses stratified by living area were not reported by Wolkenstein et al. (17).

Almost half of the respondents with current chronic pruritus reported having had chronic pruritus for more than 3 years, with almost one-third having had the symptom for more than 8 years. Twenty-five percent of the study participants with pruritus ($n = 597$) had had chronic pruritus for at least 5 years (18). These findings suggest that chronic pruritus is often a highly pervasive and long-lasting symptom. More respondents reported pruritus during the day than during the night, which is in agreement with previous research (23). Nevertheless, among the PrQoL impairment questions there were also a considerable number of respondents who reported pruritus during the night as well as sleep disruption.

Although 91% had localized pruritus, 25% reported having pruritus that affected different localizations (Table VI: generalized I). As multiple responses were possible, it appears that there are individuals who encounter both localized pruritus as well as pruritus that affects different locations. Previous research in diseased popu-

lations distinguishing between generalized and localized pruritus in a mutually exclusive manner found 26% to be localized and 74% to be generalized pruritus (12). The present study also revealed approximately 15% to have pruritus that affects the whole body, a result which is similar to the 16% reported by Ständer et al. (18).

Although associations between pruritus and QoL have been shown consistently (17, 21, 25), in the present study the impact of chronic pruritus on PrQoL was moderate on average, suggesting that individuals could come to terms with the symptom. However, a significant correlation between VAS, on the one hand, and PrQoL and emotional well-being, on the other hand, indicates that it is not pruritus *per se*, but the severity with which it is encountered that impairs PrQoL and reduces emotional well-being. Chronic but mild pruritus may not have such profound effects on PrQoL. Similar effects were reported by Holm et al. (26) in patients with atopic dermatitis.

Although 51% of the sample with current chronic pruritus reported knowing the cause of their pruritus, an almost equal proportion did not. These individuals may not have attended a physician, or the cause may not yet have been determined. The latter may be indicative of pruritus of unknown origin. In a substantial proportion (8–44.5%) of individuals with chronic pruritus (12, 23) the causes cannot be established. Of the 50% who had sought treatment for their chronic pruritic condition, approximately 70% observed alleviation of the symptom. However, most reported only partial alleviation as a result of treatment. Patients with chronic pruritus often endure a long and complicated disease course, failure of therapy and a considerable reduction in quality of life (27). The present data backs this observation.

A number of limitations of this study must be discussed. Firstly, a larger sample size would have led to higher precision, as the confidence in the obtained estimates would have increased. However, the necessary sample size was based on a power analysis prior to data collection. Secondly, data was obtained by self-report, which is subject to a variety of biases, most notably social desirability and recall bias. Pruritus is a subjective experience (28); thus it is usually assessed via self-report and this study is no exception. With regard to self-selection, drop-out analyses revealed respondents to be significantly older than non-respondents and a preponderance of females in the sample. However, in multivariate analyses sex, age, occupational status, education or place of residence were unrelated to chronic pruritus. Potential selective participation according to these socio-demographic variables is unlikely to have biased our prevalence estimates.

Conclusion

This is the first study to investigate the point, 12-month and lifetime prevalence of chronic pruritus in the general population. The results suggest that the burden of chronic pruritus in the general population is substantially higher than previously believed. Despite the reported limitations of this study, and bearing in mind the lack of population-based studies, this study appears to offer the best estimate presently available. The results indicate a high burden of the symptom of chronic pruritus in the general population. Further research is needed to confirm the results of the present study. In addition, as there is no data on the incidence of chronic pruritus and the factors that predispose individuals to develop chronic pruritus, this also requires further research.

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