Screening for depression and anxiety: Correlates of non-response and cohort attrition in the Netherlands Study of Depression and Anxiety (NESDA)

WILLEM JAN VAN DER VEEN,¹ KLAAS VAN DER MEER¹ & BRENDA W. PENNINX²

1 Department of General Practice, University Medical Centre Groningen, University of Groningen, Groningen, The Netherlands

2 Department of Psychiatry, VU University Medical Centre, Amsterdam, The Netherlands

Key words

data collection, family practice, longitudinal studies, mass screening, mood disorders

Correspondence

Willem Jan van der Veen, PhD,
Department of General Practice,
University Medical Centre
Groningen, University of
Groningen, Antonius
Deusinglaan 1, 9713 AV
Groningen, The Netherlands.
Telephone (+31) 503632968
Fax (+31) 503632964
Email: w.j.van.der.veen@med.
umcg.nl

Received 14 July 2008;
revised 12 January 2009;
accepted 29 May 2009

Abstract

A major problem in the analysis of attrition of cohorts in studies on mental health problems is that data on those who do not participate at the outset of a study are largely unavailable. It is not known how underlying psychopathology affects the first stages of screening where non-response and selectivity are usually highest. This article presents results of one of the centres of the Netherlands Study of Depression and Anxiety (NESDA), a longitudinal study aimed at describing the long-term course and consequences of depression and anxiety disorders. The aim is to describe the different ways of attrition during the first NESDA-wave in a cohort of patients aged 18–65 years of the Registration Network Groningen and to analyse whether attrition is related to gender, age and psychopathology as recorded in general practice. The attrition of the study cohort ($n = 8475$) was highest during the first stages, eventually leading to a population of 169 patients only who participated in the full NESDA-programme. Probabilities of transition from one stage of the screening process to the next were regressed on selected background variables using binary logistic regression. Correlates of participation were being female and being older (>40). Psychopathology was an important variable in the formation of the initial sample cohort, but only had a weak influence on patient response to the screening questionnaire. Study design factors had a stronger impact on the changing composition of the cohort at each screening stage compared to patient factors.
Copyright © 2009 John Wiley & Sons, Ltd.

Introduction

Depression and anxiety are common disorders in the general population, and they are among the most disabling conditions in the world (Murray and Lopez, 1997). One key issue in research on mental disorders is on the

identification of individuals suffering from depression or anxiety who may benefit from medical care and therapy. Another related research issue is to estimate frequency of occurrence measures (incidence and prevalence) and to identify high-risk segments in the population with higher prevalence of mental disorder.

Several instruments (screening scales) and study designs have been employed to screen the general population for these conditions, thereby trying to create a cross-walk between community and clinical epidemiology (Kessler *et al.*, 2003). While several accurate screening scales have been developed, less attention has been paid to possible biases introduced by attrition and selective non-response at consecutive stages of the whole screening process. Non-participation is never a pure random process, as refusal has been demonstrated to be elevated in the presence of a history of mental disorders and treatment (Kessler *et al.*, 1995). Persons with mental disorder are probably less motivated or able to respond to screening and research activities, but they may also expect to receive useful diagnostic information and treatment options by participating in a screening and research program. If there are large differences in response to a screening program within the community across degrees of mental illness severity, types of health and consultation behaviours, extrapolations of research findings to the general population and interpretations in etiological terms are likely to be seriously flawed. Research into response mechanisms and study design selectivity may reveal whether study results on affective and anxiety disorders are applicable to the general population in a primary care setting.

Generally, research efforts in population studies on mental health aimed at the analysis of study design selections and response mechanisms are confined to demographic variables and specific stages in the screening process. Results of studies focusing on attrition during later stages of the follow-up pointed to different types of attrition and different roles of socio-demographic and psychopathological variables. A publication on the follow-up of the Epidemiologic Catchment Area (ECA) showed that respondents not located at follow-up were more likely to be male, young, unmarried and with lower education than those who were re-interviewed (Eaton *et al.*, 1992). Those who refused to participate were generally older and had lower education. Psychopathology, for instance panic disorder, drug or alcohol abuse/dependence, was associated more with failure to locate than with refusal. The nationwide Dutch study on affective disorders (NEMESIS, Netherlands Mental Health Survey and Incidence Study) had an initial response of 64.2–69.7%, depending on the method of calculation (Bijl *et al.*, 1998). Results of NEMESIS for the second wave of the study revealed that psychopathology had only weak-to-moderate effects on attrition, and that it had no relationship with refusal to participate further in the study (de Graaf *et al.*, 2000). Results of the European Study of the Epidemiology of

Mental Disorders (ESEMeD) revealed that males were under-represented in several countries participating in the project, and that there was an under-representation of participants in the youngest age group (18–24 years old) (Alonso *et al.*, 2004).

A major problem in the analysis of cohort change is that data on those who do not participate in a study are largely unavailable. Therefore, results of studies on depressive and anxiety disorders are confined mostly to those variables which can be obtained easily from baseline data sets (age, gender, socio-economic status in some cases) or from an earlier wave of the same study. It is not known to which extent underlying psychopathology affects the first stages of screening where non-response and attrition rates are generally highest. In our present study we examine the demographic and psychopathological characteristics of all the persons included in the initial sampling frame by using primary care registration data. Our aim in this article is to describe the different ways of attrition during the first wave in one of the Netherlands Study of Depression and Anxiety (NESDA)-centres and to analyse whether attrition is related to gender, age and psychopathology as recorded in general practice.

Materials and methods

The NESDA-project

The NESDA is a cohort study aimed at describing the long-term course and consequences of depression and anxiety disorders and their predictors (NESDA Website, 2009; Penninx *et al.*, 2008). As its prime objective is to examine the course of depressive and anxiety disorders and their combined presence, it uses (screen) methods to select a particular target population from several settings rather than to estimate population incidences and prevalences.

The study started in 2004 and is designed as an eight-year longitudinal cohort study among 2981 participants aged 18 through 65 years. The study as a whole was designed as such to recruit patients from different settings and developmental stages of illness, as the clinical developmental stage of a disorder is regarded as a key determinant of the course of a depressive or anxiety disorder. Considering that the prevalence of depressive and anxiety disorders increases as one moves from the community, through primary care, to specialized health care settings (Goldberg and Huxley, 1992), recruitment of eligible patients took place in the general population, in general practices (in the cities of Amsterdam, Leiden and Groningen), and in mental health organizations. The number of patients recruited from all primary care

settings was 1610, contributing with 54% to the total NESDA-cohort of 2981 participants.

Recruitment from primary care

Here we aim to reconstruct and analyse the screening experience of one of the primary care populations included in the NESDA screening programme where registration data on morbidity, medication use and referral were readily available for responders and non-responders alike. Screening this population contributed with 169 primary care patients to the NESDA-cohort of 2981 subjects.

Most general practices with patients included for NESDA participate in a registration network. In the Netherlands several registration networks exist, varying in size of their populations and in their detail of recording consultation data. These registration networks carry out research based on the (standardized) electronic registration of daily patient care in their participating general practices. In this present study data are taken from one of the general practices of the Registration Network Groningen (RNG). The RNG was established in 1989, and currently has three practices in the north of the Netherlands, with a yearly population of approximately 30,000 patients. The focus of the RNG is on (pharmaco-) epidemiologic research (van der Veen and Meyboom-de Jong, 2004). Here we use data from the academic group practice in the city of Groningen that participates in NESDA with eight general practitioners (GPs). The GPs record their morbidity data electronically using the International Classification of Primary Care (ICPC; Lamberts and Wood, 1987) and provide the prescribed medication with an ICPC-based indication. The prescriptions are automatically classified with an Anatomical Therapeutical Chemical (ATC) code (WHO collaborating centre for drug statistics methodology, 1999). Patient data on dates of entry, departure and death are recorded, which enable us to include population dynamics in our analyses. For the purpose of recruiting subjects for the NESDA-cohort, we selected a sample population of regular patients aged 18–65 years. Those patients were identified who had a face-to-face contact with their GP in the last four months, as it was the aim to recruit 'active' primary care patients who could be easily approached for screening and research activities. Data on these patients were examined by the GPs of the network, in order to judge whether they could receive a questionnaire of NESDA by postal mail (see later). The screening of patient populations took place per GP and in a sequence (one or two GPs at a time) from May 2005 to July 2006. Patient data were provided with a

time schedule, running backwards from the moment of inclusion in the study sample to two years earlier.

The patient population is further classified with four groups of morbidity registered in the GP consultation records, and appearing from the registered indications for prescription and referral of the last two years (Table 1), identifying both psychological/neurological and somatic conditions. As there are well-known relationships between psychological problems and somatic conditions (Scott *et al.*, 2007) and patients with a somatic disease may respond differently to screening, we defined a separate group with a somatic condition. We take into account that patients may have become enlisted within two years prior to recruitment for NESDA and that they have been observed for a smaller period of time by their GP than the other patients. Results after correcting for the smaller observation time of these patients are not shown separately, but commented upon in a section on incomplete observation.

Screening stages and instruments

Deviations from underlying population distributions may arise not only from systematic non-response mechanisms but also from different sampling probabilities induced by the study design (Hofler *et al.*, 2005). We therefore distinguish between patient factors (P) and study design factors (SD) affecting the attrition and selection of the sample cohort of eligible patients. The stages of the NESDA screening programme, as presented in Figure 1, concern the identification of eligible patients from the enlisted and regular population who had a contact with their GP during the last four months (SD1), the evaluation of the GPs of these patient data and the sending of postal questionnaires (SD2), the response to the questionnaire (P1), the selection of screen-positives (SD3), willingness among screen-positives to participate in a phone screen (P2), meeting a depression or anxiety diagnosis criterion on the short-form Composite International Diagnostic Interview (CIDI) telephone interview (SD4), and willingness to further participate in NESDA and have a full diagnostic interview (P3).

Screening instruments employed during stage SD1 and SD2 are the selection of patient data with predefined criteria (age of the patient and having had contact during the last four months) and the evaluation of (electronic) patient data by the GPs. For the purpose of contacting patients for further research, several exclusion criteria were used, including: patient already has contact with a psychiatric care organization (as NESDA was designed as such that these patients were to be recruited separately

Table 1 Items for classification, screening and diagnosis

Data type	Items
GP registration data	<p>Age, gender, recent contacts, date of entry</p> <p>Morbidity recorded in general practice during last two years (ICPC codes); dichotomized into yes/no:</p> <ol style="list-style-type: none"> 1. Depression (P76) 2. Anxiety (P74) 3. Having recorded psychological problem: including depression, anxiety, psychological symptoms/complaints (P01–04, P06, P18–19, P23–25), psychological disorders/diagnoses (P71–73, P75, P77–80, P85, P98, P99), psychosocial problems (Z01, Z03–16, Z18–25, Z27–28) and neurological disorders/diagnoses (N86–91, N93–94, N99), use of antidepressants or anxiolytics 4. Having recorded somatic condition: including cardiovascular disease (K74–88, K91–96, K99), cerebrovascular disease (K89–90), malignant neoplasms (A79, B72–74, D74–77, K72, N74, R84–85, S77, T71, U75–77, X75–77, Y77–78), diabetes mellitus (T90) and asthma/COPD/allergic rhinitis (R95–97)
Screening instrument (Kessler 10 items and 5 anxiety questions)	<p>During the past month, how much of the time did you feel . . . ; five point Likert scale</p> <ol style="list-style-type: none"> 1. . . . tired out for no good reasons 2. . . . nervous 3. . . . so nervous that nothing could calm you down 4. . . . hopeless 5. . . . restless or fidgety 6. . . . so restless that you could not sit still 7. . . . depressed 8. . . . that everything was an effort 9. . . . so sad that nothing could cheer you up 10. . . . worthless <p>During the past month . . . ; yes/no</p> <ol style="list-style-type: none"> 1. . . . did you have a panic attack? 2. . . . did you fear to go out or to be with people? 3. . . . did you fear to do something with people around? 4. . . . did you feel worried, nervous, tense or fearsome? 5. At present do you use medication for anxiety, depression, tension or stress?
CIDI (DSM-IV diagnosis)	<p>MDD: major depression mild, moderate, severe (296.21, 296.22, 296.23, 296.31, 296.32, 296.33)</p> <p>Dysth: dysthymia (300.4)</p> <p>GAD: generalized anxiety disorder (300.02)</p> <p>SocPhob: social phobia (300.23)</p> <p>PAN: panic without agoraphobia, with agoraphobia (300.01, 300.21)</p> <p>AgoraPhob: agoraphobia without panic (300.22)</p>

from mental health organizations, not from primary care), patient has serious drug addiction problem, patient with schizophrenia or psychosis, patient is in the terminal stage of his or her life, patient does not master the Dutch language to be able to fill in the questionnaire adequately, or the patient's address is unknown.

To those patients being included for further study by the GPs, questionnaires were sent (SD2). The questionnaire chosen for NESDA is composed of the 10 questions of the Kessler-10 (K-10) (Kessler *et al.*, 2003), and five

additional questions asking for the presence (yes/no) of a panic attack, social phobia, agoraphobia, general anxiety or nervousness, and psychotropic medication use during the last month (Table 1). The K-10 is a short self-administered scale used for the detection of psychological distress, and has been applied in large epidemiologic studies (Eckert *et al.*, 2004). It has proven screening qualities for affective disorders (Furukawa *et al.*, 2003; Kessler *et al.*, 2003). Answers on the experience of the past month have to be given with a five-point Likert scale running from 'all

Figure 1 Flowchart of screening for NESDA in general practices of the RNG (for abbreviations and acronyms see Table 1 and text).

of the time' to 'none of the time'. Screen-positives were identified with a score of ≥ 20 (Furukawa *et al.*, 2003) or a positive score on any of the added anxiety questions (SD3). Screen-positives were invited to participate in a further screening round by telephone, based on the CIDI-short form sections shown in Table 1 (SD3, P2). Those who fulfilled the CIDI-short form criteria for a current depressive or anxiety disorder during the phone-screen were invited to participate in the NESDA study (SD4, P3).

As the recruitment in primary care was intentionally aimed at the screening of patients who consulted their GP regularly, we prefer using the neutral term 'compositional change' rather than the term 'selection bias' to denote the changes in the composition of the sample cohort at each screening stage. The term 'attrition' is used to denote the reduction of the sample cohort in size as a result of study design selections and refusal among patients to participate.

Diagnostic instruments

Those who fulfilled the CIDI-short form criteria for a current depressive or anxiety disorder during the phone interview were invited to participate in the NESDA study (Penninx *et al.*, 2008). The diagnoses of depression and anxiety disorders were established during the face-to-face baseline interview with the CIDI (WHO version 2.1) which classifies diagnoses according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria (American Psychiatric Association, 2001) (Table 1). The CIDI is used worldwide and the World Health Organization (WHO) field research has found high inter-rater reliability (Wittchen *et al.*, 1991), high test-retest reliability (Wacker *et al.*, 2006) and high validity for depressive and anxiety disorders (Wittchen *et al.*, 1989; Wittchen, 1994).

Statistical analysis

The odds of progressing from one screening stage to the next are regressed on demographic and morbidity variables, using univariate and multivariate binary logistic regression analysis in SPSS for Windows. Univariate regression is used first to assess the overall role of each selected demographic or morbidity variable. Multivariate regression analysis is then used for regressing the odds of progression on the main effects of gender, age, having a psychological problem and having one of the somatic conditions (variables shown in Table 1). As reference

categories were taken: age <40, male, no two-year record of specified morbidity (depression, anxiety, psychological problem, somatic condition). Parameter estimates and 95% confidence intervals (CI) are transformed into odds ratios and corresponding confidence intervals. All main effect parameters are presented.

Results

Cohort attrition

The attrition of the study cohort of 8475 patients aged 18–65 years was highest during the first stages, eventually leading to a population of 169 patients only who underwent the full CIDI-interview (Figure 1, Table 2). The exclusion of patients was highest in number after selecting those who had a contact with their GP within four months prior to their recruitment for NESDA. The probability of responding by completing the screener was 43%. Distributions by gender and age changed as a result of response mechanisms and study design factors, as the percentage of women changed from about 50% at the identification of study subjects to more than 70% at the diagnostic stage, and the percentage of patients aged 40 years and above changed from about 45% to 65%. The percentage of patients with depression or anxiety, according to their GP records, increased from 6.2 to 24.9, and the overall percentage of patients with a psychological problem increased from 26.8 to 60.4.

Table 2 Study population at consecutive stages of screening: patient numbers, transition probabilities, demographics and psychological morbidity; RNG study population

	<i>N</i>	Transition probability	Percentage female	Percentage ≥40 years	Percentage with depression or anxiety	Percentage with psychological problem
<i>RNG study population</i>						
Being a regular patient	8475		50.4	45.2	6.2	26.8
SD1: Having recent contact	3718	0.44	58.4	49.4	8.9	37.3
SD2: Selected by GP, receiving questionnaire	3109	0.84	59.7	48.6	6.8	32.2
P1: Responding to questionnaire	1335	0.43	63.6	56.9	8.1	33.9
SD3: Being screen-positive	487	0.36	68.8	58.1	19.3	53.6
P2: Willing to participate in phone screen	379	0.78	68.6	59.4	21.1	56.5
SD4: Meeting CIDI-short form criteria	205	0.54	71.7	64.4	24.4	63.4
P3: Willing to participate in NESDA	169	0.82	71.6	65.1	24.9	60.4

Table 3 Transitions from one stage to the next, related to study design, RNG study population, odds ratios (OR) and confidence intervals (CI) of univariate and multivariate logistic regression models

Parameter	SD1		SD2		SD3		SD4	
	Having contact		Inclusion by GP		Screen-positive		Meeting criteria	
	OR	CI	OR	CI	OR	CI	OR	CI
<i>Demographics</i>								
Age ≥ 40 years	1.36*	1.25, 1.48	0.82*	0.69, 0.98	1.08	0.86, 1.35	1.58*	1.04, 2.38
Gender = female	1.78*	1.63, 1.94	1.38*	1.16, 1.64	1.43*	1.13, 1.81	1.37	0.89, 2.11
<i>Morbidity in the last two years</i>								
Depression	2.21*	1.79, 2.72	0.27*	0.20, 0.35	14.36*	7.08, 29.11	1.07	0.60, 1.91
Anxiety	2.73*	1.98, 3.75	0.46*	0.30, 0.68	11.54*	4.83, 27.55	2.43*	1.10, 5.38
Having psychological problem	2.58*	2.34, 2.85	0.28*	0.23, 0.33	3.95*	3.10, 5.02	1.86*	1.23, 2.80
Having somatic condition	2.56*	2.31, 2.84	0.85	0.71, 1.02	1.18	0.94, 1.49	1.11	0.74, 1.69
<i>Multivariate model</i>								
Age (A)	1.15*	1.05, 1.26	1.03	0.85, 1.24	0.95	0.75, 1.22	1.54	1.00, 2.40
Gender (G)	1.70*	1.55, 1.86	1.58*	1.32, 1.90	1.28	1.00, 1.65	1.36	0.87, 2.13
Having psychological problem (P)	2.25*	2.03, 2.49	0.26*	0.22, 0.32	3.86*	3.03, 4.92	1.74*	1.15, 2.65
Having somatic condition (S)	2.31*	2.08, 2.58	0.97	0.80, 1.17	1.10	0.86, 1.42	0.95	0.61, 1.47

*Significant at $p < 0.05$.

Study design factors

The NESDA study was designed as such that eligible persons could be approached easily with GP data and be selected with a short questionnaire. The effects of the study criterion that persons had to have had recent contact with their GP and of the focus on the detection of persons with a depressive or anxiety disorder are shown in Table 3. Patients contacting their GP recently (44% out of the sample cohort, see Table 2) were more likely to be female and older, and to have psychological or somatic problems. The exclusion of patients by their GP, based on the predetermined exclusion criteria introduced earlier, had opposite effects, as younger patients without psychological or somatic problems and not treated in a mental health organization were more likely to be selected for further study. The results for the respondents of the screener reveal that patients diagnosed by their GP with depression or anxiety (being female in most cases) were very likely to be regarded as screen-positive. Having a psychological problem was the only parameter of importance in all the multivariate analyses. Most background variables did not have an independent impact anymore on the probability of being included for the CIDI-interview.

Patient participation

Compared to the selectivity resulting from the first stages of the NESDA-screen protocol, psychopathology and somatic disease did not have a large impact on the probability of responding to the questionnaire or the willingness to participate in the next round with the CIDI-interview (Table 4). The only non-response mechanisms we found are related to higher willingness to participate in research activities among older women and patients with a somatic condition. Our multivariate results show that there is no basis for believing that patients with psychopathology are relatively more motivated to take part in research focusing on mental health problems.

Correction for incomplete observation

Nearly 15% of patients had incomplete observation, as they became enlisted within two years prior to recruitment for NESDA. The model results after excluding those with incomplete follow-back were not systematically different from those presented in Tables 3 and 4 however, with the odds ratios being about 0.1 to 0.2 higher for stage SD1 (Having contact) and 0.05 to 0.1 lower for stage P1 (Responding to the screener).

Table 4 Transitions of one stage to the next, related to patient participation, RNG study population, odds ratios (OR) and confidence intervals (CI), univariate and multivariate binomial logistic regression models

Parameter	P1		P2		P3	
	Responding to screener		Willingness to participate in phone screen		Willingness to participate in diagnostic interview	
	OR	CI	OR	CI	OR	CI
<i>Demographics</i>						
Age $\geq$ 40 years	1.80*	1.56, 2.07	1.26	0.82, 1.94	1.19	0.57, 2.49
Gender = female	1.33*	1.15, 1.54	0.96	0.61, 1.53	0.97	0.44, 2.16
<i>Morbidity in the last two years</i>						
Depression	1.37	0.98, 1.91	1.47	0.74, 2.91	1.46	0.47, 4.46
Anxiety	1.41	0.91, 2.17	2.48	0.86, 7.16	0.79	0.27, 2.26
Having recorded psychological problem	1.15	0.99, 1.34	1.68*	1.09, 2.59	0.44	0.19, 1.01
Having somatic condition	1.32*	1.13, 1.54	1.24	0.79, 1.95	0.82	0.40, 1.70
<i>Multivariate model:</i>						
Age (A)	1.80*	1.55, 2.09	1.12	0.71, 1.76	1.30	0.59, 2.86
Gender (G)	1.42*	1.22, 1.65	0.95	0.59, 1.52	1.04	0.46, 2.36
Having psychological problem (P)	1.02	0.87, 1.19	1.65*	1.07, 2.55	0.44	0.19, 1.03
Having somatic condition (S)	1.15	0.99, 1.35	1.18	0.74, 1.88	0.81	0.37, 1.76

*Significant at $p < 0.05$.

Discussion

Most population studies on depressive and anxiety disorders do not report in detail on sample cohort change during the first stages of the screening process. Some studies are very informative about the loss to follow-up during later waves of the study (de Graaf *et al.*, 2000; Eaton *et al.*, 1992), but their insights into the initial response rates and composition of the non-respondent population are necessarily confined to a few variables available. With the use of primary care registration data in combination with the NESDA-research data we were able to examine compositional change of the sample cohort in much more detail than what has been possible hitherto in population studies on depressive and anxiety disorders.

In evaluating the relationship between patient characteristics and the progression from one screen stage to the next we addressed two factors involved: the motivation of the patient to participate, and the selection strategies as defined by the study design. Patient factors underlying the propensity to participate in the study were found to be of lesser importance than the choices made at different stages of the study design to identify eligible patients. The

first stage of defining a sample of patients who had recent contact with their GP proved to have the largest impact on the composition of the cohort, excluding for further follow-up relatively younger men and persons without a recent contact because of a psychological or somatic problem.

With regard to basic demographic variables, our results are very similar to those of most other studies reporting on non-response and attrition. Women are more likely to respond than men, and higher age also increases the likelihood of responding. Women are more-over likely to be selected for further follow-up, considering that their prevalences for most mental disorders are known to be at least twice those of men (Wittchen and Jacobi, 2005). Psychopathology, as recorded by the GP, played a major role as an underlying variable in the formation of the study sample and in the selection of screen- and phone-positives, but did not have a discriminating effect in the response to the questionnaire. Depending on the type of disorder, most patients finally included for the NESDA study and with a DSM-IV diagnosis were known by their GP to have a psychological problem.

Although the use of registration data offers unique opportunities for the study of cohort change in a

screening programme, these data are not without some flaws that need to be addressed here. The main shortcoming of our analyses is that the GP registration data are mostly based on the contacts between GPs and their patients rather than on a complete and standardized diagnostic survey of all enlisted patients. Moreover there is variation among the participating GPs in the detection of depressive and anxiety disorders and in the use of ICDPC-codes related to these disorders for their electronic record-keeping. Those patients who do not consult their GP regularly, only consult a specialist, or do not bring their mental health problems to the attention of their GP, remain unnoticed when using primary care registration data, even in the presence of a depressive or anxiety disorder that would be of interest to NESDA. Although our data show that most patients with a final DSM-IV-based diagnosis were known by their GP to have a psychological problem (in more than 60% for most diagnoses), they may also underline the view that there is considerable degree of unmet need of professional health care services (Wittchen and Jacobi, 2005). As this theme is beyond the scope of this article, it is a matter of further research to explore the relationships between types of mental disorders, their severity and co-occurrence, demand for primary care treatment and provision of adequate care (Kessler, 2007).

We examined whether our main results for the Groningen area were comparable to all primary care populations included for NESDA. The overall NESDA-recruitment in the primary care setting started with 23,750 regular patients receiving the screener. After the screening process as described in this article, the final number of screen-positives (both on the K-10 and the phone screen) included for the CIDI-interview was 898 (comprising 56% of the final primary care cohort of 1610 patients, that also included randomly selected screen-negative subjects) (Penninx *et al.*, 2008). Whereas only 3.8% (898 out of 23 750) of all primary care patients were eventually included for NESDA, this proportion was somewhat higher for the Groningen area (5.4%, 169 out of 3109 patients receiving the screener). Response percentages were very similar (43% versus 46%), and the percentages of women among those receiving a questionnaire and those responding were almost the same. Overall refusal (including non-response) was the same (62%). The age distribution was different however, with the RNG population having a younger age distribution than the populations of the other NESDA centres. The compositional change in terms of the age distribution, arising mainly from non-response among younger patients, was about the same. The percentages of screen-positives

among those returning the K-10 screener were 36.5% in this study, and 42.9% for primary care recruitment in the overall NESDA-study (Penninx *et al.*, 2008). The lower percentage in this study can be explained for a part by the selection procedure of the GPs (stage SD2), at which patients treated in a mental health organization were excluded from further study at an earlier stage compared to the other NESDA-centres.

With the recruitment of primary care patients who contacted their GP recently it was envisaged to identify patients from the community with less severe and complex disorders compared to those recruited in specialized mental health care. We showed that this was an effective strategy, as nearly all patients could be contacted easily and about one-third of patients who received the questionnaire had already contacted their GP because of a psychological problem. A drawback of this selection procedure is that patients who did not seek consultation in general practice or contacted general practice for repeat prescriptions only were not included for screening. The first stage of screening, aimed at patients regularly seeking consultation in primary care, has most likely resulted in under-representation of patients with mild depressive or anxiety disorders, patients treated for a longer time with repeat prescriptions but not seeking new consultation, and patients not consulting their GP regularly.

Women and older persons were more likely to participate in various steps of the recruitment process than men and younger persons. If age and gender appear to be important determinants of the course of depression and anxiety disorders in our future research, we should carefully consider weighing our general course results back to the original population in which younger men are known to be under-represented.

Our results indicate that choices made regarding the formation of the study sample had a stronger impact on the changing composition of the cohort at each screening stage compared to selective non-response and refusal to participate. This is an important finding for the interpretation of future NESDA results. Information on psychopathology recorded by GPs did not significantly predict participation at most stages of the recruitment process, and we therefore have reasons to assume that the resulting study cohort is representative for the 'average' person seeking consultation in primary care for psychopathological symptoms. This is important news for our future research findings, since the ultimate purpose is to examine the course of depression and anxiety disorders over time, for which it is important to start with a psychiatric sample that is as unselective as possible.

Acknowledgements

The infrastructure for the NESDA study is funded through the 'Geestkracht' program of the Dutch Scientific Organization (ZON-MW, grant number 10-000-1002) and matching funds from participating Universities and mental health care organizations (VU University Medical Center, GGZ Buitenzamen, GGZ Geestgronden, Leiden University Medical Center, GGZ Rivierduinen, University Medical Centre Groningen, Lentis, GGZ Friesland, GGZ Drenthe). The Registration Network Groningen is funded by the University Medical Centre Groningen.

The authors thank the NESDA-datamanagement in Amsterdam, the NESDA-staff and interviewers in Groningen and the general practitioners of the Academic General Practice in Groningen for their assistance in providing data and selecting patients for inclusion in NESDA.

Declaration of interest statement

The authors have no competing interests.

References

- Alonso J., Angermeyer M.C., Bernert S., Bruffaerts R., Brugha T.S., Bryson H., de Girolamo G., Graaf R., Demyttenaere K., Gasquet I., Haro J.M., Katz S.J., Kessler R.C., Kovess V., Lepine J.P., Ormel J., Polidori G., Russo L.J., Vilagut G., Almansa J., Arbabzadeh-Bouchez S., Autonell J., Bernal M., Buist-Bouwman M.A., Codony M., Domingo-Salvany A., Ferrer M., Joo S.S., Martinez-Alonso M., Matschinger H., Mazzi F., Morgan Z., Morosini P., Palacin C., Romera B., Taub N., Vollebergh W.A. (2004) Sampling and methods of the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatrica Scandinavica* (Suppl. 420), 8–20, DOI: 10.1111/j.1600-0047.2004.00326
- American Psychiatric Association. (2001) *Diagnostic and Statistical Manual of Mental Disorders*, American Psychiatric Association.
- Bijl R.V., van Zessen G., Ravelli A., de Rijk C., Langendoen Y. (1998) The Netherlands Mental Health Survey and Incidence Study (NEMESIS): Objectives and design. *Social Psychiatry and Psychiatric Epidemiology*, **33**(12), 581–586.
- de Graaf R., Bijl R.V., Smit F., Ravelli A., Vollebergh W.A. (2000) Psychiatric and sociodemographic predictors of attrition in a longitudinal study: The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *American Journal of Epidemiology*, **152**(11), 1039–1047.
- Eaton W.W., Anthony J.C., Tepper S., Dryman A. (1992) Psychopathology and attrition in the epidemiologic catchment area surveys. *American Journal of Epidemiology*, **135**(9), 1051–1059.
- Eckert K.A., Taylor A.W., Wilkinson D.D., Tucker G.R. (2004) How does mental health status relate to accessibility and remoteness? *Medical Journal of Australia*, **181**(10), 540–543.
- Furukawa T.A., Kessler R.C., Slade T., Andrews G. (2003) The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychological Medicine*, **33**(2), 357–362.
- Goldberg D., Huxley P. (1992) *Common Mental Disorders*, Routledge.
- Hofler M., Pfister H., Lieb R., Wittchen H.U. (2005) The use of weights to account for non-response and drop-out. *Social Psychiatry and Psychiatric Epidemiology*, **40**(4), 291–299, DOI: 10.1007/s00127-005-0882-5.
- Kessler R.C. (2007) The global burden of anxiety and mood disorders: Putting the European Study of the Epidemiology of Mental Disorders (ESEMeD) findings into perspective. *Journal of Clinical Psychiatry*, **68**(Suppl. 2), 10–19.
- Kessler R.C., Barker P.R., Colpe L.J., Epstein J.F., Gfroerer J.C., Hiripi E., Howes M.J., Normand S.L., Manderscheid R.W., Walters E.E., Zaslavsky A.M. (2003) Screening for serious mental illness in the general population. *Archives of General Psychiatry*, **60**(2), 184–189.
- Kessler R.C., Little R.J., Groves R.M. (1995) Advances in strategies for minimizing and adjusting for survey non-response. *Epidemiologic Reviews*, **17**(1), 192–204.
- Lamberts H., Wood M. (1987) *International Classification of Primary Care*, Oxford University Press.
- Murray C.J., Lopez A.D. (1997) Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *Lancet*, **349**(9064), 1498–1504, DOI: 10.1016/s0140-6736(96)07492-2
- NESDA Website. (2009) <http://www.nesda.nl> [1 January 2009].
- Penninx B.W., Beekman A.T., Smit J.H., Zitman F.G., Nolen W., Spinhoven P., Cuijpers P., de Jong P., van Marwijk H., Assendelft W.J.J., van der Meer K., Verhaak P., Wensing M., de Graaf R., Hoogendijk W.J., Ormel J., van Dyck R. (2008) The Netherlands Study of Depression and Anxiety (NESDA): Rationale, objectives and methods. *International Journal of Methods in Psychiatric Research*, **17**(3), 121–140, DOI: 10.1002/mpr.256
- Scott K.M., Bruffaerts R., Tsang A., Ormel J., Alonso J., Angermeyer M.C., Benjet C., Bromet E., de Girolamo G., de Graaf R., Gasquet I., Gureje O., Haro J.M., He Y., Kessler R.C., Levinson D., Mneimneh Z.N., Oakley Browne M.A., Posada-Villa J., Stein D.J., Takeshima T., Von Korff M. (2007) Depression-anxiety relationships with chronic physical conditions: Results from the World Mental Health surveys. *Journal of Affective Disorders*, **103**(1–3), 113–120, DOI: 10.1016/j.jad.2007.01.015
- van der Veen W.J., Meyboom-de Jong B. (2004) Age and gender. In: *Oxford Textbook of Primary Medical Care* (eds Jones R, Britten N, Culpepper L, Gass D, Grol R, Mant D, Silagy C), Oxford University Press.

- Wacker H., Battegay R., Mulleijans R., Schlosser C. (2006) Using the CIDI-C in the general population. In: *Psychiatry: A World Perspective* (Stefanis C, Rabavilas A, Soldatos C), pp. 183–143, Elsevier Science Publishers.
- WHO collaborating centre for drug statistics methodology. (1999) *ATC Index with DDS*, World Health Organization.
- Wittchen H.U. (1994) Reliability and validity studies of the WHO – Composite International Diagnostic Interview (CIDI): A critical review. *Journal of Psychiatric Research*, **28**(1), 57–84.
- Wittchen H.U., Burke J.D., Semler G., Pfister H., Von Cranach M., Zaudig M. (1989) Recall and dating of psychiatric symptoms. Test–retest reliability of time-related symptom questions in a standardized psychiatric interview. *Archives of General Psychiatry*, **46**(5), 437–443.
- Wittchen H.U., Jacobi F. (2005) Size and burden of mental disorders in Europe – a critical review and appraisal of 27 studies. *European Neuropsychopharmacology*, **15**(4), 357–376, DOI: 10.1016/j.euroneuro.2005.04.012
- Wittchen H.U., Robins L.N., Cottler L.B., Sartorius N., Burke J.D., Regier D. (1991) Cross-cultural feasibility, reliability and sources of variance of the Composite International Diagnostic Interview (CIDI). The Multi-centre WHO/ADAMHA Field Trials. *British Journal of Psychiatry*, **159**, 645–653, 658.