Variation in use of primary mental healthcare and effects of specific demographic and environmental determinants of patients in the Netherlands.

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Acknowledgements

Abstract

Background

In 2012, the position of Mental Healthcare Nurses (MHN) was introduced to provide mental healthcare in primary care. This was aimed to increase the accessibility of care and, at the same time, decrease costs by offering mental healthcare in primary care instead of secondary care. From previous studies, it was shown that certain patient factors may cause an increase or decrease in the chance of having a consultation at the MHN. However, the literature on MHNs is limited. The objective of this research was to detect potential provincial differences regarding the use of care provided by MHNs, find patient characteristics which may have an effect on the chance of obtaining a consultation at the MHN and finally, study the prescription of medication for mental problems in general practices for 2014-2017.

Method

The research design of this study is a quantitative retro-perspective design. Data were collected for 2016 and 2017. The total sample size includes 713,287 patients. A t-test was performed to detect differences in the use of services of the MHN. Logistic regression analyses were used to detect the Odds Ratio (OR) for age, gender, the degree of urbanisation and social economic status of a patient in relation to consultations at the MHN. Finally, a one-way ANOVA was performed to check if prescriptions of medication for mental problems in general practices changed since the implementation of MHNs.

Results

There exists a small but significant difference in the use of service of MHNs between Limburg (N=279, mean use of service 3.4%) and Noord-Brabant (N=125, mean use of service 3.1%). Women are more likely to obtain a consultation from the MHN (OR=1.62; 95% CI [1.59 to 1.66]; p=0.00). The age category which is most likely to obtain a consultation from the MHN is 19-44 years (OR=3.60; 95% CI [3.44 to 2.79]; p=0.00). If a patient has a high or moderate SES there is a higher chance to have a consultation with an MHN (OR=1.11; 95% CI [1.03 to 1.20]; p=0.01). Living in an urban place increases the chance to have at least one consultation with the MHN (OR=1.56; 95% CI [1.52 to 1.60]; p=0.00). Finally, there has not found a difference in prescriptions of medication for the years 2014-2017.

Conclusion

Patient characteristics like age, gender, urbanisation and social economic status influence the chance on a consultation with the MHN. Difference in the use of service exists, whereas the prescription of medication did not change in the years. Future research should investigate if there are GP or other patient factors which influence the use of service of the MHN and qualitatively address the role of the MHN.

Keywords: mental health nurses (MHN), provincial variation, demographic determinants, environmental determinants, prescription of medication

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Abbreviations

CI	Confidence Interval
GP	General Practitioner
HIS	Health Information System
ICPC	International Classification of Primary Care
LHV	Landelijke Huisartsen Vereniging
MHN	Mental Healthcare Nurse
NHG	Nederlands Huisartsen Genootschap
OR	Odds Ratio
SES	Social Economic Status

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1. Introduction

In this part of the thesis, the subject of the study is provided. The outline is organised as follows: first the background is defined, second the problem statement is given, third the research question is defined, fourth the contribution of this thesis is discussed and finally the outline of this report is provided.

1.1 Background

The annual prevalence of psychological diseases in the Netherlands amounts approximately 18% and causes a large burden of disease. Looking internationally, the prevalence of mental diseases in the Netherlands is average. For example, in the United States (US) the prevalence amounts 26%, in Italy 8% and in Germany 11%. Moreover, approximately 44% of the people who live in the Netherlands got diagnosed with a mental disease in their life, like depression (Veerbeek, Knispel, & Nuijen, 2015). Of all mental disorders, the most common problems are anxiety, mood disorders and depressions (de Graaf, ten Have, van Gool, & van Dorsselaer, 2012). To cure mental diseases, two general kinds of treatments are provided: (1) medication, such as antidepressants, or (2) psychological interventions, like consultations. From the perspective of the patient, preference is given to psychological interventions instead of medication (Prins, Verhaak, Bensing, & van der Meer, 2008). However, not all patients seek for help regarding their problems, because of practical (e.g. high cost of care) or emotional (e.g. scared to talk about problems) issues (Mohr et al., 2006). In addition, practical issues play a more important role in the choice to receive treatment compared to emotional issues.

As a result of the fact that some patients do not receive care based on the costs, it is essential to understand the financial healthcare system in the Netherlands. Since 2006, the health insurance system in the Netherlands changed. Every citizen may choose his or her own health insurer and needs to pay a monthly fee to obtain basic healthcare (Rijksoverheid, 2016c). The basic healthcare is fixed for every person and is determined annually by the government. Certain types of care are reimbursed by the health insurance without paying out-of-pocket expenses, i.e. primary care, however, some types of care have to be paid by the patients themselves before the health insurer pays care, i.e. hospital care (Rijksoverheid, 2018a). This threshold is known as the "own risks" and amounts in 2018 as minimum €385 and can be added with a voluntary deductible to a maximum of €885 (Rijksoverheid, 2018b). By increasing the own risk, the monthly fee reduces. Next to the basic healthcare, an additional insurance for certain types of care can be added by the patient. By doing this, some types of healthcare are reimbursed by the health insurer as well. Those types of care are not covered in basic healthcare, for example, dental care or physiotherapy. The elements included in basic healthcare are the same for every health insurance, but elements in additional insurance differ between insurances.

To understand the way healthcare is provided, it is important to study the healthcare system. In the Netherlands, healthcare is provided in two systems: primary care and secondary care. Primary care is healthcare where patients do not need a referral from the General Practitioner (GP) to receive care,

for example, care from a dentist or physiotherapy. Secondary care, also known as specialised care, is healthcare where the patient needs a referral from the GP before receiving care, for example, hospital care. In this way, the GP acts as a gatekeeper for access to secondary care and decides whether the patient really needs specialised care. Secondary care is only provided when primary care does not cover the need of the patient, and consequently, the diseases of patients are more severe.

Focusing on the mental healthcare system, patients with mild mental problems were treated by GPs before 2014. When a patient had a severe problem, the GP referred the patient to secondary care where specialised mental healthcare is provided. Approximately, one out of ten patients were referred to specialised care (Verhaak, van Dijk, Nuijen, Verheij, & Schellevis, 2012). However, this system did not work optimally for several reasons. First, diagnosing mental healthcare problems is relatively subjective. GPs have different characteristics, such as communication style, and vary in their ability to detect mental problems (Bosman, Clement, van Acker, & de Lange, 2004; Zantinge et al., 2007). Second, it takes relatively more time to detect mental problems compared to normal consultations. Lately, GPs experience more often a lack of time (Bosman et al., 2004; Zantinge et al., 2007). When a patient has mental problems, consultation time increases and the shortage of time of GPs becomes higher (Zantinge, Verhaak, Kerssens, & Bensing, 2005). Consequences of this problem are an increase in misdiagnosis by GPs, because they do not have time to ask detailed questions. Moreover, the treatment provided by GPs is one which saves time (e.g. providing medication) instead of what is best for patients (van den Berg et al., 2009). Overall, GPs are not the most suitable persons to detect mental problems.

In 2008, the World Health Organisation emphasises the importance of integrating mental healthcare into primary care, with the goal to increase accessibility of care, decrease costs and provide qualitative good care (Organization, Colleges, Academies, & Physicians, 2008). One way to achieve this is by making use of the substitution of care. In 2001, this was introduced in general practices with the focus on chronic diseases, like diabetes (Mok, 2016; Nederlandse Zorgautoriteit, 2013). The concept of substitution, where specialised nurses provide care for specific groups of patients instead of GPs, is investigated in several countries and it has a positive effect on patient satisfaction, mortality and hospital admission (Martínez-González et al., 2014). By substituting care, patients do not have to pay their own risk anymore before receiving healthcare, since primary care is covered in the basic health insurance. Besides this advantage, national mental healthcare costs may decrease (since primary care is less expensive than secondary care), the workload of GPs may decline (because of outsourcing tasks) and healthcare is provided close to the home of patients (Dierick-van Daele et al., 2010; Flik, Laan, Smout, Weusten, & de Wit, 2015; Griep, Noordman, & Dulmen, 2016; Laurant et al., 2005).

Considering the limitations of the Dutch mental healthcare system and the proposal of the WHO, an adjustment has been made in 2014. In here, the main focal points were to increase efficiency, decrease mental healthcare costs and provide better access to care. Consequently, mental healthcare in primary care was stimulated, which should lead to a decline in the use of secondary care. Restrictions were set to receive specialised care, which means that patients with severe diseases can only be referred to

secondary care when they are diagnosed with a psychiatric disorder according to the DSM-IV criteria (Spitzer & Williams, 1987). Besides this, the function of a Mental Healthcare Nurse (MHN, in Dutch Praktijk Ondersteuner Geestelijke Gezondheidszorg (POH GGZ)) was introduced in general practices to provide substitution of care.

The main role of mental healthcare in primary care is to specify the mental disease in the first consult and provide a treatment plan for short, medium, intense or chronic care (Forti et al., 2014). This is based on five criteria: (1) psychiatric disorder based on DSM-IV criteria, (2) severity of the problem, (3) level of risk, (4) complexity of the disease and (5) duration of the complaints. Based on this, the expected number of consultations is set. When another approach is necessary, the MHN informs the GP about further guidance, referral of the patient and/ or use of medication (Verhaak, van Beljouw, & Ten Have, 2010). In the end, the GP remains responsible for the patient, which means that MHNs provide additional services and do not replace GPs (Magnée, de Beurs, De Bakker, & Verhaak, 2016).

1.2 Problem statement

Since the reform, the percentage of general practices that use the service of MHNs has grown from 34% in 2011 to 87% in 2016. This is probably caused by the increasing availability of financing for this function (Trimbos, 2014; Verhaak, Nielen, & de Beurs, 2017a). However, there is still a lack of evidence about the characteristics of patients who visit MHNs. This is problematic for several reasons. First, current numbers of the use of services provided by MHNs are not known. It is important to know the population which is treated by an MHN, because this is the first step in delivering qualitative good care which is effective, timely and equal for the whole population (Kates et al., 2012). Predictions of the use of services of the MHN have been made for each municipality in the Netherlands in 2014, however, no real data is known (ROS netwerk, 2014). Second, there is a restriction on the number of hours an MHN can be deployed and this is different between health insurers. For example, according to the health insurer Menzis, a general practice may hire an MHN with a maximum of 0.222 FTE for a general practice with 2.095 patients (Menzis, 2017). However, since the population at risk differs between regions, this amount of FTE of MHNs may be different for parts of the Netherlands. By knowing the population of an MHN, one can respond proactively to factors which cause the use of services of MHNs.

1.3 Research question

The goal of this research is to detect differences in the use of mental healthcare in primary care in the Netherlands. Based on the unknown part of this subject and the problems which are described before, the following research question is set:

"To what extent is there variation in the use of services for mental healthcare problems in primary care and what is the effect of specific demographic and environmental factors of patients?"

1.4 Contributions

It is relevant to study the population of MHNs and detect patient characteristics which may differ in the chance of visiting the MHN for both practical and scientific reasons.

It is relevant to study this subject from a scientific perspective for several reasons. First, since the function of MHNs is relatively new, limited literature is available regarding this function. This causes a gap in the literature. Second, if there are differences in use of service of MHNs, it may suggest that the healthcare which is provided is not equally, efficient, effective and of the same quality of care. However, this is desirable in the Dutch healthcare system (Ahammer & Schober, 2017; Corallo et al., 2014; Lynn, Straube, Bell, Jencks, & Kambic, 2007). Sharing information on differences can create efficiency (Fontaine, Ross, Zink, & Schilling, 2010) and reduce costs (Park et al., 2015). Besides, it is the first step in performing population management, which may contribute to an increase in the quality of care (Berwick, Nolan, & Whittington, 2008). Third, general practices get paid by the health insurer in two-fold: (1) a capitation fee, which is provided for each patient in the general practices and (2) a consultation fee, which is given for each consultation an MHN gives. If a certain population requires more care, the health insurer may give those practices a higher capitation fee (Bijma, 2015; Brilleman et al., 2014). Consequently, the general practice may use more or fewer hours to deploy an MHN. Finally, several other stakeholders, like health promotors, may respond to differences in populations proactively.

Besides scientific relevance, the research is also relevant for practical reasons, since the research is carried out at Topicus. First, the company provides a software program to general practices to structure financial and healthcare data. The program of healthcare data is offered by their subsidiary, Proigia. The two different kinds of databases were not combined before, which is necessary for this research to obtain data. By doing this research, both databases should be combined, which is the goal of Topcius. Topicus will be the first in their industry that compares both databases, which makes them unique in their practice Second, it is also relevant for their customer to provide insight into their population. In this way, MHNs can increase their quality of care. Finally, Topicus is creating a dashboard for MHN to provide insight into their populations. Factors which may be relevant in explaining variation resulting from this research can be included in this dashboard.

1.5 Outline of the study

This study is structured into six chapters. Chapter two provides background information about MHNs. Chapter three summarises the existing literature regarding variation in health and healthcare. Based on this, hypotheses are presented. Chapter four provides the methodology which is used to answer the research question. Next, the results are presented in Chapter five. Finally, in Chapter six, the discussion and conclusion are provided to give a final answer to the research question.

2. Mental Healthcare Nurses

In this chapter, the literature available for MHNs is discussed. As mentioned in the introduction, the function of the MHN became more important since the reform in 2014. In this chapter, the role and tasks of the MHN are explained in depth. This is carried out by discussing first evidence on an international level and second on a national level.

2.1 International

In the Netherlands, the role an MHN fulfils is quite new. However, in several countries, the function of MHN was already executed before it was introduced in the Netherlands. In this section, literature available on an international level is discussed.

In the United Kingdom (UK) some general practices included a mental nurse in general practices to provide care. This is referred to as "counselling in primary care" and is performed in several general practices, whereas other general practices do not employ this function. Effects of both practices are investigated and a systematic review of those researches have been performed in 2011 (Bower, Knowles, Coventry, & Rowland, 2011). The researchers searched for studies and include them when their outcome variables were mental health symptoms, social functioning provided on a scale, and patient satisfaction. Finally, they compared nine studies performed in the UK and concluded that giving mental healthcare in primary care by MHNs is more effective on the short-term compared to the usual mental healthcare provided by GPs. However, this result does not seems to be true for the long-term. Besides the broad outcome on effectiveness, treatment provided by MHNs is more cost-effective and scores higher on patient satisfaction relative to mental healthcare provided by GPs (Kendrick et al., 2006). Overall, there can be concluded that care provided by an MHN is cost-effective for the short-term and for patients with mild psychological problems, but when patients have severe psychological disorders with the need of long-term treatment, patients should be referred to secondary care.

In 2007, Australia implemented a new program, called the Mental Health Nurse Incentive Programme. The aim of this initiative was to improve access for mental healthcare in primary care by introducing the function of an MHN. Their final goal was to decline healthcare costs and improve access to mental healthcare for patients. This program is quite similar to the reform which took place in the Netherlands in 2014. The program has been evaluated on several outcome measures, both qualitative and quantitative (Meehan & Robertson, 2015). Overall, the results suggest that care provided after the implementation of the program, including the role of the MHN, yields to better effects compared to the care provided before the program.

Finally, several countries have performed an RCT between groups which include an MHN and those who do not, with the focus on the somatoform disorder or depressive disorder (van der Feltz-Cornelis, van Os, van Marwijk, & Leentjens, 2010). The results suggest that consultation of mental health in primary care is effective for patients who are diagnosed with a somatoform disorder or a

depressive disorder. The most significant outcome regarding effectiveness is the reduction in utilization of mental healthcare in secondary care. Next to this research, there is mentioned that in Canada, US, Australia, the Netherlands and Germany the role of the healthcare nurse is becoming more important and this function seems cost-effective compared to mental healthcare provided in secondary care (Freund et al., 2015).

2.2 National

Besides the evidence on an international level, there is also literature available about the function of the MHN on a national level. In this section, first, some background regarding the role of the MHN in the Netherlands is given. Second, there is literature discussed regarding the function of the MHN in the Netherlands.

2.2.1 Background MHN in the Netherlands

Since countries have different interpretations regarding the role of the MHN, it is important to explain first how this is regulated in the Netherlands, before providing evidence of the function of the MHN.

There is no clear profile description of the MHN, which means that it is a function instead of a profession (LHV, 2015). Resulting, there is no specific training available to carry out the role of an MHN. With different levels of education one can employ the function of an MHN, i.e. university (for example psychology), university of applied science (for example nursing study) or secondary education (for example social work study) (Mok, 2016; Verhaak et al., 2010). An MHN should have at least the education of university or applied science of university according to the Landelijke Vereniging van Huisartsen (LVH), which is a national organisation for GPs. However, there is no uniform consensus about the practice of an MHN. At the moment, there is being investigated if the MHN can get a certificate of profession (called BIG-registratie in Dutch). The LHV described eight main tasks which should be performed by an MHN: (1) problem clarification and screening diagnostic, (2) drafting and discussing a follow-up plan, (3) providing psycho-education, (4) guiding and supporting self-management, (5) providing intervention to improve the well-being of the patient, (6) indicated prevention, (7) healthcare related prevention and (8) relapse prevention (LHV, 2015).

The care provided by an MHN gets reimbursed by the health insurance. The reimbursement of care regarding MHNs is based on the type of consultation which is provided: consultation shorter than 20 minutes, consultation longer than 20 minutes, visitation of the patient shorter than 20 minutes, visitation of the patient longer than 20 minutes and a telephone consultation. The most common consultation an MHN provides is a consult longer than 20 minutes (81% of the total) (Verhaak et al., 2017a). The least common consult an MHN gives is a visitation of the patient less than 20 minutes (0% of the total). For each health insurer, the maximum amount of hours a general practice may hire an MHN is different and may change annually. For example, focusing on Menzis, an MHN may work 0.222 FTE

in a general practice with 2,095 patients (Menzis, 2017). A general practice has several possibilities to hire an MHN. First, an MHN can be seconded by a care group for MHNs. Second, the general practice can hire an MHN by themselves for a fixed period or temporarily. This means that the MHN can be an entrepreneur.

The revenue received by the general practice from services provided by MHN can be split up into two main parts (Dijkers, Nijland, & in 't Veld, 2016). First, there is provided a fixed part (called consultation fee) by the health insurer when a GP employs an MHN: in 2011 this amounted €3.76 for each patient who is registered in that general practice. This amounts for 75% of the total revenue the general practice receives regarding MHN care. Second, the MHN gets paid for each consultation which is provided. In 2018 this amounts €9.59 (<20 minutes) for each single consult, €19.18 for a double consult (>20 minutes), €14.38 for a short visitation (<20 minutes), €23.97 for a long visitation (>20 minutes) and €4.79 for a telephone consult or an e-consultation (NZa, 2018). This part contributes for 25% of the total revenues of the MHN. In 2013, the NzA argued that there should be invested more in the function of MHN in the general practice (Nederlandse Zorgautoriteit, 2013). This resulted in an increase in 7 million euro in 2013, 25 million euro in 2014 and from 2015 each year 35 million euro was made available to invest in this function (Rijksoverheid, 2014).

2.2.2 Research regarding the MHN

Since the role of MHN became clear in sub-section 2.2.1, literature regarding MHN can be provided. Within this sub-section, there is made a separation between the national and local level.

National level

Previous research has examined the function of the MHN. This can be differentiated into literature before 2008 since this was the start of the function MHN, and evidence after 2014, as this was the year the reform was implemented.

First, research before 2014 is discussed. In 2009, an RCT has been carried out in the Netherlands. Inhere, two groups were compared: one group obtained mental healthcare in primary care (called a collaborative care program), whereas the other group obtain mental healthcare in secondary care (the control group) (van Orden, Hoffman, Haffmans, Spinhoven, & Hoencamp, 2009). In total, 27 general practices were included and provided care according to one of the two groups. The outcomes of the study suggest that patients who were included in the collaborative care program experience a higher quality of life. Furthermore, this care was considered to be more efficient, because of a shorter duration time, lower waiting lists to secondary care and a decrease in total mental healthcare costs. The effects of both groups are the same, which could mean that, by implementing the collaborative care program, the same outcome can be reached with lower healthcare costs. Next to this research, another research mentioned that, when providing mental healthcare in primary care, the problems which are treated should be of low or moderate severity to be more efficient compared to normal care (Verhaak, Kamsma,

& van der Niet, 2013). As mentioned before, some general practices already provided mental healthcare in primary care before the reform was implemented. Verhaak et al. studied the function of an MHN and reported those results (Verhaak, van der Zee, Conradi, & Bos, 2012). Looking at the population of the MHN, this is in line with the mental healthcare in secondary care. Most patients are women (70%) with the average age of 41 years. Relation problems, depressive feelings and stress are the problems which are treated the most. MHNs were more common in urban areas compared to rural areas before the reform (Heiligers et al., 2012). Treatments which may be provided by an MHN to solve those problems contain consultations, medication or refer the patient to secondary care. Referrals occurred in 30% of the patients who visited the MHN. The average number of consultations which is provided by an MHN amounts four to five which last each for approximately 45 minutes.

Second, research after 2014 is discussed. Just after the reform, Trimbos Instituut (a research institute in the Netherlands focusing on mental healthcare) performed a research about the current practices of the MHN and concluded that there is variation in practices between MHN (Trimbos, 2014). For example, it was expected that medication would be prescribed less often, however, this is not the case (Magnée, de Beurs, Schellevis, & Verhaak, 2018). This may become an effect on the longer run. In addition, there was expected that by the implementation of the MHN, substitution of mental healthcare from secondary care to primary care would take place (Magnée, de Beurs, Boxem, de Bakker, & Verhaak, 2017). As a consequence of this, mental healthcare costs may decrease and more patients could be treated because out-of-pocket expenses do not have to be paid anymore. However, it is not sure whether the MHN fulfils the expectations of the reform (Trimbos, 2014). Nivel Instituut (a Dutch institute for research in healthcare) made a factsheet about care provided by MHNs in the Netherlands for 2011-2016 (Verhaak, Nielen, & de Beurs, 2017b). It became clear that an MHN sees more patients with psychological problems instead of psychological disorders with the same patient demographics, which is in line with research performed before the research. Besides, the MHN sees more patients with psychological problems compared to the GP, who sees more patients which psychological disorders. The MHN does not replace the GP, but provides additional services (Magnée et al., 2016).

Regional level
Focusing on research performed at different geographic areas, there can be made a distinction between local and regional level. Research which is carried out at those levels is presented, however, it should be mentioned that those studies all presented limitations regarding their limited sample sizes.

First, research before 2014 is discussed. One of the articles which are published before the reform focuses on "het Gooi", a region in the province Noord-Holland (ter Horst & Haverkamp, 2012). They executed surveys based on the experience of patients with an MHN. Most of the patients are in the age category of 45-54 years and are woman (67.2%). The patients experienced care of the MHN as an additional value on top of the GP, because the threshold to go there is relatively low and they liked the attitude of the MHN. However, they also mentioned some improvement points like the weak exchange

of information between caregivers, information provided about the treatment and the low level of privacy in the room where consultations are provided. In total, they scored the MHN with a 7.1 out of 10. Clientenbelang Amsterdam also performed a research about the experience of patients with an MHN (Clientenbelang Amsterdam, 2013). Patients are satisfied with the function of an MHN and mention the added value of an MHN. Also, a study in the North of the Netherlands, Groningen, has been carried out focussing on the experience of patients with an MHN (Noordman & Verhaak, 2009). Demographics of patients match with the previous articles. In addition, the treatment provided is mostly a consultation instead of medication and the frequency of consultations is approximately two to six times. Their conclusions are the same as the results mentioned before: most MHNs treated patients with fear and depression and both the GP and patients are satisfied with the function of MHNs.

Second, research after 2014 is discussed. Available research on this topic is limited, only one article was found which focus on the regional level after the reform. This research checked the number of general practices which deployed an MHN. On province level there are differences, for example in Friesland, 66% of the general practices use the service of an MHN, whereas in Utrecht, 88% of the general practices use the service of an MHN (van Hassel, Batenburg, & van der Velden, 2016). One possible explanation for this difference may be that there are different health insurances in the provinces, which reimburse the care differently. Their overall conclusion is that there are more MHNs compared to 2011 and this percentage became stable at 88% in 2016 (van Hassel et al., 2016). Both GPs and patients are satisfied with this function, which stresses the importance of this function (Magnée, Verhaak, Boxem, & Onderhoud, 2014).

3. Variation in mental health and healthcare

Since the function of MHNs is relatively new in the Netherlands, almost no research has been performed about differences in use of service of MHNs. In this chapter, literature about variation in health and healthcare regarding mental problems is discussed first, followed by an explanation which part of the variation is warranted and which part is unwarranted. Finally, demographic characteristics of patients are discussed and corresponding hypotheses are provided which are studied in this thesis.

3.1 Variation in mental health

Since different people have different risk profiles, it is expected that populations differ across each other, as the characteristics of people differ for different regions (Ellis & Layton, 2013). In this section, the literature for mental health on international and national level is discussed to provide insight into the variation of populations. There is mainly focused on literature in secondary care, because of the limited amount of evidence available for primary care. Since it is likely that there is a shift from secondary to primary care, the population of an MHN corresponds to patients in secondary care.

3.1.1 International

Internationally, most of the literature based on mental healthcare problems is performed regarding the two major diagnoses anxiety and depression. For this reason, those are discussed first. Second, some evidence of all mental healthcare problems is presented to provide insight into demographic factors which are possibly related to mental healthcare problems.

Focussing on anxiety, a research has been performed in Finland. Several diseases were taken into account and it turns out that those are different among demographic characteristics of patients (Pirkola et al., 2005). For example, men had a higher chance to have an alcohol disorder compared to women and women had a higher chance to get a depressive disorder, compared to men. Additionally, gender, age, material status and place of residence differed significantly among several disorders. Since the risk to obtain a certain disorder is different across patients, the population of mental healthcare workers differ, because the demographics of patients are not equally distributed across the country. The same results became clear by performing a systematic review including 44 countries worldwide (Baxter, Scott, Vos, & Whiteford, 2013). They found variability across countries considering demographic factors of patients. Those differences were mostly explained by gender, age, culture, conflict, economic status and urbanicity.

Studying the disorder of depression, almost the same results regarding demographic factors of patients became clear as for anxiety. In Latvia, a research has been performed regarding depression (Rancans, Vrublevska, Snikere, Koroleva, & Trapencieris, 2014). It became clear that depression was more present in women, who live in urban areas and have alcohol dependence. In Brazil, they investigated factors influencing depression in primary care (Molina et al., 2012). Depression was more prevalent in women, with a low education, low social economic status and alcohol abuse. The prevalence

and associated factors for using mental healthcare with the disorder depression was investigated in Estonia (Kleinberg, 2014). Demographic factors which were significantly different in the population include gender, income, marital status, urban population, age, ethnicity and health status.

Finally, some studies have been performed regarding mental healthcare in general. The epidemiology of mental disorders has been investigated in Canada. Not everyone who has a mental disorder receives treatment. In Canada, less than 40% of the people who have a mental disorder obtain therapy (Fleury, Ngui, Bamvita, Grenier, & Caron, 2014). A higher educational level, being a woman or having a higher age is correlated with seeking help for mental disorders. Besides, there are factors which are different across the prevalence of mental disorders in general practices. Those include age, gender, place of residence, income, material status, social economic status and education (Barnett et al., 2012; Palin, Goldner, Koehoorn, & Hertzman, 2012). In the US they provided the prevalence for all DSM-IV disorders and presented the age which is most likely to have a certain disorder (Kessler et al., 2005). In addition, a cross-national study has been performed in 10 countries: US, Canada, Puerto Rico, France, Germany, Italy, Lebanon, Taiwan, Korea and New Zealand (Weissman et al., 1996). They concluded that the mean age differs for disorders and that those appear more for men instead of women. This was also concluded in a systematic review in Europe in 2010 (Wittchen et al., 2011). Those two studies confirm the previously discussed articles. In sum, the chance of getting a mental disorder differs across several demographic factors of patients.

3.1.2 National

Next to the international literature discussed before, there is also evidence available for the Netherlands. It is clear that there is variation in general practices (Velden, Hingstman, Kenens, & Batenburg, 2011). In this sub-section, variation in mental health is discussed. First, there is focused on variation concerning the two most common diseases and second, articles which cover all mental healthcare problems in relation to demographic factors are discussed.

First, the literature on anxiety disorders is provided. According to the Nederlands Huisartsen Genootschap (NHG), there is a higher risk to obtain an anxiety disorder when you have a low level of education and a low income (NHG, 2012). Besides, younger people have a higher chance to obtain an anxiety disorder. The Geestelijke Gezondheidszorg (GGZ) group concluded that in the Netherlands, more women compared to men had an anxiety disorder in their life (GGZ groep, 2018). A large study, called Netherlands Mental Health Survey and Incidence (NEMESIS), have been performed to detect the prevalence of psychological disorders in the Netherlands from 1996-2009 (de Graaf et al., 2012). They concluded that the risk to be diagnosed with an anxiety disorder is higher for women, if you are unemployed, in the age category of 18-24 years, live in an urban area or when you have a low income.

Second, articles focusing on depression are discussed. The Centraal Bureau van Statistiek (CBS) publishes facts about the Netherlands. Regarding depressions, they concluded that depression is most common in women in the age between 40-49 years, with a low level of education (CBS, 2016b). Besides,

women use more medication compared to men. Those facts are in line with the research of de Graaf et al. (2012). In addition, depression is more common in rural areas compared to urban areas. Next to that, the GGZ also concluded that depressions are more common for women instead of men and that a low level of education increases the chance to get a depression (GGZ Nederland, 2013).

Third, conclusions regarding all mental healthcare problems in the Netherlands are discussed. Vektis investigated practice variation in the GGZ in 2015 (Vektis, 2015). They argue that it is important to provide information about practice variation for several reasons: better knowledge for patients when choosing a care provider, provide information to health insurers for negation arrangements and finally to increase the quality of care. Indicators which are included are (1) total cost per patient, (2) average cost per patient, (3) prevalence, (4) other treatment options and (5) institution-specific factors. It became clear that there exists regional variation in the Netherlands concerning all indicators. Verhaak et al. (2005) studied the mental health in the Netherlands in 1987-2001 in the general practice (Verhaak, Hoeymans, Garssen, & Westert, 2005). Overall, more women compared to men had mental health problems, mostly in the age category of 25-44. Other risk factors contain educational level and material status. The CBS concluded that psychological complaints mainly occurred in older women, with a low educational background (CBS, 2011). Nielen et al. (2016) presented the incidence and prevalence according to a classification based on burden of disease in the Netherlands and it became clear that depression and anxiety problems occurred the most (Nielen et al., 2016). This classification was based on International Classification Primary Care (ICPC) codes. GPs are obligated by health insurers to mention a code (varying with numbers and letters) in their system when a patient visited them. For mental problems there are different codes available, so a distinction can be made in the burden of diseases. Codes which are mentioned as P01-P29 are psychological problems, codes P70-P99 are psychological disorders and codes Z01-Z29 cover social problems. Another classification system is to make a distinction between mood disorders, anxiety disorders and substance disorder, which was done in the NEMESIS study (de Graaf et al., 2012). As discussed before, several demographic characteristics of patients were taken into account to detect relationships between factors and mental disorders. Concluding, demographic characteristics which influence the chance to get a mental disorder contains gender, age, education, employment, material status and living area.

3.2 Variation in mental healthcare

The previous section emphasized that there is variation in populations, both on international and national level. In this section types of variation are discussed and there is made a distinction between warranted and unwarranted variation.

For several years, there have been performed research about variation in healthcare processes. It became clear that variation exists, even when there is controlled for demographic factors of patients, such as age or gender. In 2002, Wennberg was the first that differentiate variation into warranted and unwarranted variation in healthcare (Wennberg, 2002). However, there is still no clear definition of this phenomenon. Broadly spoken, unwarranted variation contains variation that cannot be explained by demographic of patients. In an interview, Wennberg defined this by "*variation that cannot be explained on the basis of illness, patients' preferences or dictates of scientific medicine*" (Mullan, 2004, p. 74). He defines three categories of unwarranted variation: (1) variation in effective care and patient safety (i.e. provide treatments which are scientific proven to be the best), (2) preference sensitive care (i.e. when there are two treatments which have the same effectiveness, the patient choice should be decisive) and (3) supply-sensitive care (i.e. the healthcare provided is based on the need of patient instead of the number of suppliers in the region) (Wennberg, 2002).

Warranted variation is the opposite: variation that can be explained through the illness of the patient, the preferences of patients or scientific proven effective care. This variation always exists, because it is impossible that all patients have the same demographic characteristics. Consequently, this variation is warranted, because it is not preferable to minimize this (Evans, 1990; McPherson, 1990). On the other hand, unwarranted variation is important to detect and minimize, because healthcare may then become more effective, efficient, equal, and of higher quality. This stresses the importance of improving research about variation, because then, factors that cause variation may be detected and unwarranted variation can be reduced.

However, after the explanation of variation by Wennberg, some authors had criticism on the categorisation of unwarranted variation (Mercuri & Gafni, 2011). The main discussion points were the lack of justification for Wennberg concerning the categories, if those categories are mutually exclusive and to what extent the categories are measurable. Sepucha et al. (2006) tested those categories of unwarranted variation in cancer care and came to the conclusion that patients' preferences may be warranted instead of unwarranted (Sepucha, Ozanne, & Mulley, 2006). Next to Sepucha et al. (2006), Goodman did not agree about the definition of variation (Goodman, 2009). Therefore, he provided another definition of variation in healthcare: "*the variation in medical resources, utilization and outcome that is due to differences in health system performance*" (Goodman, 2009, p. 5). Bojakowski did not agree with the definition of unwarranted variation (Bojakowski, 2010). He provided a new definition: "*unwarranted variations in healthcare services are variations that cannot be explained by public health needs or medical needs*" (Bojakowski, 2010, p. 241). In addition, he argues that unwarranted variation is largely subjective and difficult to operationalise. Mercuri and Gafni agreed with this point and argue

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that it is hard to interpret unwarranted variation (Mercuri & Gafni, 2017). Corallo et al. (2014) argue that: "*in studying medical practice variations, it is important to focus on conditions and procedures that are clinically important, policy relevant, resource intensive, involve trade-offs among healthcare sectors and/ or have high levels of public awareness*" (Corallo et al., 2014, p. 12). Unfortunately, still, no clear definition about variation exists (Mercuri & Gafni, 2011). In this study, the population of the MHN is studied. Based on this, demographic characteristics of patients may be found that increases the chance of having a consultation with an MHN. Consequently, warranted variation is studied.

3.3 Factors influencing variation in mental healthcare provided by MHNs

Since it is plausible that there exists variation in the use of services of MHNs, it is interesting to detect demographic factors of patients that may cause this variation. To divide those characteristics into parts, the stress-vulnerability model is used (Ormel, Neeleman, & Wiersma, 2001). The model explains determinants which may cause the psychological health of a patient based on: (1) demographic determinants, e.g. age and gender (2) psychobiological factors, e.g. genetic predisposition, (3) environmental determinants, e.g. Social Economic Status (SES) and (4) life events, e.g. death of partner. Taking into consideration the availability of data for this research, determinants present in group one and three are discussed. Unfortunately, information about psychobiological information and life events are not available.

In this section, first differences in the use of services of the MHN are discussed. Second, demographic and environmental determinants that may cause differences in populations are discussed and finally the prescription of medication in is discussed. Additionally, hypotheses are developed.

3.3.1 Variation in the use of healthcare provided by MHNs

As discussed in section 3.2, both international and national evidence suggests that there are differences in risk factors for mental problems in secondary care. This may cause differences in populations regarding the MHN. In this sub-section, literature focusing on the population of the MHN is discussed.

One of the main causes of variation in healthcare is the variation in health in a population. ROS network, an institute in the Netherlands that provides evidence on the health status of Dutch citizens, performed a research focusing on differences in health provided by MHNs (ROS netwerk, 2014). In here, the prevalence has been described based on ICPC codes, divided in psychological disorders (ICPC codes P70-P99), psychological problems (ICPC codes P01-P29) and social problems (ICPC codes Z01-Z29), which outlines differences in the burden of diseases. It became clear that the prediction to use services provided by the MHN in several regions in the Netherlands is different, for example in Groningen, the prevalence of psychological problems amounts 19.4 per 1000 citizens whereas in Flevoland the prevalence amounts 11.1 per 1000 citizens. If the prevalence is different across provinces in the Netherlands, it may be the case that the use of healthcare is also different across the Netherlands.

This was supported by a research performed by consulting firm Kleynveld Peat Marwick Goerdeler (KPMG) (KPMG, 2017). For example, in Groningen, 18.4% of the patients use the service of the MHN, whereas this is in Noord-Brabant only 15.7%. It has been noted that this could be caused by the differences in patient characteristics, for example, differences in SES. However, they are not sure about this, because they did not test for differences in the demographics of patients. Overall, it is likely that there are differences in use of services of the MHN. This leads to the following hypothesis:

H1:   There is provincial variation in the use of services provided by MHNs.

3.3.2 Demographic determinants

Hypothesis one described that there may be variation in the use of care provided by the MHN in the Netherlands. For this reason, it is interesting to study patient characteristics that may cause these differences. In this sub-section, the influence of gender and age, which are covered by demographic determinants to get a mental disorder, are discussed. For each determinant, a hypothesis is developed to answer the research question.

Gender

One of the determinants which may have an influence on the development of mental problems according to the stress-vulnerability model is gender. Since gender is not per definition equally divided between provinces in the Netherlands, this may have an influence on the population of an MHN (CBS, 2018).

First, international evidence is discussed. Focussing on depression and anxiety, it was found that women have a higher risk to develop a depression relative to men (Ansseau et al., 2008; Fleury et al., 2014; Kleinberg, 2014; Kuehner, 2017; Leach, Christensen, Mackinnon, Windsor, & Butterworth, 2008; Nolen-Hoeksema, 2001; Rancans et al., 2014; Weissman et al., 1996). There are different explanations provided in the literature to explain those differences in gender to get a depression. These include that women experience more stress compared to men, that women seek for more help and that women have more biological factors that may stimulate a depression (Angst et al., 2002; Li & Graham, 2017; Nolen-Hoeksema, 2001; Parker & Brotchie, 2010). Studies which focus on mental disorders in general, came to the same conclusion as research which focuses on depression: women have a higher chance to get a mental health problem compared to men (Barnett et al., 2012; Boyd et al., 2015; Fleury et al., 2014; Li & Graham, 2017; Seedat et al., 2009). For all mental healthcare disorders, only substance abuse was found more often by men compared to women (Seedat et al., 2009). Research which focus on gender differences, often lack in the fact that they do not take into account other risk factors (Riecher-Rössler, 2017). So, it is important to include as much as possible factors to minimise bias.

Second, evidence which is available for the Netherlands is discussed. Women have a significantly higher chance to develop depression, with the consequence that they use more mental healthcare compared to men (Schuch, Roest, Nolen, Penninx, & De Jonge, 2014; Verhaak, van Dijk, et

al., 2012). In the period from 1987 to 2001, the prevalence of mental healthcare problems is significantly higher for female compared to men (Verhaak et al., 2005). This is in line with the data of CBS, which pointed out that on average, one out of six women had psychological problems, whereas only one out of ten men had psychological problems in their life (CBS, 2011). Within research focusing on mental healthcare problems, different separations are made. For example, two studies made a differentiation in mood disorders, anxiety disorder and substance disorder (de Graaf et al., 2012; Ormel et al., 2001). The conclusions of both articles are that women have a higher risk to get a mood disorder and anxiety disorder, however, men have a higher risk to get a substance disorder. Overall this means that women have on average a higher risk to obtain a mental healthcare problem, but within the total of mental healthcare problems, there is one disorder where men have a higher risk. Focussing on the population of the MHN, women have a higher chance to visit an MHN compared to men (Magnée et al., 2016). It becomes clear from the literature, that women have a higher risk to develop mental healthcare problems and thus have a higher chance to visit the MHN. For this reason, the following hypothesis is set:

H2:   Women are more likely to visit an MHN compared to men.

Age
Besides gender, age is also a demographic characteristic of the patient which may differ in the population of the MHN. In this sub-section, literature is discussed on international as well as a national level for the age where mental healthcare problems occur mostly. Finally, a hypothesis is developed.

The age at which a mental healthcare problem occurs differs across certain types of diseases. For example, the risk of depression increases with age (Aluoja, Leinsalu, Shlik, Vasar, & Luuk, 2004; Kleinberg, 2014; Kolchakova & Akabaliev, 2003), while the chance an alcohol disorder decreases as one gets older and is most common in the age between 25-34 year (Andersson, Twum-Antwi, Staland-Nyman, & van Rooyen, 2018; Bromet et al., 2005; Poulin, Webster, & Single, 1997). There was no statistical difference found in the age that depression or anxiety disorder manifested (Jorm, 2000). Focussing on obtaining treatment for mental disorders, the age category which has the highest risk to obtain treatment is between 25-34 year (Fox, 1984). Barnett and colleagues found that the probability of having a mental problem increases with age, up till 60 years and after this the chance decreases (Barnett et al., 2012). This is in line with the research of Fox (Fox, 1984).

Focusing on the national level, the risk of mental healthcare disorders is the highest in the age category 18-29 year (Nielen et al., 2016). Categories of mental healthcare problems were in this article separated into mood disorders, anxiety disorders and substance disorder and for each category, the risk to obtain one of these problems was the highest in the age category 18-29 year. The prevalence of mental healthcare problems was highest in the age category 25-44 year in both 1987 and 2001 in the Netherlands. This suggests that it does not change over time. The higher the age, the lower the risk to get a mental problem. This is in line with Westerhof et al. who stated that older adults experience fewer

mental healthcare problems, but are not in a better mental health compared to younger people (Westerhof & Keyes, 2010). The NEMESIS study indicates that patients in the age category 25-30 year have the highest chance to get a psychological disorder, whereas people in the age category 55-65 year have the lowest chance (de Graaf et al., 2012). The chance where someone gets a certain disorder differs for age categories, i.e. the risk for mood disorders is the highest in the age 45-55 year, anxiety disorders are 35-45 year and substance disorders are between 18-35 year. Focusing on the population of MHN, the age category which has the highest risk to visit an MHN is between 19-44 year compared to <18 years (Magnée et al., 2016). However, this data may be biased, since the function of the MHN focused on patients older than 18 years and financing by health insurances to provide treatment to patients <18 years it was not widely used yet. At the moment, the government is considering to include a "Jeugd POH GGZ", which focuses on children younger than 18 years, but this is still in progress. This means that the factor age category may change in time for the population of the MHN. Based on the international and national evidence concerning age, the following hypothesis is set:

H3:   Patients in the age between 19-44 are more likely to visit an MHN compared to patients in other age categories.

3.3.3 Environmental determinants

Besides demographic factors, also environmental determinants may have an influence on the vulnerability to develop mental problems according to the stress-vulnerability model. Determinants which fill into this category include SES and the place of residence, i.e. an urban or rural area. In this sub-section, those factors are discussed and hypotheses are set.

Social Economic Status

Social Economic Status is defined as: "a composite measure that typically incorporates economic status, measured by income, social status, measured by education and work status, measured by occupation" (Dutton & Levine, 1989, p. 30). Besides, SES is built up out of three elements: (1) material circumstances, (2) skills, capacities and knowledge and (3) the social network of a person (Kompas Volksgezondheid, 2014). Since SES exists out of different parts, it is not possible to measure this directly, so indicators should be set to measure SES. Examples of indicators include income, education and professional status. Since SES differs across provinces, there are different outcomes on health. For instance, mortality, morbidity, health behaviour (like smoking) and certain diseases differ across categories of SES (Adler et al., 1994; Hanson & Chen, 2007; Marmot, Kogevinas, & Elston, 1987).

Internationally, there is literature available on the relation between SES and mental healthcare problems. In Estonia, people with a lower income have a higher chance to develop a depression (Kleinberg, 2014). Other elements of SES, such as education and employment status, were not significantly related to mental healthcare problems. In Belgium and Luxemburg there is found an effect

of a low level of education and unemployment on the prevalence of anxiety disorder and major depression in primary care (Ansseau et al., 2008). In Canada, determinants (i.e. predisposing factors, enabling factors, need factors and healthcare service utilization) were tested to detect differences in a group with no mental health disorder and a group with mental health disorders (Fleury et al., 2014). It became clear that in the group with mental health disorders, people have on average a lower education, lower income and a low status within the neighbourhood.

In the Netherlands, there has been made a distinction in disadvantaged neighbourhoods based on zip code (NZa, 2017). This is based on the percentage of people with a low income, the percentage of people that are studying, the percentage of non-western immigrants and address concentration in a specific neighbourhood. When the outcome of those percentages is higher than a certain value, the neighbourhood is classified as disadvantaged. In general, low SES can be found in the North of the Netherlands, high SES can be found in the middle of the Netherlands (Rijksoverheid, 2016b). People living in disadvantaged neighbourhoods need more psychological care, but they cannot afford this based on economic restrictions (Zorg in de praktijk, 2017). Those people have a higher risk to develop mental health problems and need more treatment compared to people with an average SES (Ormel et al., 2001; Verhaak, van Dijk, et al., 2012). Besides, education level has been tested and this is also correlated with psychological disorders: people with a low education have a higher risk to develop mental healthcare problems compared to people with a high education (de Graaf et al., 2012; Nielen et al., 2016; Verhaak et al., 2005). Unfortunately, there has not been performed research so far on the relation between SES and visits of the MHN. It is striking by Topicus and GPs that people with a low SES use more often services of MHNs compared to people with a high SES. For this reason, the following hypothesis is set:

H4:   Patients with a low SES are more likely to visit an MHN compared to patients with a high SES.

Place of residence
Another environmental determinant which may have an influence on mental health is place of residence. For example, the risk to develop a depression or anxiety disorders differs internationally (Ansseau et al., 2008; Dohrenwend & Dohrenwend, 1974; Marsella, 1998). Moreover, in Latvia and Estonia, it appears that depression occurs more in urban areas compared to rural areas (Kleinberg, 2014; Rancans et al., 2014). This is also the case for mental healthcare problems in general: the risk to obtain a mental healthcare problem is higher in urban areas (Barnett et al., 2012). An explanation for this may be that the stress level in rural areas is higher, which increases the chance to develop mental healthcare problems (Lederbogen et al., 2011). In Australia, mental healthcare problems are treated less in rural areas and more in urban areas (Caldwell et al., 2004). However, in China, there is a higher chance to have a depression or a substance disorder in rural areas (Phillips et al., 2009). Though, an article that pools result from systematic reviews confirms that the prevalence of mental disorders is higher in rural areas (Peen, Schoevers, Beekman, & Dekker, 2010). Within this review, there was one exception, namely the

relationship between place of residence and substance disorders. This may also explain the conflicting results of Philips et al. (2009). However, there are also other explanations possible like the definition of "urban" and "rural", countries may differ in size related to urban or rural, cultural differences or heterogeneity of the studies (Peen et al., 2010).

Focusing on the Netherlands, there are regional differences in risk to develop an anxiety disorder or depression (Rijksoverheid, 2016a). The average risk to get an anxiety disorder or depression is 44%, but in the province Drenthe this percentage amounts 34% and in Gelderland 50%. Ormel et al. (2001) did find a relationship between urban areas and the mental health of the patient (Ormel et al., 2001), just as Leeflang et al. (Leeflang, Klein-Hesselink, & Spruit, 1992). The incidence of mental healthcare problems is higher in urban areas, compared to rural areas, which is in line with most of the international evidence. However, there are also some articles which concluded that urbanisation did not have an influence on the development of mental problems. Nielen et al. (2016) separated mental healthcare problems in mood disorders, anxiety disorders and substance disorders (Nielen et al., 2016). All categories did not show any relation with incidence and urban or rural area. Focusing on the MHN, there are some significant outcomes. People living in a very low level of urbanisation have a higher chance to visit the MHN compared to a very high level of urbanisation (Finkelstein, Gentzkow, & Williams, 2016; Magnée et al., 2016). However, the confidence level of this analysis is close to one, which may suggest that this effect is not present. Looking at the available literature for both international and national concerning the place of residence, the following hypothesis is developed:

H5:   Patients living in an urban area are more likely to visit an MHN compared to patients who live in rural areas.

3.3.4 Prescription of medication for mental problems

As mentioned before, two kinds of treatments are provided by MHNs to patients: (1) medication, such as antidepressants, or (2) psychological interventions, like consultations. From the perspective of the patient, preference is given for psychological interventions instead of medication (Prins et al., 2008). The prescription of medicines is increased in time (Hansen et al., 2003; Hemels, Koren, & Einarson, 2002; Middleton, Gunnell, Whitley, Dorling, & Frankel, 2001; Pharoah & Melzer, 1995). Reasons for this increase may include patient demographics (Hansen et al., 2003; S. Hull, Aquino, & Cotter, 2005; Pharoah & Melzer, 1995), SES of the patient (Bucholc, O'Kane, Ashe, & Wong-Lin, 2018; Sleath & Shih, 2003; Wells, Katon, Rogers, & Camp, 1994), GP characteristics (Hansen et al., 2003; S. Hull et al., 2005; S. A. Hull, Cornwell, Harvey, Eldridge, & Bare, 2001; Wells et al., 1994) or practice characteristics such as location of the practice (Bucholc et al., 2018; Hansen et al., 2003; Holm & Olesen, 1988; S. Hull et al., 2005). However, since the lack of time of GPs increased over time, this may also be a cause of the increase in prescription in medicine. This is unwarranted variation, because preference-sensitive care is not provided. This means that the treatment provided is one which is not in line with the preferences of the patient.

One of the expectations with the implementation of MHNs was the decline of prescribing medication for psychological disorders. However, it appears that the rate of antidepressant prescriptions did not change in 2015 compared to 2011 (Magnée et al., 2018). In this time, almost all general practices make use of the service of an MHN and since the GP can refer patients to the MHN for consultations, it was expected that the use of medication will decrease, since this is not the preference of the patient. Magnée and colleges (2018) mentioned that this may be an effect on the long-term instead of the short term. However, it may also be the case that MHNs also experience a lack of time and cannot offer the treatment patients prefer. This may be categorised as unwarranted variation as well, because the problem that the GPs experienced before is passed on to the MHNs. Since this study is three years after the study of Magnée, it may be the case that the prescription of medication for mental healthcare problems have been decreased in general practices. For this reason, the following hypothesis is set:

H6: The prescription of medication for mental healthcare problems in general practices have decreased since the role of MHN has been implemented in general practices.

Since the MHNs cannot prescribe medication themselves, hypothesis six focuses on the whole population of the GP. For this hypothesis, it is not the intention to study specific patient-related factors related to the prescription of medication, as MHNs do not have a direct influence on the prescription of medication. However, since there may be an indirect effect, it is interesting to check if the prescription of medication has been declined since the MHN operates in general practices. An overview of all hypotheses can be found in Figure 1.
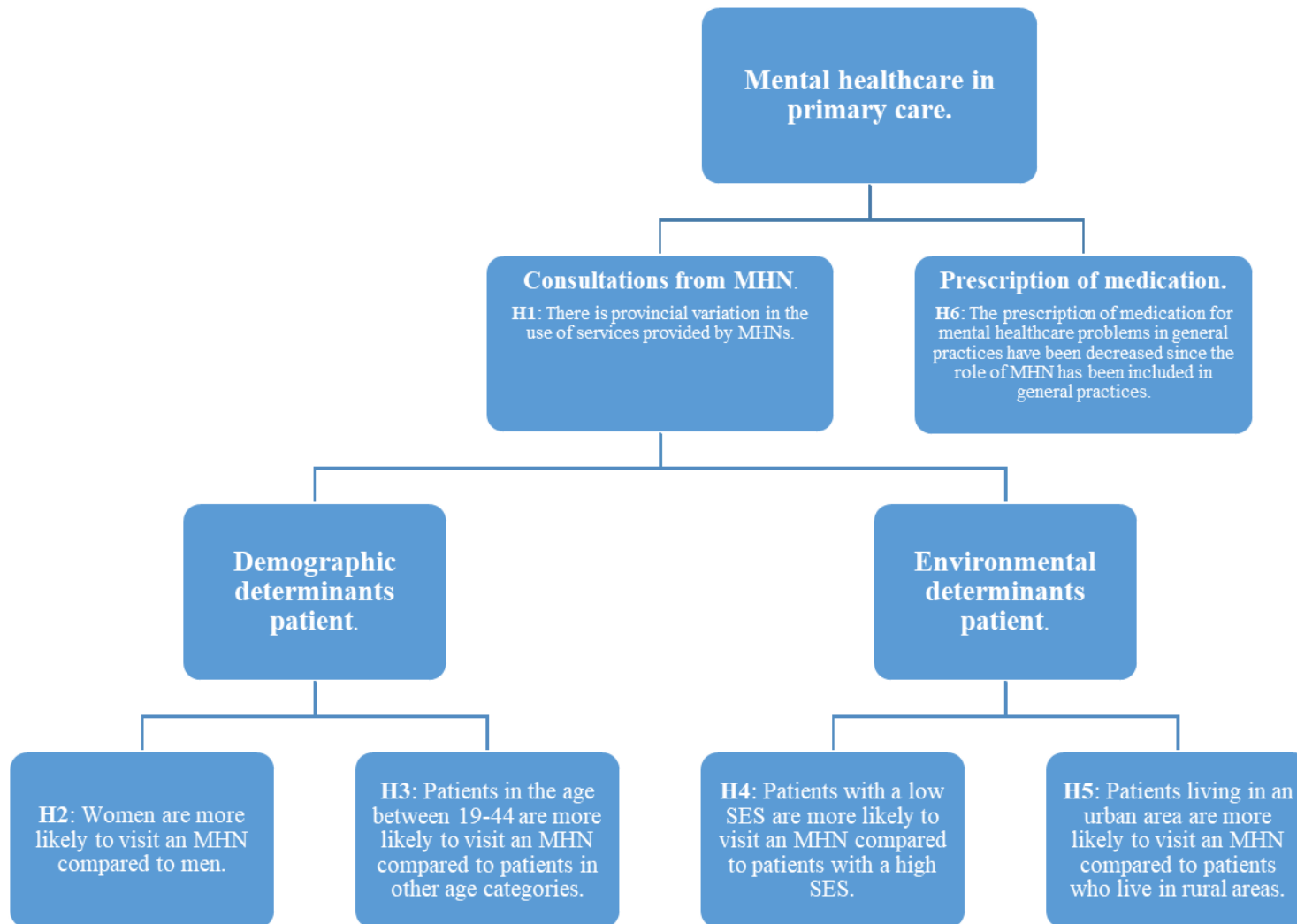
Figure 1. Overview of the hypotheses

4. Methodology

In the previous chapter, the literature was studied and hypotheses were set. In this chapter, the methodology which is used to test the hypotheses is discussed. Overall, the main paper which is focused on is Magnée et al, 2016. She already studied the population of the MHN.

Within this chapter, the outline is as follows: the research design is explained first, second the data which is used in this study are discussed and third, the data analysis to provide an answer on the research question and hypotheses is given.

4.1 Research design

The main goal of a research design is to find methods which provide an answer on the hypotheses and research questions that were set. The research design which is used in this thesis is a retro perspective cohort study with a quantitative design. In this section, an argumentation for this choice is given.

By choosing a study type, two types should be taken into account: a prospective or retro perspective cohort study. First, in a prospective cohort study, a specific population should be formulated. Within this population, a sample will be included in the research and this sample will be studied for a certain period. For example, a sample of pregnant women will be selected and they will be followed in time to detect if selected factors have an influence on childbirth. Opposing, in a retro perspective cohort study, the sample will be studied after the event took place. For example, a sample of women that gave birth will be selected and there will be asked to those women if certain factors happened during the pregnancy. The main differences between the studies include the time element. Within a prospective cohort study, the patient is followed in time and data about factors is gathered while it takes place, whereas in a retro perspective study one moment is set where is checked which factors took place in the past. Consequently, a prospective cohort study may take several years to obtain data. Focusing on this study, a retro perspective study design is used, because it is the goal to detect determinants which caused a visit by the MHN. Since those factors are studied afterwards, a retro perspective study is used.

Moreover, the method which is used can be qualitative or quantitative. The method used in this thesis has a quantitative design. Quantitative research is performed when statistical analyses are used to explain the variable. Data includes numbers, like age or number of consultations. Within a qualitative design, it is mostly about supporting data and develop new theories. One of the methods to do this is through interviews. Inhere, data is gathered and analysed based on what respondents said. The main difference between those two is that within quantitative research, most explanations are given, while with qualitative research, descriptions are given. In this research, it is the intention to detect patient characteristics that have a higher or lower risk to obtain a consultation of the MHN and for this reason, it has a quantitative design.

4.2 Data

The research is performed at Topicus, department GPs, located in Deventer. As described before, the company offers a software program to GPs existing of two parts: a health-specific and a financial part. Considering the financial part, GPs have to record the services they provided and send this to the health insurer before they receive money. Calculus, a subsidiary of Topicus, takes on this task from the GP. Opposing, Proigia, another subsidiary of Topicus, summarises data on patient-specific level. By presenting this data to GPs, they get insight into their population and they can take proactive measures to take care of their population in the most efficient and effective way. Those two subsidiaries work together and provide services to GPs. Overall, of all general practices in the Netherlands, 92% use the service offered by Topicus. In this research, the health specific data offered by Proigia is used.

Since MHNs work in general practices and have to register their consultations as well to the health insurer, there is also information available regarding data of MHNs. The data which is used is on an aggregate level, which means that no patient-specific data is used. As a result, permission to use this data should be asked to general practitioners instead of patients. However, in the Netherlands most GPs affiliate with a care group. Those care groups represent a certain region in the Netherlands and monitor the outcome and processes of general practices. Since there are more general practices present in a care group, it is efficient to ask them for permission to use the data instead of individual general practices. The ethics committee of the University of Twente gave the approval to contact care groups. Care groups in several regions in the Netherlands were asked and in total three care groups agreed to join this research and share data. They represent the provinces Noord-Brabant and Limburg, which is the South of the Netherlands. The final sample size amounts 713,287 patients for the years 2016 and 2017.

Since Proigia extracts data from the Health Information System (HIS) a query was developed to obtain the specific data from the database. Considering the hypotheses which were set in Chapter 3, the age, gender, SES and place of residence of the patient should be extracted from the HIS. A patient could only be counted once in a year and was only included if all variables were available. In the query which was formulated, also the separation based on ICPC codes was taken into account to determine the burden of disease. However, after talking with professionals, it became clear that MHNs do not register ICPC codes regularly. This is a consequence of the fact that MHNs may not diagnose patients, this is the task of the GP. Since the number of ICPC codes related to consultations of MHNs is relatively low, there is decided to not take into account differences in the burden of disease, because this is not a representation of the real burden of disease in a population. However, the data is analysed and results are available on request. The last hypothesis focuses on medication. A patient can use several types of medication for psychological problems. Medication is coded according to the Anatomical Therapeutic Chemical Classification System (ATC-codes). Psychological medication falls into the categories N05, N06 and N07. The following specific ATC-codes are added in the query: N05a, N05b, N05c, N06a, N06b, N06c, N06d and N07b. When one (or more) of these codes are registered by the patients in the year, the patient is counted as "had a prescription of mental healthcare medication".

4.3 Analysis

In this section, the analyses which were used to answer the hypotheses are provided. Since there are multiple hypotheses, different types of analysis were used to answer those hypotheses (Field, 2013). First, the analysis which is performed to answer the first hypothesis is presented. Second, the analysis which provides an answer to the second, third, fourth and fifth hypotheses is discussed. Finally, the analysis which is used to answer the sixth hypothesis is given. All analyses were performed in SPSS 22.

Hypothesis 1

To provide an answer to the first hypothesis, the definition of the use of services of the MHN for each province should be determined. This is presented as a percentage of the number of patients who used the service of the MHN divided by the total number of patients in the general practice. If absolute numbers were used, there was a bias from the size of the general practice, e.g. the number of consultations in a general practice with 5,000 patients is very likely to be higher compared to a general practice with only 1,000 patients. By using the percentage, the size of the general practice is taken into account. Any consultation registered by the MHN can be applicable to this (for example a long consult, a telephone consult or visit). Patients with at least one consultation from the MHN are included in the analysis. The descriptive statistics are presented, which provides insight into possible outliers and the distribution of the data. When, for example, the median is substantially different from the mean, it indicates that the data is skewed and not normally distributed. In this case, there should be taken actions to make the data normally disturbed again (e.g. take the logarithm of the data) before the analysis starts. Regarding outliers, the outlier labelling rule is used to detect outliers. The interquartile range of 2.2 is used as a multiplier and all observations which fall outside the range are considered as outliers and deleted from the data before running the analysis (Hoaglin, Iglewicz, & Tukey, 1986).

Second, to answer the first hypothesis and check if there are differences in the means of the use of service of the MHN for two different provinces in the Netherlands (i.e. Limburg and Noord-Brabant), an independent-sample t-test is performed (Field, 2013, p. 364). Inhere, data for four years is included (2017, 2016, 2015 and 2014) since this was the maximum years of data available for all general practices. Before starting the t-test, the homogeneity of the variances in both samples was studied. This was tested by a Levene's test. If the outcome of the test is not significant ($p>0.05$), the variances are not different from each other and the homogeneity of the variances can be assumed. If the outcomes of the test are significant ($p<0.05$), there cannot be assumed that there is homogeneity. In both cases, SPSS provides the outcomes of the t-test. A significance level of $p<0.05$ was held for the t-test. If the outcome of the t-test is significant, H0 can be rejected. Consequently, there can be concluded that there is variation in the use of services provided by the MHN between the provinces.

To answer the second, third, fourth and fifth hypotheses logistic regression analyses were used. This provides the Odds Ratio (OR) for the chance of visiting an MHN for each patient characteristic. The OR is presented as Exp (B) and represents the difference in odds between two groups. If this value is higher than 1, the odds of the outcome occurring increases when this variable is present. Conversely, if the value is lower than 1, the odds that the outcome occurs decreases with the presence of this variable. Data available for this analysis is on an aggregate level for different provinces in the Netherlands. Overall, the study of Magnée et al. (2016) is mostly replicated in this analysis. She included the years 2011-2015 and in this research, the years of 2016 and 2017 were used, so it is complementary to her research.

Since there are different variables which are included in the analysis, first the variables should be defined. The dependent variable in this analysis includes patients in one year that visit the MHN compared to patients who did not visit the MHN in a particular general practice. This is a binary outcome measure, since the answer on the question contains yes or no regarding visiting the MHN. The independent variables which are used include (1) gender, (2) age, (3) SES and (4) place of residence. First, gender is included as a dummy variable. Second, age is divided into age categories, namely <18 years, 19-44 years, 45-64 years and >65 years. This is the same division in age categories as Magnée et al. (2016) persisted and in this way results from this thesis can be compared with her outcomes. Third, SES is separated into low SES and average or high SES based on zip code, as discussed before. The NHG-codes 1001 and 1006 and the Vektis codes 11000 and 11108 are used to determine if a patient lives in a low SES area. Finally, place of residence is determined on the location of the general practice: urban or rural based on number of addresses per km^2. Those numbers are provided for each place by CBS (CBS, 2015). As a result, the degree of urbanisation is categorised as urban when there are ≥1,250 addresses per km^2 and rural when there are <1,250 addresses per km^2. There is assumed that people who have their GP in an urban area, also live in an urban area, because it is obligated that a GP can visit a patient within 15 minutes in case of emergency (Nederlandse Patiënten Federatie, 2018). Besides, since data is used from different parts of the Netherlands, the province where the general practice is located is added as control variable by the use of a dummy for each province (i.e. Noord-Brabant and Limburg). An overview of the independent variables can be found in Table 1.

Since the dependent variable is binary (yes/ no visit at the MHN) and the independent variables are categorical, a logistic regression method is used to predict the probability of Y given the independent variables. As the independent variables are categorical, there are no assumptions to be tested before the analysis starts (Field, 2013, p. 769). To draw conclusions on the outcomes of the models, different measures should be interpreted. First, the OR and p-values of the independent variables should be studied. This outcome provides an answer on hypotheses two, three, four and five. A threshold for significance for the OR is held as $p<0.05$. Next to the odds ratio, the confidence interval is provided for each ratio. If the value 1 is present in the 95% confidence interval, there is a chance that the outcome is 1, which means that there is no certainty about the direction of the independent variable. If this is the

case, there cannot be drawn any conclusion for this independent variable. In total, six models are tested: (1) including control variable, (2) including gender and control variable, (3) including age and control variable, (4) including SES and control variable, (5) including urbanisation and control variable and (6) all variables. In this way, the effect of a specific variable can be determined and besides, compared to the full model.

Summarising this into the final logistic regression model with the inclusion of all variables, Y contains the number of patients who used the service of the MHN and patients that did not. All independent variables have been discussed before, β includes the intercept and ε includes the error-term. Finally, the model looks like:

Model. Y = patients visiting the MHN vs. patients not visiting the MHN
$$Y = \beta + \alpha GENDER + \alpha AGE + \alpha SES + \alpha URBANISATION + \alpha PROVINCE + \varepsilon$$

Hypothesis 6
To determine if the prescription rate of medication decreased in the years, a one-way ANOVA is performed. Corresponding to hypothesis one, the percentage of people who were prescribed medication in a general practice was taken as an outcome measure. The budget to hire an MHN is available since the reform in 2014, so this year is the starting year. The final year is the year where final data is available for 2017. Overall, the prescription rate of medication for mental problems for the years 2014, 2015, 2016 and 2017 is compared.

Before performing this analysis, the homogeneity of the variances should be checked (Field, 2013, p. 459). This was performed by using a Levene's test. Only when this test is significant, a Welch-test should be carried out to get the correct version of the F-test. When this test is not significant ($F > 0.05$), the variances are not significantly different and the ANOVA can be carried out. Afterwards, one should analyse the outcomes of the ANOVA and detect if there are differences between groups (between different region's in the Netherlands) and within groups (within region's in the Netherlands). A significant level of 0.05 is used to see whether the means are significantly different from each other. If the tests are significant, H0 can be rejected, which means that the mean of populations are significantly different from the mean, and thus, that there are differences in the prescription rate of medication. If this test is not significant, H0 cannot be rejected and the means in the years are not significantly different.

Table 1. Description of variables used

Dependent variable	Measurement
Patients visiting the MHN	Total number of patients with at least one consultation of the MHN vs. total number of patients without a consultation of the MHN

Independent variables	Measurement
Gender of the patient	Woman = 1, Man = 0
Age of the patient	Categories in years:
	< 18
	19-44
	45-64
	>65
SES of the patient	SES low = 1, SES others = 0
Degree of urbanisation	Urban = 1: ≥1,250 addresses per km^2
	Rural = 0: <1,250 addresses per km^2
Province	Limburg = 1, Noord-Brabant = 0

5. Results

In this part of the paper, the results of the analyses are presented. First, a description of the data is provided, followed by the results of the analyses. The answers are presented in chronological order of the hypotheses which were set in Chapter three.

5.1 Description of the data

Before running the analysis, it is important to study the data to see if there are outliers and to check whether the data is normally distributed. Since there are several hypotheses which should be answered, the data used for each hypothesis is discussed.

First, the data to answer the first hypothesis is studied. The descriptive statistics can be found in Table 2, Panel A. By calculating the range where observations may be in between according to the outlier labelling rule, it became clear that there are two outliers. Those two observations are deleted from the dataset. Consequently, there is data from 125 general practices in Noord-Brabant (average size of the general practice amounts 3,426 patients, ranging from 1,836 to 7,355 patients), and for 277 general practices presented in Limburg (average size of the general practice amounts 3,154 patients, ranging from 1,374 to 7,331 patients). The amount of general practices included in the research is larger in Limburg due to the fact that there agreed two care groups to affiliate with the research in Limburg and only one care group in Noord-Brabant. The mean use of service of the MHN for all data amounts 3.3% and the median amounts 3.3%. The skewness is in both provinces <2.0 and the histogram takes the shape of a normal distribution. Thus, those facts suggest that the data is normally distributed and no data adjustments have to be made for this part.

Second, the frequencies of the variables used to answer the second, third, fourth and fifth hypothesis are studied. The frequencies of the variables are presented in Table 3. In total, 713,287 patients were included in the analysis. It does not make sense to provide the descriptive statistics of the data, since the independent variables are categorical. Consequently, it is not possible to detect outliers or normal distribution of the data. Overall, the sample size is equally distributed concerning gender: 49.6% is woman, 50.4% is man. The age category which is mostly present in the data is 45-64 year (30.8%). Most of the people have a medium or high SES (97.6%), live in a rural area (62.5%) in the province Limburg (65.4%). Except for SES, the sample is approximately equally divided among the categories included in the analysis.

Third, the data for the final hypothesis is studied which focuses on the prescription of medication in the general practices. The descriptive statistics of prescription of medication can be found in Table 2 Panel B. Again, outliers were detected based on the outlier labelling rule. In total, six observations have been deleted. It becomes clear that the mean (13.9%) of the data is not substantially different from the median (13.9%). The skewness is in all years <2.0 and the histogram takes the shape of a normal distribution. Thus, the data is normally distributed and no adjustments have to be made before the analysis starts.

Table 2. Descriptive statistics for the use of services of MHNs and prescription of medication
This table represent the description of the data used to (1) detect provincial differences in the use of service of the MHN in the years 2016 and 2017, represented as Panel A and (2) to detect differences in the prescription of medication in the years 2017, 2016, 2015, 2014 and 2013, presented as Panel B.

Measure	Panel A (%)	Panel B (%)
Mean	3.28	13.87
Median	3.33	13.92
Standard deviation	1.66	2.60
Minimum	0.10	5.59
Maximum	8.03	20.84
General practices	N=402	N=681

Table 3. Frequencies of patient characteristics
In this table, the division of the data for certain patient characteristics is presented as frequencies. The total number of patients included in this research is 713,287 for the years 2016 and 2017. Definitions of the variables presented can be found in Table 1.

	No MHN consult	MHN consult	Total
Gender			
Men	342,401	11,407	353,808
Women	341,302	18,177	359,479
Age			
<18 years	128,932	2,175	131,107
19-44 year	195,734	12,062	207,796
45-64 year	208,955	10,488	219,443
>65 years	150,082	4,859	154,941
SES			
Low	16,701	744	17,445
Medium or high	667,002	28,840	695,842
Place of residence			
Rural	430,210	15,573	445,783
Urban	253,493	14,011	267,504
Province			
Limburg	445,778	20,775	466,553
Noord-Brabant	237,925	8,809	246,734

5.2 Provincial variation in use of services MHN

In this section, an independent t-test is performed to check if there exists provincial variation for the provinces Noord-Brabant and Limburg. The results of the independent t-test for the use of service are presented in Table 4.

After the percentage of use of services of the MHN was calculated for all general practices, the outcomes were separated into the provinces. In Limburg (N=277) the mean use of service of the MHN amounted to M=3.4% (std=1.7%) and the confidence interval ranges from 3.2% to 3.6%. The mean use of services of the MHN in Noord-Brabant (N=125) amounted to M=3.1% (std=1.6%) and the confidence interval ranges from 2.8% to 3.1%. The standard deviations are not substantially large and the confidence intervals do not overlap. Besides, the kurtosis and skewness of the data are acceptable (skewness <2.0 and kurtosis <9.0), which means normality of the data can be assumed and the analysis can be performed.

To check if there are provincial differences in the use of services of MHNs, an independent-sample t-test was performed. The results are presented in Table 4. The equality of variances was tested by a Levene's test and it became clear from the F-test that equality of variances can be assumed: F= 1.146, p=0.285. The outcomes of the corresponding t-test are t=1.926, p=0.048. As a result of those outcomes, it can be suggested that the use of services of MHNs is different in the provinces. Specifically, the use of service is higher in Limburg compared to Noord-Brabant. Overall, there is support to accept hypothesis one.

Table 4. Results of the independent-sample t-test
This table shows the results of the independent-sample T-test which is performed to detect provincial differences in use of the service of MHN, which is a percentage of the population of the general practice. The data included in the analysis are from the years 2016 and 2017.
[1] *The sample size amounts 125 practices with an MHN*
[2] *The sample size amounts 277 practices with an MHN*

Mean Noord-Brabant[1]	Mean Limburg[2]	Mean difference	T-value	Significance
3.07%	3.38%	0.30%	1.926	0.048

5.3 Factors causing differences in use of service MHN

In this section, the results are presented to answer hypotheses two, three, four and five. Following the finding in section 5.2, i.e. there are provincial differences in the use of services of MHNs, it is interesting to study if the population of the MHN has an influence on this. Specifically, age, gender, SES and place of residence are studied to detected whether it has an influence on the chance that patients use the service of the MHN. The outcomes of the logistic regression with dependent variable consultations with the MHN in the year 2016 or 2017 are presented in Table 5. Since the research of Business Administration focused on specific patient characteristics and the increase or decrease in healthcare expenditures of consultations of the MHN, the results of Health Sciences can be compared to the results of Business Administration. This link is made in Chapter 6.

The Nagelkerke R^2 of the model amounts 0.037, which means that 3.7% of the variation in use of service of the MHN is attributable to age, gender, SES and place of residence. This is quite low, however, still in line with the literature that explains variation on those patient characteristics. In the master thesis of Business Administration, there was investigated if healthcare expenditures can be explained by demand or/ and supply factors. The results suggest that 4.0% of the variation in average fee of MHNs from consultations is explained by the demand side, i.e. patient-related factors. So, the results in this thesis are quite similar.

First, the second hypothesis is considered which stated that women are more likely to visit an MHN compared to men. Men were taken as a reference category in the analysis. Model 2 provides the result by only including gender in the analysis and the OR amounts 1.6. When the other variables were added, the results do not change that much and women have still a significantly higher chance (1.6x) compared to men to have a consultation with the MHN. The Confidence Interval (CI) of model 2 and 6

is quite narrow, which is caused by the large sample size in this research. Besides, the CIs of the models overlap, which means that there is no difference in the effect of gender in model 2 compared to model 6. Since this result of the analysis is in line with the second hypothesis, hypothesis two is accepted.

Second, the third hypothesis is tested, which stated that patients in the age category 19-44 have the highest chance to visit an MHN. In this research, the age category of <18 years was taken as reference category, so that the results can be compared with the outcomes of Magnée et al. (2016). She also took <18 years as a reference category. Based on Table 5, model 3, patients in the age of 19-44 have the highest chance to visit an MHN, i.e. 3.7x higher chance, compared to patients <18 years. This result stays the same when all variables are taken into account in the analysis in model 6. The CIs of the two models do overlap again for each age category, which suggests that there is no effect of other variables. The analysis has been performed with the age category of 19-44 years as reference group as well and it was found that the OR of all categories are smaller than 1, which suggests that patients in the age of 19-44 year have the highest chance to visit an MHN. Thus, hypothesis three is accepted.

Third, the fourth hypothesis is tested. This hypothesis stated that patients with a low SES are more likely to visit an MHN compared to patients with a medium or high SES. The results suggest that this is not the case, instead, the opposite seems to be true: patients with a moderate or high SES have a 1.1x higher chance to have a consultation with an MHN compared to patients with a low SES, according to model 4 in Table 5. The CIs of SES in model 4 and model 6 overlap, which suggest that there is no difference in the coefficient for SES between the two different models. However, this may be due to the fact that only a small part of the patients in the analysis have a low SES. Nevertheless, hypothesis four is not confirmed.

Fourth, the fifth hypothesis is tested. There was stated that patients living in an urban area are more likely to visit an MHN compared to patients who live in rural areas. Based on zip-code of the location of the general practices, a division between rural and urban area has been made. The results of both model 5 and 6 suggest that patients living in an urban area have indeed more chance (1.6x) to visit an MHN compared to patients in a rural area. Again, the CIs of the models overlap, which suggest that the effect is not different between the models. This means that there have been found support to accept the fifth hypothesis.

Finally, it becomes clear from Table 5 that patients living in Limburg are more likely to visit the MHN (1.3x) compared to patients living in Noord-Brabant. No hypothesis was set for this variable since this variable was included as a control variable. When model 1 is compared to model 6, the CIs do not overlap, which means that the OR for the province may be determined by the other factors included in the analyses. Overall, three of the four hypothesis in this section are accepted. The results are discussed and linked to the literature in Chapter 6.

Table 5. Results of the logistic regression regarding MHN consultations
This table represents the results of the logistic regression analyses concerning the chance of having a consultation with an MHN. The dependent variable includes patients that visit the MHN in the years 2016 and/ or 2017 at least once. The definitions of the independent variables can be found in Table 1. The models include (1) control variable, (2) control variable and gender, (3) control variable and age, (4) control variable and SES, (5) control variable and place of residence and (6) all variables. The R^2 includes the Nagelkerke R^2. OR: Odds Ratio, CI: Confidence Interval.
* Significant at the 0.01 level (2-tailed)

		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	Men (reference)												
	Women			1.599*	1.561 to 1.638							1.617*	1.587 to 1.656
Age	<18 (reference)												
	19-44					3.655*	3.490 to 3.827					3.604*	3.441 to 3.775
	45-64					2.932*	2.798 to 3.072					2.922*	2.788 to 3.062
	>65					1.891*	1.796 to 1.990					1.863*	1.770 to 1.961
SES	Low (reference)												
	High or moderate							1.114*	1.034 to 1.201			1.111*	1.029 to 1.199
Place of residence	Rural (reference)												
	Urban									1.584*	1.547 to 1.622	1.561*	1.524 to 1.599
Province	Noord-Brabant (reference)												
	Limburg	1.259*	1.227 to 1.291	1.259*	1.228 to 1.292	1.264*	1.232 to 1.297	1.264*	2.232 to 1.297	1.342*	1.308 to 1.377	1.344*	1.310 to 1.380
Constant		0.037*		0.028*		0.015*		0.037*		0.046*		0.011*	
Observations		713,287		713,287		713,287		713,287		713,287		713,287	
R^2		0.002		0.009		0.023		0.002		0.008		0.037	

5.4 Prescription of medication over the years

The final analysis which has been performed to answer the sixth and final hypothesis is a one-way ANOVA regarding the prescription of medication over the years 2014, 2015, 2016 and 2017. The outcomes of the analysis provide an answer to the final hypothesis. The rate of prescription of medication was calculated by dividing the number of patients that have been prescribed medication for mental problems by the number of patients that do not have been prescribed medication for mental healthcare problems in a general practice for each year.

Prior to running the ANOVA, several assumptions should be checked. First, the assumption of normality is checked. After making Q-Q plots, a histogram and a check of normality in SPSS, it became clear that the data is normally distributed. Second, the homogeneity of variances is checked by a Levene's test. The assumption is satisfied based on Levene's F test, $F=1.150$, $p=0.328$. Concluding, both assumptions have been met.

The average prescription of medication in the years are presented in Table 6. As already becomes clear, the means do not differ that much in the years. The results of the ANOVA analysis suggest that the outcome of the one-way ANOVA is not significant $F=0.361$, $p=0.781$. Thus, the null hypothesis of no differences between the means cannot be rejected. Besides, no result of the post-hoc test is significant, which means that by comparing each year separately with each other, still no differences are detected. This means that hypothesis six, where was stated that the prescription of medication decreased within the years, is not confirmed.

Table 6. Overview of prescription of medication in the years
In this table, the number of practices, mean, standard error and standard deviation of the rate of prescription of medication are presented. The mean, standard error and standard deviation are presented in percentages. The rate of prescription of medication in a general practice is calculated by dividing the number of people that have had prescribed medication in a year by the people that did not have had prescribed medication.

	Number of practices	Mean (%)	Standard error (%)	Standard deviation (%)
2017	169	13.77	0.19	2.53
2016	171	13.83	0.19	2.45
2015	171	14.05	0.19	2.44
2014	170	13.84	0.22	2.89

An overview of the results regarding the outcomes of the hypotheses discussed in this chapter can be found in the Appendix.

6. Discussion and conclusion

In this study, the difference in populations of MHNs was investigated by a retro-perspective quantitative analysis. This chapter answers the research question which was set in the introduction and discusses the results. The structure is as follows: first the findings are summarised, second the results are discussed given the existing literature, third strengths and weaknesses of this study are presented, and finally, recommendations for further research are provided.

6.1 Main findings

The stated research question presented in the introduction of this research was: *"To what extent is there variation in the use of services for mental healthcare in primary care and what is the effect of specific demographic and environmental factors of patients?"*. In this section, an answer to the research question is provided.

This study found that there exists a small but significant difference in the use of service of the MHN between Limburg (N=279, mean use of service 3.38%) and Noord-Brabant (N=125, mean use of service 3.07%). This means that in Limburg the service of the MHN is used 0.3% more compared to Noord-Brabant. Based on the stress-vulnerability model, there was made a distinction between demographic and environmental factors of patients that may cause a difference in chance of obtaining a consultation of the MHN. Demographic determinants which have been investigated include age and gender. The outcomes suggest that women are more likely to obtain a consultation from the MHN (OR=1.62; 95% CI [1.59 to 1.66]; p=0.00) compared to men. In addition, the age category which has the highest chance to obtain a consultation from the MHN is 19-44 years (OR=3.60; 95% CI [3.44 to 2.79]; p=0.00). Environmental determinants which have been investigated to have an impact on the chance of having a consult at the MHN are SES and degree of urbanisation. If a patient has a high or moderate SES, he or she is more likely to have a consultation with an MHN (OR=1.11; 95% CI [1.03 to 1.20]; p=0.01) compared to patients with a low SES. Living in an urban place increases the chance to have at least one consultation with the MHN (OR=1.56; 95% CI [1.52 to 1.60]; p=0.00). Finally, there is no proof to conclude that there exists a difference in the rate of prescription of medication for the years 2014-2017.

6.2 Discussion

In this section, the results of this research are discussed and linked to the literature. Articles which have been used for comparison focuses on MHNs and evidence from the Netherlands to make the most reliable conclusions regarding the theoretical implications. There is a distinction made between theoretical and practical contributions.

Theoretical contributions

Since the function of the MHN is relatively new, the literature available for this part of the healthcare sector is limited. This research adds to the literature on this scarce subject of MHNs. In this sub-section, the theoretical contributions are presented by comparing the results of this study to the existing literature.

The first hypothesis focused on the difference in the use of services provided by the MHN. It became clear that the use of services is significantly higher in Limburg, compared to Noord-Brabant. This is in line with the research of KPMG, which focused on the use of mental healthcare in all provinces in the Netherlands. Their outcome measure contains the number of patients visiting mental healthcare in a province compared to patients that have a health insurance in that province. Since the outcome measure in this research is the use of services from MHNs compared to total patients in a general practice, the percentage in this research should be lower compared to the outcome of KPMG, since specialised care is not taken into account in this thesis. This seems to be the case: in Noord-Brabant, the use of mental healthcare is between 15-16 per cent (in this research 3.1%) and in Limburg between 17-18% (in this research 3.4%) (KPMG, 2017, p. 32). The average healthcare expenditures for mental healthcare in all sectors is around €3.000 per patient and the average healthcare expenditures for care provided by MHNs is around €270, which explains the differences in magnitude between the KPMG research and this thesis. Overall, the result of hypothesis one is in line with the literature. Besides, the outcomes of the logistic regressions performed in this research also confirm this hypothesis: patients living in Noord-Brabant have a 0.7x lower chance compared to patients living in Limburg. While discussing the results with the directors of the care groups, it became clear that they observe that people living in Limburg are visiting mental healthcare more often compared to people living in Noord-Brabant. This corresponds to the numbers of the CBS, however, they did not test for factors that may cause this effect (CBS, 2016a). The directors provided the explanation of a cultural difference in the provincial differences in the use of service, i.e. the attitude against seeking help for mental problems between the provinces. Another possible explanation for this may be that the role of MHN was introduced earlier in Limburg compared to Noord-Brabant (Vektis, 2015, p. 25). People in Limburg may be more familiar with the services provided of the MHN and consequently will earlier visit an MHN, because they know that it is possible to obtain mental healthcare in primary care by the MHN.

The second hypothesis stated that women have a higher chance to visit an MHN compared to men. Studying the results of this thesis, this is the case: women have a 1.6x higher chance of visiting an MHN compared to men. This is in line with the results of Magnée et al. (2016), who found that women have a 1.2x higher chance of visiting an MHN compared to men. So, the direction of the OR is the same, however, the magnitude is a bit different and the CIs of both results do not overlap. There may be several reasons for this difference in magnitude. First, their research includes the years 2011-2014 and since the role of the MHN has become stable in the years of this analysis, this may be a cause of the small difference in magnitude. Second, they included all provinces in the Netherlands and this research only captures the South of the Netherlands. Third, this research included only data from care groups which

may also bias the results. Finally, they included more variables, which may have an impact on the magnitude of the coefficient, as also becomes clear from Table 5. Nevertheless, the results that women have a higher chance to visit an MHN compared to men is the same. This result is also in line with the fact that women have a higher chance to develop a mental healthcare problem (de Graaf et al., 2012; CBS, 2011) and use more mental healthcare compared to men (de Graaf et al., 2012; Schuch et al., 2014). Finally, the results can be compared to the results of Business Administration. If a patient is a woman, the annual healthcare expenditures increase with €4.44. This suggests that women have a higher chance to visit an MHN and at the same time have higher annual healthcare expenditures, which means that they have more consultations compared to men.

Regarding the third hypothesis, the age category which has the highest risk to obtain a consult of an MHN is the age between 19-44 years. This corresponds with the research of Magnée (2016) who found that the odds ratios for the age categories are 2.6 for 19-44 year (this research: 3.4), 2.0 for 45-64 year (this research: 2.8) and 1.1 for >65 years (this research: 1.8) compared to the age category < 18 years. Patients in the age of 19-44 have the highest chance to obtain a consultation with the MHN compared to patients in other age categories. Again, the direction of the outcomes of this thesis and the article of Magnée et al. (2016) are the same, however, the magnitude of the coefficients differ. Besides, CIs of this research and their research do not overlap. This may again be caused through different populations, data from care groups, the difference in variables included or the increase in the use of services of the MHN. Besides, according to de Graaf et al. (2012), who made another division in age categories, patients in the age of 18-24 year have the highest chance to obtain a mental healthcare problem and according to Nielen et al., (2016), the age category 18-29 has the highest risk on a mental healthcare problem. Consequently, this may increase the chance in this age category of obtaining a consult of the MHN. The results of Business Administration suggest that annual healthcare expenditures increase with age. More specifically, if the age of the patient increases with one year, the annual healthcare expenditures increase with €0.11. This may suggest that older patients have higher healthcare expenditures, which is in line with the literature.

The third hypotheses stated that patients with a low SES have a higher chance to visit an MHN compared to patients with a high SES. Focusing on this research, hypothesis three seems to have the opposite effect: patients with a high SES have a 1.1x higher chance to visit an MHN compared to patients with a low SES. The articles available regarding MHNs mention that there may be an effect of SES, although no research has been performed regarding the relation of SES and care provided by MHNs. Also, Magnée et al (2016) did not include SES in the analyses. Focusing on GP care, patients with low SES use more care compared to patients with a high SES (de Graaf et al., 2012; Smits, Droomers, & Westert, 2002). Besides, patients with a low income and a low level of education have the highest chance of having a mental healthcare problem (de Graaf et al., 2012). However, it seems to be the case that patients with a low SES use less care provided by MHN compared to people with a high SES. One possible explanation for this may be that the definition of SES differs in the literature, which makes SES

a hard subject to investigate. SES can exist out of different parts, like income or level of education. In this research, a merged variable was taken, but in fact, the different parts may have different effects. Besides the broad definition of SES, the SES of people differs for different provinces in the Netherlands (Kompas Volksgezondheid, 2014). Since the data in this research only focuses on the South of the Netherlands, this may bias the results. Besides, it may also be the case that patients with a low SES are not familiar with the care provided by the MHN or patients with a high income have more resources to use care from MHN. Overall, further research should be performed to find out what the effect of SES is on consultations with the MHN.

Concerning the fifth hypothesis, which focused on the degree of urbanisation, the results suggest that patients who live in an urban area have a 1.6x higher chance to visit an MHN compared to patients living in a rural area. Surprisingly, the results of Business Administration suggest that living in an urban area, lower the healthcare expenditures for consultations of MHN with €3.60. This suggests that people in urban places have a higher chance to visit the MHN, however, the annual healthcare expenditures decrease when one lives in an urban area. One of the reasons for this difference may be that waiting lists for the MHN are high in urban cities (which causes the increase in chance for people living in an urban area), so an MHN can only provide a few consultations, which decreases the healthcare expenditures. Magnée et al. (2016) divided the degree of urbanisation, based on zip-code, in different categories: very high, high, medium, low or very low. Their results suggest that patients living in a very low or low degree of urbanisation, i.e. an urban area, have the highest chance of a consult of the MHN. However, as mentioned before, the confidence interval of the outcomes overlap with one, which may suggest that the results are not significant. This is not mentioned in the article specifically. Another argumentation for the fact that patients living in an urban area have a higher chance of visiting an MHN may also be that people in urban area have a higher income, which may result in the fact that they have more resources to use the service of the MHN (Kompas Volksgezondheid, 2014). Those factors can be studied in future research. Studying the literature regarding the prevalence of mental problems, it becomes clear that patients living in a rural area have the highest chance of having a mood disorder, whereas patients living in an urban area has the highest prevalence for anxiety disorders (de Graaf et al., 2012). It may be the case that patients included in this research were mostly visiting the MHN for anxiety disorders instead of mood disorders, which may support the results. Unfortunately, it was not possible to include a division of disease severity, because of a lack of registering problems of the MHN. Future research should include this to check if the results are still robust.

The final hypothesis focused on the prescription of medication for mental healthcare problems in general practices. Since patients prefer consultations above medication as a treatment for their mental problems, it was expected that, since the role of MHN was introduced, the prescription of medication would decrease (Bower et al., 2011). However, this hypothesis is not confirmed in this thesis: the prescription of medication did not change significantly in the years 2014-2017. The results in this thesis regarding the prescription of medication for mental problems are in line with the results of Magnée et

al. (2018), who concluded that the rate of anti-depression medication did not change since the role of the MHN was implemented (Magnée et al., 2018). Bower et al. (2011), performed their research in the UK, where the MHN is already present for a longer time. Both Magnée et al. (2018) and Bower et al. (2011) argue that the decrease in the prescription of medication may be an effect for the long-term. The results of this study suggest that this decrease is still not seen in 2017. Moreover, it may also be the case that the waiting lists of the MHN are too long, which causes a lack of time for the MHN to provide care, and that they are consequently still not able to provide care according to patients' preferences. Another clarification may be that there are a lot of patients with severe diseases, which mostly use medication. In this case, consultations provided by MHNs can be seen as additional care next to medication. A possible research that can detect whether this is the case, may be to detect if there is prescribed less strong medication. However, this is quite hard, since MHNs do not often register disease severity yet. Overall, future research must clarify which factors may be causes for the stable rate of prescriptions of medication.

Practical contributions

Considering the previous discussion of the hypotheses, it became clear that there are some theoretical contributions. Moreover, the outcomes of the analysis may also have some practical implications.

First, given what is known about patient characteristics that may cause an increase in the chance of a consultation with the MHN, the general practice or health insurer may react proactively when they know certain patient characteristics are over present in their practice. For example, when a certain general practice has a lot of women in their population, it may be the case that the number of patients visiting the MHN is higher compared to a practice with the same number of patients but fewer women. The health insurer may provide more budget to the general practice if this is known beforehand. In this way, the problem of inequality of care is minimised and more effective care can be provided.

Second, the result suggests that patients living in Noord-Brabant use less care from MHNs compared to patients living in Limburg. One of the reasons, as mentioned before, for this may be that patients in Limburg are more open to seeking care for mental healthcare problems compared to Noord-Brabant. Although this may be a cultural point and probably a kind of stigma against mental problems, it may be effective to promote the function of the MHN in Noord-Brabant so that people know it exists. In this way, the difference in use of healthcare between the provinces may decrease.

Third, data were made available by care groups. This means that the outcomes of this research can best be interpreted for GPs that also affiliate with a care group. It is expected that general practices that are integrated with a care group, code their consultations relatively well, because the care group takes over the declaration task. If the MHN does not code the consultations correctly, they do not receive the fee for the provided care. Since 75% of the general practices are affiliated with a care-group in the Netherlands, the external validity of the study is high (Huisarts en Wetenschap, 2014). Still, one should be cautious when generalising the results to GPs that do not affiliate with a care group.

6.3 Strengths and limitations

Considering this research, there are several strengths and weaknesses. In this section, first, the strengths are discussed, which is followed by the limitations of this study.

One of the main strength of this research includes the sample size. The results are more reliable when the number of observations increases. Since the large sample size, the results can be considered reliable. Second, Topicus offers a software that invoices the bill by the health insurer. Because of this, the registration of consultations should be often good, otherwise, the general practice does not receive the money for the care they provided. Consequently, the data used in this research is reliable, which is a strength of this thesis. Finally, the results of this thesis were compared to the results of the thesis of Business Administration. This provides insight into the population and healthcare expenditures at the same time, which is a strength of this thesis.

Besides the strengths of this research, it should be noted that there are also some limitations. First, there could not be corrected for a case-mix, since there is a lack of registering problems by the MHN. The MHN operates in the general practice, so ICPC-codes should be used to register the diagnose of the patient. However, it is seen by professionals that MHNs have problems with registering those codes, mainly since the ICPC-codes focus on GPs instead of MHNs. As mentioned before, there are a lot of ICPC-codes and no clear cut have been made for several diagnoses. One of the consequences is that MHNs do not register the code, which is a limitation of the study since the disease severity of patients could not be taken into account. Second, variables which were available for research were limited. The selection of patient characteristics in this research was based on the stress-vulnerability model (Ormel et al., 2001). Only two of the four subjects mentioned in the model were covered. This is a limitation of this study, since this research does not cover all characteristics which may have an impact on the chance of a consultation at the MHN. Disease severity, ethnicity, civil status and other social factors are examples of variables which may also have had an effect to have a consultation with the MHN (Kennisplatform Integratie & Samenleving, 2015; Powell, Davies, & Thomson, 2003). Third, the variables which were included in the analysis were not all equally available regarding frequencies for the different categories. For example, the provinces included in this research are Noord-Brabant and Limburg. This captures most of the south of the Netherlands, however, Limburg is over presented in this study. Since the data is taken together and conclusion are made on an aggregate level, there may exist a bias regarding the outcomes. As mentioned before, low SES was underrepresented in this study, which influences the reliability of the results. Fourth, the definition of SES is relatively broad and no specific effects are determined. For this reason, it may be the case that the effect of SES is different when one uses another definition. This is a limitation of this study. Finally, the relation between GP and MHN can have an important effect on the patients the MHN sees, because the GP refers the patients to the MHN. This effect could not be estimated in this study, because there was no data available regarding the relation of patients, MHNs and GPs.

6.4 Future research

Considering the discussion, strengths and limitations of this study, some suggestions for future research are presented in this section. This advice is mostly based on the limitations discussed before.

First, it is interesting to add variables that may cause a consultation of the MHN. For example, the GP may influence the population of the MHN, since the patient is first seen by the GP. The GP refers the patient to the MHN, so it is possible that this has an effect on the population of the MHN. Besides GP factors, patient-related factors may be studied. The stress vulnerability model suggests which factors influence the occurrence of mental problems. It is interesting to include life events and psychobiological factors as well and expand factors of demographic and environmental determinants. As mentioned before, disease severity may also be included when the coding of MHN is improved. The advice is given to the NHG to replace the ICPC-codes of the GP for specific MHN codes focusing on mental problems. Next to the addition of new variables for patient-related factors, the SES of patients can be extended by including several variables like income or highest level of education of the patient. SES has been split up in this research according to (1) high and (2) moderate or low. It may be the case that this definition is too broad, since it exists out of several factors. When it is known which factors of SES cause a higher chance of a consultation of the MHN (caused by GP or patient characteristics), there may be reacted proactively by the increase of employability of an MHN. Overall, the following question may be asked: "*what kind of patient and/ or GP factors also influence the chance of having a consultation at the MHN next to the factors detected in this research?*"

Second, since there is a growing body of literature on quantitative research regarding the MHN, it is interesting to perform a qualitative study. For example, it became clear that the prescription of medication has not been decreased in time, whereas this was expected by the implementation of the function of the MHN. However, why did this not decrease? Do MHNs or patients prefer medication instead of consultations? A qualitative research regarding this subject should be carried out to detect the causes of this fact. Consequently, the following question can be considered: "*what are causes for the stable medication rate since the implementation of the MHN concerning mental healthcare problems in general practice?*"

Finally, it is still not known whether the function of the MHN is cost-effective. Six years after the introduction of the MHN, it should be possible to address the cost-effective. Since the use of MHNs is stable for several years now, it may reveal reliable results. Referral rates should be considered to detect if treatment provided by an MHN prevents patients from seeking help in secondary care and if there are other benefits regarding the function of the MHN. Summarizing, the following question may be asked: "*to what extent is the function of the MHN cost-effective?*".

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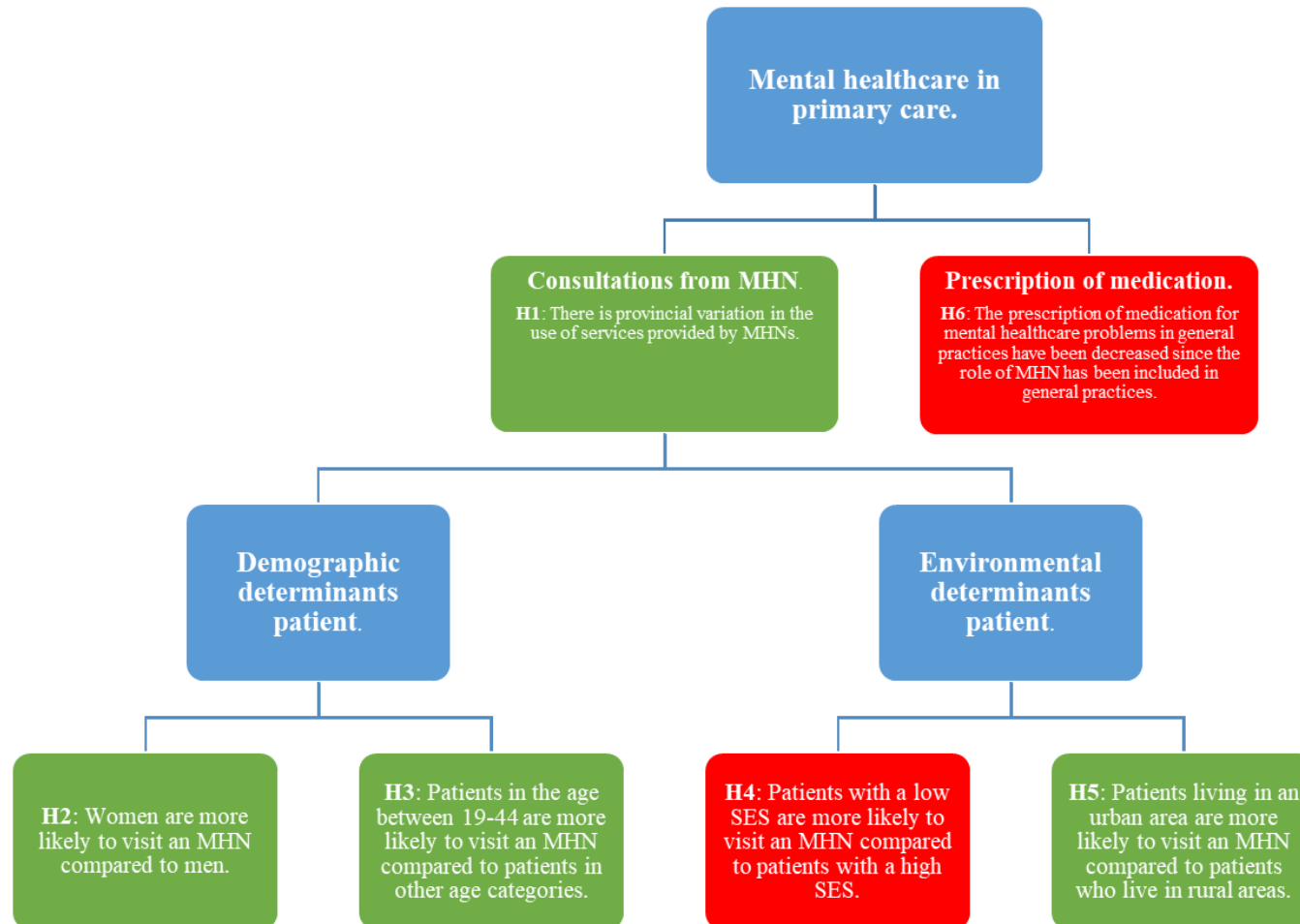
Appendix

Figure 2. An overview of the results for each hypothesis
Green: supported, red: not confirmed