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CLINICAL REPORT

Onychophagia is Associated with Impairment of Quality of Life

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Onychophagia is defined as a chronic nail biting behaviour affecting about 20–30% of the general population. However, nail biting seems to be an ignored problem in a daily clinical practice. We have analysed the influence of onychophagia on quality of life (QoL) and stigmatisation level among 339 medical students with and without nail biting. Those with onychophagia demonstrated significantly higher QoL impairment compared to the controls ($p < 0.001$). Subjects who had been unable to stop nail biting behaviour in the past ($p < 0.01$) had visible nail abnormalities ($p = 0.03$), spent more time on nail biting ($p = 0.02$) and with a higher number of involved fingernails ($p = 0.03$), demonstrated further impaired QoL. Furthermore, tension before or when trying to resist nail biting ($\beta = 12.5$; $p < 0.001$), suffering due to nail biting ($\beta = 12.6$; $p = 0.001$) and nail eating behaviour ($\beta = –7.5$; $p < 0.01$) were independent variables influencing QoL. Participants with onychophagia also demonstrated higher level of stigmatisation (0.6 ± 1.2 vs. 0.2 ± 0.6 points, $p < 0.01$), although in both groups the stigmatisation level was low. ***Key words: nail biting; HRQoL; stigmatisation.***

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Onychophagia is defined as a chronic nail biting behaviour usually starting during childhood or early adulthood (1–3). Our recent study (4), in accordance with previous data (5–8), demonstrated that onychophagia is a frequent problem, affecting about 20–30% of the general population. Onychophagia seems to be rare in children younger than 3–6 years (9, 10), but the frequency increases in children older than 5–6 years, only to decrease again by the age of 18 years. It may, however, persist in some subjects until adulthood (9, 11).

Onychophagia seems to be a variant of compulsion, which may lead to destruction of fingernails. According to the ICD-10 (International Classification of Diseases and Health Related Problems – 10th Revision) nail biting is classified among other specified behavioural and emotional disorders with onset usually occurring in childhood and adolescence (F98.8), together with excessive masturbation, nose picking and thumb sucking (12). Remarkably, diagnostic criteria have not been well described for this group of disorders yet.

Nail biting does not seem to be an acknowledged problem in a daily clinical practice. The cause of onychophagia is unknown. For some persons nail biting may be an automatic behaviour, especially when they are engaged in other activities such as reading a book or watching TV. On the other hand, there are individuals with onychophagia for whom nail biting is an intentional activity. It may also be a result of a need to have perfect nails, as some persons try to bite any irregularity or nail stickiness. Interestingly, they continue such behaviour regardless of how badly their nails look afterwards (4). To further explore the influence of onychophagia on the patients' wellbeing, we have analysed the quality of life (QoL) and stigmatisation level in subjects with onychophagia in comparison to their counterparts without nail biting behaviour.

MATERIAL AND METHODS

Participants

A total of 343 medical students of Wroclaw Medical University were initially recruited to the study. Four of them refused to participate (reject ratio: 1.2%), whilst the remaining 339 subjects (208 females and 131 males, ratio 1.6:1) were enrolled into the study after a written informed consent was obtained from all participants. Their age ranged from 21 to 26 years (mean age: 23.9 ± 1.1 years).

Study design

This cross-sectional study was approved by the Ethics Committee of the Wroclaw Medical University. A specially designed questionnaire was developed for the study purpose, as no diagnostic instrument assessing onychophagia has been available so far. All included subjects completed this questionnaire to determine the presence of onychophagia and characteristics of the nail biting behaviour. Detailed results of the questionnaire were published elsewhere (4).

All subjects were asked to complete questionnaires assessing QoL and stigmatisation level. QoL was assessed with the validated Polish version of the NailQoL questionnaire (13, 14). The NailQoL questionnaire is a disease-specific instrument consisting of 15 items divided into 3 domains: symptoms, emotions and function. For each item, the following scores were assigned to each response: 0 (never), 25 (rarely), 50 (sometimes), 75 (often), and 100 (always). Final scoring was calculated by dividing the sum of scoring achieved for single questions by the number of analysed items. The final scoring ranged from 0 (normal QoL) to 100 (the highest impairment of QoL) (13). The NailQoL was originally developed to assess QoL

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in patients with onychomycosis, however, we have previously adapted this instrument to be used in other nail disorders (14).

The degree of stigmatisation was evaluated with the validated Polish version of the 6-Item Scale proposed by Evers's group (15, 16). The following scoring was assigned to each item: 0 (no), 1 (sometimes), 2 (very often), and 3 (always). The final scoring ranged from 0 (no stigmatisation) to 18 (the highest level of stigmatisation) (15, 16).

After completing all questionnaires, each participant underwent psychiatric examination based on the computerised Munich version of the Composite International Diagnostic Interview (CIDI), a fully structured diagnostic instrument designed by World Health Organization for identifying mental disorders based on diagnostic criteria of the ICD-10 and DSM-IV classifications (17). Detailed results of psychiatric comorbidities in participants with onychophagia were published elsewhere (4). In addition, all individuals with onychophagia were carefully examined regarding their fingernails. Any abnormalities of the nail plate were copied to the specially prepared cartoon of the nail and analysed with the ImageJ software (available at http://rsbweb.nih.gov/ij).

Statistical analysis

All results were analysed using the software package Statistica® 10.0 (Statsoft, Cracow, Poland). The results are demonstrated as median and quartiles as the distribution of analysed variables was non-parametric. The significance of the observed differences between studied groups was assessed by the Mann-Whitney *U* test, Kruskal-Wallis ANOVA rank test, Spearman rank correlation test (ρ – Spearman correlation coefficient), multiple regression analysis where appropriate. A p-value <0.05 was considered as statistically significant.

RESULTS

Nail abnormalities in participants with onychophagia

Sixty-seven participants (19.8%; 34 females and 33 males) suffered from onychophagia at the time of examination. An additional 93 persons (27.4%; 60 females and 33 males) reported nail biting behaviour in the past, but stopped prior to recruitment to the current study. The mean age of onychophagia onset was 7.7 ± 3.5 years among females and 8.1 ± 3.6 years among males ($p = 0.47$). Detailed characteristics of onychophagia in the studied group have been published elsewhere (4).

Among those subjects who confirmed current onychophagia, 30 (44.8%) participants demonstrated no visible abnormalities of the fingernail plates. In the remaining subjects with onychophagia, 12 (17.9%) had abnormalities within 1–2 fingernails, 4 (6.0%) within 3–4 fingernails, 1 (1.5%) within 8 fingernails and 20 (29.8%) on all fingernails. The most common nail abnormality was nail plate shortening, which was observed in 36 (53.7%) participants. The mean area reduction of the fingernail plates was $18.2 \pm 6.5\%$ (range 7.3–35.7%) of the original nail plate surface. In addition, 5 (7.5%) participants had transverse ridges on their fingernails, and 1 subject demonstrated longitudinal ridges. The latter abnormality seemed to rather be an occasional finding unrelated to onychophagia, as no other participant had such nail deformation. No other fingernail abnormalities were observed in the studied group.

Quality of life and onychophagia

According to NailQoL, only 3 (4.5%) participants with onychophagia demonstrated no impairment of QoL (total NailQoL scoring = 0 points). Among the remaining active nail biters, 44 (65.7%) subjects received up to 25 points, 18 (26.9%) between 25 and 50 points, and 2 (3.0%) individuals more than 50 points. Subjects with onychophagia demonstrated significantly higher total scoring of NailQoL as well as higher scoring of all 3 dimensions (symptoms, emotions and function) when compared to counterparts without onychophagia, indicating poorer QoL in nail biters related to their fingernail clinical status (Table I). No significant differences of QoL were observed between females and males with onychophagia as well as QoL level was unrelated to the age of onychophagia onset, onychophagia localisation (single fingernail, one hand, both hands), nail biting frequency (every day, almost every day, several times a week, several times a month), and area of nail plate surface reduction (data not shown). On the other hand, subjects who have not been able to stop nail biting behaviour in the past demonstrated further impaired QoL [median NailQoL total scoring: 23.3 (13.3–36.7) points vs. 10.0 (5.8–23.3) points, $p < 0.01$], had visible nail abnormalities [median NailQoL total scoring: 19.2 (10.0–30.8) points vs. 10.0 (5.0–28.3) points, $p = 0.03$], spent more time on nail biting ($\rho = 0.28$, $p = 0.02$), had higher number of involved fingernails ($\rho = 0.26$, $p = 0.03$), and demonstrated some specific features of onychophagia like tension while trying to resist nail biting or suffering because of nail bitting (Table II). According to multiple regression analysis, tension before or when trying to resist nail biting ($\beta = 12.5$; $p < 0.001$), suffering because of nail biting ($\beta = 12.6$; $p = 0.001$) and nail eating behaviour ($\beta = -7.5$; $p < 0.01$) were the only independent variables influencing QoL.

Stigmatisation and onychophagia

Similarly to QoL, subjects with onychophagia demonstrated higher level of stigmatisation, when compared to their counterparts without onychophagia (mean scoring of stigmatisation: 0.6 ± 1.2 vs. 0.2 ± 0.6 points, respectively, $p < 0.001$) (Table I). However, only 21 (31.3%) subjects

Table I. *Comparison of participants with and without onychophagia regarding the level of quality of life and stigmatisation*

	With onychophagia	Without onychophagia
Quality of life according to the NailQoL		
Total scoring	15.8 (6.7–28.3)	6.7 (1.7–11.7)*
Symptoms	33.3 (8.3–50.0)	16.7 (0.0–25.0)*
Emotions	10.0 (5.0–27.5)	2.5 (0.0–7.5)*
Function	12.5 (0.0–25.0)	0.0 (0.0–0.0)*
Stigmatisation according to 6 Item Scale	0 (0.0–1.0) (mean: 0.6)	0.0 (0.0–1.0)* (mean: 0.2)

*$p<0.001$.

Results demonstrated as median and quartiles in brackets, p-values according to Mann-Whitney *U* test.

demonstrated some degree of stigmatisation ranging from 1 to a maximum of 5 points according to 6-Item Stigmatisation Scale. Stigmatisation level was not related to the gender, age of onychophagia onset, onychophagia localisation, nail biting frequency, presence of visible fingernail abnormality, or area of nail plate surface reduction (data not shown). However, higher degree of stigmatisation correlated with longer duration of nail biting episodes ($\rho = 0.35$, $p < 0.01$) as well as with some specific features of onychophagia (Table II). Multiple regression analysis demonstrated that suffering because of nail biting ($\beta = 1.3$; $p < 0.01$) was the only independent variable influencing stigmatisation level. Furthermore, higher stigmatisation level correlated with higher global QoL impairment ($\rho = 0.61$, $p < 0.001$) as well as with all 3 QoL dimensions (symptoms: $\rho = 0.37$, $p = 0.002$; emotions $\rho = 0.58$, $p < 0.001$; function $\rho = 0.41$, $p < 0.001$).

DISCUSSION

Taking into account that onychophagia may affect up to 30% of the general population (4–8) it is astounding that this problem is so rarely reported in the literature and has not widely been studied so far. It is worth mentioning that onychophagia cannot be considered as a cosmetic problem or an innocuous behaviour. It was clearly demonstrated that chronic nail biting may cause significant dental abnormalities, such as malocclusion, incisor rotation and gingival recession (18, 19). Onychophagia may also cause important complications, e.g. infections of the tissue around the nails, irreversible fingernail shortening or formation of epidermoid cysts (20–22).

Despite a number of complications of onychophagia mentioned above, little is known about its influence on the patient's wellbeing. It was postulated that in some people nail biting is an automatic behaviour, done subconsciously, while in others it is an intentional activity, done fully consciously – these persons usually stop other activities to bite their nails (4). Some people may bite their nails when they feel stressed or anxious as a method of calming themself (23). Sometimes nail biting may be preceded by a feeling of tension and tension can even increase if someone tries to resist nail biting. Joubert (24) found that nail biters who regarded their behaviour as a serious problem manifest higher anxiety scores. This indicates that nail biting may exert a significant effect on the patient's psychological condition. However, data on the influence of onychophagia on QoL and daily functioning are lacking. Based on our results, it could be suggested that indeed onychophagia may decrease a patient's wellbeing at least in a subset of individuals, especially in those who demonstrate more severe forms of onychophagia. It seems that the QoL impairment is a consequence of nail biting behaviour, as studied subjects that felt tension prior to nail biting behaviour or felt relief or pleasure as a result of such behaviour, had a more impaired QoL. This could suggest that such feelings may indicate a deeper psychic-determined abnormal behaviour, making people more unhappy, as they normally would want to stop with the behaviour but cannot resist. Thus, we suppose that QoL alteration results, at least partially, from inability to control nail biting behaviour, which causes some degree of shame or fear of being a weak personality. Nail eating behaviour was also related to more impaired QoL, suggesting that more severe forms of onychophagia can cause significant emotional and psychological problems.

Several studies demonstrate that nail diseases, albeit affecting a rather small portion of the body surface might cause significant impairment of QoL (13, 25–29). Comparing onychophagia with onychomycosis or nail psoriasis, the impairment in onychophagia patients, based on NailQoL, was smaller than in the 2 latter conditions. Patients with onychomycosis or nail psoriasis had on average twice higher scoring than onychophagia subjects (13, 28). Importantly however, some patients with onychophagia received a comparably high scoring indicating that in those subjects nail biting must be taken seriously. Identification of those persons seems to be of primary importance, as they most probably need psychological support or even psychiatric treatment (30). We suggest that asking some simple questions about onychophagia, as it was done in our questionnaire, would be of help in identifying such individuals. Regarding stigmatisation level, we observed higher stigmatisation in participants with onychophagia when compared to subjects, who did not report nail biting behaviour. Despite a rather small degree of stigmatisation in subjects with onychophagia, a highly significant correlation between stigmatisation and QoL scoring was observed, thus indicating that the feeling

Table II. *Correlations between specific features of onychophagia and quality of life and stigmatisation scoring (*n = *67*)

	Quality of life level				Stigmatisation level
	Total scoring	Symptoms	Emotions	Function	
Tension before or when trying to resist nail biting	$R = 0.51$, $p < 0.001$	$R = 0.46$, $p < 0.001$	$R = 0.46$, $p < 0.001$	$R = 0.31$, $p = 0.02$	$R = 0.5$, $p < 0.001$
Feeling of relief, gratification or pleasure after nail biting	$R = 0.3$, $p = 0.03$	$R = 0.3$, $p = 0.02$	$R = 0.25$, $p = 0.06$	$R = 0.12$, $p = 0.38$	$R = 0.16$, $p = 0.22$
Suffering because of nail biting	$R = 0.59$, $p < 0.001$	$R = 0.38$, $p = 0.001$	$R = 0.57$, $p < 0.001$	$R = 0.44$, $p < 0.001$	$R = 0.67$, $p < 0.001$
Eating of fingernails	$R = 0.38$, $p = 0.002$	$R = 0.32$, $p < 0.01$	$R = 0.32$, $p < 0.01$	$R = 0.28$, $p = 0.02$	$R = 0.33$, $p < 0.01$

Unless otherwise indicated, questions regarding specific features of onychophagia were scored as follows: never: 0; sometimes: 1; often: 2; always: 3. *p*-values according to Spearman rank correlation test.

of stigmatisation is an important determinant of QoL impairment. In contrast, lack of any relevant relationship between nail plate shortening and QoL may indicate, that physical consequences of onychophagia did not play a major role in changing QoL of studied population.

Our study has some limitations. We have included a relatively homogenous group of subjects (young adults), and it is possible that onychophagia can be handled differently in other age groups. Therefore, it is difficult to extrapolate our findings to other patient groups. On the other hand, having a homogenous healthy population of young people facilitated the analysis of the influence of onychophagia on QoL, as the importance of potential confounders (e.g. concomitant nail diseases) is easily neglected. Furthermore, we have only used a disease-specific QoL instrument, thus it is difficult to assess what the relevance of onychophagia is in comparison to other chronic disorders. However, we do believe that general QoL questionnaires are not well suited to analyse the influence of nail diseases on patient wellbeing, as they are too general to identify problems with such small organs as nails. Furthermore, the complete examination of one single patient lasted about one hour, as it also included a psychiatric examination, and adding any other additional questionnaire would make participants even more tired.

To summarise, it seems that onychophagia is a relevant medical problem and should not be routinely considered as a trivial situation. Some people with nail biting may experience significant psychological suffering and identification them is a first step to help them. Further studies on the influence of onychophagia on patient well-being are needed to better characterise the relevance of nail biting behaviour on daily functioning.

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