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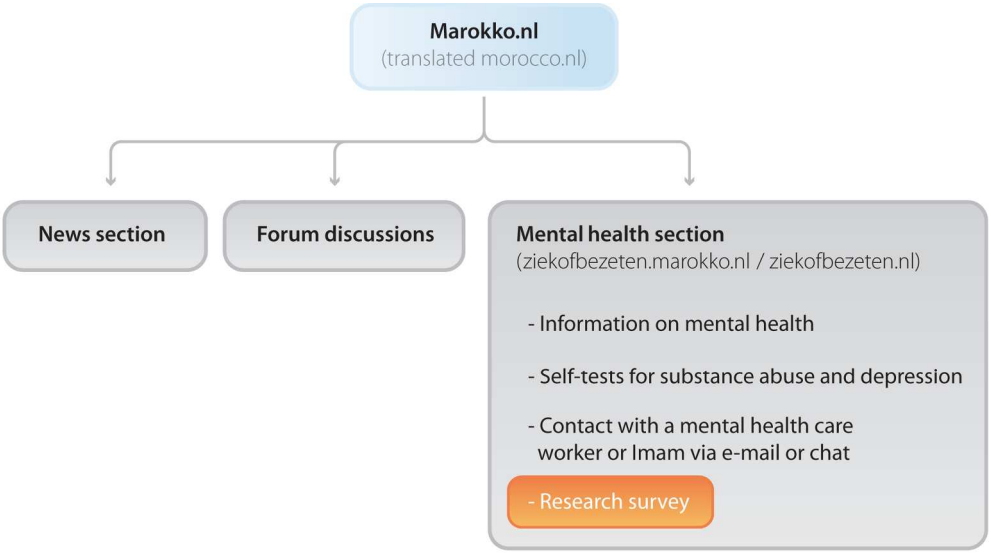

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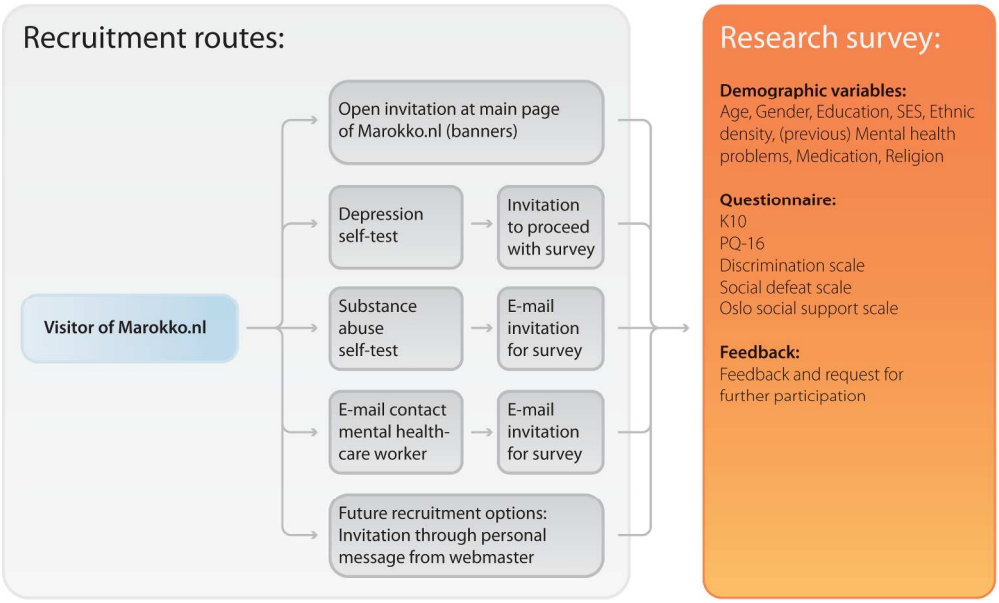

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Migrants Examined for Determinants of psychopathology through INternet Assessment (MEDINA) study: a cross-sectional study among visitors of an Internet community

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ABSTRACT

Introduction

Migration is a risk factor for the onset of psychopathology. A range of social factors may play a role in the aetiology of psychiatric disorders in migrants. A better understanding of these associations is needed to develop preventive interventions to reduce the disease burden in the migrant population. Research among minority groups is generally time-consuming and it is difficult to recruit participants. Internet can offer interesting new possibilities to conduct research among ethnic minorities. This paper describes the design of an epidemiological study in the Moroccan-Dutch population, which will be entirely performed online. We investigate the association between social factors and psychopathology.

Methods and analysis

The website Marokko.nl is visited by 70% of the young Moroccan-Dutch population in the Netherlands. This website therefore provides a unique possibility for research within this population. We will conduct a survey with online questionnaires via this website. The online survey consists of several validated short self-report questionnaires, measuring depressive and anxiety symptoms (K10), psychotic symptoms (PQ-16), and instruments measuring discrimination, social support and social defeat. Furthermore, demographic characteristics are collected. We will use univariate and multivariate methods for analysing the data.

Ethics and dissemination

The local Medical Ethical Committee have assessed the study protocol and judged that the study could be conducted without their approval. Knowledge dissemination

will take place through peer-reviewed publication in scientific journals as well as publication for participants on the project website.

Discussion

In this study we further explore the association between psychopathology and social factors within an online Moroccan-Dutch sample. The recruitment of participants via the website Marokko.nl creates a big advantage in collecting a large sample of a specific migrant population. Strengths and limitations of the methodology are discussed. Furthermore, we review the advantages and challenges of online epidemiological research methods.

Strengths and limitations of this study

Strengths

- This study uses a novel methodology, in which recruitment and data collection is performed entirely online.
- The use of the Internet creates the opportunity to recruit many Moroccan-Dutch migrants, a population which is otherwise difficult to reach for research.
- We collaborate with the gatekeepers of the website Marokko.nl, which is visited by 70% of the young Moroccan-Dutch population in the Netherlands.

Limitations

- Because of Internet recruitment, we can collect a convenience sample.
- Due to the cross-sectional design, we cannot determine the direction of associations between variables that we investigate.

INTRODUCTION

Across countries and cultures, migration is a risk factor for the development of psychopathology. [1] Psychiatric disorders are heterogeneous and they develop as a result of the interplay between a range of genetic and environmental influences [2-4] Gaining a better understanding of the aetiology of psychopathology, and especially of modifiable risk factors that are associated with its development, is essential because this can lead us to preventive interventions. In migrants, some aetiological risk factors remain unchanged (e.g. genetic factors) whereas others (e.g. environmental factors) may change as a result of migration. Studying the development of psychopathology in migrant populations may further increase our understanding of the role of these risk factors. [5]

Currently available evidence suggests that the association between migration and psychopathology is strongest for psychotic disorders. Two meta-analyses found that the relative risk for developing schizophrenia was significantly higher in the migrant population compared to the native population. [6, 7] Interestingly, the relative risk for developing schizophrenia greatly differed between migrant subgroups, and was as high as 4.5 for second-generation migrants and 4.8 in black ethnic groups. [7-9] For mood disorders, Swinnen *et al* found a relative risk of 1.38 (95% CI 1.17-1.62) for migrants in a meta-analysis covering 14 studies (2 on depressive disorder, 5 on bipolar disorder and 9 on mood disorders on unspecified polarity). [10] Since then, other studies have confirmed the increased prevalence of depressive symptoms in migrant populations. [11, 12] A recent study by Cantor-Graae *et al* has shown increased incidence risk ratios for all psychiatric disorders in foreign-born adoptees and second generation migrants having one foreign born parents. However, for first generation and second-

generation migrants with two foreign-born parents, the risk was only increased for schizophrenia. [1]

Variation in the incidence of psychopathology between different ethnic groups, has also been shown in the Netherlands, where the present study is situated. In 2012, the largest migrant groups in the Netherlands (16.7 million inhabitants) originated from Turkey (392,923; 2.3% of the total population), Morocco (362.954; 2.2% of the total population), Surinam (346.797; 2.1% of the total population), and the Dutch Antilles (143.992; 0.9% of the total population). [13]

For schizophrenia, the incidence was increased in most of the different migrant groups in the Netherlands compared to the overall population, but not in all. The incidence of schizophrenia appeared to be highest in the second-generation Moroccan-Dutch inhabitants. [14, 15] Furthermore, a Dutch study has shown that incidence and prevalence rates for mood disorders are highest among Turkish migrants (Relative Risk 4.9), followed by Moroccan migrants (RR 3.6) and Surinamese migrants (RR 1.8), while the rates in Western-European migrants were comparable to the general Dutch population. [16] These findings replicate the results from a previous Dutch study. [17]

Possible explanations

Although migrants are at increased risk to develop psychopathology, the explanation for this association is still largely unknown. Previously it was hypothesized that the disorder itself would be a factor in migration, because especially schizophrenia and bipolar patients were believed to be more restless and rootless and therefore more inclined to migrate. This 'selective migration' hypothesis was first suggested by Ødegaard *et al* in 1932 [18] but is now generally discarded, as scientific evidence cannot

support it. [19, 20] An example of an argument against the selective migration theory is the fact that the incidence of schizophrenia in second-generation migrants is substantially higher compared to their parents from the first generation. This phenomenon points to the importance of post-migration factors or, in other words, (social) factors in the country of destination. [6] Social factors that are frequently suggested to be associated with psychopathology in migrants are (among others): discrimination, lack of social support and social defeat. Discrimination was associated with psychotic symptoms in several studies. [21-23] Also in mood disorders, an association with discrimination was found. [23-26] Lack of social support or isolation was found to be associated with psychopathology in several studies. [27, 28] In the original article by Gilbert *et al* in 1998, the concept of social defeat, or "being in a subordinate position" [9] was associated with depression. [29] Social defeat has also been hypothesized as an etiological factor for developing schizophrenia in migrant populations. [9] Discrimination, social support and social defeat are variables we will measure in this study. Furthermore, associations between demographic variables and increased risk for psychopathology in migrants have also been found. As an example, younger age at migration was a risk factor for psychosis in a Dutch study. [30] In a systematic review, Shaw *et al* found that lower density of the ethnic minority population in the neighbourhood was associated with higher risk of psychopathology. This effect was most consistently found for psychosis and only tentative for other mental disorders, due to heterogeneity and limited statistical power of the studies examined. [31]

Aims of the current study

In the current study, we want to further explore the relationship between migration

and psychopathology, concentrating on social factors. We aim to investigate the associations between psychotic symptoms and mood symptoms on the one hand and discrimination, social defeat, and social support on the other. As the association between social factors and psychopathology may be subgroup-specific, we focus on one ethnic group: the Moroccan-Dutch population. Via the website Marokko.nl, we have the unique opportunity to reach a large proportion of this population.

METHODS AND ANALYSIS

We will conduct an online survey in a cross-sectional convenience sample of the Moroccan-Dutch population, using a combination of several self-report questionnaires. The survey will run from 15-11-2012 to 1-5-2014.

Our research questions are the following:

1. How often are symptoms of depression and psychosis reported in a cross sectional sample of young (age 20-35) Moroccan-Dutch participants, measured by self-administered screening questionnaires?
2. Which environmental factors of stress or strain do the Moroccan-Dutch participants report, thereby specifically focusing on social factors such as discrimination, social defeat and social support?
3. What is the association between the symptoms of psychopathology and the reported social factors?

Setting

We will recruit participants at a unique website, which is visited by the majority of Moroccan-Dutch adolescents: www.marokko.nl. This website exists for over ten

years. Of all young Moroccan-Dutch people (age 15-35) in the Netherlands 70% visit this website regularly, of whom 33% visits the website weekly. [32, 33] Marokko.nl is serving as a national forum board, where everybody can start a discussion and respond to it. With some exceptions, the language in these discussions is Dutch. Discussions are moderated by a trained team of (mostly Moroccan-Dutch) moderators who make sure the website regulations are respected. Only visitors with an account can contribute to the discussion. To set up an account one has to create a pseudonym and answer some questions about gender and age. This pseudonym is shown when creating or replying to a discussion. Also, the account is connected to a personal email box; this "personal message" system is available within the site. Because the pseudonyms guarantee anonymity, members feel free to share very personal information in the forum discussions. This includes personal information about sensitive topics like sickness and health, (arranged) marriages, pregnancy and abortion. Although mental health problems are generally a taboo in the Moroccan-Dutch population, on this website many discussions cover this subject. Apparently, there is a need for a platform to discuss these issues in this community.

Despite their need for discussing mental health issues, the Moroccan-Dutch population is underrepresented in preventive programs in mental health care. On the Marokko.nl website, psychiatric problems are discussed, but no professional help is offered. In 2012, we therefore created an add-on to the website about mental health. This mental health domain of Marokko.nl is called www.ziekofbezeten.marokko.nl ("ziek of bezeten" means: being ill or being possessed). Within this domain, we supply information about psychiatric disorders, self-tests for depression and substance use, and email and chat contact with mental health care workers or specially trained

Imams. [34] Our research survey is nested within ziekofbezeten.nl. For a schematic overview of the online environment see figure 1.

Participants & recruitment

The participants in this study will be recruited from the Moroccan-Dutch population.

Inclusion criteria for this study are:

- At least one of the parents is born in Morocco
- Having sufficient knowledge of the Dutch language
- Having internet access and being a visitor the website marokko.nl

Exclusion criteria are:

- Age younger than 18 years

Recruitment takes places online, using the website Marokko.nl. We will recruit participants in several ways, which are listed below and are shown in Figure 2. There are three main recruitment routes that lead participants to our survey:

1. Advertisement via banners on Marokko.nl.
2. Via an invitation at the end of a depression self-test on the ziekofbezeten.marokko.nl domain: after filling out the depression self-test, people will be asked to participate in the survey.
3. In several places on the website ziekofbezeten.nl, visitors who are interested in participating in the study, have the opportunity to "opt-in" for research and leave an e-mail address.

Should these recruitment routes not result into a sufficient number of participants, additional forms of recruitment can be deployed:

- Via the "personal message" function (a marokko.nl linked email service), a random subset of the registered users can be asked to participate.
- Contributors of several relevant forum discussions can be approached via "personal message" and asked to participate.
- Location of the advertisement of the study can be customized. When for example more women than men are included, the study can specifically be advertised on parts of the website where men are active.

We will track the route via which participants were recruited (anonymously), so that we can analyse the various recruitment strategies and compare the participant characteristics between these recruitment strategies.

Procedure

After inclusion, participants will be asked to fill out an online survey. The first webpage will contain information about the study and informed consent. When informed consent is given, the next page will show the survey. The survey consists of questions about depressive and psychotic symptoms, discrimination, social defeat, social support, and baseline demographics. Completing all questions will take approximately 10 minutes. Furthermore, we will ask the participants if we can approach them for further research at a later time.

The last page will provide participants feedback on the questionnaires they filled out. When scores for psychopathology are high, the advice to contact the general practitioner will be given and addresses of mental health care organisations are provided.

Measurements & Instruments

We will ask for demographic variables, as listed in table 1. As a measurement of ethnic density, we ask for the first 4 digits of the postal code, which provides us with enough information to connect to a certain area or neighbourhood without conflicting with the participants' anonymity.

Table 1, Demographic variables

Demographic variables	Operationalization
Age	Years
Gender	
Ethnicity	Country of birth, country of birth parents
Age of migration	If applicable
Ethnic density	Postal code (first 4 figures)
Previous mental health care	If yes: diagnosis
Previous/current medication	(free text words)
Social economic status	Income
Education	(free text words)
Religion	How important is religion for you? (Likert scale)
Substance use	First 3 questions of the Drug Use Disorders Identification Test (DUDIT) + question on kind of substance used

The main part of our online survey consists of a combination of 5 short questionnaires measuring psychopathology and social factors, which are listed in table 2. The questionnaires are further described below. Table 3 shows an example of questions for each questionnaire.

Table 2, questionnaires

Trait	Questionnaire	Items	Time
Depressive symptoms	K10	10	2 min
Psychotic symptoms	PQ-16	16	2 min
Discrimination	Discrimination scale	22	2 min
Social defeat	Social defeat scale	16	3 min
Social support	Oslo social support questionnaire	3	1 min
	Total time (including demographics):		10 min.

Table 3, question examples

Questionnaire	Question example	Scale
K10	During the last month, how often did you feel tired out for no good reason?	0 – not at all … 4 – always
PQ-16	I have seen things that other people apparently can't see.	True – Untrue
Discrimination scale	How often do you experience one of the following types of discrimination: You are being scoffed at or threatened.	0 – never … 3 – often
Social defeat scale	I feel that I have not made it in life	0 – not at all … 4 – always
Oslo social support questionnaire	How many people are so close to you that you can count on them if you have serious personal problems?	0 – none … 4 – six or more

Psychopathology – Mood symptoms

The Kessler Psychological Distress Scale (K10). [35]The questionnaire contains 10 items on a 5-point likert scale. This scale has previously been tested for the validity in the Dutch language [36] and for online self-administration. [37]Furthermore, it has previously been used in a migrant population in the Netherlands.[38]

Psychopathology – Psychotic symptoms

The Prodromal Questionnaire-16 (PQ-16) is a short version of the Prodromal Questionnaire. [39]It is a self-report screening instrument for psychosis risk, with 16 true/false statements. The instrument has been developed and tested for validity in the Dutch language. [40]

Social factors – perceived discrimination

The Everyday Discrimination Scale" consists of two subscales. Clark *et al.* [41]The scale showed adequate results in the appraisal of a review by Bastos *et al.* [42]The translation we use is previously used in the Dutch MIGROUP study (an add-on

protocol to the GROUP-study).[43]

Social factors – social support

The Oslo Social Support Questionnaire was designed by Dalgard *et al.* [44-46]It consists of only three questions and was the instrument of choice for social support on a expert meeting where common instruments for mental disorders for European population studies were chosen, called “EUROHIS". [47]A Dutch translation of the instrument is available.

Social factors – social defeat

The most widely used instrument for measuring social defeat is the Social Defeat Scale, designed by Gilbert *et al.* [29, 48]It is a 16 item self-report scale. This instrument was also included in the MIGROUP protocol [43] and therefore available in Dutch.

Sample size calculation

We based the power calculations on two associations we are investigating in our study: 1. The association between discrimination and depression; 2. The association between discrimination and psychosis.

1. The power calculation for the association between depression and discrimination is based on the study by Van Dijk *et al.* [24]In this study, around 50% of 153 Moroccan-Dutch and 199 Turkish-Dutch participants experienced discrimination. In order to be able to detect an association with an effect size measured as an Odds Ratio of at least 2, the sample size per group (with and without discrimination) is 182. Based on this association, inclusion should reach a minimum of 400 participants.

2. Power calculation for detecting the association between perceived discrimination and psychotic symptoms (delusional hallucination) was based on Janssen *et al.* [21]This study differs from our study because it has a longitudinal design and it also includes Dutch inhabitants, not only migrants. The similarity between both studies is that they both take place in the general (healthy) population. Based on this study, for an α= 0.05 (two-sided 0.025) and β= 0.20 (Power 80%) to detect an association with an Odds Ratio of at least 2, N had to be at least over 864 participants.

Based on the power calculation for the association between discrimination and psychosis, we decided to include 1000 participants.

Data analysis

Descriptive statistics

In this study, we investigate the association between social factors (independent variables) and psychopathology (dependent variable) and we correct for relevant social-demographic variables (confounding variables). The dependent variable psychopathology will be divided into psychotic symptoms and psychological distress (depressive and anxiety symptoms). Using cut-off scores for the specific questionnaires, we consider psychopathology as a binary variable (yes/no psychotic disorder; yes/no psychological distress)

Univariate analysis

Association between social factors and psychopathology will first be described in percentages, subdivided by socio-demographic variables (e.g. gender, age, socio-

economic status, ethnicity). We will use Chi-square test for categorical and t-tests for continuous variables to identify significant associations between these variables.

Multivariate analysis

After univariate analysis, we will use a regression model (possibly Poisson regression) to investigate the association between psychopathology and the social factors, correcting for confounders. The exact regression model we will choose is partly dependent on the incidence of psychopathology in our sample. We consider the Poisson regression model, because we expect that the occurrence of psychopathology will not be high in our non-clinical sample.

ETHICS AND DISSEMINATION

Informed consent and data security

When entering the survey, participants are asked for informed consent. They can give their consent by checking a box. In addition, participants will be asked to check a box to confirm that his or her age is above 18. When both boxes are checked, participants can click on 'next' and the first page of survey is displayed. A unique research identification number will then be created for each participant, which is used for data filing and handling. All recorded personal information (like pseudonym on the website, name or email address) will be coded. IP-addresses will not be recorded. For the online questionnaire, we use the service of Qualtrics. [49]In this online service, we can design the entire survey and link it to the ziekofbezeten-domain of Marokko.nl (so it can be opened from this website). They guarantee good safety measurements for data storage and handling. For online data transport, the safety is comparable with

Internet banking. The researchers remain owner of the data and can download it for analysis. The user-account of the researcher is secured by username and password. [50]

Ethical considerations

The Medical Ethical Committee of the UMCG have assessed the study protocol and judged that the study could be conducted without their approval.

Dissemination

We aim to present the study results at conferences and one or more scientific publications in peer-reviewed journals. After publication, results of the study will also be published on ziekofbezeten.nl, to inform study participants and other interested people about the results.

DISCUSSION

This study protocol is a result of new possibilities the Internet creates for epidemiological research. We describe an online survey in the Moroccan-Dutch population, a target group that is hard to reach for researchers and health care workers through traditional means, but which is very actively participating in a range of social exchanges on the website Marokko.nl. The methodology of online research is rather new in psychiatric epidemiology and has many advantages. Research within an online community offers the possibility to reach large numbers of the study population with relatively simple means at affordable costs. [51, 52] Online questionnaires have a more structured format, therefore reducing the risking of skipping questions or making errors by the participants. [53] Questions can be customised, based on previous answers, saving time for the participant. Furthermore, there is no data entry by the researcher,

which saves time and reduces data entry errors.[54] Like in our study, online recruitment can provide unique access to groups that are otherwise difficult to reach.[51, 54, 55]

An important aspect in this study is that it is designed in close collaboration with the Marokko.nl gatekeepers, who are familiar with or part of the Moroccan-Dutch target population. This enhances the survey design, reduces non-response and secures efficient recruitment strategies within the website.

Although the Internet creates new and exciting possibilities in epidemiological research, there are also new challenges and possible limitations. With online research, recruiting a probability sample is difficult or even impossible and response rates cannot always be calculated.[55] However, non-probability or convenience samples can also generate important information. Two studies investigated ecstasy use with different sampling strategies to compare probability versus non-probability samples.[56, 57] They concluded that the two samples were to a great extent comparable in terms of demographic and drug use characteristics. The samples differed slightly on employment status,[56, 57] recent use of drugs other than ecstasy, and how the ecstasy was obtained.[57] The authors suggest that the differences were due to different recruitment strategies. Another study used probability and non-probability samples in a study of elderly patients with end stage renal disease and their spouses. Although there were some differences on religion and ethnicity, most demographic characteristics were comparable.[58] In our design, we recruit a convenience sample within a well-described population of which the overall size within the population is known. We will therefore be able to compare the demographic characteristics in our sample with the characteristics of the entire Moroccan Dutch population.

An important limitation of our recruitment strategy is that people with psychological complaints may be more interested in participating in the study, and may thus be overrepresented. By using and recording different recruitment methods (such as the depression self-test and advertisement on Marokko.nl), we can get an idea whether participants with specific characteristics may enter the study in different ways, which is helpful in determining the impact of such factors on outcome.

Another possible limitation is our use of a cross-sectional design, that may show associations between variables, but does not reveal causal and temporal relations. However, the results of this study will serve as the basis for future prospective research in which causality can be more closely studied. We will ask participants consent to approach them at a later moment. With a follow-up measurement with the same design and instruments, we can create a prospective cohort.

Using only self-report information could be another possible limitation of the study. We have no other source to check demographic variables, the notification of symptoms and the absence or presence of social factors. This may lead to participants exaggerating (or underreporting) their symptoms in order to see how this influences the feedback they are given. However, earlier research suggests that the anonymity of online self-report questionnaires can also result in more open and honest answers to sensitive questions compared to questionnaires that are used by an interviewer, [53-55] and there is no risk for interviewer bias. [54]

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Authors' contributions

RS conceptualised and initiated the website ziekofbezeten. MvdB and RS designed the study. MvdB wrote the manuscript. LvdK and RS contributed to, and critically revised the manuscript. All authors read and approved the final version of the manuscript.

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Competing interests

None declared.

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Figure Legends

Figure 1, online environment of the study

Figure 2, recruitment strategy and survey design

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Migrants Examined for Determinants of psychopathology through INternet Assessment (MEDINA) study: a cross-sectional study among visitors of an Internet community

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Migrants Examined for Determinants of psychopathology through INternet Assessment (MEDINA) study: a cross-sectional study among visitors of an Internet community

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ABSTRACT

Introduction

Migration is a risk factor for the onset of psychopathology. A range of social factors may play a role in the aetiology of psychiatric disorders in migrants. A better understanding of these associations is needed to develop preventive interventions to reduce the disease burden in the migrant population. Research among minority groups is generally time-consuming and it is difficult to recruit participants. Internet can offer interesting new possibilities to conduct research among ethnic minorities. This paper describes the design of an epidemiological study in the Moroccan-Dutch population, which will be entirely performed online. We investigate the association between social factors and psychopathology.

Methods and analysis

The website Marokko.nl is visited by 70% of the young Moroccan-Dutch population in the Netherlands. This website therefore provides a unique possibility for research within this population. We will conduct a survey with online questionnaires via this website. The online survey consists of several validated short self-report questionnaires, measuring depressive and anxiety symptoms (K10), psychotic symptoms (PQ-16), and instruments measuring discrimination, social support and social defeat. Furthermore, demographic characteristics are collected. We will use univariate and multivariate methods for analysing the data.

Ethics and dissemination

The local Medical Ethical Committee have assessed the study protocol and judged that the study could be conducted without their approval. Knowledge dissemination

will take place through peer-reviewed publication in scientific journals as well as publication for participants on the project website.

Discussion

In this study we further explore the association between psychopathology and social factors within an online Moroccan-Dutch sample. The recruitment of participants via the website Marokko.nl creates a big advantage in collecting a large sample of a specific migrant population. Strengths and limitations of the methodology are discussed. Furthermore, we review the advantages and challenges of online epidemiological research methods.

Strengths and limitations of this study

Strengths

- This study uses a novel methodology, in which recruitment and data collection is performed entirely online.
- The use of the Internet creates the opportunity to recruit many Moroccan-Dutch migrants, a population which is otherwise difficult to reach for research.
- We collaborate with the gatekeepers of the website Marokko.nl, which is visited by 70% of the young Moroccan-Dutch population in the Netherlands.

Limitations

- Because of Internet recruitment, we collect a convenience sample, with the risk of selection bias.
- Due to the cross-sectional design, we cannot determine the direction of associations between variables that we investigate.

INTRODUCTION

Across countries and cultures, migration is a risk factor for the development of psychopathology.[1] Psychiatric disorders are heterogeneous and they develop as a result of the interplay between a range of genetic and environmental influences.[2-4] Gaining a better understanding of the aetiology of psychopathology, and especially of modifiable risk factors that are associated with its development, is essential because this can lead us to preventive interventions. In migrants, some aetiological risk factors remain unchanged (e.g. genetic factors) whereas others (e.g. environmental factors) may change as a result of migration. Studying the development of psychopathology in migrant populations may further increase our understanding of the role of these risk factors.[5]

Currently available evidence suggests that the association between migration and psychopathology is strongest for psychotic disorders. Two meta-analyses found that the relative risk for developing schizophrenia was significantly higher in the migrant population compared to the native population.[6, 7] Interestingly, the relative risk for developing schizophrenia greatly differed between migrant subgroups, and was as high as 4.5 for second-generation migrants and 4.8 in black ethnic groups.[7-9] For mood disorders, Swinnen *et al.* found a relative risk of 1.38 (95% CI 1.17-1.62) for migrants in a meta-analysis covering 14 studies (2 on depressive disorder, 5 on bipolar disorder and 9 on mood disorders on unspecified polarity).[10] Since then, other studies have confirmed the increased prevalence of depressive symptoms in migrant populations.[11, 12] A recent study by Cantor-Graae *et al.* has shown increased incidence risk ratios for all psychiatric disorders in foreign-born adoptees and second generation migrants having one foreign born parents. However, for first generation and second-

generation migrants with two foreign-born parents, the risk was only increased for schizophrenia.[1]

Variation in the incidence of psychopathology between different ethnic groups has also been shown in the Netherlands, where the present study is situated. In 2012, the largest migrant groups in the Netherlands (16.7 million inhabitants) originated from Turkey (392,923; 2.3% of the total population), Morocco (362.954; 2.2% of the total population), Surinam (346.797; 2.1% of the total population), and the Dutch Antilles (143.992; 0.9% of the total population).[13] For schizophrenia, the incidence was increased in most of the different migrant groups in the Netherlands compared to the overall population, but not in all. The incidence of schizophrenia appeared to be highest in the second-generation Moroccan-Dutch inhabitants.[14, 15] Furthermore, a Dutch study has shown that incidence and prevalence rates for mood disorders are highest among Turkish migrants (Relative Risk 4.9), followed by Moroccan migrants (RR 3.6) and Surinamese migrants (RR 1.8), while the rates in Western-European migrants were comparable to the general Dutch population.[16] These findings replicate the results from a previous Dutch study.[17]

Possible explanations

Although migrants are at increased risk to develop psychopathology, the explanation for this association is still largely unknown. Previously, it was hypothesized that the disorder itself would be a factor in migration, because especially schizophrenia and bipolar patients were believed to be more restless and rootless and therefore more inclined to migrate. This 'selective migration' hypothesis was first suggested by Ødegaard *et al.* in 1932[18] but is now generally discarded, as scientific evidence cannot support it.[19, 20] An example of an argument against the selective migration theory is

the fact that the incidence of schizophrenia in second-generation migrants is substantially higher compared to their parents from the first generation. This phenomenon points to the importance of post-migration factors or, in other words, (social) factors in the country of destination.[6] Social factors that are frequently suggested to be associated with psychopathology in migrants are (among others): discrimination, lack of social support and social defeat. Discrimination was associated with psychotic symptoms in several studies.[21-23] Also in mood disorders, an association with discrimination was found.[23-26] Lack of social support or isolation was found to be associated with psychopathology in several studies.[27, 28] In the original article by Gilbert *et al.* in 1998, the concept of social defeat, or "being in a subordinate position"[9] was associated with depression.[29] Social defeat has also been hypothesized as an etiological factor for developing schizophrenia in migrant populations.[9] Discrimination, social support and social defeat are variables we will measure in this study. Furthermore, associations between demographic variables and increased risk for psychopathology in migrants have also been found. As an example, younger age at migration was a risk factor for psychosis in a Dutch study.[30] In a systematic review, Shaw *et al.* found that lower density of the ethnic minority population in the neighbourhood was associated with higher risk of psychopathology. This effect was most consistently found for psychosis and only tentative for other mental disorders, due to heterogeneity and limited statistical power of the studies examined.[31]

Aims of the current study

In the current study, we want to further explore the relationship between migration and psychopathology, concentrating on social factors. We aim to investigate the

associations between psychotic symptoms and mood symptoms on the one hand and discrimination, social defeat, and social support on the other. As the association between social factors and psychopathology may be subgroup-specific, we focus on one ethnic group: the Moroccan-Dutch population. This population is relatively hard to reach for researchers and mental health care workers. A previous population-based study in several ethnic groups in the Netherlands reported response rates of 30.2% for Dutch participants compared to 20.8% for Moroccan-Dutch participants.[17] A research report of the Dutch government in the year 2000 states that Moroccan-Dutch patients are underrepresented in the mental health care system.[32] However, since the majority of young Moroccan-Dutch individuals actively visit the website Marokko.nl, we have a unique opportunity to reach this population.

METHODS AND ANALYSIS

We will conduct an online survey in a cross-sectional convenience sample of the Moroccan-Dutch population, using a combination of several self-report questionnaires. The survey will run from 15-11-2012 to 1-5-2014.

Our research questions are the following:

1. How often are symptoms of depression and psychosis reported in a cross sectional sample of young (age 18-35) Moroccan-Dutch participants, measured by self-administered screening questionnaires?
2. Which environmental factors of stress or strain do the Moroccan-Dutch participants report, thereby specifically focusing on social factors such as discrimination, social defeat and social support?
3. What is the association between the symptoms of psychopathology and the reported social factors?

Setting

We will recruit participants at a unique website, which is visited by the majority of Moroccan-Dutch adolescents: www.marokko.nl. This website exists for over ten years. Of all young Moroccan-Dutch people (age 15-35) in the Netherlands 70% visit this website regularly, of whom 33% visits the website weekly.[33, 34] Marokko.nl is serving as a national forum board, where everybody can start a discussion and respond to it. With some exceptions, the language in these discussions is Dutch. Discussions are moderated by a trained team of (mostly Moroccan-Dutch) moderators who make sure the website regulations are respected. Only visitors with an account can contribute to the discussion. To set up an account, one has to create a pseudonym and answer some questions about gender and age. This pseudonym is shown when creating or replying to a discussion. Also, the account is connected to a personal email box; this "personal message" system is available within the site. Because the pseudonyms guarantee anonymity, members feel free to share very personal information in the forum discussions. This includes personal information about sensitive topics like sickness and health, (arranged) marriages, pregnancy and abortion. Although mental health problems are generally a taboo in the Moroccan-Dutch population, on this website many discussions cover this subject. Apparently, there is a need for a platform to discuss these issues in this community.

Despite their need for discussing mental health issues, the Moroccan-Dutch population is underrepresented in preventive programs in mental health care. On the Marokko.nl website, psychiatric problems are discussed, but no professional help is offered. In 2012, we therefore created an add-on to the website about mental health. This mental health domain of Marokko.nl is called www.ziekofbezeten.marokko.nl

("ziek of bezeten" means: being ill or being possessed). Within this domain, we supply information about psychiatric disorders, self-tests for depression and substance use, and email and chat contact with mental health care workers or specially trained Imams.[35] Our research survey is nested within ziekofbezeten.nl. For a schematic overview of the online environment see figure 1.

Participants & recruitment

The participants in this study will be recruited from the Moroccan-Dutch population. Inclusion criteria for this study are:

- At least one of the parents is born in Morocco
- Having sufficient knowledge of the Dutch language
- Having internet access and being a visitor the website marokko.nl

Exclusion criteria are:

- Age younger than 18 years

Recruitment takes places online, using the website Marokko.nl. We will recruit participants in several ways, which are listed below and are shown in Figure 2. There are three main recruitment routes that lead participants to our survey:

1. Advertisement via banners on Marokko.nl.
2. Via an invitation at the end of a depression self-test on the ziekofbezeten.marokko.nl domain: after filling out the depression self-test, people will be asked to participate in the survey.
3. In several places on the website ziekofbezeten.nl, visitors who are interested in participating in the study, have the opportunity to "opt-in" for research and leave an e-mail address.

Should these recruitment routes not result into a sufficient number of participants, additional forms of recruitment can be deployed:

- Via the "personal message" function (a marokko.nl linked email service), a random subset of the registered users can be asked to participate.
- Contributors of several relevant forum discussions can be approached via "personal message" and asked to participate.
- Location of the advertisement of the study can be customized. When for example more women than men are included, the study can specifically be advertised on parts of the website where men are active.

We will track the route via which participants were recruited (anonymously), so that we can analyse the various recruitment strategies and compare the participant characteristics between these recruitment strategies.

Procedure

After inclusion, participants will be asked to fill out an online survey. The first webpage will contain information about the study and informed consent. When informed consent is given, the next page will show the survey. The survey consists of questions about depressive and psychotic symptoms, discrimination, social defeat, social support, and baseline demographics. Completing all questions will take approximately 10 minutes. Furthermore, we will ask the participants if we can approach them for further research at a later time. The last page will provide participants feedback on the questionnaires they filled out. When scores for psychopathology are high, the advice to contact the general practitioner will be given and addresses of mental health care organisations are provided.

Measurements & Instruments

We will ask for demographic variables, as listed in table 1. As a measurement of ethnic density, we ask for the first 4 digits of the postal code, which provides us with enough information to connect to a certain area or neighbourhood without conflicting with the participants' anonymity.

Table 1, Demographic variables

Demographic variables	Operationalization
Age	Years
Gender	Male/female
Ethnicity	Country of birth, country of birth parents
Age of migration	If applicable
Ethnic density	Postal code (first 4 figures)
Previous mental health care	If yes: diagnosis
Previous/current medication	(free text words)
Social economic status	Income
Education	(free text words)
Religion	How important is religion for you? (Likert scale)
Substance use	First 3 questions of the Drug Use Disorders Identification Test (DUDIT) + question on kind of substance used

The main part of our online survey consists of a combination of 5 short questionnaires measuring psychopathology and social factors, which are listed in table 2. The questionnaires are further described below. Table 3 shows an example of questions for each questionnaire.

Table 2, questionnaires

Trait	Questionnaire	Items	Time
Depressive symptoms	K10	10	2 min
Psychotic symptoms	PQ-16	16	2 min
Discrimination	Discrimination scale	22	2 min
Social defeat	Social defeat scale	16	3 min
Social support	Oslo social support questionnaire	3	1 min
	Total time (including demographics):		10 min.

Table 3, question examples

Questionnaire	Question example	Scale
K10	During the last month, how often did you feel tired out for no good reason?	0 – not at all … 4 – always
PQ-16	I have seen things that other people apparently can't see.	True – Untrue
Discrimination scale	How often do you experience one of the following types of discrimination: You are being scoffed at or threatened.	0 – never … 3 – often
Social defeat scale	I feel that I have not made it in life	0 – not at all … 4 – always
Oslo social support questionnaire	How many people are so close to you that you can count on them if you have serious personal problems?	0 – none … 4 – six or more

Psychopathology – Mood symptoms

The Kessler Psychological Distress Scale (K10)[36] is a short questionnaire measuring mood and anxiety symptoms. It contains 10 items on a 5-point likert scale. This scale has previously been tested for the validity in the Dutch language[37] and for online self-administration.[38] Furthermore, it has previously been used in a migrant population in the Netherlands.[39]

Psychopathology – Psychotic symptoms

The Prodromal Questionnaire-16 (PQ-16) is a short version of the Prodromal Questionnaire.[40] It is a self-report screening instrument for psychosis risk, with 16 true/false statements. The instrument has been developed and tested for validity in the Dutch language.[41] Although this instrument has not been specifically validated in Moroccan-Dutch participants, the sample in which it has been studied in previous research was ethnically diverse.[42, 43]

Social factors – perceived discrimination

Discrimination is measured with a combination of two sbuscales: the 'everyday discrimination scale' and the 'major experiences of discrimination scale'[44-46] The instrument showed adequate results in the appraisal of a review by Bastos *et al.*[47] The translation we use is previously used in the Dutch MIGROUP study (an add-on protocol to the GROUP-study).[48]

Social factors – social support

The Oslo Social Support Questionnaire was designed by Dalgard *et al.*[49-51] It consists of only three questions and was the instrument of choice for social support on an expert meeting where common instruments for mental disorders for European population studies were chosen, called "EUROHIS".[52] A Dutch translation of the instrument is available.

Social factors – social defeat

The most widely used instrument for measuring social defeat is the Social Defeat Scale, designed by Gilbert *et al.*[29, 53] It is a 16 item self-report scale. This instrument was also included in the MIGROUP protocol[48] and therefore available in Dutch.

Sample size calculation

We based the power calculations on two associations we are investigating in our study: 1. The association between discrimination and depression; 2. The association between discrimination and psychosis.

1. The power calculation for the association between depression and discrimination is based on the study by Van Dijk *et al.*[24] In this study, around 50% of 153 Moroccan-Dutch and 199 Turkish-Dutch participants experienced

discrimination. In order to be able to detect an association with an effect size measured as an Odds Ratio of at least 2, the sample size per group (with and without discrimination) is 182. Based on this association, inclusion should reach a minimum of 400 participants.

2. Power calculation for detecting the association between perceived discrimination and psychotic symptoms (delusional hallucination) was based on Janssen *et al.*[21] This study differs from our study because it has a longitudinal design and it also includes Dutch inhabitants, not only migrants. The similarity between both studies is that they both take place in the general (healthy) population. Based on this study, for an $\alpha = 0.05$ (two-sided 0.025) and $\beta = 0.20$ (Power 80%) to detect an association with an Odds Ratio of at least 2, N had to be at least over 864 participants.

Based on the power calculation for the association between discrimination and psychosis, we aim to include 1000 participants.

Data analysis

Descriptive statistics

We will describe the socio-demographic variables in our sample and will compare them with those of other studies on psychopathology with Moroccan-Dutch participants. We will investigate the association between social factors (independent variables) and psychopathology (dependent variable) and we correct for relevant social-demographic variables (confounding variables). The dependent variable psychopathology will be divided into psychotic symptoms and psychological distress (depressive and anxiety symptoms). Using cut-off scores for the specific

questionnaires, we consider psychopathology as a binary variable (yes/no psychotic disorder; yes/no psychological distress)

Univariate analysis

Association between social factors and psychopathology will first be described in percentages, subdivided by socio-demographic variables (e.g. gender, age, socio-economic status, ethnicity). We will use Chi-square test for categorical and t-tests for continuous variables to identify significant associations between these variables. We will take gender differences in our sample into account in our analysis, since previous studies in the Moroccan-Dutch population have shown large differences in psychopathology rates between men en women.[14, 17]

Multivariate analysis

After univariate analysis, we will use a regression model (possibly Poisson regression) to investigate the association between psychopathology and the social factors, correcting for confounders. The exact regression model we will choose is partly dependent on the incidence of psychopathology in our sample. We consider the Poisson regression model, because we expect that the occurrence of psychopathology will not be high in our non-clinical sample.

ETHICS AND DISSEMINATION

Informed consent and data security

When entering the survey, participants are asked for informed consent. They can give their consent by checking a box. In addition, participants will be asked to check a box to confirm that his or her age is above 18. When both boxes are checked, participants

can click on 'next' and the first page of survey is displayed. A unique research identification number will then be created for each participant, which is used for data filing and handling. All recorded personal information (like pseudonym on the website, name or email address) will be coded. IP-addresses will not be recorded.

For the online questionnaire, we use the service of Qualtrics.[54] In this online service, we can design the entire survey and link it to the ziekofbezeten-domain of Marokko.nl (so it can be opened from this website). They guarantee good safety measurements for data storage and handling. For online data transport, the safety is comparable with Internet banking. The researchers remain owner of the data and can download it for analysis. The user-account of the researcher is secured by username and password.[55]

Ethical considerations

The Medical Ethical Committee of the UMCG have assessed the study protocol and judged that the study could be conducted without their approval.

Dissemination

We aim to present the study results at conferences and in one or more scientific publications in peer-reviewed journals. After publication, results of the study will also be published on ziekofbezeten.nl, to inform study participants and other interested people about the results.

DISCUSSION

This study protocol is a result of new possibilities the Internet creates for epidemiological research. We describe an online survey in the Moroccan-Dutch population, a target group that is hard to reach for researchers and health care workers

through traditional means, but which is very actively participating in a range of social exchanges on the website Marokko.nl. The methodology of online research is rather new in psychiatric epidemiology and has many advantages. Research within an online community offers the possibility to reach large numbers of the study population with relatively simple means at affordable costs.[56, 57] Online questionnaires have a more structured format, therefore reducing the risking of skipping questions or making errors by the participants.[58] Questions can be customised, based on previous answers, saving time for the participant. Furthermore, there is no data entry by the researcher, which saves time and reduces data entry errors.[59] Like in our study, online recruitment can provide unique access to groups that are otherwise difficult to reach.[56, 59, 60]

An important aspect in this study is that it is designed in close collaboration with the Marokko.nl gatekeepers, who are familiar with or part of the Moroccan-Dutch target population. This enhances the survey design, reduces non-response and secures efficient recruitment strategies within the website.

Although the Internet creates new and exciting possibilities in epidemiological research, there are also new challenges and possible limitations. With online research, recruiting a probability sample is difficult or even impossible and response rates cannot always be calculated.[60]

In a non-probability or convenience sample, there is a possible risk of selection bias, which is one of the major limitations of our study. Recruitment via a convenience sample is entirely dependent of people who are willing to volunteer. Therefore, the probability that people who, for example, fear stigmatization are less likely to participate in research focusing on mental illness. However, this may be partly countered by the fact that the internet-survey allows participants to stay anonymous.

This is supported by the fact that mental illnesses are frequently and openly discussed on Marokko.nl.

However, non-probability or convenience samples can also generate important information. Two studies investigated ecstasy use with different sampling strategies to compare probability versus non-probability samples.[61, 62] They concluded that the two samples were to a great extent comparable in terms of demographic and drug use characteristics. The samples differed slightly on employment status,[61, 62] recent use of drugs other than ecstasy, and how the ecstasy was obtained.[62] The authors suggest that the differences were due to different recruitment strategies. Another study used probability and non-probability samples in a study of elderly patients with end stage renal disease and their spouses. Although there were some differences on religion and ethnicity, most demographic characteristics were comparable.[63] In our design, we recruit a convenience sample within a well-described population of which the overall size within the population is known. We will therefore be able to compare the demographic characteristics in our sample with the characteristics of the entire Moroccan Dutch population.

An important limitation of our recruitment strategy is that people with psychological complaints may be more interested in participating in the study, and may thus be overrepresented. More specifically, recruitment via the depression self-test might encourage people with depressive complaints to participate in particular. By using and recording different recruitment methods (such as the depression self-test and advertisement on Marokko.nl), we can investigate the effects of the recruitment strategy on the outcome variables. Depending on these differences, we might need to correct for it in our analyses.

Another possible limitation is our use of a cross-sectional design, that may show associations between variables, but does not reveal causal and temporal relations. However, the results of this study will serve as the basis for future research, in which temporal relations can be more closely studied. We will ask participants' consent to approach them at a later moment. We consider performing a follow-up measurement with the same design and instruments. If we will be able to reach enough participants, we can create a prospective cohort.

Using only self-report information could be another possible limitation of the study. We have no other source to check demographic variables, the notification of symptoms and the absence or presence of social factors. This may lead to participants exaggerating (or underreporting) their symptoms in order to see how this influences the feedback they are given. However, earlier research suggests that the anonymity of online self-report questionnaires can also result in more open and honest answers to sensitive questions compared to questionnaires that are used by an interviewer,[58-60] and there is no risk for interviewer bias.[59]

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Authors' contributions

RS conceptualised and initiated the website ziekofbezeten. MvdB and RS designed the study. MvdB wrote the manuscript. LvdK and RS contributed to, and critically revised the manuscript. All authors read and approved the final version of the manuscript.

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Competing interests

None declared.

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Figure Legends

Figure 1, online environment of the study

Figure 2, recruitment strategy and survey design

Migrants Examined for Determinants of psychopathology through INternet Assessment (MEDINA) study: a cross-sectional study among visitors of an Internet community

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ABSTRACT

Introduction

Migration is a risk factor for the onset of psychopathology. A range of social factors may play a role in the aetiology of psychiatric disorders in migrants. A better understanding of these associations is needed to develop preventive interventions to reduce the disease burden in the migrant population. Research among minority groups is generally time-consuming and it is difficult to recruit participants. Internet can offer interesting new possibilities to conduct research among ethnic minorities. This paper describes the design of an epidemiological study in the Moroccan-Dutch population, which will be entirely performed online. We investigate the association between social factors and psychopathology.

Methods and analysis

The website Marokko.nl is visited by 70% of the young Moroccan-Dutch population in the Netherlands. This website therefore provides a unique possibility for research within this population. We will conduct a survey with online questionnaires via this website. The online survey consists of several validated short self-report questionnaires, measuring depressive and anxiety symptoms (K10), psychotic symptoms (PQ-16), and instruments measuring discrimination, social support and social defeat. Furthermore, demographic characteristics are collected. We will use univariate and multivariate methods for analysing the data.

Ethics and dissemination

The local Medical Ethical Committee have assessed the study protocol and judged that the study could be conducted without their approval. Knowledge dissemination

will take place through peer-reviewed publication in scientific journals as well as publication for participants on the project website.

Discussion

In this study we further explore the association between psychopathology and social factors within an online Moroccan-Dutch sample. The recruitment of participants via the website Marokko.nl creates a big advantage in collecting a large sample of a specific migrant population. Strengths and limitations of the methodology are discussed. Furthermore, we review the advantages and challenges of online epidemiological research methods.

Strengths and limitations of this study

Strengths

- This study uses a novel methodology, in which recruitment and data collection is performed entirely online.
- The use of the Internet creates the opportunity to recruit many Moroccan-Dutch migrants, a population which is otherwise difficult to reach for research.
- We collaborate with the gatekeepers of the website Marokko.nl, which is visited by 70% of the young Moroccan-Dutch population in the Netherlands.

Limitations

- Because of Internet recruitment, we collect a convenience sample, with the risk of selection bias.
- Due to the cross-sectional design, we cannot determine the direction of associations between variables that we investigate.

INTRODUCTION

Across countries and cultures, migration is a risk factor for the development of psychopathology.[1] Psychiatric disorders are heterogeneous and they develop as a result of the interplay between a range of genetic and environmental influences.[2-4] Gaining a better understanding of the aetiology of psychopathology, and especially of modifiable risk factors that are associated with its development, is essential because this can lead us to preventive interventions. In migrants, some aetiological risk factors remain unchanged (e.g. genetic factors) whereas others (e.g. environmental factors) may change as a result of migration. Studying the development of psychopathology in migrant populations may further increase our understanding of the role of these risk factors.[5]

Currently available evidence suggests that the association between migration and psychopathology is strongest for psychotic disorders. Two meta-analyses found that the relative risk for developing schizophrenia was significantly higher in the migrant population compared to the native population.[6, 7] Interestingly, the relative risk for developing schizophrenia greatly differed between migrant subgroups, and was as high as 4.5 for second-generation migrants and 4.8 in black ethnic groups.[7-9] For mood disorders, Swinnen *et al.* found a relative risk of 1.38 (95% CI 1.17-1.62) for migrants in a meta-analysis covering 14 studies (2 on depressive disorder, 5 on bipolar disorder and 9 on mood disorders on unspecified polarity).[10] Since then, other studies have confirmed the increased prevalence of depressive symptoms in migrant populations.[11, 12] A recent study by Cantor-Graae *et al.* has shown increased incidence risk ratios for all psychiatric disorders in foreign-born adoptees and second generation migrants having one foreign born parents. However, for first generation and second-

generation migrants with two foreign-born parents, the risk was only increased for schizophrenia.[1]

Variation in the incidence of psychopathology between different ethnic groups has also been shown in the Netherlands, where the present study is situated. In 2012, the largest migrant groups in the Netherlands (16.7 million inhabitants) originated from Turkey (392,923; 2.3% of the total population), Morocco (362.954; 2.2% of the total population), Surinam (346.797; 2.1% of the total population), and the Dutch Antilles (143.992; 0.9% of the total population).[13] For schizophrenia, the incidence was increased in most of the different migrant groups in the Netherlands compared to the overall population, but not in all. The incidence of schizophrenia appeared to be highest in the second-generation Moroccan-Dutch inhabitants.[14, 15] Furthermore, a Dutch study has shown that incidence and prevalence rates for mood disorders are highest among Turkish migrants (Relative Risk 4.9), followed by Moroccan migrants (RR 3.6) and Surinamese migrants (RR 1.8), while the rates in Western-European migrants were comparable to the general Dutch population.[16] These findings replicate the results from a previous Dutch study.[17]

Possible explanations

Although migrants are at increased risk to develop psychopathology, the explanation for this association is still largely unknown. Previously, it was hypothesized that the disorder itself would be a factor in migration, because especially schizophrenia and bipolar patients were believed to be more restless and rootless and therefore more inclined to migrate. This 'selective migration' hypothesis was first suggested by Ødegaard *et al.* in 1932[18] but is now generally discarded, as scientific evidence cannot support it.[19, 20] An example of an argument against the selective migration theory is

the fact that the incidence of schizophrenia in second-generation migrants is substantially higher compared to their parents from the first generation. This phenomenon points to the importance of post-migration factors or, in other words, (social) factors in the country of destination.[6] Social factors that are frequently suggested to be associated with psychopathology in migrants are (among others): discrimination, lack of social support and social defeat. Discrimination was associated with psychotic symptoms in several studies.[21-23] Also in mood disorders, an association with discrimination was found.[23-26] Lack of social support or isolation was found to be associated with psychopathology in several studies.[27, 28] In the original article by Gilbert *et al.* in 1998, the concept of social defeat, or "being in a subordinate position"[9] was associated with depression.[29] Social defeat has also been hypothesized as an etiological factor for developing schizophrenia in migrant populations.[9] Discrimination, social support and social defeat are variables we will measure in this study. Furthermore, associations between demographic variables and increased risk for psychopathology in migrants have also been found. As an example, younger age at migration was a risk factor for psychosis in a Dutch study.[30] In a systematic review, Shaw *et al.* found that lower density of the ethnic minority population in the neighbourhood was associated with higher risk of psychopathology. This effect was most consistently found for psychosis and only tentative for other mental disorders, due to heterogeneity and limited statistical power of the studies examined.[31]

Aims of the current study

In the current study, we want to further explore the relationship between migration and psychopathology, concentrating on social factors. We aim to investigate the

associations between psychotic symptoms and mood symptoms on the one hand and discrimination, social defeat, and social support on the other. As the association between social factors and psychopathology may be subgroup-specific, we focus on one ethnic group: the Moroccan-Dutch population. This population is relatively hard to reach for researchers and mental health care workers. A previous population-based study in several ethnic groups in the Netherlands reported response rates of 30.2% for Dutch participants compared to 20.8% for Moroccan-Dutch participants.[17] A research report of the Dutch government in the year 2000 states that Moroccan-Dutch patients are underrepresented in the mental health care system.[32] However, since the majority of young Moroccan-Dutch individuals actively visit the website Marokko.nl, we have a unique opportunity to reach this population.

METHODS AND ANALYSIS

We will conduct an online survey in a cross-sectional convenience sample of the Moroccan-Dutch population, using a combination of several self-report questionnaires. The survey will run from 15-11-2012 to 1-5-2014.

Our research questions are the following:

1. How often are symptoms of depression and psychosis reported in a cross sectional sample of young (age 18-35) Moroccan-Dutch participants, measured by self-administered screening questionnaires?
2. Which environmental factors of stress or strain do the Moroccan-Dutch participants report, thereby specifically focusing on social factors such as discrimination, social defeat and social support?
3. What is the association between the symptoms of psychopathology and the reported social factors?

Setting

We will recruit participants at a unique website, which is visited by the majority of Moroccan-Dutch adolescents: www.marokko.nl. This website exists for over ten years. Of all young Moroccan-Dutch people (age 15-35) in the Netherlands 70% visit this website regularly, of whom 33% visits the website weekly.[33, 34] Marokko.nl is serving as a national forum board, where everybody can start a discussion and respond to it. With some exceptions, the language in these discussions is Dutch. Discussions are moderated by a trained team of (mostly Moroccan-Dutch) moderators who make sure the website regulations are respected. Only visitors with an account can contribute to the discussion. To set up an account, one has to create a pseudonym and answer some questions about gender and age. This pseudonym is shown when creating or replying to a discussion. Also, the account is connected to a personal email box; this "personal message" system is available within the site. Because the pseudonyms guarantee anonymity, members feel free to share very personal information in the forum discussions. This includes personal information about sensitive topics like sickness and health, (arranged) marriages, pregnancy and abortion. Although mental health problems are generally a taboo in the Moroccan-Dutch population, on this website many discussions cover this subject. Apparently, there is a need for a platform to discuss these issues in this community.

Despite their need for discussing mental health issues, the Moroccan-Dutch population is underrepresented in preventive programs in mental health care. On the Marokko.nl website, psychiatric problems are discussed, but no professional help is offered. In 2012, we therefore created an add-on to the website about mental health. This mental health domain of Marokko.nl is called www.ziekofbezeten.marokko.nl

("ziek of bezeten" means: being ill or being possessed). Within this domain, we supply information about psychiatric disorders, self-tests for depression and substance use, and email and chat contact with mental health care workers or specially trained Imams.[35] Our research survey is nested within ziekofbezeten.nl. For a schematic overview of the online environment see figure 1.

Participants & recruitment

The participants in this study will be recruited from the Moroccan-Dutch population. Inclusion criteria for this study are:

- At least one of the parents is born in Morocco
- Having sufficient knowledge of the Dutch language
- Having internet access and being a visitor the website marokko.nl

Exclusion criteria are:

- Age younger than 18 years

Recruitment takes places online, using the website Marokko.nl. We will recruit participants in several ways, which are listed below and are shown in Figure 2. There are three main recruitment routes that lead participants to our survey:

1. Advertisement via banners on Marokko.nl.
2. Via an invitation at the end of a depression self-test on the ziekofbezeten.marokko.nl domain: after filling out the depression self-test, people will be asked to participate in the survey.
3. In several places on the website ziekofbezeten.nl, visitors who are interested in participating in the study, have the opportunity to "opt-in" for research and leave an e-mail address.

Should these recruitment routes not result into a sufficient number of participants, additional forms of recruitment can be deployed:

- Via the "personal message" function (a marokko.nl linked email service), a random subset of the registered users can be asked to participate.
- Contributors of several relevant forum discussions can be approached via "personal message" and asked to participate.
- Location of the advertisement of the study can be customized. When for example more women than men are included, the study can specifically be advertised on parts of the website where men are active.

We will track the route via which participants were recruited (anonymously), so that we can analyse the various recruitment strategies and compare the participant characteristics between these recruitment strategies.

Procedure

After inclusion, participants will be asked to fill out an online survey. The first webpage will contain information about the study and informed consent. When informed consent is given, the next page will show the survey. The survey consists of questions about depressive and psychotic symptoms, discrimination, social defeat, social support, and baseline demographics. Completing all questions will take approximately 10 minutes. Furthermore, we will ask the participants if we can approach them for further research at a later time. The last page will provide participants feedback on the questionnaires they filled out. When scores for psychopathology are high, the advice to contact the general practitioner will be given and addresses of mental health care organisations are provided.

Measurements & Instruments

We will ask for demographic variables, as listed in table 1. As a measurement of ethnic density, we ask for the first 4 digits of the postal code, which provides us with enough information to connect to a certain area or neighbourhood without conflicting with the participants' anonymity.

Table 1, Demographic variables

Demographic variables	Operationalization
Age	Years
Gender	Male/female
Ethnicity	Country of birth, country of birth parents
Age of migration	If applicable
Ethnic density	Postal code (first 4 figures)
Previous mental health care	If yes: diagnosis
Previous/current medication	(free text words)
Social economic status	Income
Education	(free text words)
Religion	How important is religion for you? (Likert scale)
Substance use	First 3 questions of the Drug Use Disorders Identification Test (DUDIT) + question on kind of substance used

The main part of our online survey consists of a combination of 5 short questionnaires measuring psychopathology and social factors, which are listed in table 2. The questionnaires are further described below. Table 3 shows an example of questions for each questionnaire.

Table 2, questionnaires

Trait	Questionnaire	Items	Time
Depressive symptoms	K10	10	2 min
Psychotic symptoms	PQ-16	16	2 min
Discrimination	Discrimination scale	22	2 min
Social defeat	Social defeat scale	16	3 min
Social support	Oslo social support questionnaire	3	1 min
	Total time (including demographics):		10 min.

Table 3, question examples

Questionnaire	Question example	Scale
K10	During the last month, how often did you feel tired out for no good reason?	0 – not at all … 4 – always
PQ-16	I have seen things that other people apparently can't see.	True – Untrue
Discrimination scale	How often do you experience one of the following types of discrimination: You are being scoffed at or threatened.	0 – never … 3 – often
Social defeat scale	I feel that I have not made it in life	0 – not at all … 4 – always
Oslo social support questionnaire	How many people are so close to you that you can count on them if you have serious personal problems?	0 – none … 4 – six or more

Psychopathology – Mood symptoms

The Kessler Psychological Distress Scale (K10)[36] is a short questionnaire measuring mood and anxiety symptoms. It contains 10 items on a 5-point likert scale. This scale has previously been tested for the validity in the Dutch language[37] and for online self-administration.[38] Furthermore, it has previously been used in a migrant population in the Netherlands.[39]

Psychopathology – Psychotic symptoms

The Prodromal Questionnaire-16 (PQ-16) is a short version of the Prodromal Questionnaire.[40] It is a self-report screening instrument for psychosis risk, with 16 true/false statements. The instrument has been developed and tested for validity in the Dutch language.[41] Although this instrument has not been specifically validated in Moroccan-Dutch participants, the sample in which it has been studied in previous research was ethnically diverse.[42, 43]

Social factors – perceived discrimination

Discrimination is measured with a combination of two sbuscales: the 'everyday discrimination scale' and the 'major experiences of discrimination scale'[44-46] The instrument showed adequate results in the appraisal of a review by Bastos *et al.*[47] The translation we use is previously used in the Dutch MIGROUP study (an add-on protocol to the GROUP-study).[48]

Social factors – social support

The Oslo Social Support Questionnaire was designed by Dalgard *et al.*[49-51] It consists of only three questions and was the instrument of choice for social support on an expert meeting where common instruments for mental disorders for European population studies were chosen, called "EUROHIS".[52] A Dutch translation of the instrument is available.

Social factors – social defeat

The most widely used instrument for measuring social defeat is the Social Defeat Scale, designed by Gilbert *et al.*[29, 53] It is a 16 item self-report scale. This instrument was also included in the MIGROUP protocol[48] and therefore available in Dutch.

Sample size calculation

We based the power calculations on two associations we are investigating in our study: 1. The association between discrimination and depression; 2. The association between discrimination and psychosis.

1. The power calculation for the association between depression and discrimination is based on the study by Van Dijk *et al.*[24] In this study, around 50% of 153 Moroccan-Dutch and 199 Turkish-Dutch participants experienced

discrimination. In order to be able to detect an association with an effect size measured as an Odds Ratio of at least 2, the sample size per group (with and without discrimination) is 182. Based on this association, inclusion should reach a minimum of 400 participants.

2. Power calculation for detecting the association between perceived discrimination and psychotic symptoms (delusional hallucination) was based on Janssen *et al.*[21] This study differs from our study because it has a longitudinal design and it also includes Dutch inhabitants, not only migrants. The similarity between both studies is that they both take place in the general (healthy) population. Based on this study, for an $\alpha = 0.05$ (two-sided 0.025) and $\beta = 0.20$ (Power 80%) to detect an association with an Odds Ratio of at least 2, N had to be at least over 864 participants.

Based on the power calculation for the association between discrimination and psychosis, we aim to include 1000 participants.

Data analysis

Descriptive statistics

We will describe the socio-demographic variables in our sample and will compare them with those of other studies on psychopathology with Moroccan-Dutch participants. We will investigate the association between social factors (independent variables) and psychopathology (dependent variable) and we correct for relevant social-demographic variables (confounding variables). The dependent variable psychopathology will be divided into psychotic symptoms and psychological distress (depressive and anxiety symptoms). Using cut-off scores for the specific

questionnaires, we consider psychopathology as a binary variable (yes/no psychotic disorder; yes/no psychological distress)

Univariate analysis

Association between social factors and psychopathology will first be described in percentages, subdivided by socio-demographic variables (e.g. gender, age, socio-economic status, ethnicity). We will use Chi-square test for categorical and t-tests for continuous variables to identify significant associations between these variables. We will take gender differences in our sample into account in our analysis, since previous studies in the Moroccan-Dutch population have shown large differences in psychopathology rates between men en women.[14, 17]

Multivariate analysis

After univariate analysis, we will use a regression model (possibly Poisson regression) to investigate the association between psychopathology and the social factors, correcting for confounders. The exact regression model we will choose is partly dependent on the incidence of psychopathology in our sample. We consider the Poisson regression model, because we expect that the occurrence of psychopathology will not be high in our non-clinical sample.

ETHICS AND DISSEMINATION

Informed consent and data security

When entering the survey, participants are asked for informed consent. They can give their consent by checking a box. In addition, participants will be asked to check a box to confirm that his or her age is above 18. When both boxes are checked, participants

can click on 'next' and the first page of survey is displayed. A unique research identification number will then be created for each participant, which is used for data filing and handling. All recorded personal information (like pseudonym on the website, name or email address) will be coded. IP-addresses will not be recorded.

For the online questionnaire, we use the service of Qualtrics.[54] In this online service, we can design the entire survey and link it to the ziekofbezeten-domain of Marokko.nl (so it can be opened from this website). They guarantee good safety measurements for data storage and handling. For online data transport, the safety is comparable with Internet banking. The researchers remain owner of the data and can download it for analysis. The user-account of the researcher is secured by username and password.[55]

Ethical considerations

The Medical Ethical Committee of the UMCG have assessed the study protocol and judged that the study could be conducted without their approval.

Dissemination

We aim to present the study results at conferences and in one or more scientific publications in peer-reviewed journals. After publication, results of the study will also be published on ziekofbezeten.nl, to inform study participants and other interested people about the results.

DISCUSSION

This study protocol is a result of new possibilities the Internet creates for epidemiological research. We describe an online survey in the Moroccan-Dutch population, a target group that is hard to reach for researchers and health care workers

through traditional means, but which is very actively participating in a range of social exchanges on the website Marokko.nl. The methodology of online research is rather new in psychiatric epidemiology and has many advantages. Research within an online community offers the possibility to reach large numbers of the study population with relatively simple means at affordable costs.[56, 57] Online questionnaires have a more structured format, therefore reducing the risking of skipping questions or making errors by the participants.[58] Questions can be customised, based on previous answers, saving time for the participant. Furthermore, there is no data entry by the researcher, which saves time and reduces data entry errors.[59] Like in our study, online recruitment can provide unique access to groups that are otherwise difficult to reach.[56, 59, 60]

An important aspect in this study is that it is designed in close collaboration with the Marokko.nl gatekeepers, who are familiar with or part of the Moroccan-Dutch target population. This enhances the survey design, reduces non-response and secures efficient recruitment strategies within the website.

Although the Internet creates new and exciting possibilities in epidemiological research, there are also new challenges and possible limitations. With online research, recruiting a probability sample is difficult or even impossible and response rates cannot always be calculated.[60]

In a non-probability or convenience sample, there is a possible risk of selection bias, which is one of the major limitations of our study. Recruitment via a convenience sample is entirely dependent of people who are willing to volunteer. Therefore, the probability that people who, for example, fear stigmatization are less likely to participate in research focusing on mental illness. However, this may be partly countered by the fact that the internet-survey allows participants to stay anonymous.

This is supported by the fact that mental illnesses are frequently and openly discussed on Marokko.nl.

However, non-probability or convenience samples can also generate important information. Two studies investigated ecstasy use with different sampling strategies to compare probability versus non-probability samples.[61, 62] They concluded that the two samples were to a great extent comparable in terms of demographic and drug use characteristics. The samples differed slightly on employment status,[61, 62] recent use of drugs other than ecstasy, and how the ecstasy was obtained.[62] The authors suggest that the differences were due to different recruitment strategies. Another study used probability and non-probability samples in a study of elderly patients with end stage renal disease and their spouses. Although there were some differences on religion and ethnicity, most demographic characteristics were comparable.[63] In our design, we recruit a convenience sample within a well-described population of which the overall size within the population is known. We will therefore be able to compare the demographic characteristics in our sample with the characteristics of the entire Moroccan Dutch population.

An important limitation of our recruitment strategy is that people with psychological complaints may be more interested in participating in the study, and may thus be overrepresented. More specifically, recruitment via the depression self-test might encourage people with depressive complaints to participate in particular. By using and recording different recruitment methods (such as the depression self-test and advertisement on Marokko.nl), we can investigate the effects of the recruitment strategy on the outcome variables. Depending on these differences, we might need to correct for it in our analyses.

Another possible limitation is our use of a cross-sectional design, that may show associations between variables, but does not reveal causal and temporal relations. However, the results of this study will serve as the basis for future research, in which temporal relations can be more closely studied. We will ask participants' consent to approach them at a later moment. We consider performing a follow-up measurement with the same design and instruments. If we will be able to reach enough participants, we can create a prospective cohort.

Using only self-report information could be another possible limitation of the study. We have no other source to check demographic variables, the notification of symptoms and the absence or presence of social factors. This may lead to participants exaggerating (or underreporting) their symptoms in order to see how this influences the feedback they are given. However, earlier research suggests that the anonymity of online self-report questionnaires can also result in more open and honest answers to sensitive questions compared to questionnaires that are used by an interviewer,[58-60] and there is no risk for interviewer bias.[59]

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Authors' contributions

RS conceptualised and initiated the website ziekofbezeten. MvdB and RS designed the study. MvdB wrote the manuscript. LvdK and RS contributed to, and critically revised the manuscript. All authors read and approved the final version of the manuscript.

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Competing interests

None declared.

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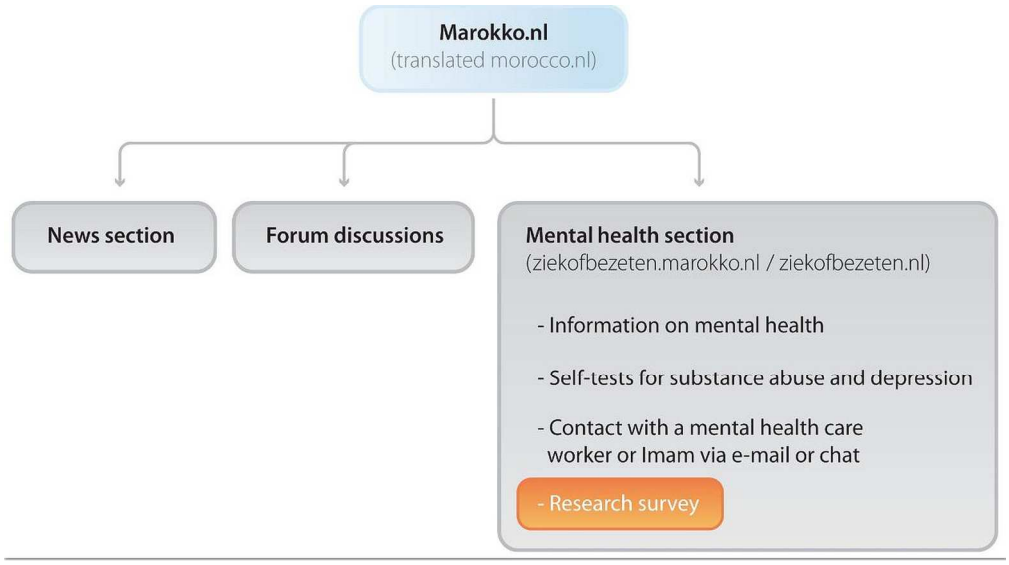
Figure Legends

Figure 1, online environment of the study

Figure 2, recruitment strategy and survey design



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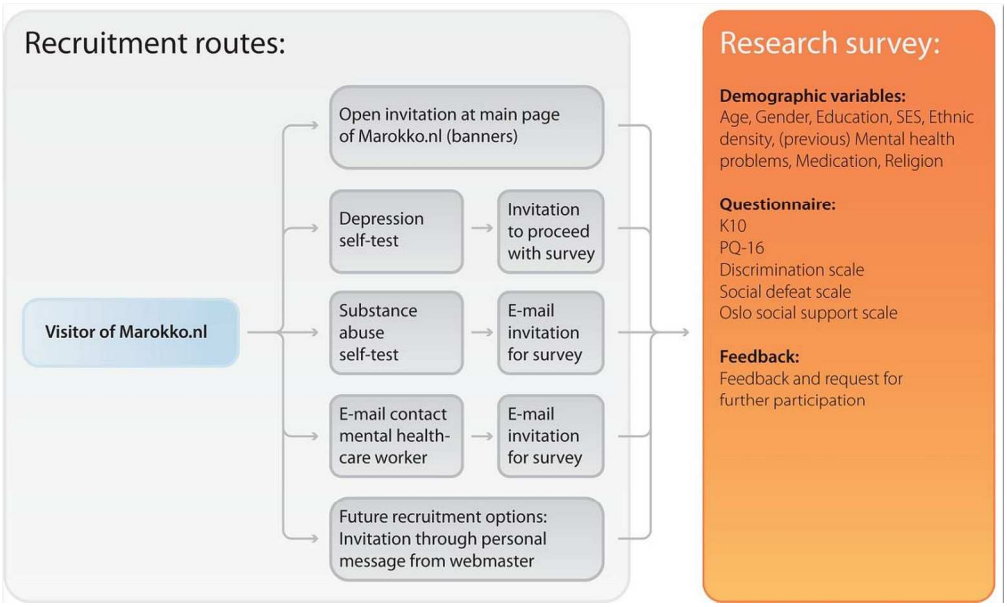

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