

## CLINICAL REPORT

# Onychophagia and Onychotillomania: Prevalence, Clinical Picture and Comorbidities

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**Onychophagia is defined as chronic nail biting behaviour, which usually starts during childhood. Onychotillomania results from recurrent picking and manicuring of the fingernails and/or toenails, leading to visual shortening and/or extraction of nails. The aim of this study was to assess the prevalence of onychophagia and onychotillomania in young adults, and the comorbidity of these conditions with anxiety disorders and obsessive compulsive disorders (OCD), as well as to determine factors related to these behaviours. A total of 339 individuals were interviewed with a structured questionnaire. Onychophagia was present in 46.9% of participants (including 19.2% active and 27.7% past nail biters), and an additional 3 people (0.9%) had onychotillomania. The majority of subjects (92.2%) described nail biting as an automatic behaviour. Tension before nail biting was reported by 65.7% of nail biters, and feelings of pleasure after nail biting by 42%. Among the participants with lifetime onychophagia, 22.5% met criteria of anxiety disorder and 3.1% of OCD, while in the group without onychophagia at least one anxiety disorder was diagnosed in 26.2% and OCD in 5.0%. We did not find any correlation between nail biting and other anxiety disorders or OCD. In conclusion, no single condition was associated with nail biting or influenced such behaviour; multiple psychological factors were involved. *Key words: onychophagia; nail biting; onychotillomania.***

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Onychophagia is defined as chronic nail biting behaviour, which usually starts during childhood or early adulthood (1–3). It is estimated that more than half of the school-age population frequently, or at least occasionally, bites their fingernails (4). There are only a few published studies analysing the frequency of this problem in the general population, most of which are limited to children and adolescents. The prevalence of onychophagia found among children and adolescents ranges from 20% to 29% (5–7). Onychophagia has rarely been noted in children

younger than 3–6 years (8, 9). By the age of 18 years the frequency of this behaviour again decreases; however, it may persist into adulthood in some subjects (8, 10).

According to the International Classification of Diseases and Health Related Problems – 10<sup>th</sup> Revision (ICD-10), nail biting is classified as 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 (11). Diagnostic criteria have not been well described for this group of disorders.

Onychophagia seems to be a variant of compulsion, which may lead to destruction of the fingernails. Nail biting is an under-recognized problem in daily clinical practice, occurring as a continuum from mild to severe (12, 13). Some studies indicate that nail biting may result from over-stimulation (due to stress or excitement) or under-stimulation (due to boredom or inactivity) (12, 14). Nail biters often bite off rough, broken or sticking out fragments of the cuticles or fingernails in order to make the fingernails smooth and appear perfect or regular (14). In addition, some individuals seem to experience pleasure and relaxation during nail biting (14). Some observations suggested comorbidity of nail biting and OCD or anxiety disorders (15, 16).

Onychotillomania results from recurrent picking and manicuring of the fingernails and/or toenails, leading to visual shortening and/or extraction of the nails (17–19). There are no epidemiological data on this behaviour, and our knowledge about onychotillomania is limited to a few case reports (18, 20–22). The aim of the present study is to provide further data on the prevalence of onychophagia and onychotillomania among young adults, and to determine the comorbidity of anxiety disorders and OCD, and the factors related to nail biting behaviour.

## MATERIALS AND METHODS

The study was approved by the ethics committee of Wrocław Medical University. A total of 343 medicine students of Wrocław Medical University were initially recruited into the study. Four subjects (1.2%) declined to participate. Written informed consent was obtained from all remaining participants: 208 (61.4%) females and 131 (38.6%) males, mean  $\pm$  SD age 23.9  $\pm$  1.1 years, range 21–26 years, after providing full information about the study. As there is no diagnostic instrument to assess onychophagia, a specially designed questionnaire was

developed for the study. All included subjects completed the questionnaire, to determine the presence of onychophagia or onychotillomania and characterize the nail biting behaviour. The questionnaire included questions on demographic data, date of onychophagia and/or onychotillomania onset, localization, frequency and intensity of nail biting, feelings accompanying the nail biting (e.g. pleasure/gratification/relief after nail biting, tension before or when trying to resist nail biting), presence of nail eating, whether nail biting was intentional or automatic, and whether it occurred or not during other activities. According to the onset of nail biting, participants with onychophagia were divided into 2 groups: early onset (before the age of 13 years), and late onset of onychophagia (after the age of 13 years). The lifetime prevalence of anxiety disorders and OCD has been determined according to the ICD-10 (11). Each participant was examined by a psychiatrist (PP, MG or MK-J) using the computerized Munich version of the Composite International Diagnostic Interview (CIDI), a fully-structured diagnostic instrument designed by the World Health Organization (WHO) for identifying mental disorders based on diagnostic criteria of the ICD-10 and Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) classifications (23). Several studies confirmed the reliability and validity of the CIDI (e.g. 24, 25), and it has been used in many epidemiological studies on the general population, as well as in studies evaluating the prevalence of mental disorders among patients with various medical conditions (e.g. 26, 27).

All results were analysed using the software package Statistica® 10.0 (Statsoft, Krakow, Poland). The significance of the observed differences between studied groups was determined by the Student's *t*-test, Pearson's  $\chi^2$  test, or two-sided Fisher's exact test. A *p*-value < 0.05 was considered statistically significant.

## RESULTS

### *Clinical characteristics of onychophagia*

A total of 160 persons (47.2%) reported nail biting during their lifetime, and an additional 3 persons (0.9%) reported problems of onychotillomania. Onychophagia was diagnosed in 95 females (59.4%) and 65 males (40.6%) (*p*=0.43). The mean age of onychophagia onset was  $8.0 \pm 3.5$  years, age range 3–20 years. The majority of individuals (86.2%) started nail biting before the age of 13 years, and only 22 participants (13.8%) reported later onset. The mean age of onset among females was  $7.7 \pm 3.5$  years, and among males  $8.1 \pm 3.6$  years (*p*=0.47). Ninety-three persons (58.1%) who reported nail biting during their lifetime had stopped nail biting prior to the study participation. The mean age they ceased nail biting was  $13.7 \pm 4.2$  years, ranging from 7 to 24 years; females stopped nail biting at a mean age of  $13.5 \pm 4.0$  years, while males stopped at a mean age of  $14 \pm 4.6$  years (*p*=0.86). The mean duration of onychophagia was  $10 \pm 5.5$  years, ranging from 1 to 20 years. There was no statistically significant difference between females and males regarding the mean duration of nail biting (*p*=0.79).

Sixty-seven individuals (19.8%; 34 females and 33 males) continued nail biting at the time of our study. Nail biting characteristics of this group are shown in

Table SI<sup>1</sup>. A significant portion of participants (*n*=32; 48.5%) reported nail biting several times a month. Only 6 persons (9.1%) bite fingernails every day. The analysed subjects usually bit their fingernails less than 5 times a day (*n*=59; 89.4%) and spent < 10 min/day on nail biting (*n*=47; 71.2%) (Table SI<sup>1</sup>). The mean duration of nail biting per day was  $7.6 \pm 7.7$  min, ranging from 1 to 30 min. More than half of participants with active onychophagia (*n*=39; 59.1%) tried to give up nail biting; the mean duration of periods of cessation of nail biting was  $3.8 \pm 2.6$  months, ranging from 0.5 to 12 months. No statistically significant differences were found between females and males regarding nail biting characteristics (Table SI<sup>1</sup>).

Specific factors related to nail biting are shown in Table SII<sup>1</sup>. Five persons (7.6%) always felt tension before nail biting or when trying to resist such behaviour, and a further 36 individuals (58.1%) had this feeling at least sometimes. Feelings of pleasure, gratification or relief occurring at least sometimes after nail biting confirmed 24 participants (42%), while 32 persons (57.1%) never had such feelings. The majority of participants (*n*=59; 92.2%) described nail biting as an automatic behaviour, without thinking about it. They usually bit their fingernails during other activities, such as watching television, using a computer, learning, reading, etc. Only 5 persons (7.8%) never bit their fingernails automatically. In 20 participants (39.3%) nail biting was an intentional action; they interrupted other activities in order to carry out nail biting. For most females (82.3%) nail biting was not an intentional activity, while most males (51.5%) acknowledged, that they had bitten their fingernails intentionally, interrupting other activities at the same time. The difference in the frequency of intentional nail biting between females and males was statistically significant (*p*=0.02) (Table SII<sup>1</sup>). There was also a statistically significant difference between women and men considering the frequency of automatic nail biting (*p*=0.02). No other relevant differences were observed regarding gender (Table SII<sup>1</sup>).

Groups with different onychophagia onset did not differ from each other in terms of continuing nail biting at the time of our study (*p*=0.18), frequency (*p*=0.4), intensity (*p*=0.47) and other factors associated with nail biting (Tables SI<sup>1</sup> and SII<sup>1</sup>).

### *Comorbidities of onychophagia*

At least one anxiety disorder or OCD was diagnosed in 87 participants (25.6%), while 252 persons (74.4%) did not meet any ICD-10 criteria during their life, either for anxiety disorders or for OCD. A total of 25 individuals met diagnostic criteria for more than one mental disorder.

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der. The most common disorders were: specific phobia ( $n=48$ ; 14.1%), panic disorder ( $n=17$ ; 5.0%), social phobia ( $n=15$ ; 4.4%) and OCD ( $n=14$ ; 4.4%). Generalized anxiety disorder was diagnosed in 8 subjects (2.3%) and agoraphobia in 4 persons (1.8%). Mental disorders occurred more frequently among females ( $n=65$ , 31.2%) than males ( $n=22$ , 16.8%) ( $p=0.003$ ), which was consistent with previous findings (e.g. 28). Among participants who bit nails during their lifetime at least one anxiety disorder or OCD was diagnosed in 38 persons (23.7%): 36 persons (22.5%) met criteria of anxiety disorder and 5 persons (3.1%) of OCD (3 subjects had symptoms of both anxiety disorder and OCD), while in the group without onychophagia, anxiety disorders or OCD occurred in 49 persons (27.4%): anxiety disorder in 47 (26.2%) and OCD in 9 persons (5.0%) (7 subjects had both anxiety disorder and OCD). The differences of anxiety disorder or OCD prevalence between analysed groups were not statistically significant ( $p=0.44$  and  $p=0.38$ , respectively). On the other hand, general anxiety disorder was only diagnosed among individuals with lifetime onychophagia ( $n=8$ ; 5.0%;  $p=0.033$ ). Table SIII<sup>1</sup> shows detailed frequency of anxiety disorders and OCD among participants with lifetime onychophagia and without onychophagia.

Among individuals who continued nail biting at the time of our study 17 (25.4%) met ICD-10 criteria of anxiety disorders or OCD. A similar proportion was found in persons who ceased nail biting before entering the study ( $n=21$ , 22.6%) ( $p=0.68$ ). However, individuals with anxiety disorder or OCD were more likely to describe tension before or when trying to resist nail biting than persons without such diagnosis, and the difference was statistically significant ( $p=0.006$ ). They also more often reported nail biting than did individuals with neither anxiety disorder nor OCD ( $p=0.026$ ). Other characteristics of nail biting remained unrelated to the presence of psychiatric comorbidities (Table SIV<sup>1</sup>).

### *Onychotillomania*

Onychotillomania was diagnosed in only 3 participants (2 females and 1 male). The mean age of onset was  $8.6 \pm 2.3$  years, ranging from 6 to 10 years. The mean duration of onychotillomania was  $14 \pm 2.5$  years, ranging from 12 to 17 years. One participant reported that manipulation within fingernails was performed every day, 1 was doing it almost every day, and the third several times a week. For 2 of them, picking of fingernails took approximately 15 min/day, and the remaining patient was not able to assess the daily duration of fingernail manipulation. Two participants damaged the fingernails of both hands, the third picked the fingernails of the right hand only (she was left-handed). One person reported tension occurring always before picking, while 2 only sometimes experienced this feeling. Pleasure or relief after picking was mentioned by 2

persons. In 2 females specific phobia was diagnosed, while none of the male participants met diagnostic criteria for anxiety disorder or OCD.

## DISCUSSION

Onychophagia is thought to occur mainly in childhood, but in some cases it may continue into adulthood. Data on the lifetime risk of onychophagia and the prevalence of current onychophagia in different populations are inconsistent. Most studies are limited to children or adolescents. Based on previous findings from such epidemiological studies, the prevalence of onychophagia during childhood and adolescence ranged from 20% to 33% (4–9); however, some researchers estimated that nail biting may occur even more often, i.e. in up to 45% of adolescents (29). Our study confirmed that the highest prevalence of nail biting is found among children and adolescents. In the majority (86.2%) of participants with onychophagia, disease onset occurred before the age of 13 years, and only 13.8% of persons had later onset. Analysing the lifetime prevalence of onychophagia among study participants, we found that nail biting occurred in 47.2% (equally among females and males). Some authors suggested that nail biting after the age of 10 years is more common among boys than girls (30), while others showed a higher prevalence among females than males (30). In contrast, we found no difference in the frequency of onychophagia with gender, irrespective of age.

Only a few studies have assessed the frequency of nail biting among adults. The largest epidemiological study on the prevalence of onychophagia was carried out in the group of approximately 7000 male recruits older than 18 years. Twenty-one percent of them were found to bite their nails at the time of the study (31). The results of the present study indicate a similar current prevalence rate of nail biting (19.8%) in young adults, while the lifetime prevalence is much higher (47.2%). Coleman & McCalley (32) obtained similar data observing the lifetime onychophagia in 52% of males and 54% of females. This study revealed a significant difference in the current nail biting prevalence between women and men (19% vs. 29%), a finding which was not confirmed in our study.

There are different explanations of the basic causes of onychophagia. It is postulated that nail biting may occur in moments of stress or anxiety as an attempt to calm down (33, 34). In some cases nail biting is preceded by a feeling of tension. The tension may increase when someone tries to resist nail biting. Nail biting was also described as a form of self-stimulation when the person bites their nails while bored or inactive (33–35). For some persons nail biting is an automatic behaviour. They are doing it without thinking about it, especially when they are engaged in other activities, such as reading or

watching TV. On the other hand, there are individuals with onychophagia for whom nail biting is an intentional activity. They usually give up other kind of activities in order to bite their nails (33, 36). Nail biting may also be a result of a need for perfect nails; thus some persons try to bite any irregularity or nail stickiness and they continue this behaviour regardless of how bad their nails look afterwards. Interestingly, onychophagia appears to be differently determined in women and men. Among female patients, intentional nail biting occurred only occasionally, as the majority denied that they had ever bitten their nails deliberately, giving up others activities at the same time. In contrast, for more than half of males, nail biting was an intentional activity on which they focused, not engaging in other forms of activity. Moreover, more than 40% of females stated that they had always bitten their nails automatically without thinking about it, compared with <10% of males.

Despite the fact that onychophagia is considered, at least partly, to be related to emotional disturbance and anxiety, only a few studies analysed an association between nail biting and anxiety. The variability of the findings is due to different ascertainment methods and different attitudes to anxiety, that resulted in a wide range of developed measurement instruments. Most commonly, researchers assessed nail biting behaviour in association with a state of anxiety, or in association with anxiety as a personality trait. Observation of children or college students in experimental conditions that produced anxiety or boredom led to inconsistent results (37, 38). Joubert (39) using the manifest anxiety state ascertained that higher manifest anxiety scores received nail biters who regarded their behaviour as a serious problem. Ghanizadeh (40) investigated the comorbidity of some mental disorders in 63 children with nail biting and found that one of the most common comorbid mental disorders was separation anxiety; however, no other anxiety disorders were examined. To the best of our knowledge no study investigated the comorbidity of nail biting and anxiety disorders in early adulthood. In our study the lifetime prevalence of anxiety disorders was 24.2% and females were more likely to have anxiety disorders than men, which is consistent with data from epidemiological studies. It is estimated that approximately 1 in 4 persons met diagnostic criteria of at least one anxiety disorder during their lifetime, and women had anxiety disorders more often than men (30% vs. 19%) (28). No association was found between nail biting and diagnosis of at least one anxiety disorder, including phobias, general anxiety and panic disorder. However, when comorbidity of individual anxiety disorder and onychophagia was analysed, there was a statistically significant difference in the prevalence of general anxiety disorder between participants with and without onychophagia. Nestadt et al. (16) suggested that the association between grooming disorders, such

as nail biting, with general anxiety disorder may be as strong as with OCD.

Moreover, we found that nail biters with general anxiety disorder more frequently reported tension before nail biting or when trying to resist such behaviour than did participants without a diagnosis of general anxiety. They were also more likely to report suffering due to nail biting.

Onychophagia is considered as behaviour associated with OCD, although the data regarding comorbidity of nail biting and OCD are limited and, as in anxiety, are mostly confined to children and adolescents. Moreover, most studies were based on the sample of persons with diagnosis of OCD, and commonly they did not include the control group. Grant et al. (15) reported that, in the group of 70 children and adolescents with a diagnosis of OCD, nail biting was observed in 10%. Authors suggest that grooming disorders including nail biting may be more common in youths with OCD than in the general population, although this study was also carried out without a population-based control group. On the other hand, Grant et al. (41), assessing nail biting in adults with OCD, found a current nail biting rate of 2.4%, and a lifetime rate of 4.1%, which was lower than rates among non-nail biters in most other studies. Bienvenu et al. (42) included a control group and only found a trend for a higher prevalence of nail biting among subjects with a diagnosis of OCD in comparison with control subjects. Our findings did not support the suggestion that nail biting is more common in subjects with OCD than in the general population. In our study, OCD was diagnosed in only 3.1% of nail biters, which is consistent with the lifetime prevalence rate of OCD in the general population. The prevalence of OCD was slightly higher in participants without onychophagia (5%); however, the difference was not statistically significant.

In conclusion, these data show that no single condition or factor is associated with nail biting or influences such behaviour, but that multiple factors are involved. A huge variability in nail biting patterns was observed; thus no dominant model of onychophagia could be determined for the whole group. These observations are consistent with some previous findings, mostly from studies performed in children (2, 8, 43), as well as with the functional analysis of behaviour of persons with onychophagia (36, 43). Except for general anxiety disorder, no relationship was found between nail biting and other anxiety disorders or OCD.

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