

Publiphilia Impactfactorius: a new psychiatric syndrome among biomedical scientists?

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Disclaimer:

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Abstract

To explore clusters of personality traits among biomedical scientists, and to associate the clusters with academic position and research misbehaviour we designed a cross-sectional study with cluster analysis of personality traits among a stratified sample of Dutch biomedical scientists working in academic medical centers.

We used the NEO-BIG5, Rosenberg Self-esteem, Achievement Motivation Inventory and the Dark Triad (narcissistic, Machiavellianistic and psychopathic personality traits) as validated questionnaires. Self-reported research misconduct was assessed via a separate questionnaire.

We included 537 active biomedical scientists completed a web-based survey (response rate 65%). Cluster analysis revealed the existence of three personality clusters among biomedical scientists: the ‘perfectionist’, the ‘ideal son-in-law’ and the ‘sneaky grandiose’. The latter cluster showed a consistent set of (subclinical) personality traits such as narcissism, psychopathy and Machiavellianism, that are indicative of the presence of a mental disorder, but could not be classified as such in terms of the DSM-IV TR or ICD-10. Male gender, higher academic hierarchical position, perceived publication pressure and, importantly, self-reported scientific misbehaviour were associated with the ‘sneaky grandiose’ personality cluster.

These findings suggest that biomedical scientists in the ‘sneaky grandiose’ personality cluster have a relatively high propensity to engage in research misbehaviour. A small proportion of the ‘sneaky grandiose’ might suffer from a psychiatric condition characterized by pathological preoccupation with publishing and being cited. We therefore propose to name this syndrome ‘Publiphilia Impactfactorius’ (PI), and we suggest this affliction should be considered in revised versions of DSM5 and ICD-10. We provide tentative diagnostic criteria for PI. Early

identification and intensive treatment or, alternatively, expulsion and annihilation of colleagues who suffer from PI may prevent further accumulation of research waste.

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Introduction

Personality traits differ significantly between professionals, and the biomedical field is no exception.^{1,2} Biomedical scientists in particular have an increasingly doubtful reputation, mainly for producing a large amount of irrelevant and unreliable ‘research waste’³ with a view to enhancing their career perspectives and boosting their ego. However, whether specific clusters of personality traits are indeed typical for biomedical scientists is unknown. This can be of particular interest since personality traits impact on behavior, and sloppy science or even scientific misconduct may be linked to specific clusters of personality traits. Scientists’ personality traits can thus potentially inform not only the selection of candidates for academic positions, but also targeted prevention programs or even the decision to expel individuals. In this study, we explore the personality traits of biomedical researchers and perform a cluster analysis to identify common combinations of such traits. We use validated personality questionnaires. Our secondary objective was to assess whether personality clusters, if they exist, are associated with personal and job-specific characteristics, research misbehavior and perceived publication pressure with a view to ultimately describe a new psychiatric syndrome.

Materials and Methods

Participant’s selection and procedure

1833 biomedical scientists working in four medical university centres in the Netherlands were invited to participate in our web-based survey. Scientists were eligible to participate if they were

able to read English, were scientifically active and gave informed consent by following the link to the online questionnaire.

E-mail addresses of the scientists were obtained via the research councils of the participating institutions. We collected e-mail addresses of scientists from nine departments per institution (two preclinical departments, three clinical departments (internal medicine, surgery and psychiatry), two supportive departments (ie epidemiology, public health), and the most and least publishing (per fte) department). We sent an invitation e-mail to explain the objective of the study, using neutral terms such as ‘achievement’, ‘motivation’, ‘personality’ and ‘scientific success’, and provided them with a link to an anonymous online questionnaire on a protected website.

Scientists who did not respond within 2 weeks were sent 2 reminders. After the second reminder we asked invited participants who still did not respond to fill in an ultra-brief survey to determine their reason for declining participation.

Ethical approval

The ethical Review Committee of Vrije University medical centre (VUmc) approved the protocol and confirmed that the Medical Research Involving Human Subjects Act (WMO) does not apply. In the email to the participants, we explicitly stated that full protection of their identity was guaranteed.

Survey characteristics and outcomes

The survey contained, apart from demographic data and job specific questions, six (validated) questionnaires.

To measure personality traits, we used the Dark Triad (testing narcissism, Machiavellianism and psychopathy),⁴ the NEO Big Five testing neuroticism, extraversion, openness, conscientiousness and agreeableness),⁵ the Achievement Motivation Inventory⁶ and the Rosenberg Self-Esteem questionnaire.⁷

Machiavellianism is often described as ‘to be unemotional, detached from conventional morality and prone to deceive and manipulate others, focused on unmitigated achievement and high priority of own performances’.⁸ Narcissism is referred to a ‘tendency to pursue gratification from vanity or egotistic admiration and recognition of one’s own attributes’⁹ and psychopathy is characterized by ‘enduring antisocial behavior, diminished empathy and remorse, and disinhibited or bold behavior’.¹⁰

Research misbehaviour was measured by a composite scale (See supplementary table S2) based on questionnaires used by investigators with additional items gathered from different landmark publications on research misbehaviour.¹¹⁻¹³ To measure publication pressure, we used the validated Publication Pressure Questionnaire (PPQ).¹⁴

Respondents provided demographic information on gender, age, academic position (PhD student, postdoc, (assistant, associate and full) professor), type of specialty; years working as a scientist, main professional activity (research, education, patient care or management), and Hirsch index.¹⁵ The survey was primarily designed to relate personality traits with research misbehaviour (manuscript submitted for publication).

Statistical Analysis

We used cluster analysis to explore the existence of different personality clusters of biomedical scientists, performed with SPSS version 20. With this technique participants were clustered into

groups that resemble each other more than they resemble the participants outside the group at issue. First we transformed the scores from the questionnaires into z-scores and then we fitted 2-cluster, 3-cluster and 4-cluster solutions, according to the standard methods described for cluster analysis.^{16;17}

As a validation procedure, we conducted a split-half cross-validation for the total group of respondents. Cohen's kappa was used to compare the agreement between estimated and predicted values of the three clusters.

Analysis of Variance was used to compare clusters. Associations were explored between the personality clusters and the demographic and job specific characteristics (including the research misbehaviour severity score, see supplementary table S1)

Results

In total, we used 1833 email addresses. Of these, 182 bounced because the address no longer existed or was inactive. Of the remaining 1651, 1098 invitees opened the email, 715 started the survey (response rate 65%) and 537 completed the survey (completion rate 49%). We excluded 2 participants who declared they were not scientifically active.

The demographic data of the complete responders are summarized in table 1.

(here table 1)

Cluster analysis

Cluster analyses revealed that a 3-cluster model derived from 6 personality questionnaires offered optimal discrimination (ANOVA $p < 0.001$ for all scales). These questionnaires were: the Rosenberg Self-Esteem questionnaire, the neuroticism subscale of the Neo-Big 5, the three

subscales of the Dark Triad (Machiavellianism, narcissism and psychopathy subscales) and the Achievement Motivation Inventory. Table 2 specifies the three clusters.

Cluster 1 (n=140) is characterized by high levels of neuroticism ('emotionally reactive and vulnerable to stress'¹⁸), self-esteem and achievement motivation. These scientists have relatively low levels of narcissism. We decided to label this cluster as 'Perfectionists'.

Cluster 2 (n=192) has relatively low scores on self-esteem and achievement motivation. They are honest, 'easy going', and have the lowest scores on neuroticism ('They tend to be calm, emotionally stable, and free from persistent negative feelings').¹⁹ These biomedical scientists also have the lowest scores in narcissism, Machiavellianism and psychopathy. By consensus of our mothers, we decided to call this cluster 'Ideal son-in-law'.

The third cluster (n=205) is characterized by the highest levels of Machiavellianism, narcissism and psychopathy and with low self-esteem scores and a relative low motivation to achieve. After hefty deliberation, we decided to label this cluster as the 'Sneaky grandiose'.

As a validation procedure, we conducted a split-half cross-validation of the data. This yielded Cohen kappas of 0.826 and 0.845 with p-values $p < 0.0001$), which can be interpreted as large.

(here table 2)

Who are these people?

Demographic and job-specific characteristics were compared between the clusters (see figure 1a-d, and supplementary table S2). 'Sneaky grandiose' was the dominant phenotype among men, whereas 'Ideal son-in-law' was most prevalent in female biomedical scientists. This suggests that 'Ideal daughter-in-law' may be a more appropriate label for this cluster. Perfectionists turned out

to be often under 40 years of age or PhD students. Full professors were rare among the Perfectionists and common among the Sneaky grandiose. That may explain why Perfectionists had a relatively low H-index. Personality clusters were evenly distributed in scientists under 40 years of age/PhD student, but progressively few perfectionists were found among biomedical scientists who were more senior, in terms of age, academic position or Hirsch index. Research misbehaviour severity and publication pressure scores differed between the clusters of biomedical scientists (see figure 1c and d). The ideal sons-in-law had lowest scores on the research misconduct severity score, whereas the sneaky grandiose cluster had the highest scores. The perfectionists reported the highest publication pressure.

Discussion

Salient findings and interpretation

To our knowledge, this is the first study that classifies personality traits in biomedical scientists. We identified three personality clusters. To make a career in biomedical science (more postdoctoral and professor positions, higher H-index), the data suggest, you need to be either an ideal son-in-law or a sneaky grandiose. The sneaky grandiose, however, display narcissistic, Machiavellianistic and psychopathic traits, have low self-esteem and high neuroticism. Their personality may predispose them to scientific misbehaviour. Hence we suggest targeting ideal sons (or daughters)-in-law for future key positions in biomedical science.

A previous study on personality traits of biomedical scientists included only those who were found guilty of research misconduct.²⁰ Hence, selected participants were all ‘rotten apples’, not representative of the whole spectrum of biomedical scientists. Nevertheless, some similarities are arresting. That study also unearthed (among other profiles) a personality profile called ‘the

grandiose', with a similar pattern of personality traits. No other studies to date are available on personality traits or personality clusters in biomedical or other scientists. Why are sneaky grandiose overrepresented in higher academic ranks? One possibility is that the character of many biomedical scientists evolves into this phenotype after prolonged exposure to a hostile environment, which includes perverse incentives,²¹ hypercompetition,²² and many bad examples and cheating role models.¹³ The alternative explanation is that it is simply a matter of selection, where perfectionists are the first to be expelled from academia, and the sneaky grandiose have only ideal sons-in-law left to compete with. Without longitudinal studies, these questions are impossible to answer with certainty. However, narcissistic and psychopathic personality traits are predominantly genetically determined,²³ suggesting that evolution of such traits within a relatively short period of adulthood is unlikely to play a large role.

Comparison with existing literature in normal population revealed that the levels of the subscales of the Dark Triad (including Machiavellianism) are comparable with the most recent literature⁴ suggesting that the traits are no higher in biomedical researchers than in the general public. However, the sneaky grandiose cluster has high levels of the three subscales of the Dark Triad compared with general public.⁴

One strength of our study is that the split-half cross-validation suggested high validity.

Furthermore, we included a relatively large number of participants and had a high response rate (65%) compared to average response rates in web-based surveys.^{24;25} Moreover, respondents were blinded to the primary objective of this study, which makes it implausible that response bias has influenced the results.

Although we felt that it was highly unlikely that our study has limitations (see competing interests), some limitations have to bear in mind. This includes the cross sectional design of our

study and the lack of a clear theoretical base for the findings. This makes longitudinal causal inferences regarding personality traits troublesome.

Another important bias is in the profile itself. Since the filthy grandiose profile is easily engaged in research misconduct, we should take that into account when we analyse and interpret the data; it will be very likely that respondents belonging in this cluster were not completely sincere while participating in our survey and might have made up their answers. After adjusting for this bias, it's likely that the real levels of narcissism and psychopathy will turn out to be much higher

Unravelling a psychiatric disorder?

Our cluster analysis identifies a large proportion of medical scientists, mostly elderly males in high positions, belonging to the 'sneaky grandiose' personality cluster. It is certainly conceivable that a subset of the 'sneaky grandiose' have extreme levels of the Dark Triad traits as seen in the interquartile ranges within this cluster (see table 2). Some of the characteristics of sneaky grandiose scientists resemble features of the narcissistic and psychopathic personality disorders, which are existing classifications in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR) and the International Statistical Classification of Diseases (ICD-10). However, no psychiatric disorder describes the complete phenotype of extreme sneaky grandiose, whose key symptoms are described in Box 1. Since individuals suffering from more extreme features of the sneaky grandiose may pose a heavy burden to themselves and their surroundings, we propose a new psychiatric disorder: Publiphilia Impactfactorius (PI). We suggest this affliction should be considered while revising the DSM-IV TR or ICD-10. Auspiciously, the abbreviation of the syndrome parallels that of Principle Investigator.

How can you recognize Publiphilia Impactfactorius?

Individuals that suffer from PI can be recognized by obsessive preoccupation with citation indices, a strong urge to publish in high impact factor journals, profound despair and tantrum episodes after rejection of a manuscript, paranoid thoughts and envy towards colleagues, obsessive focus on authorship ranks, greed for higher academic positions, and a propensity to cut corners or worse. Some even have rage attacks after noticing that their Hirsch index had not risen since they looked at it a few days earlier. They are very much afraid of failure and believe that the end always justifies the means. They make tactical (for them beneficial) decisions in research collaborations, manipulate others to get things done and if needed, they are intentionally nasty and rude to coworkers, especially to junior colleagues. They easily lie and deceive to get ahead (see Box 1).

What can you do?

For the short term it is advisable to make significant changes to selection and promotion criteria. Researchers with PI might not be the talented new colleague of your preference that will give your department an honest boost in collaboration and trustworthiness. What institutions probably need – especially in leadership positions - are sincere, quiet, honest, trustworthy high achievers. Selection procedures should aim at recruiting ideal sons-in-law. To accomplish this, board members and head of research departments should bring their mother-in-law to the job interviews to select the ideal candidate. Or they can also directly appoint one of the female candidates, as PI seems to be very rare among them.

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Diagnostic Criteria for Publiphilia Impactfactorius

- A. Five (or more) of the following symptoms are present:
1. Has a grandiose sense of self-importance (exaggerates scientific achievements and talents, demands admiration from inferiors)
 2. Is preoccupied with fantasies of publications in high impact factor journals (New England Journal of Medicine and higher)
 3. Selfish in all professional behavior, never altruistic
 4. Lack of remorse, being indifferent to or rationalizing having hurt, mistreated or stolen from colleagues or co-authors
 5. Manipulative in all professional relations and often using confidential information against colleagues
 6. Can be impulsive, out of control and emotionally unstable, especially when coworkers contradict their beliefs and opinions
 7. Continuously comparing their H-index with others with a view to confirm their own grandiosity. If colleagues have higher H-indexes, this can cause extreme envy and disgust
 8. Emotional dependence on frequent publishing
 9. Unable to cope with rejections of manuscripts or grant proposals
- B. Evidence for having engaged in at least one of the following questionable research practices¹
1. Turned a blind eye to colleagues' use of flawed data or questionable interpretation of data
 2. Frequently demanding honorary and guest authorships without contribution
 3. Decided to collect more data after seeing that the results were almost statistically significant
 4. Not disclosed a relevant financial or intellectual conflict of interest
- C. Having had at least 5 years of scientific work experience
- D. Evidence that the pervasive pattern of symptoms was not displayed (yet existent) at the onset of his scientific career
- E. Having a higher academic rank such as assistant, associate or full professor

¹ These 4 research misbehaviours were independently associated with higher incidences in the sneaky grandiose cluster ($p < 0.05$).

Tables

		N=535	%
Gender	Male	229	42.8%
	Female	306	57.2%
Age	<40	396	74
	>40	139	26
Academic Position	PhD student	303	56.6%
	Postdoc, Assistant or Associate Professor	177	33.1%
	Full Professor	55	10.3%
Years working as a scientist	0-4	220	41.1%
	5-10	158	29.5%
	11-15	46	8.6%
	16-20	35	6.7%
	21-25	26	4.7%
	>25	49	9.2%

Table 1. Demographics

	Mean (95% CI) (n=535)	Clusters of biomedical scientists					
		I (n=140)		II (n=193)		III (n=202)	
		Mean (95% CI)	z-scores	Mean (95% CI)	z-scores	Mean (95% CI)	z-scores
Narcissism (Range 13-35)	25.2 (CI 24.9 – 25.6) IQR 22-27	22.5(CI 21.9 – 23.1) IQR 20-25	-0.66	23.8(CI 23.2 – 24.2) IQR 22-26	-0.36	28.5(CI 28.1 – 28.8) IQR 27-30	0.79
Machiavellianism (Range 9-38)	25.0 (CI 24.6 – 25.3) IQR 21-26	26.0(CI 25.3 – 26.6) IQR 23-27	0.24	21.7(CI 21.2 – 22.1) IQR 19-24	-0.78	27.4 (CI 26.9 – 27.9) IQR 25-30	0.58
Psychopathy (Range 9-30)	18.2 (CI 17.8 – 18.5) IQR 14-20	19.1(CI 18.4 – 19.7) IQR 17-21	0.21	15.2 (CI 14.8 – 15.6) IQR 13-17	-0.75	20.5(CI 20.0 – 20.9) IQR 18-23	0.56
Achievement Motivation (Range 14-35)	20.9 (CI 20.6 -21.3) IQR 17-23	23.5(CI 22.8 – 24.1) IQR 21-26	0.64	20.7(CI 20.2 – 21.2) IQR 18-24	-0.05	19.4 (CI 18.9 – 19.8) IQR 17-21	-0.39
Self Esteem (Range 10-32)	18.4 (CI 18.0 – 18.7) IQR 15-20	22.3(CI 21.8 – 22.8) IQR 20-24	1.02	17.1(CI 16.7 – 17.6) IQR 15-20	-0.32	16.8 (CI 16.4 – 17.2) IQR 15-19	-0.40
Neuroticism (Range 4-20)	10.1 (CI 9.9 – 10.4) IQR 7-13	12.5(CI 12.0 – 13.0) IQR 10-15	0.73	8.8 (CI 8.4 – 9.2) IQR 7-11	-0.41	9.8 (CI 9.3 – 10.2) IQR 8-12	-0.11
		Perfectionist		Ideal son-in-law		Sneaky grandiose	

Table 2. The mean scores, 95% CI and the z-scores for the 6 personality traits are provided for both the total group of participants and for the 3 personality clusters. According to cluster analysis methods, cluster differences with ANOVA were statistically significant for all 6 traits ($p < 0.001$)

Figures

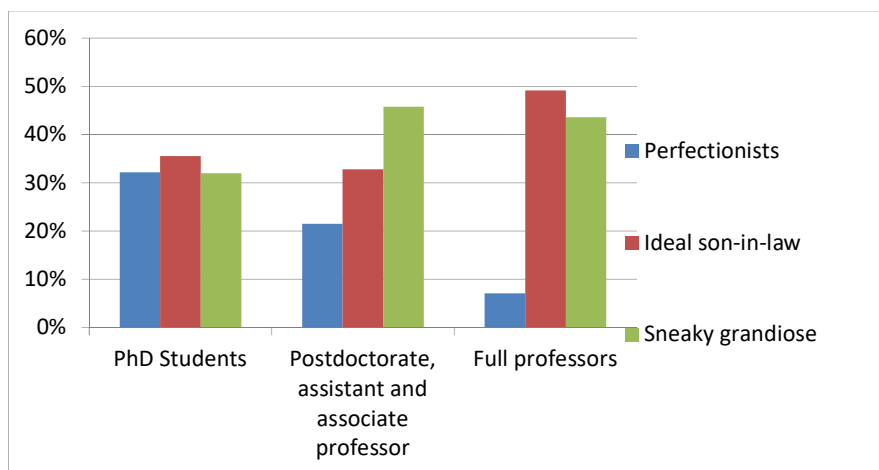


Figure 1a. respondents (in %) per academic rank, stratified for the 3 clusters ($p < 0.001$)

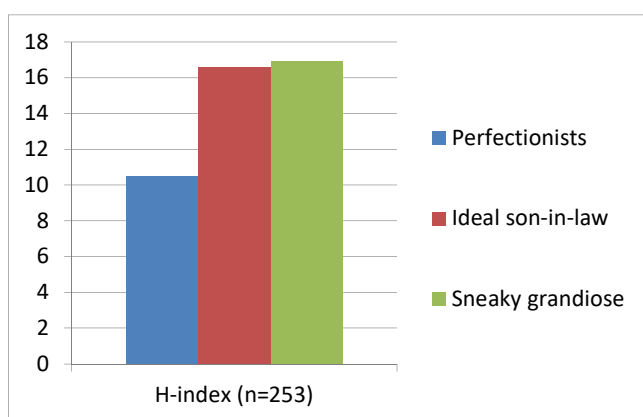


Figure 1b. The H-index, stratified for the 3 clusters ($p = \text{NS}$).

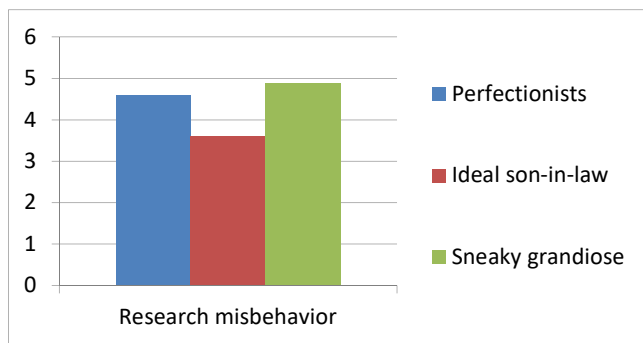


Figure 1c. Research misbehaviour severity score, stratified for the 3 clusters ($p < 0.05$).

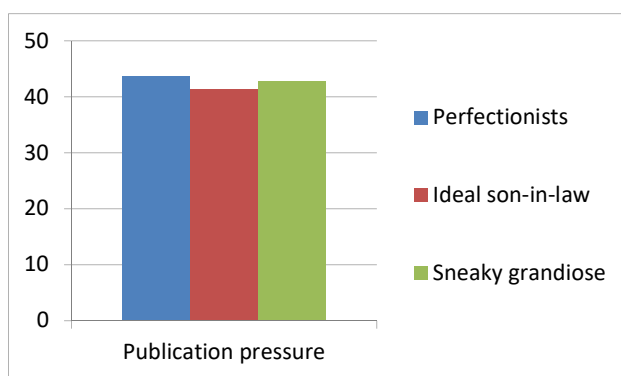


Figure 1d. Perceived publication pressure, stratified for the 3 clusters ($p < 0.01$).

Competing interests

All authors have completed the ICMJE uniform disclosure form at and declare no support from any organization for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

However, the authors are all diagnosed to be sneaky grandiose and as being borderline cases of Publiphilia Impactfactorius. JT's main symptoms include an immeasurable and unconditional sense of grandiosity. His inability to cope with rejections, and to write endless rebuttals to editors after each rejection is internationally recognized, and has placed him on a 'publication black list' of most editors of high impact factor journals.

YS's primary concern is his citation indicators. His obsession with citations has resulted in an avalanche of self-citations. The compulsion that every article should at least contain 3 self-citations is the most eye-catching symptom, as evidenced by the present manuscript. He also publishes otherwise insignificant papers containing citations to his papers under 4 pseudonyms.

LB is addicted to checking his Hirsch Index almost on a weekly basis. He sometimes checks the Web of Science (105 on July 29th, 2015), but likes Google Scholar most because its higher value (144 on July 29th, 2015). Every additional point gives him a feeling of intense happiness that unfortunately tends to last shorter over time, due to the so-called tolerance symptom.

Contributorship

JT, YS and LB all had substantial contributions to the conception or design of the work. JT was responsible for the acquisition of the data. JT, YS, and LB were involved in the analysis and interpretation of data for the work;

JT, YS, and LB drafted the work or revised it critically for important intellectual content and gave final approval of the version to be published;

JT, YS, and LB all agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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- No funding source supported this study.
- The authors expect no financial benefit from the possible introduction of PI in the revised editions of the DSM-IV TR or the ICD-10. However, they have advanced plans for opening a treatment and wellness centre for Principal Investigators suffering from Publiphilia Impactfactorius.

Acknowledgement

We would like to thank all ‘patients’ (☺) that participated in our survey. We hope that recognition of their symptoms and suffering will stimulate future research leading to options for prevention and therapy.

Furthermore a special thanks to our biostatistician Francisca Gallindo Garre for her remarkable statistical knowledge and help.

Transparency declaration

Joeri Tjldink affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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