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Clinical Features, Prevalence and Psychiatric Complaints in Subjects with Fear of Vomiting

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Specific phobia of vomiting (also known as emetophobia) is a relatively understudied phobia with respect to its aetiology, clinical features and treatment. In this stage, research is mostly based on people with self-reported fear of vomiting. This paper presents a survey on the clinical features of fear of vomiting of individuals. Self-reported vomit-fearful subjects from the Dutch community and from an Internet support group are included. Both vomit-fearful groups were characterized by high reports of fear, the presence of panic symptoms, and by extensive avoidance and safety behaviours. They also reported other psychiatric complaints, which were measured with a structured screening instrument. Vomiting complaints started mostly in late puberty. A significant proportion of the vomit-fearful participants had a treatment history. The prevalence rate of fear of vomiting in the community sample was established at 8.8% (female : male ratio = 4:1). Overall, results show that fear of vomiting is a common phenomenon, which can seriously impair daily functioning. Finally, clinical questions to be addressed in future research are formulated.

Key Practitioner Message:

- Specific phobia of vomiting (also known as emetophobia) is among the least studied phobias.
- Most clinical data come from research with self-described fear of vomiting.
- This paper presents data on the clinical features, prevalence and additional psychiatric complaints of fear of vomiting in two vomit-fearful samples and one control sample with no fear of vomiting.
- Estimates of prevalence of fear of vomiting in a Dutch community sample were established at 1.8% for men and 7% for women.
- Evidence suggests that fear of vomiting is a chronic and disabling condition that may cause significant impairment in daily functioning.

Keywords: Fear of Vomiting, Specific Phobia of Vomiting, Emetophobia, Prevalence, Clinical Features, Survey

INTRODUCTION

According to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) criteria (APA, 2000), irrational fears of vomiting and avoidance behaviours related to vomiting situations are classified as a specific phobia of vomiting. Although only very limited clinical and scientific knowledge exists on this phobia, it is not a rare condition in clinical practice.

Interestingly, this specific phobia of vomiting seems to come in various guises (McNally, 1997). For some patients, their greatest fear pertains to vomiting as such, whereas others predominately fear that other people vomit in their presence. Fear of others vomiting may be primarily related to fear of contamination and therefore of vomiting oneself. Still, others' worst fear is that they might vomit in a public place or social situation in the presence of other people. Fear of negative social evaluation and shame can be part of the clinical picture (Marks, 1987), seemingly regardless of the primary locus.

To our knowledge, there are only two more elaborate descriptive studies on clinical features of fear of vomiting. Lipsitz, Fyer, Paterniti, and Klein (2001) conducted an Internet survey involving 56 mostly female participants. Results suggested that emetophobic complaints started before puberty and followed a chronic course. Lifetime rates of psychiatric problems were established in a non-systematic manner and revealed that participants had suffered in the past or suffer at present from various anxiety disorders (specific phobia, panic disorder, social phobia, obsessive–compulsive disorder and childhood separation anxiety) and/or depression. Apart from separation anxiety, reported problems all started after the onset of fear of

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vomiting. About 50% of the respondents reported that they experienced panic attacks that were unrelated to fear of vomiting.

Veale and Lambrou (2006) conducted an exploratory survey involving hundred self-reported vomit phobics and explored the similarities and differences in psychopathology with regard to panic disorder patients in comparison with non-clinical controls. Also, in this study, female vomit phobics were in an overwhelming majority. Furthermore, indications were found not only for a major overlap in cognitive processes and behaviours with panic disorder, but also for a significant overlap in phenomenology with obsessive–compulsive disorder and health anxiety, and some overlap with social anxiety emerged.

The key processes that seem to maintain fear of vomiting are the elaborate avoidance and safety-seeking behaviours, selective attention for internal sensations as well as hypervigilance for seeing others vomiting. Consequently, vomit-fearful subjects engage in monitoring interoceptive stimuli such as nausea (Hunter & Antony, 2009), perform checking behaviours on, e.g., food expiration dates (Veale & Lambrou, 2006), and avoid situations like eating in a restaurant and visiting sick people (Bouman & van Hout, 2006). Female patients even postpone getting pregnant because they fear the anticipated first-trimester vomiting (Lipsitz et al., 2001) or terminate pregnancy because of their fear of vomiting (Veale & Lambrou, 2006). Also, eating rituals and significant food restriction have been reported (Lipsitz et al., 2001; Veale & Lambrou, 2006). Thus, fear of vomiting can have profound consequences for the subjects' daily life.

Given the limited data on fear of vomiting in the literature, this paper is a further conceptual exploration of fear of vomiting. The study focuses on the clinical characteristics of fear of vomiting (i.e., locus of fear, feared consequences, avoidance and safety behaviours, and psychiatric complaints). The psychiatric complaints were established systematically using a diagnostic screening instrument. We also screened a control group of subjects from the community without fear of vomiting on psychiatric complaints by using the same structured psychiatric screening instrument. Also, information regarding prevalence of fear of vomiting, general health status, vomit history and treatment history of vomit-fearful individuals was gathered. These clinically important facets are addressed in a survey involving two self-reported vomit-fearful groups (a community sample and an Internet support group).

METHOD

Participants

Participants were recruited from members of the Dutch community who were asked to participate by mail and from participants who responded to an announcement on a Dutch Internet website representing a support group for emetophobia.

Community Participants

A total of 1100 letters were sent to randomly selected addresses all over the Netherlands. The receivers of these letters were asked to participate in the study (to get insight into the characteristics of fear of vomiting for better recognition of the complaint) and could do so by returning a reply card with their names and addresses. Next, they received a questionnaire booklet (see Measurements section). A total of 233 questionnaire booklets were sent to interested participants; 173 (74%) were returned, and 171 booklets could be used for data analyses. Fifteen of the 171 respondents (8.8%) from the community sample answered affirmatively to the question 'At present are you afraid to vomit (e.g. vomit yourself or see other people vomit)?' Thus, respondents in the community sample were divided into a control group of participants without fear of vomiting (control community group; $n = 156$) and a group of vomit-fearful participants (vomit-fearful community group; $n = 15$).

Internet Participants

The participants from the Internet support group (vomit-fearful Internet group) were recruited by placing an announcement on an emetophobia self-help website. Of the 22 participants who expressed their interest, 19 (86.4%) returned the set of questionnaires that had been sent to them by mail. They all responded positively to the question on fear of vomiting.

Measurements

Emetophobia Inventory

For the purpose of this study, we developed a broad-spectrum questionnaire based upon the available literature as well as upon the authors' clinical experiences with emetophobic patients. In case of an affirmative answer to the question 'Are you afraid of vomiting?', respondents were asked to answer additional questions related to emetophobic phenomenology (i.e., fear and avoidance, actual vomiting behaviour, emetophobic cognitions, avoidance and safety-seeking behaviours) and aetiology (i.e., age of onset). The content of the questions is shown in Tables 2 and 3.

Psychiatric Diagnostic Screening Questionnaire

The Psychiatric Diagnostic Screening Questionnaire (PDSQ) is a self-report questionnaire that reliably and validly screens for the most prevalent DSM-IV Axis I disorders (Zimmerman & Mattia, 2001; Dutch version PDSQ-NL: Arrindell, 2004). A condensed version was used in the present study, supplemented with questions on panic

symptoms. This resulted in a 32-item questionnaire probing for the presence (in a 'yes' or 'no' format) of symptoms of depression, obsessive–compulsive disorder, panic disorder, agoraphobia, social phobia and hypochondriasis. The original cut-off scores of the PDSQ (Zimmerman & Mattia, 2001) were used to classify psychopathology in DSM-IV categories (see Tables 4 and 5).

Statistical Analysis

Depending on the nature of the variables, differences between groups were tested using one-way ANOVAs. Least significant difference tests were used for *post hoc* comparisons. Kruskal–Wallis or Mann–Whitney tests were applied on ordinal-level variables for comparing three and two groups, respectively. Fisher's Exact Tests (using a Monte Carlo method) were used for differences between nominal variables. Alpha was set at the conventional 5% level (two sided). In case of multiple testing, a Bonferroni correction was applied.

RESULTS

Demographic Variables

Fear of vomiting was surprisingly common in the Dutch community sample. The point prevalence rate of fear of vomiting was 8.8%. The proportion of women in this group was four times higher than the proportion of men.

Demographics of the vomit-fearful groups and control group without fear of vomiting are presented in Table 1.

There is a female predominance in both vomit-fearful groups (Fisher's Exact Test, $p = 0.005$). The vomit-fearful Internet participants were significantly younger ($F(2,172) = 20.04$, $p < 0.0001$) and comprised more students than the other groups (Fisher's Exact Test, $p < 0.005$).

The vomit-fearful groups were treated separately in the statistical analyses as they differed significantly on relevant variables.

Phenomenology of Fear of Vomiting

Severity of Fear of Vomiting and Avoidance Behaviours

The degree of fear and avoidance of vomiting related situations was rated on a nine-point Likert scale (0 = 'I'm not afraid at all'/'I never avoid the situation', 8 = 'I am very afraid'/'I always avoid the situation'). The three groups showed significant mean differences on fear ($F(2,185) = 213.42$, $p < 0.0001$) and avoidance ($F(2,185) = 102.83$, $p < 0.0001$). As expected, *post hoc* analyses revealed that the vomit-fearful Internet participants (fear: M = 5.53, standard deviation [SD] = 2.4; avoidance: M = 5.16, SD = 1.57) and vomit-fearful community participants (fear: M = 4.33, SD = 2.6; avoidance: M = 5.6, SD = 1.99) reported a significantly higher degree of fear and avoidance than the control group without fear of vomiting (fear: M = 0.34, SD = 0.7; avoidance: M = 0.9, SD = 1.61). As much as 13.9% of the control community group reported the tendency to avoid vomiting-related situations.

Locus of Fear of Vomiting

The locus of fear was independent within the vomit-fearful groups (Fisher's Exact Test, $p > 0.05$). Overall, the majority of the vomit-fearful participants (76.8%) reported to fear vomiting themselves, whereas 40.3% of the participants were afraid to vomit in the presence of other people, and 45% feared to see others vomiting. About a fifth (21.2%) feared a combination of all three vomiting-related situations.

Avoidance and Safety-seeking Behaviours

The question 'How do you control your anxiety?' was answered by the vomit-fearful participants by indicating which of 21 alternatives were applicable (see Table 2).

A number of avoidance and safety-seeking behaviours, such as checking the expiration date of food, avoiding drunk or sick people and carrying or taking antacid medication, were relatively prevalent in both vomit-fearful groups. Checking the expiration date of

Table 1. Demographics of vomit-fearful community group, vomit-fearful Internet group and control community group without fear of vomiting

	Control	Vomit fearful	
	Community group ($n = 156$)	Community group ($n = 15$)	Internet group ($n = 19$)
	% (n)	% (n)	% (n)
Sex			
Male	43.6 (68)	20.0 (3)	10.5 (2)
Female	56.4 (88)	80.0 (12)	89.5 (17)
Age (M (SD))	47.4 (14.6)	46.4 (17.8)	25.2 (4.3)
Education			
Low	21.8 (34)	26.7 (4)	36.8 (7)
Middle	23.7 (37)	40.0 (6)	36.8 (7)
High	54.5 (85)	33.3 (5)	26.3 (5)
Marital status			
Without partner	29.5 (46)	20.0 (3)	52.6 (10)
With partner	70.5 (110)	80.0 (12)	47.4 (9)
Unemployment benefit			
Yes	20.5 (32)	6.6 (1)	31.6 (6)
No	79.5 (124)	93.4 (14)	68.4 (13)
Job			
No employment	30.8 (48)	40.0 (6)	31.6 (6)
Part time	25.0 (39)	46.7 (7)	31.6 (6)
Full time	41.7 (65)	13.3 (2)	15.8 (3)
Student	2.6 (4)	0.0 (0)	21.0 (4)

SD = standard deviation.

Table 2. Fisher's Exact Tests for avoidance and safety-seeking behaviours in vomit-fearful participants

	Vomit fearful		*p*
	Community group	Internet group	
	n = 15 (%)	*n* = 19 (%)	
Buying and eating easily digestible food	6.7	15.8	0.61
Checking food for expiration date	40	89.5	0.003
Refusing eating food prepared by others	6.7	10.5	1.0
Postponing pregnancy	0	47.4	0.002*
Avoiding sick people and children	26.7	73.7	0.01
Avoiding drunk people	40	68.4	0.16
Avoiding using alcohol	6.7	63.2	0.001*
Carrying something to eat to prevent nausea	6.7	10.5	1.0
Not using of medication for fear of side-effects	6.7	42.1	0.05
Making sure to find the toilet in public buildings	6.7	63.2	0.001*
Frequent washing of hands	0	42.1	0.005
Avoiding visiting foreign countries	6.7	63.2	0.001*
Avoiding parties and other social situations	0	31.6	0.02
Wearing comfortable clothing	13.3	5.3	0.57
Avoiding driving a car, using public transport	6.7	31.6	1.0
Avoiding unpleasant smells	33.3	26.3	0.72
Using chewing gum	13.3	42.1	0.13
Carrying or taking stomach pills	33	53	0.31
Avoiding certain TV programmes	7	26	0.20
Not visiting dentist or physician	0	21	0.11
Other	7	32	0.10

*$p \leq 0.002$.
Bonferroni correction ($\alpha^* = 0.05/21$).

food, postponing pregnancy, avoiding alcoholic beverages, making sure to reach a public toilet in time and not having holidays abroad were even more prevalent among the vomit-fearful Internet participants. In line with this, the mean total number of avoidance and safety-seeking behaviours was significantly higher among the vomit-fearful Internet participants (M = 8.58, SD = 4.56) than among the vomit-fearful community participants (M = 2.86, SD = 1.83) ($t(31) = 4.42$, $p < 0.0001$).

Feared Consequences of Vomiting

On the question 'When anxious, what do you fear most?', four out of eight possible answers were endorsed by at least 20% of the vomit-fearful respondents. 'Getting contaminated and becoming ill' was reported by 47.4% of the vomit-fearful Internet participants in contrast to none of the vomit-fearful community participants (Fisher's Exact Test, $p = 0.002$, Bonferroni correction ($\alpha^* = 0.05/7$): $p < 0.007$). All vomit-fearful Internet participants reported 'fear of nausea and vomiting' in comparison with 66.7% of the vomit-fearful community participants (Fisher's Exact Test, $p > 0.007$). No significant relationships were found between groups in thoughts on 'fear of panic' and on 'fear of loss of control', although respectively 29.4% and 38.2% of the vomit-fearful participants reported these thoughts as possible consequence. Only 2.9% of the vomit-fearful subjects feared 'getting a heart attack'.

Vomiting History and General Health Status

Vomiting History and Frequency of Vomiting

No significant difference was found between the three groups with regard to the number of times the respondents actually vomited over the past 10 years (Kruskal–Wallis test: $\chi^2(2) = 4.55$, $p = 0.103$). In all three groups, the modal frequency was 'less than one time a year'. There was, however, a difference between groups in the time since they vomited for the last time (Kruskal–Wallis test: $\chi^2(2) = 8.02$, $p = 0.018$). In the control community group, the highest percentage (42.9%) was between 1 and 5 years ago, whereas the largest proportion (42.1%) among the vomit-fearful Internet participants reported 5 to 10 years passed since they vomited for the last time. The majority of the vomit-fearful community participants (53.3%) reported a more recent period (between 6 months and 2 years). Only the difference between the control community group and the vomit-fearful Internet group reached statistical significance ($U = 886.5$, $p = 0.005$).

General Health

As can be seen in Table 3, the control community group reported a significantly better self-perceived physical health. Univariate analysis of variance with age as a covariate showed, however, that this effect can be explained by differences in group ages (covariate was significant, $p = 0.003$). Results showed that the control community group was less likely to receive a treatment for physical complaints compared with the vomit-fearful participants. Groups did not differ significantly on past treatment for digestive tract symptoms.

Age of Onset and Treatment History

Onset Age

The vomit-fearful groups did not differ significantly on age of onset. The modal age of onset was between 13 and 18 years.

Table 3. Fisher's Exact Tests for general health and treatment history

	Control	Vomit fearful		*p*
	Community group	Community group	Internet group	
	(*n* = 156) (%)	(*n* = 15) (%)	(*n* = 19) (%)	
Physical health				0.003**
Excellent/good	74.4	46.7	42.1	
Reasonable/moderate	23.7	46.7	42.1	
Bad/very bad	1.9	6.7	15.8	
Current treatment for physical complaints	23.1	46.7	42.1	0.048*
Past treatment for digestive tract symptoms	21.8	40	42.1	0.06
Past treatment for fear of vomiting	n/a	6.7	89.5	0.0001**
Current treatment for fear of vomiting	n/a	13.3	52.6	0.03*

*$p < 0.05$.
**$p < 0.01$.

Past and Current Treatments for Fear of Vomiting

It emerged that a significant larger proportion of the vomit-fearful Internet participants compared with the vomit-fearful community participants reported a past or current treatment experience for fear of vomiting (see Table 3). Among the vomit-fearful Internet participants, 89.5% sought help in the past, and 52.6% currently received some form of therapy. Unfortunately, it was not possible to establish the nature of the treatment.

Psychiatric Complaints According to the Psychiatric Diagnostic Screening Questionnaire, Dutch Version

Table 4 shows the proportion of (additional) psychiatric complaints as measured using the PDSQ-NL. A significant relation was found between groups and psychiatric complaints. In general, the rates for (additional) psychiatric complaints among the vomit-fearful Internet participants were significantly higher than in both community groups. Self-reported complaints referring to panic disorder, agoraphobia and social phobia were substantially more prevalent among the vomit-fearful Internet participants. Interestingly, also in the control group without fear of vomiting, psychiatric complaints were reported. There was an unexpected high prevalence (12.2%) of self-reported social phobic complaints.

Table 4. Fisher's Exact Tests for psychiatric complaints according to the Psychiatric Diagnostic Screening Questionnaire, Dutch version

Disorder	Control	Vomit fearful		*p*
	Community group	Community group	Internet group	
	n = 156 (%)	*n* = 15 (%)	*n* = 19 (%)	
Depression	2.6	13.3	21.1	0.003*
OCD	2.6	26.7	31.6	0.0001*
Panic disorder	7.1	20	52.6	0.0001*
Agoraphobia	5.8	20	84.2	0.0001*
Social phobia	12.2	19.5	63.2	0.0001*
Hypochondriasis	5.8	7.9	26.3	0.016

*$p < 0.008$.
Bonferroni correction ($\alpha^* = 0.05/6$).
OCD = obsessive–compulsive disorder. PDSQ-NL = Psychiatric Diagnostic Screening Questionnaire, Dutch version.

The total number of self-reported complaints referring to psychiatric disorders differed significantly between the three groups ($F(2,56) = 7.38$, $p = 0.001$; control community group: M = 1.6, SD = 1.2; vomit-fearful community group: M = 2.7, SD = 1.4; vomit-fearful Internet group: M = 2.9, SD = 1.3). Both vomit-fearful groups did not differ from each other on the total number of disorders but showed significantly higher mean figures than the control group without fear of vomiting ($p < 0.001$).

The respondents were also asked to indicate whether the DSM-IV panic symptoms would apply to them if they were anxious (response: 'yes' or 'no').

Table 5 shows that all (100%) of the vomit-fearful Internet participants reported nausea or gastric complaints when anxious compared with 46.7% of the vomit-fearful community participants and 29.7% of the control community group. Over 60% of the vomit-fearful Internet participants perceived a variety of panic symptoms: palpitations perspiration, trembling, feeling of suffocation, chest pain or pressure, dizziness and faintness, derealization, hot and cold flushes, fear of losing control or getting mad.

The mean number of panic symptoms differed significantly between the three groups ($F(2,164) = 42.47$, $p < 0.0001$; vomit-fearful Internet group: M = 8.53, SD = 2.07; vomit-fearful community group: M = 4.36, SD = 2.44; control community group: M = 3.04, SD = 2.19). The

Table 5. Fisher's Exact Tests for perceived panic symptoms

Symptom	Control	Vomit fearful		*p*
	Community group	Community group	Internet group	
	n = 156 (%)	*n* = 15 (%)	*n* = 19 (%)	
Palpitations or racing heart	48.1	46.7	63.2	0.48
Sweating	51	40	73.7	0.11
Trembling of shaking	29.5	53.3	94.7	0.0001*
Shortness of breath or difficulty breathing	18.4	20	47.4	0.02
Choking sensations	18.7	26.7	84.2	0.0001*
Chest pain	17.3	20	63.2	0.0001*
Nausea or stomach upset	29.7	46.7	100	0.0001*
Dizziness, feeling of fainting	19.5	33.3	63.2	0.0001*
Feeling unreal	21.9	20	68.4	0.0001*
Fear of losing control or going crazy	9	26.7	73.7	0.0001*
Fear of dying	5.8	26.7	21.1	0.006
Tingling sensations or numbness	9	6.7	31.6	0.02
Cold and hot flushes	30.1	40	68.4	0.005

*$p \leq 0.004$.
Bonferroni correction ($\alpha^* = 0.05/13$).

vomit-fearful Internet participants perceived a significant ($p < 0.0001$) higher mean number of symptoms than both other groups.

Panic attacks (i.e., at least four panic symptoms, either related or unrelated to fear of vomiting) were experienced by 57.9% of the vomit-fearful Internet participants, 33.3% of the vomit-fearful community participants and 6.4% of the participants without fear of vomiting (Fisher's Exact Test, $p < 0.0001$).

DISCUSSION

The vomit-fearful Internet and community participants in this study had no formally established DSM diagnosis; still, they reported high levels of subjective fear and avoidance, a variety of panic symptoms when anxious, and developed elaborated avoidance strategies. These strategies included a vast variety of active and passive avoidance behaviours such as continuously checking the expiration date of food products and avoiding people who are sick—especially those affected with stomach flu—or drunk. The results of this study suggest that fear of vomiting is a chronic and disabling condition that may cause significant impairment in daily functioning. Severity indices of complaints found in our vomit-fearful samples are largely in line with the findings of Lipsitz et al. (2001) and of Veale and Lambrou (2006) on vomit-fearful subjects.

The vomit-fearful Internet subjects who participated in our study can be considered more seriously impaired than the vomit-fearful participants from the community sample, reporting more avoidance and safety behaviours and more panic symptoms. They mentioned gastric complaints when anxious and feared nausea and vomiting. Almost 90% of the vomit-fearful Internet group had been treated for fear of vomiting in the past, and more than half of the respondents still received treatment for their complaints.

Despite the fact that the main feared consequence of the vomit-fearful participants was to become nauseous and consequently to vomit, it appeared that they had very limited experience with vomiting themselves. The utilized avoidance behaviour seemed very successful in the prevention of vomiting as the fearful participants reported that years had passed since their last vomit experience. Interestingly, also some subjects in the control community group without fear of vomiting reported avoidance of potential vomiting situations but significantly less than the vomit-fearful Internet participants (see also Table 2). One might postulate that although vomiting is not very likely to occur in daily life, it has such potentially threatening capacities (e.g., related to disgust, illness and loss of control) that even subjects without fear of vomiting engage in some sort of avoidance to diminish the risk of vomiting.

Although, the main locus of the fear may vary between vomit-fearful patients, results show that there is a high degree of overlap between the loci. About a fifth of the vomit-fearful subjects reported fear of vomiting themselves, and of vomiting in the presence of others, and to see other people vomiting.

The chronic course and disabling consequences of fear of vomiting are also reflected in the early age of onset and additional psychiatric complaints. We found a modal age of onset between 13 and 18 years, which resembles the age of onset of 17 years found by Lelliot, McNamee, and Marks (1991). In line with Lipsitz et al. (2001), our vomit-fearful

subjects frequently recognized complaints that pertained to panic disorder, agoraphobia and social phobia. Although, we used a standardized widely used self-report measure to determine additional psychiatric complaints or disorders, a clinical interview is required to determine if it is a matter of true co-morbidity.

A high report of panic symptoms was found in the self-reported vomit-fearful participant groups. A significant proportions of the participants reported having four or more panic symptoms when anxious. However, we could not confirm the presence of panic attacks (according to the DSM-IV-R criteria), nor could we determine whether the panic symptoms were related or unrelated to fear of vomiting. The relationship between fear of vomiting and panic disorder warrants more study. Based on the cognitive model of panic (Clark, 1986), nausea (and possibly other sensations of anxiety) can become misinterpreted as evidence of impending vomit.

Since a proportion of the control community group without fear of vomiting reported psychiatric complaints (i.e., fears concerning social phobia, panic disorder, agoraphobia and hypochondriasis), it may be suggested that the method of recruitment may have led to sampling bias providing data with a disproportionately larger number of subjects with fears than one might expect from a truly representative community sample. The fact that these fears were surprisingly common in the Dutch community group resembles, however, findings from epidemiological surveys undertaken in the USA (the Epidemiologic Catchment Area Study: Myers et al., 1984; Robins et al., 1984) and the Netherlands (the Netherlands Mental Health Survey and Incidence Study: Bijl, Ravelli, & van Zessen, 1998).

Systematic data concerning the prevalence of fear of vomiting in the community are scant. Only two studies (Philips, 1985; Becker et al., 2007) reported prevalence estimates for fear of vomiting. Philips (1985) found prevalence figures of 3.1% for men and in 6% for women in the USA. Findings from the Dresden Mental Health Study found a lifetime prevalence rate of 0.2% and a point prevalence of only 0.1% in female participants. In our random Dutch community sample, fear of vomiting was present in 1.8% of the men and in 7% of the women. The point prevalence rate for the total sample was found to be even higher (8.8%) than the 1-month prevalence rate (5.5%) for specific phobia in the Netherlands (Bijl et al., 1998). These findings show that self-reported fear of vomiting is a frequent occurrence in the Dutch community. Note, however, that this finding might be an overestimation because it is based on a single question that does not follow DSM-IV guidelines on fear, avoidance and interference with person's daily life. The figures may include a group of subjects who experience more disgust, when seeing other people vomit, than fear. Although we explicitly asked the subjects to rate fear of vomiting, we can not rule out the possibility that the subjects rated (fear of) disgust rather than fear, which may have influenced the prevalence rates. Interesting in this respect is the suggestion of Massop (2005) that subjects with severe fear of vomiting avoid reading or writing the word 'vomit' and its many synonyms, which consequently may have influenced their response behaviour. This implies that we might have missed the more severe cases, suppressing this study's prevalence estimate as well as obscuring the more severe end of the fear of vomiting continuum. Altogether, it is not safe as yet to generalize the prevalence rates found in our community sample of vomit-fearful subjects to patients with specific phobia of vomiting.

This study has some limitations. First, a selection bias may be accountable for the relative low response from the original 1100 addresses (i.e., 21% requested the questionnaire, and 16% completed it). It is possible that only those who were interested in fear of vomiting requested the questionnaire. Second, psychiatric complaints were determined with the abridged version of the Dutch PDSQ-NL. The original cut-off scores of the PDSQ (Zimmerman & Mattia, 2001) were used because psychometrics for the Dutch population are not available. Therefore, the prevalence of psychiatric complaints should be considered as mere indications. Third, although a standardized questionnaire was used to measure the clinical features, the study can be criticized for the lack of a structured diagnostic interview. Note that in the absence of an interview, the PDSQ tends to overdiagnose disorders. Lastly, participants were classified into two categories (i.e., presence or absence of fear of vomiting) on the basis of only one question; that is, 'At present are you afraid to vomit (e.g. vomit yourself or see other people vomit)?' Therefore, it is not quite appropriate to generalize our results to a group of patients with a specific phobia of vomiting. The severity indices mentioned above, however, do support the notion that on average the participants are more than just slightly vomit-fearful respondents.

Results from research so far shows that the clinical picture of severe fear of vomiting and specific phobia of vomiting demonstrates some important differences and similarities with the diagnostic categories of either panic disorder (e.g., Veale & Lambrou, 2006), agoraphobia (e.g., Lipsitz et al., 2001), social phobia (e.g., Marks, 1987) and obsessive–compulsive disorder (e.g., O'Connor, 1983). Fear of vomiting can be best differentiated from other anxiety disorders on the basis of their main concern (i.e., fear of nausea and consequently vomiting), purpose of avoidance and safety behaviours (i.e., prevention of nausea and (exposure to) vomiting) and dominating anxiety symptoms (i.e., gastrointestinal symptoms). Panic attacks can be part of the clinical picture of a specific phobia of vomiting. To clarify problems with the classification of fear of vomiting, a formal DSM diagnosis with the use of a structured clinical interview is necessary. Next, psychometrically sound assessment instruments should be developed and administered (see, e.g., the

Emetophobia Questionnaire in Van Overveld, de Jong, Peters, van Hout, & Bouman, 2008).

Cognitive processes such as selective attention for internal sensations and hypervigilance for seeing others vomiting play an important role in the maintenance of vomiting fears. Based on our clinical experiences with (sub)clinical subjects and research on fear of vomiting so far, these processes are expressed in the three loci (fear to vomit themselves, fear that other people vomit in their presence and fear to vomit themselves in the presence of other people) in several ways. The fear to vomit themselves can be expressed by some subjects through fear and avoidance of direct confrontation with emetophobic stimuli like, for instance, unknown (e.g., exotic) or perishable food, because they fear to become sick and to vomit as a consequence. Other subjects are afraid to vomit because of a condition that produces nausea like pregnancy, car sickness or anxiety/panic. The fear that other people vomit in their presence can be expressed through two more indirect pathways. Some subjects fear vomiting through confrontation with people with a contagious gastroenteritis, whereas others fear to vomit as a reflex to confrontation with people perceived as having a greater risk of vomiting (e.g., drunk or sick people). The fears of vomit-fearful subjects that are afraid that other people see them vomiting contain a clear social component (i.e., shame, embarrassment). It is noticeable that nauseous feelings are often interpreted as predictor for the anticipated vomiting situation. This pattern can be seen both with fearful subjects that fear to vomit themselves as well as with subjects who focus mostly on the vomit signals of other people. So in the latter case, a pale face of a fellow traveller sitting in an uncomfortable position will be interpreted as a signal of stomachache or nausea and therefore signals that he/she will vomit in the near future.

At present, limited information is available on treatment opportunities and outcome effects in emetophobia (Bosschen, 2007). Because a considerable amount of vomit-fearful subjects develop additional psychiatric complaints, and because co-morbidity has disabling consequences on illness duration (e.g., Wittchen, Essau, & Krieg, 1991), and leads to more service utilization (Bijl & Ravelli, 2000), it is important to develop both secondary prevention programmes and treatments for fear of vomiting.

The ingredients for effective treatment of fear of vomiting are still unclear. There are several interesting clinical questions to be addressed in research. For example, is it necessary for vomit-fearful subjects to be confronted with vomiting sensations, vomiting images or vomiting sounds for optimal treatment effects (see also Philips, 1985)? Is interoceptive exposure to challenge feared symptoms (including symptoms of panic) an essential treatment ingredient (see also Hunter & Antony, 2009)? Or, is gradual exposure to avoided situations with the prevention of safety-seeking behaviours as proposed by Bouman and van Hout (2006) sufficient for vomit-fearful patients to profit from treatment? Furthermore, no results as yet are available on the effects of cognitive interventions in subjects with fear of vomiting.

Future research has to focus on the development of sound diagnostic assessment instruments and the improvement of the treatment options for this relatively prevalent complaint with its many appearances including patients with a diagnosis of specific phobia of vomiting.

REFERENCES

APA. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., Text Revision). Washington, DC: American Psychiatric Association.

Arrindell, W.A. (2004). *Dutch translation of the Psychiatric Diagnostic Screening Questionnaire (PDSQ)*. Groningen: Department of Clinical and Developmental Psychology, University of Groningen.

Becker, E.S., Rinck, M., Türke, V., Kause, P., Goodwin, R., Neumer, S., & Margraf, J. (2007). Epidemiology of specific phobia subtypes: Findings from the Dresden Mental Health Study. *European Psychiatry, 22*, 69–74.

Bijl, R.V., & Ravelli, A. (2000). Psychiatric morbidity, service use, and need for care in the general population: Results from the Netherlands Mental Health Survey and Incidence Study. *American Journal of Public Health, 90*, 602–607.

Bijl, R.V., Ravelli, A., & van Zessen, G. (1998). Prevalence of psychiatric disorder in the general population: Results of the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Social Psychiatry and Psychiatric Epidemiology, 33*, 587–595.

Bosschen, M.J. (2007). Reconceptualizing emetophobia: A cognitive–behavioral formulation and research agenda. *Journal of Anxiety Disorders, 21*, 407–419.

Bouman, T.K., & van Hout, W.J.P.J. (2006). CS-exposure werkt bij emetofobie. *Gedragstherapie, 39*, 127–138.

Clark, D.M. (1986). A cognitive approach to panic. *Behaviour Research and Therapy, 24*, 461–470.

Hunter, P.V., & Antony, M.M. (2009). Cognitive–behavioral treatment of emetophobia: The role of interoceptive exposure. *Cognitive and Behavioral Practice, 16*, 84–91.

Lelliot, P., McNamee, G., & Marks, I. (1991). Features of agora-, social, and related phobias and validation of the diagnoses. *Journal of Anxiety Disorders, 5*, 313–322.

Lipsitz, J.D., Fyer, A.J., Paterniti, A., & Klein, D.F. (2001). Emetophobia: Preliminary results of an Internet survey. *Depression and Anxiety, 14*, 149–152.

Marks, I.M. (1987). *Fears, phobias, and rituals*. New York: Oxford University Press.

Massop, M. (2005). *Misselijk van angst: Leven met een overgeeffobie*. Antwerpen: Houtekiet.

Myers, J.K., Weissman, M.M., Tischler, G.L., Holzer, C.E., III, Leaf, P.J., Orvaschel, H., Anthony, J.C., Boyd, J.H., Burke, J.D., Jr., Kramer, M., & Stoltzman, R. (1984). Six-month prevalence of psychiatric disorders in three communities: 1980–1982. *Archives of General Psychiatry, 41*, 959–967.

McNally, R.J. (1997). Atypical phobias. In G.C.L. Davey (Ed.), *Phobias: A handbook of theory, research and treatment*. Chichester: Wiley.

O'Connor, J.J. (1983). Why can't I get hives: Brief strategic therapy with an obsessional child. *Family Process*, *22*, 201–209.
Philips, H.C. (1985). Return of fear in the treatment of a fear of vomiting. *Behaviour Research and Therapy*, *23*, 45–53.
Robins, L.N., Helzer, J.E., Weissman, M.M., Orvaschel, H., Gruenberg, E., Burke, J.D., Jr, & Regier, D.A. (1984). Lifetime prevalence of specific psychiatric disorders in three sites. *Archives of General Psychiatry*, *41*, 949–958.
Van Overveld, M., de Jong, P.J., Peters, M.L., van Hout, W.J.P.J., & Bouman, T.K. (2008). An Internet-based study on the relationship between disgust sensitivity and emetophobia. *Journal of Anxiety Disorders*, *22*, 524–531.
Veale, D. & Lambrou, C. (2006). The psychopathology of vomit phobia. *Behavioural and Cognitive Psychotherapy*, *34*, 139–150.
Wittchen, H.-U., Essau C.A., & Krieg J.-C. (1991). Anxiety disorders: Similarities and differences of comorbidity in treated and untreated groups. *The British Journal of Psychiatry*, *159*, 23–33.
Zimmerman, M., & Mattia, J.I. (2001). The Psychiatric Diagnostic Screening Questionnaire: Development, reliability and validity. *Comprehensive Psychiatry*, *42*, 175–189.

