

ABORTION AND MENTAL HEALTH

**A longitudinal study of common mental
disorders among women who terminated
an unwanted pregnancy**

JENNEKE VAN DITZHUIJZEN

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ABORTION AND MENTAL HEALTH

**A longitudinal study of common mental disorders among women
who terminated an unwanted pregnancy**

ABORTUS EN PSYCHISCHE GEZONDHEID

Een longitudinaal onderzoek naar veel voorkomende psychische
aandoeningen bij vrouwen die een ongewenste zwangerschap beëindigden

(met een samenvatting in het Nederlands)

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Promotoren Prof.dr. W.A.M. Vollebergh
Prof.dr. C.H.C.J. van Nijnatten

Copromotoren Dr. M. ten Have
Dr. R. de Graaf

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CHAPTER 1

INTRODUCTION

Worldwide, around 1 in 4 pregnancies ended in an abortion between 2010 and 2014 (Sedgh et al., 2016). In the Netherlands, approximately 30,000 women per year have an abortion; which is about 8.5 abortions per 1,000 women aged 15-44 (IGZ, 2015). The last decade has seen a renewed interest in international research about the question whether termination of an unwanted pregnancy is linked to subsequent mental health problems (e.g., APA, 2008; Charles et al., 2008; Coleman, 2011; NCCMH, 2011). This interest was partly prompted by testimonies of researchers stating that scientific evidence shows that abortion poses a significant risk to women's mental health (e.g., Coleman, 2006b, in Major et al., 2009), which contradicted the findings of the first scientific expert panel of the American Psychological Association (Adler et al., 1990; 1992). This instigated another wave of empirical studies, as well as the execution of various review studies (e.g., APA, 2008; Charles & Polis, 2008; Coleman, 2011; NCCMH, 2011).

In the Netherlands, public and political debate about the possible mental health consequences of abortion also arose around a decade ago. One of the smaller political parties that was part of the coalition in the cabinet Balkenende-IV expressed concerns about possible negative mental health consequences of abortion. Their request for research was backed up by other political parties, because they recognized that there is very little empirical research on abortion and mental health linkages in the Dutch context. In 2008, the Dutch Ministry of Public Health and Sports decided to subsidize research into the mental health of women who have an abortion, and the Netherlands Organisation for Health Research and Development (ZonMw) granted funding to Utrecht University to conduct this longitudinal study, as one of the four projects within the program Exploration Abortion Care (Verkenning Abortushulpverlening). This dissertation is a product of that study.

The main question guiding the current study was whether termination of an unwanted pregnancy is associated with subsequent mental disorders. The Dutch Abortion and Mental Health Study (DAMHS) was developed to deal with some of the most common methodological threats plaguing research in this field. Before the goals, research questions, and design of the study are explained in more detail, background information on the local situation with regard to abortion, as well as on international theory and empirical work, is presented.

1.1 Abortion in the Netherlands

1.1.1 The Dutch Abortion Act

In November 1984, the first Dutch Abortion Act came into force. The legislative process of legalization was by no means a simple procedure. In 1969, the distribution of contraceptives was legalized. Since 1970, several bills for amendment of the law on abortion had been submitted, but did not pass the House of Representatives (Tweede Kamer). Because of societal changes in the Netherlands and the growing body of jurisprudence expanding the concept of ‘medical indication’ for induced abortion, it became virtually impossible to enforce the law. To restore the ‘legal security’, the law needed to be revised (Kamerstukken 1978/79, in: Visser et al., 2005). The debates in the Dutch House of Representatives at the end of the 70’s showed that the political views were very far apart, and the two political parties that formed a coalition in parliament at the time, the conservative-liberal VVD and the Christian democratic CDA, could not reach agreement on the subject. In 1981, the Ginjaar/De Ruiter bill was accepted with a small majority, and in 1984 the final version of the abortion act, the Law on Pregnancy Termination (WAZ: Wet Afbreking Zwangerschap) came into effect.

The WAZ is based on two values: the lawful protection of unborn human life, and the right to medical care in case of unwanted pregnancy (Visser et al., 2005). Because these two values are at odds with each other in the situation of an unwanted pregnancy, termination of a pregnancy is considered acceptable only when women’s distress about the pregnancy makes abortion inevitable. The legislator stated explicitly that the concept of ‘emergency situation’ cannot be defined or delimited in general terms, because of the diversity in experiences of emergency. Therefore only normative guidelines are stated, instead of strict norms. Guidelines are that the judgement of the woman about the emergency situation is leading, but also that the doctor should decide whether he or she can justify the abortion, not only medically but also ethically. The doctor has to assess whether the woman has made her decision voluntarily and after careful deliberation. In order to guarantee (a) a careful decision process, education, and post-abortion care, (b) good quality of medical treatment, and to avoid (c) commercial practices, the WAZ is enforced by means of a licensing system.

Pregnancies can only be terminated in hospitals and clinics with a license which prescribes certain conditions for the procedure, by medical doctors with a license,

issued by the Dutch Ministry of Public Health and Sports (VWS). The WAZ does not state a gestation limit for induced abortion, but this time limit can be deduced from the statement that abortion can only be performed until the fetus is viable, which is currently at 24 weeks gestation. Also, a margin of two weeks should be taken into consideration when using advanced diagnostic methods. Therefore, Dutch abortion clinics will perform abortions up until 22 weeks of gestation. Under some conditions of ultrasound gestation age determination, margins can be smaller (Visser et al., 2005). After 24 weeks, abortion is only allowed when the fetus is not viable. Furthermore, a deliberation period of five days is obligatory, which starts at the first contact with a medical doctor (often the family doctor).

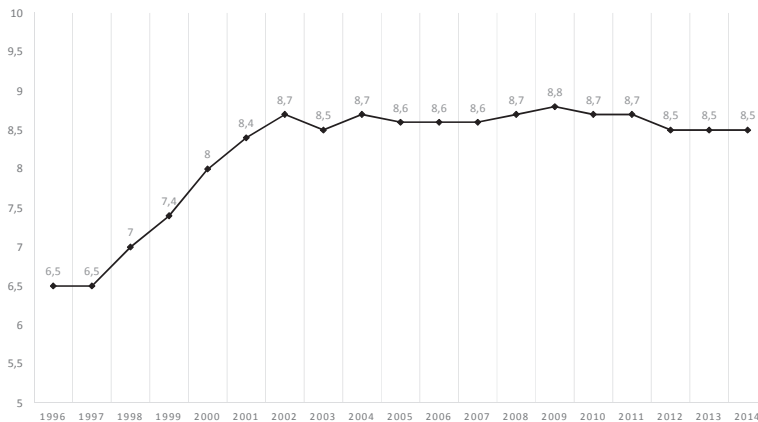
Initially, the WAZ was not applicable to the period until 16 days after the woman should have had a menstrual period, because the pregnancy could not be determined with certainty. With the development of new techniques, this argument became invalid. In 2009, the government concluded that this so-called 'overdue treatment' (overtijdbehandeling) should no longer be excluded from the WAZ, but did not see reason to amend the WAZ because the conditions were already being met through the licensing regulations, and the Dutch criminal law prohibits abortions to be performed by people without a license. Up until today, a deliberation period of five days is therefore not needed for early pregnancies up to 6 weeks + 2 days after the first day of the last menstrual cycle. However, in more than two thirds of these early terminations or 'overdue treatments', a deliberation period of five days or more is used (IGZ, 2010). At the moment of writing this dissertation, the Dutch Ministry of Public Health and Sports has announced that it will submit a bill to revise the law so that the 'overdue treatment' will be included in the WAZ, without the obligatory deliberation time (Kamerbrief d.d. 27-06-2016), in order to enable family doctors to provide medical abortions up until 6 weeks + 2 days of pregnancy gestation.

1.1.2 Abortion rate and abortion ratio

There are two different measures used to compare international data on abortion. The abortion *rate* is based on the number of induced abortions *per 1,000 women in the fertile age range of 15-45*; the abortion *ratio* is based on the number of induced abortions per 1,000 live births. Compared to other countries, our *abortion rate* is among the lowest in the world (Levels et al., 2012; IGZ, 2014; Sedgh et al., 2016). The Dutch abortion rate has been consistent for the last decade at around 8.5 pregnancy terminations per 1,000 women aged 15-44 (IGZ, 2014, see also Figure 1.1). In the United

States and the United Kingdom, the abortion rate is almost doubled, 15.9 and 16.5, respectively; and the global abortion rate is about 35 (Sedgh, 2016). The Dutch abortion ratio was 152 in 2014, which indicates that 152 pregnancies were terminated per 1,000 live births (IGZ, 2015).

Figure 1.1 Abortions in the Netherlands per 1000 women aged 15-44 (from: IGZ, 2014; 2015)



Around 30,000 pregnancies are terminated in the Netherlands per year in the last few years, around 10 to 15% of these are among women from outside the Netherlands. Most pregnancies (81.5% in 2014; IGZ, 2015) are terminated in the first trimester; more than half of these before 7 weeks of gestational age. In 2013, 21.5% of abortions were medical ('abortion pill'), 60.8% instrumental (curettage), and 17.6% a combination of both. Abortion among teenagers is declining; in 2013 the abortion rate among teenagers decreased with 10% compared to 2012, and among girls under 15 with 39%. The Netherlands also has one of the lowest teenage pregnancy rates (Picavet et al., 2014; Picavet, 2016).

1.1.3 Access to abortion care

In 2010, when we started our study, there were 16 abortion clinics in the Netherlands, but some of them closed since then. Currently, there are 13 facilities in various locations spread out over the country, although most of them are concentrated in the most urban area of the Netherlands, the Midwest 'Randstad'. Most abortions (over 90%) are performed in these specialized abortion clinics, the rest of the abortions are

performed in general hospitals (IGZ, 2015). Women who require options counseling or help deciding what to do, are referred to the FIOM, a government-subsidized organization specialized in (neutral) options counseling for women with unwanted pregnancies, and questions regarding descent/ adoption. Recently the funding for FIOM was cut, and as a result FIOM had to shift focus to knowledge transfer instead of offering care to women. FIOM now also offers online options counseling, as well as post-abortion psychosocial counseling. Another government-funded organization offering counseling to women who are faced with unwanted pregnancy, is Siriz, which is directly linked to the Dutch Association of Protection of the Unborn Child (VBOK). There are also other organizations offering options counseling, but these are not funded by the Dutch government.

In the Netherlands, abortion is free of charge, it is fully subsidized by the government. Contraception is covered by medical basic insurance for women under the age of 21. For women of 21 and older, the extent of coverage by additional insurance for contraception differs between insurance companies, contraception method, and even where you get it from. However, even if it is covered, the costs might be paid by the patient via the so-called mandatory 'At Own Risk' contribution ('eigen risico', maximum 385 Euros in 2016), unless the contribution has been spent in that year on other health costs.

The political and societal climate with regard to abortion can be considered liberal in the Netherlands. Low abortion rates have been associated with the widespread acceptance of family planning in the Netherlands (Ministry of Foreign Affairs, 2011). Up until the 1960's the Netherlands had one of the highest birth rates in Europe, but this situation changed dramatically in the decade that followed. This was influenced by the transition from an agricultural to a modern industrial society, rapid economic growth, declining influence of the churches on daily life, increased educational level, and mass media (Ketting & Visser, 1994). The introduction and use of contraceptives was stimulated by social and political debate about overpopulation, the increased influence of both the emancipation movement and the Dutch Society for Sexual Reform, the increased involvement of family doctors in family planning, the public health insurance system, and the lift of the ban on contraceptives around 1970 (Ministry of Foreign Affairs, 2011; Ketting & Schnabel, 1980). Using the European and World Value Surveys, Need et al. (2008) found that the Dutch public opinion about abortion is more permissive of abortion compared to countries where abortion is restricted by law. A recent explorative investigation by TNS Nipo showed that 72% of a Dutch population sample (n = 979) was strongly or mostly in favor of the possibility to

have an abortion, and that 85% is in favor of openly discussing the option of abortion in case of an unwanted pregnancy (Raaijmakers et al., 2016).

To summarize, barriers in access to abortion are low in the Netherlands: abortion care is free and available to everyone, and family planning is highly accepted. This makes the Netherlands a particularly interesting context for research into the mental health and wellbeing of women who have abortions. In the United States for example - where most research on the subject of abortion and mental health is done - barriers to abortion care are higher: the costs range from about 500 to 1,500 dollars (information from www.plannedparenthood.org), an abortion sometimes requires travelling to a different state or country, and there is a stronger influence of the churches on public opinion toward abortion. These circumstances might confound any possible relation between abortion and mental health. In the Netherlands, this type of confounding by barriers-in-access is expected to be much smaller. This is one of the reasons why the current study is informative to an international audience as well.

1.2 International theory and findings

1.2.1 Theory: ‘abortion-as-trauma’ or ‘abortion-as-life-event’?

Several theoretical frameworks have influenced thinking about possible associations between abortion and mental health outcomes (APA, 2008; Major et al., 2009; NCCMH, 2011). Two views have dominated the discussion about whether or not abortion causes harm to women’s mental health.

The first view is that abortion is a **traumatic experience**, which is unique in the sense that it involves the death of an unborn child, and the violation of maternal attachments to it (Coleman, 2005; Speckhard & Rue, 1992). Speckhard and Rue stated that abortion can lead to a specific subtype of posttraumatic stress disorder, the Post-Abortion Syndrome (PAS). PAS is not recognized as a diagnosis in the Diagnostic and Statistical Manual of Mental Disorders (DSM) of the American Psychiatric Association (APA, 2000), nor in the ICD-10. In international research the term is no longer in use. Researchers who have proposed this view, state that abortion strongly increases the risk of mental disorders (e.g., Coleman, 2011).

The second view is that abortion can be considered a **potentially stressful life event**, within the range of other normal life stressors (Major et al., 2009). In this perspective,

it can trigger an adverse reaction, particularly in vulnerable women (NCCMH, 2011), but it can also resolve stress associated with the unwanted pregnancy and lead to relief (Major et al., 2009). This view is often placed into the context of **stress and coping theory** (Lazarus & Folkman, 1984). A key principle of this theory is that the response to a life event is variable, because it is dependent on the interaction between the person and its environment, as well as on the cognitive appraisal of the event and the coping style of the person. In this view, an abortion will not inevitably lead to adverse mental health, but it depends on situational and personal risk factors, such as the sociocultural context, co-occurring risks, or a history of mental disorders prior to the pregnancy (APA, 2008; Major et al., 2000).

From these views, two hypotheses can be formulated with regard to the question whether abortion leads to mental disorders. The abortion-as-trauma view states that abortion strongly increases the risk of post-abortion mental disorders; the abortion-as-life-event view states that abortion 'on its own' does not increase the risk of mental disorders, but that this strongly depends on other vulnerability factors. In the next paragraph, we will discuss the scientific evidence with regard to these hypotheses.

1.2.2 Empirical findings

In the last ten years, a number of systematic review studies have been conducted (APA, 2008; Charles et al., 2008; Coleman, 2011; NCCMH, 2011), as well as a number of evaluative reviews (e.g., Robinson et al., 2009; Steinberg & Russo, 2009), on a relatively small body of empirical studies. The most influential reviews were the one conducted by the Taskforce on Mental Health and Abortion of the American Psychological Association (APA, 2008) and the British review of the National Collaborating Centre Mental Health, which was a joint project of the Royal College of Psychiatrists and the British Psychological Society (NCCMH, 2011). The systematic review studies all use slightly different selection criteria, therefore each review study only discusses the part of the available evidence the authors consider worthwhile, this varies from 22 to 73 studies. All review studies mention that the field is characterized by methodological limitations, and that this strongly restricts the possibilities to perform a review study. For pragmatic reasons, all review studies still include research that is limited in terms of design or method. The NCCMH review added a table displaying ideal and pragmatic criteria for reviewing purposes. First, we will mention the most important methodological limitations of this field. After this, we will discuss some of the most leading empirical studies.

A. Sampling and design

Problems of design and sampling characterize this field of research (APA, 2008). In theory, a randomized experiment would be the most useful design to investigate mental health effects of abortion, but evidently this is ethically impossible. Therefore, researchers have to use observational studies for this purpose. The most appropriate design would then be a prospective longitudinal study of a large cohort of women, ideally following up all pregnancy decisions as well as their mental health, from an early (at least pre-fertile) age. Such a study would be extremely costly and not practically feasible, because one would need enormous numbers of participants to end up with a large enough subset of women who have abortions (especially in countries with a low abortion rate).

Two types of studies have been used in this field. First, a large part of the longitudinal studies used subsamples from large extant population studies which had not been specifically designed for investigating abortion (e.g., ; Coleman et al., 2009; Fergusson et al., 2009; Mota et al., 2011; Reardon & Cougle, 2002; Steinberg & Finer, 2011). Although the sample sizes of these studies are usually very large, the subsamples of women having abortion are often much smaller than one would expect based on national abortion registry data, which raises concerns with regard to underreporting. Second, some studies have been specifically designed for investigating abortion, and use primary cohorts of women who had an abortion, often recruited in abortion clinics (e.g., Foster et al., 2015; Major et al., 2000). In these studies, the total sample size is often smaller for pragmatic reasons, but the number of women who had an abortion (and verifiably so), is mostly larger than in the extant population studies. Selection effects are a potential threat to validity in these primary cohort studies, due to convenience or selective sampling.

The preferred design for causal questions about abortion and mental health is longitudinal with a long follow up time. Most primary cohort studies use follow up periods of maximum two years (e.g., Major et al., 2000), the Turnaway study (see www.ansirh.org/research/turnaway-study) is one of the few studies following up participants until 5 years. When follow up time is too short, mental disorders which develop at a later stage might be missed, and potential recurrence of previous mental disorders would remain unobserved.

Further, abortion studies are notorious for their low initial response and high attrition rate (APA, 2008). It is possible that the people who remain in the study differ systematically from those who drop out. Perhaps the women who were most

distressed dropped out, but it could also be the case that those who experienced the least distress dropped out more often. For this reason, it is especially important in these kind of studies that a response analysis is carried out.

B. Measurement of abortion

Most studies in this field, especially the studies on extant datasets that were not specifically designed for this, had no verifiable data about their participants' abortion status. Most often, women were asked whether they had an abortion, relying on retrospective recall. This could lead to underreporting of abortion, resulting in systematic bias. If this bias is different for certain subgroups, the problem becomes even larger (Major et al., 2009). If abortions are reported, the timing of the abortion can often not be assessed accurately from the retrospective reporting, and the interval between abortion and interview differs between participants. In this type of research, often the order of abortion and mental disorders cannot be ascertained accurately (Charles et al., 2008; NCCMH, 2011) and hence associations become obscured; causality could even be reversed completely. Also, other information about the abortion is generally lacking, such as gestation length, type of abortion, and pregnancy intention.

C. Measurement of mental disorders

Outcomes in this type of research vary considerably; from negative post-abortion emotions (Major et al., 2000; Rocca et al., 2013) to use of mental health care (Munk-Olsen et al., 2011) or validated depression or anxiety questionnaires (Biggs et al., 2015; Major et al., 2000). Most primary cohort studies measured, due to time constraints, only a limited number of mental disorders. Also, they mostly used validated self-report questionnaires of subclinical symptoms of these disorders, which do not compare to a diagnostic interview administered by a clinician or trained interviewer. Very few studies investigated a wide array of common mental disorder diagnoses, although a few studies on extant datasets did (e.g., Coleman et al., 2009; Mota et al., 2011; Steinberg & Finer, 2011).

D. Co-occurring risk factors

Another serious threat to validity in this type of research, is confounding by co-occurring risk factors. It is essential to adequately assess and adjust for confounding

variables, “[...] because there are naturally occurring interrelations among many of the phenomena associated with elective abortion that make it difficult to tease apart the causal chain that might be operating” (APA, 2008, p.16).

First, lifetime psychiatric disorders are highly prevalent among women having abortions (Steinberg et al., 2014), which influences measurement of post-abortion mental disorders, and could lead to incorrect attribution of these disorders to the abortion. The most important predictor of mental disorders after abortion, is a history of mental disorders (Gilchrist et al., 1995; Major et al., 2000; NCCMH, 2011). Therefore, it is important that previous mental disorders are measured adequately, and that the order of events (abortion and onset of mental disorder) is clearly defined.

Second, unwanted pregnancy is often associated with other adverse circumstances, which might also impact mental health on the longer term. Furthermore, the abortion rate is higher among certain age groups and ethnic backgrounds (NCCMH, 2011; Picavet et al., 2014). Various other variables have been associated with abortion, such as childhood abuse and violence (Boden et al., 2009; Russo & Denious, 2001; Steinberg & Tschann, 2013), and these may also affect future mental health. There is no rigorous way to guarantee comparability between groups (Kessler & Schatzberg, 2012), and mere adjustment for covariates might not be stringent enough (APA, 2008).

E. Reference groups

A methodological issue which has repeatedly been mentioned by review studies (e.g., APA, 2008; NCCMH, 2011), is the use of inappropriate reference groups, such as women who never had been pregnant, miscarried, or delivered a (presumably intended) pregnancy. The choice of reference group is dependent on the type of causal question (Charles et al., 2008). In this area of research, two different types of causal questions are often confused (Fergusson et al., 2009; Kessler & Schatzberg, 2012). The first causal question is whether abortion of an unwanted pregnancy has more, or less, adverse effects on mental health than its realistic alternatives (such as carrying the unwanted pregnancy to term). This causal question has recently been investigated by the Turnaway Study (e.g., Biggs et al., 2015; Foster et al., 2015; Rocca et al., 2013), using a reference group of women whose abortion requests were declined because of gestation time. This group does not include women with unwanted pregnancies who never went to an abortion clinic, which is presumably a large group. These women are also faced with many other potentially negative events after they are denied an abortion, which are also influencing mental health. This is an adequate design to

investigate effects of abortion versus being denied an abortion, when the unwanted pregnancy is a given. The second causal question is whether the life event of termination of an unwanted pregnancy increases the risk of mental disorders. This requires a design which incorporates a before-after intra-person measurement of mental health, and/or a reference group of women who did not go through this life event, but are similar in background variables. This design provides information about the consequences of the whole life event, which is lost when focusing on the specific effect of abortion versus denial of abortion. It is this latter question that is being addressed in the current study.

1.2.3 Weighing the evidence

It is very difficult to combine the strong features of the extant population studies with those of the primary cohort studies; winning some in terms of one criterion often means losing some on another criterion. So far, no study has been able to fend off all methodological limitations. Still, some studies have been particularly influential in this field, and I will mention the most important ones which measured diagnostic categories of mental disorders.

First, the New Zealand population based studies of Fergusson and colleagues (2006; 2008; 2009) were strong because they measured DSM-IV mental disorders among a cohort of young women who were followed up from birth until age 25 and 30. In these studies, women who had an abortion were compared to women who had a baby and/or never had been pregnant. They showed that women who had had an abortion before age 21, had a slightly higher risk of mental disorders after age 21 than women in the two reference groups, and risk factors such as childhood abuse were taken into account. Drawbacks of these studies were that the number of participants in the final analyses was low, and that they were limited to young women. Furthermore, their adjustment for previous mental health was limited to 12-month prevalence rates of mental disorders at age 15 and the number of mental disorders in the previous measurement interval. Therefore not all pre-abortion lifetime prevalence might have been controlled for.

Two other population studies which are worthwhile mentioning, even though they did not use diagnostic interviews, are those of Munk-Olsen and colleagues (2011; 2012). In these studies, Swedish abortion registration data were linked to national psychiatry registration data, enabling analysis of huge quantities of verifiable data. An important strength of these studies is that incidence and recurrence were measured: women

were only considered at risk if they did not have any psychiatric contact in the nine months before the abortion (Munk-Olsen et al., 2011) or only if they did (Munk-Olsen et al., 2012). It was found that psychiatric contact was not higher after abortion than before abortion; but that women who had an abortion more often had had psychiatric contact than women who delivered a pregnancy (both before and after the event). Limitations of these studies are that psychiatric contact does not necessarily reflect the presence of mental disorders, and that many background variables (such as childhood abuse) could not be controlled for, because the data did not include these.

Another influential study is the British study of Gilchrist and colleagues (1995), in which 13,261 women with an unintended pregnancy were followed by family doctors. This study is similar to the studies of Munk-Olsen and colleagues (2011; 2012) in that the abortion timing was assessed based on medical records, instead of retrospective reporting. However, this was a primary cohort study especially designed to investigate potential effects of an abortion. Diagnoses of mental disorders were assessed by family doctors, based on a small number of diagnostic categories, also from medical records. Contrary to Fergusson's findings (2006; 2008), these authors did not find an increase in the number of mental disorders after termination of an unintended pregnancy. An impediment of this study was that family doctors assessed the mental disorders, and other research has shown convincingly that family doctors are insufficiently competent to detect mental disorders among their patients (Smit, 2006).

Another primary cohort study was conducted by Major and colleagues (Major et al., 2000). In this study, women were interviewed shortly before and shortly after an abortion, one month later, and two years later. The number of participants was relatively large: they started with 882 at first measurement, and ended up with 442 participants at last follow up. A limited number of mental disorders (depression, PTSD) were assessed with short-version questionnaires. They found that most women did not develop symptoms after abortion, and those who did, were women with a history of depression symptoms.

Two other studies were limited in terms of reference groups and in terms of abortion assessment, but nevertheless should be mentioned because they resulted into an lengthy discussion between various researchers. In these studies, a wide range of common mental disorders were measured with diagnostic interviews, among women who had an abortion and women who gave birth, in the National Comorbidity Survey (2009). Coleman and colleagues first published a study (Coleman et al., 2009), concluding that abortion clearly had impact on mental health of women. This study

received numerous critical commentaries, and was also methodologically refuted by a re-analysis by Steinberg and Finer (2011), who tried to reproduce the results using the exact same data. They did not find any effect of the abortion on mental health. After this, Coleman and colleagues published a corrigendum (Coleman et al., 2011) and an author's reply, still stating that there were effects, but these were again countered by a forceful reply of Steinberg and Finer (2012). Coleman and colleagues had presented lifetime disorders as indicative of post-abortion disorders, instead of the more accurate measure of 12-month or 30-days (current) diagnoses, and they did not change this in the corrigendum. Presenting lifetime diagnoses implies that it is impossible to tell whether the abortion occurred before or after the mental health problems. The editor of the *Journal of Psychiatric Research*, Alan Schatzberg, asked the principal investigator of the National Comorbidity Survey, Ronald Kessler, to ferret out the issues in the exchange between these researchers (Kessler & Schatzberg, 2012). They concluded that the Steinberg-Finer critique (2011) was justified, and that the Coleman and colleagues (2009) analysis did not support their own conclusion that abortion leads to mental health problems.

Most review studies conclude that the field of research is severely hampered by methodological constraints, which seriously impedes causal inference. Despite this, they do weigh all the evidence, and with the exception of Coleman's review (2011), they all conclude that there is no strong evidence that abortion harms mental health. Coleman (2011) found a large increase in mental disorders after an abortion. This review was critically refuted, because the author had done a faulty meta-analysis (Kendall et al., 2012), did not mention inclusion criteria while excluding many studies, and included many studies (50%) that she authored on herself (NCCMH, 2011). Therefore, this review study's conclusions seem not reliable.

All in all, the general consensus seems to be that abortion does not 'cause' mental disorders. Some researchers do mention that some women do develop mental disorders, but this is usually related to risk factors other than the abortion. However, as Kessler and Schatzberg (2012) noted, even the results of the Steinberg-Finer analysis (2011) are not incontrovertible. As it is simply impossible to do randomized controlled trials with women who request an abortion, comparability between groups cannot be guaranteed. Therefore, creative research designs like matched designs and quasi-experimental designs, should be the focus of research in this field (Kessler & Schatzberg, 2012).

1.3 Evidence gaps

Considering all limitations of the empirical and review studies so far, more high quality research is needed for answering the question whether abortion increases the risk for mental health problems. The first and most important gap in evidence concerns causality. As stated above, most studies were characterized by severe methodological drawbacks; so even if most of them are in agreement with each other, we have to remain cautious in drawing conclusions. Kessler and Schatzberg (2012) proposed that new methods for increasing causal inference should be the focus of future research, such as the creative use of quasi-experimental or matching designs. Furthermore, from an epidemiology perspective, causal inference could be further increased by measuring first-incidence and recurrence of mental health problems, instead of prevalence.

A second gap in the evidence so far, is long-term consequences of abortion. Most women do experience at least some distress around the abortion, but this does not mean that they will develop long term mental disorders. Also, with a short follow up time, it could be argued that women with a belated reaction to the abortion are being missed. Therefore, it is highly relevant that we look at the incidence and recurrence of mental disorders on the long term, years after the abortion.

A third gap in knowledge, very much related to the first, is that there is insufficient insight into the mental health backgrounds of women who have abortions. Women who have had mental disorders before, might not only be more prone to recurrence of these disorders, but also to abortion (and/or unwanted pregnancy) itself. It has indeed been found that various problems or risk behaviors tend to co-occur or cluster together in individuals (e.g., Willoughby et al., 2004; Vermeulen-Smit et al., 2015; Monshouwer et al., 2012), that some mental disorders - such as conduct disorder - are associated with sexual risk-taking behavior (Ramrakha et al., 2007) and even unwanted pregnancy (Pedersen & Mastekaasa, 2011).

Fourth, not enough evidence is available on factors which might explain variation in responses to abortion. Identifying risk factors for mental health problems after abortion is therefore still needed. Some women might be more prone to develop mental health problems than others, and this might be influenced by emotional reactions to the abortion (Fergusson et al., 2009). Abortion-related variables, such as experienced decision difficulty, avoidance oriented coping, and other variables, may play a role in the associations between abortion and mental health (Major et al., 1998).

Studying these relevant covariates could provide more insight into which women are of particular concern in terms of risk of negative outcomes.

Lastly, it is still unknown whether women with and without a history of mental health problems might respond differently to an abortion. Not only future mental health is important, but also the subjective experiences of the unwanted pregnancy and the abortion, in terms of emotions, burden, decision difficulty, coping, and so on. Former research has shown that women's abortion experiences are highly variable and often characterized by both positive and negative feelings (Rocca et al., 2013; Weitz et al., 2008). Furthermore, women with only internalizing disorders (mood, anxiety), only externalizing disorders (substance use disorders, childhood impulse control disorders), women with both types of disorders, and women with no history of disorders at all, might respond differentially to abortion. To gain more insight into the role of previous mental disorders within the decision process, the emotions around the abortion and so on, we should take a closer look at women's personal experiences.

1.4 Objectives of this thesis

The general goal of this thesis is to offer more conclusive insight into the question whether women experience mental health problems after an abortion, and which factors are related to this. The following central aims are formulated, and addressed in this thesis (see Table 1.1).

1. To investigate whether women who have abortions are more likely to have had mental disorders (i.e., a psychiatric history).
2. To gain more insight into the influence of psychiatric history on how women experience having an abortion of an unwanted pregnancy (in terms of pre-abortion decision difficulty, experienced burden, post-abortion emotions, abortion-specific self-efficacy and coping).
3. To assess whether abortion is associated with an increased incidence of post-abortion mental disorders, after 2,5 to 3 years and after 5 to 6 years.
4. To assess whether abortion is associated with an increased recurrence of post-abortion mental disorders, after 2,5 to 3 years and after 5 to 6 years.
5. To explore which potential risk factors are related to the first-incidence or recurrence of mental disorders among women who have had an abortion.

Table 1.1 Research questions per objective and the used data and method per question.

| Research question | Sample/ wave | Method | Chapters |
|--|---|---|----------|
| 1. Are women who have abortions more (or less) likely to have had previous mental disorders, compared to women who did not have an abortion? | Baseline T0 of DAMHS + reference | Cross-sectional study, logistic regression controlling for sociodemographic covariates | 2 |
| 2. To what extent does psychiatric history affect women's pre- and post-abortion experiences? | T0, DAMHS only | Cross-sectional study, linear and logistic regression analyses | 3 |
| 3. Does abortion increase the risk of incident mental disorders in the years after the abortion (short- and long-term)? | T0 and T1 (Chapter 4), T0, T1 and T2 (Chapter 5) DAMHS + reference | Longitudinal study, incidence of mental disorders, one-to-one matching, logistic regression analysis, chi-square tests | 4 and 5 |
| 4. Does abortion increase the risk of recurrent mental disorders in the years after the abortion (short- and long-term)? | T0 and T1 (Chapter 4), T0, T1 and T2 (Chapter 5) DAMHS + reference | Longitudinal study, recurrence of mental disorders, one-to-one matching, logistic regression analysis, chi-square tests | 4 and 5 |
| 5. Which potential risk factors are related to the incidence or recurrence of mental disorders after abortion? | T0 and T1, DAMHS only | Longitudinal study, multivariate logistic regression analysis | 6 |

Scope of the study

It is important to consider the scope of this study. We focused on diagnoses of common mental disorders only. In case women do not develop mental disorders, this does not mean that they do not experience any negative emotions, burden or stress. However, our research question focused on the development of clinical DSM-IV mental disorders. Further, we only investigated induced abortions of unwanted pregnancies. Some participants said they had the abortion for health reasons, but we only excluded women from the study if they had abortions of wanted pregnancies for clear medical reasons (such as fetal anomaly). Last, we did not compare to other outcomes of unwanted pregnancies, such as carrying the pregnancy to term or miscarriages.

1.5 The study design

1.5.1 The Dutch Abortion and Mental Health Study (DAMHS)

In reaction to the absence of comprehensive longitudinal studies into abortion and mental health in the Netherlands, but also to extend the existing work on this topic that has been done in the US, the UK, New Zealand, and Scandinavia, a prospective longitudinal study was set up with a primary cohort of women who had an abortion. The measurement of mental disorders and a number of covariates was based on the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2), which is described into more detail below. The research design, recruitment strategy, and additional abortion-related measurements were further developed and fine-tuned in cooperation with an advisory committee of medical and research experts.

The DAMHS participants were recruited by clinical staff in Dutch abortion clinics in 2010. Eight out of the sixteen clinics (at the time) were selected on the basis of geographical location (province/part of the Netherlands, degree of urbanization) and clinic size (licensed for 1st and 2nd trimester abortion or 1st trimester abortions only), in order to attain a good balance and a representative sample of respondents from the whole country. All selected clinics willing to participate in the study, except for one, due to reorganization at the time of the study. The participating abortion clinics were located in Heemstede, Utrecht, Rotterdam, The Hague, Eindhoven, Arnhem, and Zwolle.

Recruitment training was provided at each facility to all staff members involved in recruitment. Staff members were instructed to ask the women to read the research flyer and complete a reply card, shortly after the abortion procedure. In the Netherlands, no ethical committee will allow extensive interviewing for research purposes *before* the abortion procedure is completed, because the research might interfere with or even influence the decision process, but we were allowed to put up posters in the waiting room, to passively inform women about the study. Recruitment was done *after* women had recovered from the procedure, but before they left the clinic. Recruitment was active in the sense that the clinic staff (nurses, doctors) provided a research flyer and reply card to women who were over 18 years old and Dutch-speaking, and had an abortion of an unwanted pregnancy (not for medical reasons). At the same time, recruitment was passive in the sense that they did not ask women if they wanted to participate, but merely informed them about the study.

The flyer contained information about the nature of the interviews (mental health and well-being) and about the duration and follow up time (5 to 6 years). Also, the importance of the study was stressed, and women were informed of the compensation (a 50 Euro gift voucher) per interview. The reply card had a YES-side and a NO-side. On the YES-side, women could tick a box saying 'YES, I am willing to be contacted by researchers and hear more about the study', it was made clear that by ticking this box they did not commit themselves to participation; and they could decline participation at any time. Women were also informed about the confidentiality of the research and that they would be contacted by interviewers without making any reference to the abortion, for privacy reasons. On the NO-side, women who decided immediately that they did not want to be contacted for the study, were asked to complete a few questions about the reason for non-response and sociodemographics. In anticipation of a low initial response, we wanted to have as much information about the non-responders as possible.

Shortly after the abortion procedure, staff members asked the women to read the research flyer, complete a reply card, and deposit the card in a locked mailbox. This mailbox was emptied by researchers of the study on a weekly basis. Details were entered in a database and prospective respondents were divided over a team of interviewers. Interviewers were all female professionals over the age of 24, with experience in interviewing and/or psychodiagnostics. All interviewers were trained for two full days. Training covered the use of the psychodiagnostic instrument, interviewer skills (such as remaining neutral yet supportive while administering the interview), and recruiter skills.

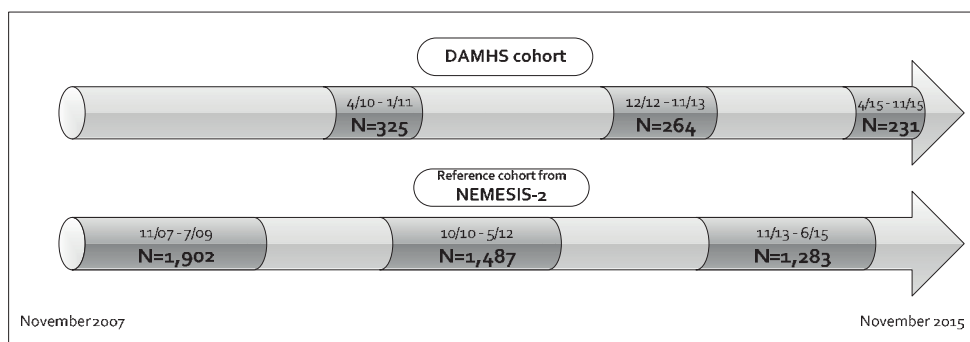
The interviewers contacted the participants about 10 to 20 days after the abortion procedure, and confirmed eligibility, willingness to participate, and make an appointment for the interview. The interview was scheduled about 20 to 40 days after the abortion. The timing of contact and interview was chosen after consultation with the advisory committee. The aim was to do the interview as soon as possible after the last post-abortion medical check-up, which is around the time that pregnancy hormones also have dissipated, in order to minimize recall bias. Interviews were typically held at the home address of the participant. The entire interview was laptop-assisted.

332 Women were interviewed at baseline, of which 7 interviews could not be completed, leaving 325 participants for analysis.

1.5.2 The reference cohort: NEMESIS-2

The reference cohort was taken from the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2; De Graaf et al., 2010a, 2010b, 2012). In NEMESIS-2, a multistage, stratified random sampling procedure was applied in order to select households. From each household, the adult with the most recent birthday was selected to participate. The sample was nationally representative, but younger subjects were somewhat underrepresented. In total, 6,646 respondents participated at T₀, of whom 3,668 were female. Of these, 2,040 women were selected based on age range (similar to DAMHS: 18-46), but 138 women who had an abortion were excluded, leaving 1,902 cases for analysis. The sampling strategy, interview procedure and response of the NEMESIS-2 study are described elsewhere (Alonso et al., 2004; De Graaf et al., 2008; De Graaf et al., 2010a).

Figure 1.2 Timing and inclusion of respondents at T₀, T₁ and T₂ for the DAMHS cohort and the reference cohort from NEMESIS-2.



1.5.3 Overview of methods and design

The total duration of the NEMESIS-2-study was about 6 years, and the total duration of the DAMHS study was about 5 years (see Figure 1.2), From the first measurement at baseline (T₀), we included 325 DAMHS women in the analysis, and compared these to 1,902 women from NEMESIS-2, who did not report having had an abortion. At first follow up (T₁) we retained 264 DAMHS women and 1,487 NEMESIS-2 women; at second follow up (T₂), 231 DAMHS cases were included, and 1,283 of the reference cohort. With our study design, we aimed to address the most common methodological limitations.

A. Sampling and design

The study design was a prospective cohort study, including retrospective measurements. In Chapters 3 and 4 of this thesis, we used matching methods to induce complete balance in the covariates, hereby minimizing any pre-existing differences between the two cohorts. We made use of a primary cohort of women who had abortions, and compared these data to population data of women who did not have abortions.

To minimize attrition, we have put extra effort into panel maintenance. We thoroughly and openly informed women about the study at the outset, they received a gift voucher for their participation, and participants were contacted in between measurement waves as well. They received regular updates, newsletters, Christmas cards, and we always included change-of-address cards for the participants to send to us in case their address changed. The participants were contacted through e-mail or regular mail, whatever they preferred. At the end of each interview, interviewers double-checked all address details, and asked whether participants could provide contact details of a contact person, who interviewers could contact when the participants could not be reached. Furthermore, interviewers made multiple attempts at contacting the women at T₁ and T₂, at different times of the day/week, using different contact methods. At T₂, we also used social media to trace women who could not be found, but had been willing to participate. Last but not least, we performed response and attrition analyses, to see if the retained sample was selective.

B. Measurement of abortion

We made use of a primary cohort of women who had an abortion, which were recruited in the abortion clinic. All participants in DAMHS had an abortion around the same time, 20 to 40 days before the first interview. We also collected information about the abortion and other reproductive history, such as gestation length, type of abortion, previous abortions, and so on.

C. Measurement of mental disorders

We investigated a wide array of common mental disorders with the Composite International Diagnostic Interview (CIDI) version 3.0 (Alonso et al., 2004; Haro et al., 2006). Organic exclusion rules were used to construct diagnoses, in order to ascertain that symptoms were not due to a somatic cause, an injury, or use of drugs, alcohol or

medication. Clinical calibration studies in various countries found that the CIDI 3.0 assesses anxiety, mood and substance use disorders with generally good validity in comparison to blinded clinical reappraisal interviews with the SCID (Structured Clinical Interview for DSM-IV; Haro et al., 2006). Furthermore, we used a probing technique (described in Kessler et al., 2005) to determine age-of-onset and timing of diagnosis between measurements as accurate as possible.

At To, lifetime prevalence of mental disorders was assessed, at the two follow up measurements, the presence of mental disorders between both waves was assessed. The following disorders were included: mood disorders (major depression, dysthymia, bipolar disorder); anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder); substance use disorders (alcohol/drug abuse and dependence); and (at To) childhood impulse control disorders (ADHD, conduct disorder, oppositional defiant disorder) and antisocial personality disorder.

To improve causal inference, we measured incidence and recurrence. It is known that these outcomes are more informative than prevalence when investigating the etiology of mental disorders (e.g., Rothman, 2012). For incidence, women who never had one or more disorders before To were included in the at-risk group. For recurrence, women who had one or more disorders in their lifetime, but not in the 12 months before To, were included. By excluding 12-month prevalence, the correct order of events of abortion and disorder was ensured.

D. Co-occurring risk factors

Apart from extensively measuring psychiatric history in the first measurement (To), we also measured other potential risk factors, such as sociodemographic variables and childhood abuse. We did not only enter these variables as covariates, but we investigated their impact into greater detail. In Chapter 2, we investigated the pre-abortion prevalence of mental disorders, and in Chapter 6, we studied the impact of psychiatric history on pre- and post-abortion experiences. In Chapter 5, we investigated which risk factors are indeed predictive of mental disorders among women who have had an abortion.

E. Reference groups

For our research question, a reference group of women who did not have an abortion was adequate, we did not compare the abortion to its alternatives (i.e., carrying the

pregnancy to term). Our reference group was taken from a large representative population study. In Chapters 3 and 4, we used 1-to-1 case control matching to deal with pre-existing differences in confounding variables. By doing this, the two cohorts were equal in variance on background variables.

1.6 Outline of the thesis

In Chapter 2, we assessed the lifetime histories of mental disorders among women who had an abortion and women who did not. It was essential to first gain insight on the pre-abortion mental health of these women, before looking at potential mental health consequences of abortion. In Chapter 3 we looked at the impact of these lifetime histories of mental disorders on how women experience the unwanted pregnancy and the abortion, in terms of pre-abortion decision difficulty, experienced burden (of the pregnancy and the abortion), post-abortions emotions, abortion-specific self-efficacy and coping. The next two chapters address the question whether having an abortion increases the risk of incidence or recurrence of mental disorders. In Chapter 4, we focus on incidence and recurrence on the shorter term, the follow up period is 2,5 to 3 years. In Chapter 5 potential long-term effects (5 to 6 years) are investigated. Chapter 6 concerns risk factors for incidence or recurrence of mental disorders, in case these do occur after an abortion. Finally, in the Discussion, all findings are summarized, integrated, and the main research questions are answered. The most important findings, limitations and implications for both research and clinical practice are discussed.

CHAPTER 2

PSYCHIATRIC HISTORY OF WOMEN WHO HAVE HAD AN ABORTION

Jenneke van Ditzhuijzen

Margreet ten Have

Ron de Graaf

Carolus H.C.J. van Nijnatten

Wilma A.M. Vollebergh

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Author contributions: JvD developed the study concept and design, managed the data collection, performed the literature searches and data analysis, and wrote the manuscript. MtH supervised the data analysis. WV, CvN, MtH and RdG gave advice in all stages, and provided feedback to the manuscript. WV and CvN conceptualized the general DAMHS study, in cooperation with MtH and RdG, who were responsible for the NEMESIS-2 data.

Abstract

Prior research has focused primarily on the mental health consequences of abortion; little is known about mental health before abortion. In this study, the psychiatric history of women who have had an abortion is investigated. 325 Women who recently had an abortion were compared with 1,902 women from the population-based Netherlands Mental Health Survey and Incidence Study (NEMESIS-2). Lifetime prevalence estimates of various mental disorders were measured using the Composite International Diagnostic Interview 3.0. Compared to the reference sample, women in the abortion sample were three times more likely to report a history of any mental disorder (OR = 3.06, 95% CI = 2.36-3.98). The highest odds were found for conduct disorder (OR = 6.97, 95% CI = 4.41-11.01) and drug dependence (OR = 4.96, 95% CI = 2.55-9.66). Similar results were found for lifetime-minus-last-year prevalence estimates and for women who had first-time abortions only. The results support the notion that psychiatric history may explain associations that have been found between abortion and mental health. Psychiatric history should therefore be taken into account when investigating the mental health consequences of abortion.

2.1 Introduction

Since 2008, a number of review studies of research on possible mental health consequences of abortion have been conducted (APA, 2008; Charles et al., 2008; Coleman, 2011; National Collaborating Centre for Mental Health, 2011; Robinson et al., 2009; Steinberg & Russo, 2009;). Most of these reviews showed that this field of research on possible mental health consequences of abortion has been severely hampered by methodological problems. For example, pre-existing mental health problems are often neglected, and when attempts are made to take them into account, the rigor of approaches is highly variable (Steinberg & Russo, 2009). Measuring pre-existing mental health problems (and controlling for these) is important, because women who have abortions could have higher rates of pre-abortion mental health problems, which could very well influence post-abortion mental health status (APA, 2008; Steinberg & Finer, 2011; Steinberg & Russo, 2008; 2009).

There are indeed indications that women who have had an abortion might have had more mental health problems before the abortion than other women. One Dutch study showed that women who have had an abortion more often consulted a family doctor for social or psychological problems than women who did not have an abortion - not only after, but also long before the abortion (Kooistra et al., 2007). Other recent findings have demonstrated that women who had an abortion showed higher incidence rates of psychiatric contact, both before and after the abortion, as compared to women who brought a pregnancy to full term (Munk-Olsen et al., 2011). A further study (Mota et al., 2010) found that among women who had both abortions and mental health disorders, the majority of mental health disorders first occurred before the abortion rather than afterwards, suggesting mental health disorders may precede an abortion.

Some researchers who have taken pre-abortion mental health into account, did so for one or a few mental disorders only, such as depression or anxiety (Major et al., 2000; Steinberg & Russo, 2008). Other studies controlled for a wide range of pre-abortion mental disorders (Steinberg & Finer, 2011) or assessed whether various mental disorders had started before or after the abortion (Mota et al., 2010), but in these studies the timing of the abortion was reported retrospectively, which might introduce information bias (Charles et al., 2008; APA, 2008; Major et al., 2009). To our knowledge, no study has investigated the pre-abortion prevalence of a wide range of mental health disorders, with verifiable data about the timing of the abortion.

In the current cross-sectional study we compared women who recently terminated an unwanted pregnancy with women who never had an abortion from the population-based Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2: De Graaf et al., 2010a; 2010b) regarding lifetime prevalence of mental disorders, controlling for demographic variables.

2.2 Method

2.2.1 Abortion sample

Recruitment and participants

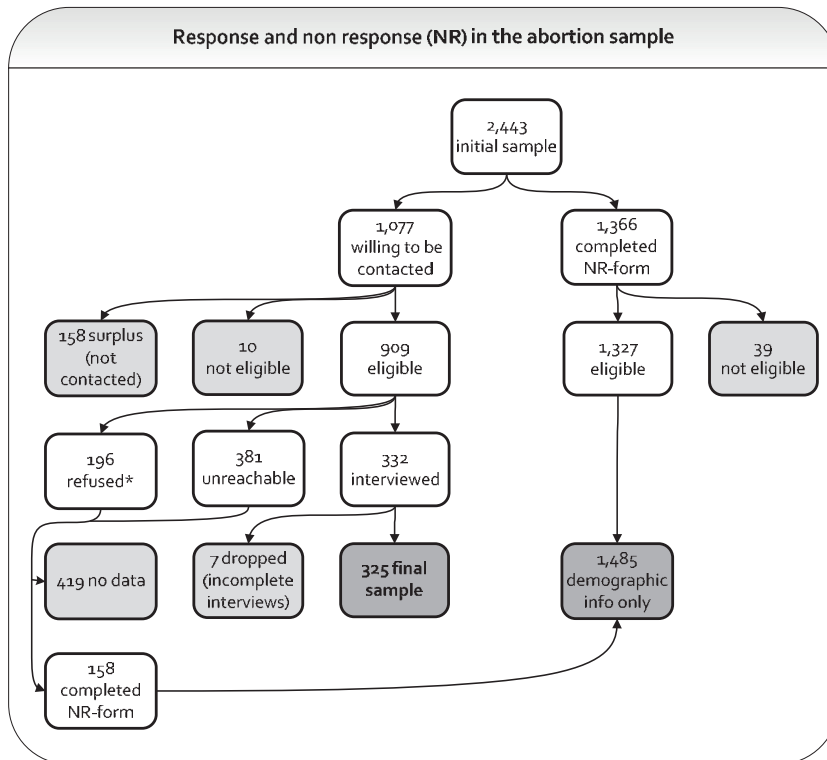
Recruitment was conducted by clinical staff of specialized abortion clinics in the Netherlands. Eight out of the 16 existing abortion clinics were selected in order to attain a good balance and fair representation of this population, on the basis of (1) geographical location (part of the Netherlands, degree of urbanization) and (2) clinic size. All selected clinics were willing and able to participate in the study, except one, due to reorganization at the time of the study. Shortly after the abortion procedure, clinical staff members would ask the women to read the research flyer and complete a reply card, which was deposited in a locked mailbox.

The study was restricted to women obtaining an induced first or second trimester abortion of an unwanted pregnancy, without clear medical indications. Inclusion criteria were that participants had to be at least 18 years old, residing in the Netherlands, and sufficiently fluent in the Dutch language.

During the data collection period for the abortion sample, 2,443 women completed the reply card. Since we anticipated a low response rate, we also collected demographic data and reasons for non-response from the women who did not want to participate, in order to do a response analysis. 1,077 Women provided contact details, and 1,366 completed the non-response questions. We attempted to contact a random selection of 919 of the women willing to be interviewed. Of these, 381 were not reachable, either because they did not answer the phone or e-mail after at least 10 attempts (3 for e-mail) or because the contact details were incorrect. With 120 women, an appointment within the (rather limited) interviewing period could not be scheduled, 38 women did not show up at the appointment, another 38 women refused on reconsideration, and

10 women were omitted after the second check on eligibility. 332 Women were interviewed. Seven interviews could not be completed, leaving 325 women for analysis. Participant flow is displayed in Figure 2.1.

Figure 2.1 Participant flow throughout the recruitment and interviewing



* Only 38 women refused to take part in the study; with 120 women no appointment could be scheduled, and another 38 women did not show up at the interview.

Interview procedure

Ten professionally trained female interviewers contacted the participants 10 to 20 days after the abortion, in order to assess eligibility (age and Dutch language proficiency), confirm participation and make an appointment for the interview. The interview was scheduled 20 to 40 days after the abortion. The aim was to conduct the interview as soon as possible after the last post-abortion medical checkup. The women were assured that the results would remain confidential and anonymous and that they could discontinue participation whenever they wished. All participants provided

written informed consent. Interviews were held at either the home address of the participant (86%), or at a relatively neutral setting, such as an office space at the university or a hotel lobby with privacy booths. The entire interview was laptop-assisted and lasted on average 2.5 hours. The women received a gift card of €50 for their participation. The fieldwork took place from April 2010 until January 2011. The study was approved by a medical ethics committee of the Central Committee on Research involving Human Subjects.

2.2.2 Reference sample

The reference sample was taken from the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2, De Graaf et al., 2010a; 2012). It consisted of 1,902 women who had reported they never experienced abortion, in the same age range as the abortion sample (18-46).

In NEMESIS-2, a multistage, stratified random sampling procedure was applied in order to select households. From each household, the adult with the most recent birthday was selected to participate. The fieldwork took place from November 2007 to July 2009.

The response rate in NEMESIS-2 was 65.1%. The sample was nationally representative, but younger subjects were somewhat underrepresented. In total, 6,646 respondents participated, of whom 3,668 were female. The sampling strategy, interview procedure and response of the NEMESIS-2 study are described elsewhere (Alonso et al., 2004; De Graaf et al., 2008; De Graaf et al., 2010a).

2.2.3 Measures

Psychiatric history

In both samples, presence of lifetime DSM-IV disorders was assessed with the Composite International Diagnostic Interview (CIDI) 3.0, which was developed and adapted for use in the World Mental Health (WMH) Survey Initiative (Alonso et al., 2004). The CIDI 3.0 was first produced in English and underwent a rigorous process of adaptation in order to obtain a conceptually and cross-culturally comparable version in Dutch (Alonso et al., 2004; De Graaf et al., 2008; De Graaf et al., 2010a).

Organic exclusion rules were used to construct diagnoses, in order to ascertain that symptoms were not exclusively due to a somatic cause, an injury, or use of drugs,

alcohol or medication. Clinical calibration studies in various countries found that the CIDI 3.0 assesses anxiety, mood and substance use disorders with generally good validity in comparison to blinded clinical reappraisal interviews with the SCID (Structured Clinical Interview for DSM-IV; Haro et al., 2006).

The following disorders were included: mood disorders (major depression, dysthymia, bipolar disorder); anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder); substance use disorders (alcohol/drug abuse and dependence); childhood impulse control disorders (ADHD, conduct disorder, oppositional defiant disorder); and antisocial personality disorder. Childhood impulse control disorders were limited to respondents aged 18-44 because of concerns about recall bias in older respondents on questions about these disorders in childhood (Wittchen, 1994).

Covariates

Demographic variables were age (18-24, 25-34 and 35-46 years), living situation (with or without a partner at the time of interview - or at the time of the abortion, if this was different from the time of interview); employment situation (paid job or not, students were categorized as having a job if they had a part time job); ethnicity (Western versus non-Western); education level (primary education, lower secondary education, higher secondary education and higher professional education) and urbanicity of place of residence (five categories, ranging from very high (city) to very low (rural)).

2.2.4 Statistical analysis

First, lifetime prevalence estimates were calculated for each mental disorder in the abortion sample and the reference sample. Prevalence estimates of the reference sample were weighted by means of post-stratification to correct for different response rates among different population groups. After weighting, the demographic characteristics of the reference sample came close to those of the general population (De Graaf et al.; 2010a). Second, multivariate logistic regression analyses were performed for each of the mental disorders, adjusting for demographic variables (age, living situation, work situation, education level, ethnicity, and urbanicity). We performed two extra analyses in order to investigate the theoretical possibilities that our results were influenced by recent psychopathology linked to the abortion (or the unwanted pregnancy) or by prior abortions. To this end we repeated our analyses for

(1) lifetime-minus-last-year prevalence estimates, and (2) a subsample of women in the abortion sample who had not had any prior abortions ($n=239$). Testing was two-sided and statistical significance was considered to be $P < 0.05$. Statistical analyses were performed using SPSS 20.

2.3 Results

2.3.1 Response and non-response analysis

We interviewed 332 women, reducing the response rate for interviews to 36,5% (332 of 909 eligible and initially willing women). We were unable to interview 577 of the eligible women, because they were unreachable, unavailable for interview within the defined period, or they refused participation on reconsideration. These women were re-approached (539 by e-mail, 38 by phone) to provide basic demographic details (age, living situation, children, ethnicity) and reason for non-response. Of these, 158 women responded. These data were then added to the data of the 1,327 eligible women who initially completed the non-response form in the abortion clinics (see Fig. 1). This resulted in a net 'response' for the non-response form of $n = 1,485$ (78.0% of 1,904 women who did not participate). The main reasons for not wanting to participate in the interview were (1) 'I do not have any problems with the abortion and I do not wish to talk about it' (32%); and (2) 'I am worried that by participating, other people around me might find out about the abortion' (20.5%).

The final sample of 325 women was compared to (a) the non-response group, and (b) the total population of Dutch women aged 18 to 46 years who were treated in two large abortion clinics during the recruitment period (see Table 2.1). We used the latter group since these data were more detailed and more recent than the available national abortion registration data (Kruijer & Wijssen, 2010). Comparison of the two-clinic population data to the national abortion registration data of 2009 yielded no significant differences.

The women in the abortion sample were significantly older and significantly less often of non-Western origin than the women in the two other groups. The women in the abortion sample more often lived together with a partner than those in the two-clinic group, however, there was no difference with the non-response group. There were no differences in terms of whether the women had children or not. Regarding education, we could only compare data of the abortion sample and the two-clinic group, which

demonstrated that the abortion sample was significantly higher educated. Women in the abortion sample less often had had one or more prior abortions than those in the two-clinic group, but the difference with the non-response group was non-significant.

Table 2.1 Characteristics of the response group (abortion sample), the non-response group, and an abortion clinic population group.

| | Abortion sample (n=325) | Non-response group (n=1,485) | <i>p</i> ^a | Population of 2 abortion clinics ^b (n=2,625) | <i>p</i> ^a |
|-------------------------------|----------------------------|---------------------------------|-----------------------|--|-----------------------|
| Mean age (SD) | 29.8 (7.7) | 28.7 (7.3) | .02 | 28 (n.a.) ^c | <.001 |
| Living situation n (%) | | | .42 | | <.001 |
| With partner | 146 (44.9) | 555 (47.5) | | 834 (33.1) | |
| Without partner | 179 (55.1) | 614 (52.5) | | 1,689 (66.9) | |
| Children n (%) | | | .36 | | .29 |
| One or more children | 175 (53.8) | 636 (56.7) | | 1,332 (50.7) | |
| No children | 150 (46.2) | 486 (43.3) | | 1,293 (49.3) | |
| Ethnicity n (%) | | | <.001 | | <.001 |
| Dutch + other Western | 256 (78.8) | 727 (68.5) | | 1,343 (50.3) | |
| Non-Western | 69 (21.2) | 334 (31.5) | | 1,328 (49.7) | |
| Education n (%) | | | | | <.001 |
| Primary education | 11 (3.4) | n.a. | | 144 (6.2) | |
| Lower secondary education | 57 (17.5) | n.a. | | 402 (17.4) | |
| Higher secondary education | 123 (37.8) | n.a. | | 1,191 (51.4) | |
| Higher professional education | 134 (41.2) | n.a. | | 556 (24.0) | |
| Prior abortions n (%) | | | .10 | | <.001 |
| Yes | 86 (26.5) | 330 (22.2) | | 1,042 (39.7) | |
| No, first time | 239 (73.5) | 1,155 (77.8) | | 1,583 (60.3) | |

Abbreviations: n.a., not available. Note: Categories do not always add up to the total number of cases, because of missing values. ^a *P* values are derived from t-tests for continuous variables (non-parametric tests delivered the same results) and χ^2 -tests for categorical variables in which the abortion sample was compared to the other groups (individually). ^b Population restricted to women aged 18-46 living in the Netherlands who were treated in the recruitment period. ^c Mean age for the 2 abortion clinics is based on year of birth only, not on actual age; t-test is based on this constructed age variable for both groups.

2.3.2 Demographics

Demographic characteristics of the abortion sample and reference sample are displayed in Table 2.2. Compared to the reference sample, women who had had an abortion were younger, less often living together with a partner, more often of non-Western origin, more often without a job, and more often higher educated. They were also more likely to live in urban areas. The abortion sample and the reference sample did not differ in terms of whether they had children or not.

2.3.3 Psychiatric history

Table 2.3 shows that the lifetime prevalence of any axis-I mental disorder was significantly higher for the abortion sample (68.3%) than for the reference sample (42.2%). Compared to the reference sample, women in the abortion sample were three times more likely to have had any mental disorder, after controlling for demographics.

Regarding the categories of disorders, women in the abortion sample were more likely to have had any mood disorder (OR = 2.30, 95% CI = 1.78-2.98, $p < .001$), any anxiety disorder (OR = 2.31, 95% CI = 1.79-2.99, $p < .001$), any substance use disorder (OR = 2.16, 95% CI = 1.58-2.95, $p < .001$) or any childhood impulse control disorder (OR = 4.35; 95% CI = 3.01-6.28, $p < .001$) compared to women in the reference sample.

Regarding the separate mental disorders, we found that women in the abortion sample were twice as likely to report a history of major depression and of bipolar disorder compared to women in the reference sample, but for dysthymia there were no significant differences. Women in the abortion sample were also twice as likely to report a history of panic disorder, social phobia or specific phobia, but for agoraphobia and generalized anxiety disorder the difference between the two samples was not significant. Women in the abortion sample were also twice as likely to report a history of alcohol or drug abuse, and four to five times more likely to report a history of alcohol or drug dependence. Women in the abortion sample were about three times more likely to report oppositional defiant disorder and ADHD, and almost seven times more likely to report conduct disorder. Women in the abortion sample were four times more likely to report a history of antisocial personality disorder. The largest differences between the two samples were found for childhood conduct disorder (OR = 6.97, 95% CI = 4.41-11.01, $p < .001$) and drug dependence (OR = 4.96, 95% CI = 2.55-9.66, $p < .001$), followed by alcohol dependence (OR = 4.21, 95% CI = 1.53-11.59, $p < .001$) and antisocial personality disorder (OR = 3.87, 95% CI = 2.17-6.90, $p < .001$).

Table 2.2 Demographic characteristics of the abortion sample and the reference sample.

| | Abortion sample (n=325) | Reference sample^a (n=1902) | p^b |
|---|------------------------------------|--|----------------------|
| | n (%) | n (%) | |
| Age categories | | | <.001 |
| 18-24 | 107 (32.9) | 255 (21.1) | |
| 25-34 | 116 (35.7) | 600 (32.5) | |
| 35-46 | 102 (31.4) | 1,047 (46.4) | |
| Living situation | | | <.001 |
| With partner | 146 (44.9) | 1,297 (64.4) | |
| Without partner | 179 (55.1) | 605 (35.6) | |
| Children | | | .86 |
| One or more children | 175 (53.8) | 1,158 (54.4) | |
| No children | 150 (46.2) | 744 (45.5) | |
| Ethnicity | | | <.001 |
| Western (Dutch + other Western ethnicity) | 256 (78.8) | 1,724 (90.3) | |
| Non-Western ethnicity | 69 (21.2) | 178 (9.7) | |
| Employment situation | | | .002 |
| Paid job | 230 (70.8) | 1,560 (78.8) | |
| No paid job | 95 (29.2) | 342 (21.2) | |
| Education | | | <.001 |
| Primary education | 11 (3.4) | 48 (5.1) | |
| Lower secondary education | 57 (17.5) | 383 (20.8) | |
| Higher secondary education | 123 (37.8) | 733 (45.1) | |
| Higher professional education | 134 (41.2) | 738 (28.9) | |
| Urbanicity | | | <.001 |
| Very high | 106 (32.6) | 308 (19.7) | |
| High | 116 (35.7) | 546 (31.2) | |
| Medium | 62 (19.1) | 424 (18.5) | |
| Low | 29 (8.9) | 379 (19.8) | |
| Very low | 12 (3.7) | 245 (10.9) | |

^a Percentages for the reference sample are weighted.

^b p values are derived from χ^2 tests.

Table 2.3 Lifetime prevalence estimates (and standard errors) of for the abortion sample and the reference sample, odds ratios (and 95% confidence intervals).

| | Abortion sample (n=325) | Reference sample^a (n=1902) | Odds Ratio^b (95% C.I.) | p |
|---|--|--|--|----------|
| | % (s.e.) | % (s.e.) | | |
| Any mood disorder | 40.9 (2.7) | 25.0 (0.9) | 2.30 (1.78-2.98) | <.001 |
| Major depression | 36.9 (2.7) | 23.2 (1.0) | 2.18 (1.67-2.83) | <.001 |
| Dysthymia | 2.5 (0.9) | 1.8 (0.3) | 1.14 (0.51-2.57) | .75 |
| Bipolar disorder | 3.4 (1.0) | 1.6 (0.3) | 2.26 (1.07-4.77) | .03 |
| Any anxiety disorder | 39.7 (2.7) | 22.5 (1.0) | 2.31 (1.79-2.99) | <.001 |
| Panic disorder | 7.7 (1.5) | 4.3 (0.5) | 2.06 (1.27-3.35) | .004 |
| Agoraphobia | 1.8 (0.7) | 1.4 (0.3) | 1.64 (0.64-4.19) | .30 |
| Social phobia | 18.8 (2.2) | 10.9 (0.7) | 1.94 (1.40-2.70) | <.001 |
| Specific phobia | 19.4 (2.2) | 9.9 (0.7) | 2.30 (1.66-3.20) | <.001 |
| Generalized anxiety disorder | 7.1 (1.4) | 4.7 (0.5) | 1.51 (0.93-2.47) | .10 |
| Any substance use disorder | 23.1 (2.3) | 11.2 (0.7) | 2.16 (1.58-2.95) | <.001 |
| Alcohol abuse | 15.4 (2.0) | 8.0 (0.6) | 1.83 (1.27-2.62) | .001 |
| Alcohol dependence | 2.2 (0.8) | 0.6 (0.2) | 4.21 (1.53-11.59) | .005 |
| Drug abuse | 7.1 (1.4) | 3.0 (0.4) | 2.28 (1.35-3.86) | .002 |
| Drug dependence | 6.2 (1.3) | 1.2 (0.2) | 4.96 (2.55-9.66) | <.001 |
| Any impulse control disorder^c | 21.3 (2.3) | 5.7 (0.6) | 4.35 (3.01-6.28) | <.001 |
| ADHD | 4.7 (1.2) | 1.4 (0.3) | 3.50 (1.71-7.15) | .001 |
| Conduct disorder | 16.3 (2.1) | 3.2 (0.4) | 6.97 (4.41-11.01) | <.001 |
| Oppositional defiant disorder | 6.0 (1.3) | 1.8 (0.3) | 2.91 (1.58-5.34) | .001 |
| Any Axis-1 disorder | 68.3 (2.6) | 42.2 (1.1) | 3.06 (2.36-3.98) | <.001 |
| Antisocial Personality Disorder | 7.7 (1.5) | 1.7 (0.3) | 3.87 (2.17-6.90) | <.001 |

^a Percentages for the reference sample from NEMESIS-2 are weighted.

^b Controlled for the following demographic variables age category, living situation, work situation, education level, ethnicity, and urbanicity.

^c For the impulse control disorders there is no last year prevalence and lifetime prevalence is based on childhood years only. Since the impulse control disorder sections of the CIDI were not administered to respondents of age 45 or older, the n is lower (abortion sample n=319; reference sample n=1733).

To investigate whether recent psychopathology linked to the unwanted pregnancy or the abortion could account for the results, we repeated the analyses for lifetime-minus-last-year prevalence rates. This analysis yielded similar results; odds ratios were comparable and all *p*-values were either exactly or almost the same.

2.4 Discussion

In this study, we examined the psychiatric history of women who terminated an unwanted pregnancy by comparing them to women who did not report having had an abortion, while controlling for age, living situation, work situation, education level, ethnicity and urbanicity. For all categories of disorders and most separate mental disorders the lifetime prevalence was higher for women who had an abortion. For most disorders, women who had an abortion were at least two times more likely to report a history of mental disorder than women who never had an abortion. Childhood conduct disorder and drug dependence discriminated best between the abortion sample and the reference sample, with odds as high as almost seven and five, respectively.

Results from secondary analyses for lifetime-minus-last year psychiatric history yielded similar results; therefore the higher prevalence among women who have had an abortion cannot be attributed to abortion-related or pregnancy-related mental health problems. The pattern of results also largely held for a subsample of women having first-time abortions; except for bipolar disorder, alcohol abuse and alcohol dependence. The latter is partly consistent with earlier research showing that alcohol and drug use are associated with having more than one abortion (Prager et al., 2007; Steinberg & Finer, 2011). However we should remain prudent in interpreting these findings, because of the lower prevalence rates of these disorders in general.

Our results clearly demonstrate that women who have had an abortion are more likely to have a history of mental disorders than women who have not had an abortion. This could reflect (a), an increased chance of unintended pregnancy among women with a history of mental disorders compared to controls; or (b), that women with a history of mental health problems more often choose to terminate unintended pregnancies compared to controls. If (a) is the case, this suggests that women with mental disorders could be more prone to other problem situations, such as getting into unsatisfactory relationships or not using birth control (properly). It has indeed been

found that various problem behaviors often co-occur among the same individuals (Willoughby et al., 2004), that childhood antisocial behavior (conduct disorder) is associated with sexual risk-taking behavior later in life (Ramrakha et al., 2007), and that conduct disorder is strongly associated with unwanted pregnancy (Pedersen & Mastekasaa, 2011). Other research suggests that women who score high on unconventionality are more likely to use substances and to engage in behaviors that increase their risk of unplanned pregnancy (Martino et al., 2006). This also fits with our results, which show that conduct disorder and drug dependence, but also alcohol dependence and antisocial personality disorder, are important discriminators between women with and without abortion history.

If (b) is the case, then for women with a psychiatric history, an unintended pregnancy may be more often unwanted. They may therefore be more likely to choose to terminate it than women without this history. This could be mediated by factors related to mental disorders. For example, low self-esteem could be related to a more pessimistic outlook on the life they would offer a child, or to doubts regarding their parenting skills. Low self-esteem has also been associated with a variety of mental disorders, such as depression (De Jong et al., 2012; Orth et al., 2009a; 2009b; Roberts et al., 1996; Silverstone & Salsali, 2003), social anxiety (De Jong et al., 2012; Silverstone & Salsali, 2003) and substance abuse (Martino et al., 2006; Unger et al., 1997); but also with externalizing problems, such as antisocial behavior, aggression and delinquency or criminal behavior (Donnellan et al., 2005; Trzesniewski et al., 2006). Other factors related to mental health, such as income or poverty, could also have mediated the choice for abortion (Lund et al., 2010; Schmiede & Russo, 2005). Even without mediation by factors such as these, it is not unlikely that women who have been faced with problems before, envisage more problems than women without these experiences when they get pregnant unintentionally.

The two pathways (a) and (b) are not mutually exclusive; they could both explain the higher rate of abortion in women who report a history of mental disorders. Unfortunately, disentangling these pathways is problematic, if not impossible. To form reference groups one would need women who became pregnant unintentionally and women who did not choose to terminate an unwanted pregnancy. These women are not only hard to find, but also their perception of pregnancy intention or 'wantedness' is usually characterized by ambivalence, and can change over time, during and after the pregnancy (Kendall et al., 2005). More research is needed to answer the question about ways in which psychiatric history could predispose women toward unintended or unwanted pregnancy and abortion.

2.4.1 Strengths and limitations

With data of large numbers of participants, we could ascertain whether women who have had an abortion are different from other women in terms of lifetime prevalence of psychiatric disorders. We have overcome several important methodological problems that characterize research on abortion and mental health (APA, 2008; Charles et al., 2008; Major et al., 2009; NCCMH, 2011; Robinson et al., 2009; Steinberg & Russo, 2009). For example, we used a reliable and valid instrument to assess mental disorders, the CIDI 3.0, which is widely used in many different countries and known for its agreement with clinical interviews (Haro et al., 2006; Kessler et al., 2007; Vollebergh et al., 2001). Reporting took place shortly after the abortion had taken place, which is important for accurate measurement of reproductive history. Finally, pregnancy 'wantedness' was the same for all women who had an abortion.

A critical issue in abortion and subsequent mental health research is the use of inappropriate reference groups, such as women who had never been pregnant, women who delivered, or women who never had an abortion (APA, 2008; Charles et al., 2008). However, a reference group of women who never had an abortion – our reference sample – *can* be informative, depending on the research question (Ferguson et al., 2009). In the current study, it was neither necessary nor recommended to compare abortion to its alternatives in the case of unwanted pregnancy. First, our main aim was to investigate the psychiatric history of women who terminated an unwanted pregnancy; the distinction between the pregnancy and the abortion was less relevant. Second, we considered it unwise to confront pregnant women with an intensive interview about former mental health issues.

The relatively low response rate is inherent to the subject of the research. For many women, abortion is a private matter. As a consequence, the abortion sample was slightly selective: compared to women in the total abortion population, women in our abortion sample were slightly older, more often living together with a partner, and more often had higher (professional) education. These demographic characteristics are generally associated with a lower prevalence of mental disorders (De Graaf et al., 2010b). Therefore it seems more likely that our data are an underestimation, rather than an inflation, of the prevalence of mental disorders in the total abortion population.

Recall bias can never be excluded completely in retrospective reporting. A prior study demonstrated that lifetime prevalence estimates as measured with the CIDI are in fact doubled for prospective measurement compared to retrospective measurement

(Moffitt et al., 2010). Other studies also show that recall of, for example, the number of depressive episodes is more often underestimated and not overestimated (Kruijshaar et al., 2005). There is no reason to assume that, because of mood congruence, the results of the abortion sample are inflated by the retrospective reporting (Raphael & Cloitre, 1994).

We do not know if there has been underreporting of abortion in the reference group. Even if underreporting of abortion has been the case, the number of unreported abortions in the reference group would be negligibly small, since the abortion rate in the Netherlands is very low (8.8 abortions per 1,000 fertile women living in the Netherlands in 2009; Kruijjer & Wijzen, 2010).

2.4.2 Implications of the findings

Our findings indicate that it is important to consider pre-existing differences in psychiatric history when investigating the mental health consequences of abortion. They show that it is necessary to adjust for pre-existing mental disorders in a rigorous manner, using reliable and valid instruments. Based on our findings, it seems highly relevant to investigate whether certain pre-existing mental disorders could predispose women toward either unintended/unwanted pregnancy and/or abortion. It is important to note that our results do not imply that most women who have abortions have mental health problems. Many psychologically healthy women experience unwanted pregnancies and make a decision to abort. It is also important to point out that our findings do not provide evidence that women with a history of both mental disorders and abortion will be worse off in the future than women with a history of mental disorders only. Longitudinal research could provide more conclusive results.

CHAPTER 3

THE IMPACT OF PSYCHIATRIC HISTORY ON WOMEN'S PRE- AND POST-ABORTION EXPERIENCES

Jenneke van Ditzhuijzen

Margreet ten Have

Ron de Graaf

Carolus H.C.J. van Nijnatten

Wilma A.M. Vollebergh

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Abstract

The objective of this study is to investigate to what extent psychiatric history affects pre-abortion decision difficulty, experienced burden, and post-abortion emotions and coping. Women with and without a history of mental disorders might respond differently to unwanted pregnancy and subsequent abortion. Women who had an abortion ($n = 325$) were classified as either with or without a history of DSM-IV mental disorders, using the Composite International Diagnostic Interview (CIDI) version 3.0. The two groups were compared on pre-abortion doubt, post-abortion decision uncertainty, experienced pressure, experienced burden of unwanted pregnancy and abortion, and post-abortion emotions, self-efficacy, and coping. The study was conducted in the Netherlands. Data were collected using structured face-to-face interviews, and analyzed with regression analyses. Compared to women without prior mental disorders, women with a psychiatric history were more likely to report higher levels of doubt ($OR = 2.30$; $95\% CI = 1.29-4.09$), more burden of the pregnancy ($OR = 2.23$; $95\% CI = 1.34-3.70$) and the abortion ($OR = 1.93$; $95\% CI = 1.12-3.34$), and more negative post-abortion emotions ($\beta = 0.16$; $95\% CI = 0.05-.28$). They also scored lower on abortion-specific self-efficacy ($\beta = -0.11$; $95\% CI = -0.22-0.00$) and higher on emotion-oriented ($\beta = 0.22$; $95\% CI = 0.11-0.33$) and avoidance oriented coping ($\beta = 0.12$; $95\% CI = 0.01-0.24$). The two groups did not differ significantly in terms of experienced pressure, decision uncertainty, and positive post-abortion emotions. Psychiatric history strongly affects women's pre- and post-abortion experiences. Women with a history of mental disorders experience a more stressful pre- and post-abortion period in terms of pre-abortion doubt, burden of pregnancy and abortion, and post-abortion emotions, self-efficacy and coping. Negative abortion experiences may, at least partially, stem from prior or underlying mental health problems.

3.1 Introduction

Research consistently has shown that abortion experiences are highly variable, individualized, and often characterized by both positive and negative feelings (Major et al., 2009; Rocca et al., 2013; Weitz et al., 2008). For some women, having an abortion is moderately stressful, and for others it is perceived as a severely stressful life event (Kero & Lalos, 2000; Major et al., 2000). Stress-vulnerability models assert that pathogenic effects of stressors are more pronounced in more vulnerable persons (Monroe & Simmons, 1991; Ormel & Neeleman, 2000); psychiatric history is considered a vulnerability factor of major importance. The objective of this study is to investigate to what extent psychiatric history affects how women experience the period around the abortion, in terms of pre-abortion decision difficulty, experienced burden, and post-abortion emotions, self-efficacy and coping.

Research into pre-abortion psychiatric history is scarce and inconsistent. Studies assessing pre-abortion history of specific disorders, such as post-traumatic stress (Wallin Lundell et al., 2013), depression (Major et al., 2000; Pedersen, 2008; Steinberg et al., 2011), or anxiety (Steinberg & Russo, 2008), show variable prevalence rates of pre-abortion symptoms, and their conclusions are limited to specific disorders only. A few abortion studies have measured a wide range of disorders, using the Composite International Diagnostic Interview (CIDI) (Fergusson et al., 2009; Mota et al., 2010; Steinberg & Finer, 2011; Steinberg et al., 2014; Van Ditzhuijzen et al., 2013, see also Chapter 2). However, in most of these studies (Fergusson et al., 2009; Mota et al., 2010; Steinberg & Finer, 2011; Steinberg et al., 2014), abortion was based on retrospective self-report only, which is methodologically problematic, especially in the case of large time intervals between waves (APA, 2008). In our psychiatric epidemiology study (see Chapter 2), the date of abortion could be determined, and the abortion-to-interview interval was equally short for all participants. Results revealed that women who had an abortion were three times more likely to report a pre-abortion psychiatric history, than women who did not have an abortion. Pre-abortion psychiatric history should therefore be taken into account when investigating post-abortion mental health.

It is relevant to find out whether women with and without pre-abortion mental disorders respond differently to an event like unwanted pregnancy and subsequent abortion, as this might influence future mental health. For example, research has shown that women who experienced doubt during abortion decision-making or felt pressure to have the abortion, had poorer mental health outcomes post-abortion

(Major et al., 2009; NCCMH, 2011; Söderberg et al., 1998). Abortion experience variables might also mediate or moderate any possible effects of pre-abortion mental health on post-abortion mental health. A study showed that abortion-specific self-efficacy partly mediated the relationship between pre- and post-abortion depression (Cozzarelli, 1993). Depression and anxiety may also be reciprocally related to avoidance oriented coping (Grant et al., 2013). Even though most reviews conclude that abortion itself does not predict mental disorders (APA, 2008; Charles et al., 2008; NCCMH, 2011), women with a history of mental disorders might experience more stress around the abortion, which in turn might increase the likelihood or timing of recurrence of the disorder; in particular when prior mental health problems are associated with increased levels of stress. Therefore these variables should be taken into account when looking at links between mental health and abortion.

In the current study, we use the first wave of a cohort study (the Dutch Abortion and Mental Health Study; DAMHS) to compare women with and without a history of mental disorders. The main research question is: Do women with a history of mental disorders experience a more stressful period before and after an abortion than women without this history? The outcomes examined include pre-abortion doubt, decision uncertainty, experienced pressure, experienced burden (of pregnancy and abortion), and post-abortion emotions, self-efficacy, and coping. An exploratory sub-question is whether there are differences between types of disorder histories. Internalizing disorders, such as depression and anxiety disorders, have traditionally been related to abortion (Pedersen, 2008; Steinberg et al., 2011; Steinberg & Russo, 2008). However, there are also indications that externalizing disorders, such as conduct disorder or alcohol abuse, might predispose for unwanted pregnancy (Martino et al., 2006; Pedersen & Mastekaasa, 2011). We wanted to investigate whether these two types of disorder histories, as well as a comorbid internalizing and externalizing disorder history, are differentially related to various aspects of pre- and post-abortion variables.

3.2 Method

3.2.1 Participants and procedure

Participants were recruited by clinical staff in specialized abortion clinics. In the Netherlands, the majority of abortions are performed in these clinics. Eight out of the sixteen existing Dutch clinics were selected in order to attain a good balance on the

basis of geographical location and clinic size, but one clinic could not participate due to reorganization at the time of the study. Shortly after the abortion procedure, staff members would ask the women to read the research flyer, complete a reply card, and deposit it in a locked mailbox. Women wrote either their contact details on one side of this reply card in case they wished to be contacted for informed consent and the interview, or completed a short non-response form on the other side in case they refused participation. The study enrolled Dutch-speaking women in the age range from 18 to 46 years, requesting an abortion (medical or aspiration, up to 24 weeks) for an unwanted pregnancy up to 24 weeks, without clear fetal or maternal medical indications. In three clinics recruitment was limited to predetermined days when enough staff was available; in the other four clinics all eligible women were approached. We also collected demographic data and reasons for non-response from 1,366 women who refused participation at recruitment, and another 158 women who were willing but did not participate, in order to do a response analysis.

Between April 2010 and January 2011, ten professionally trained female interviewers interviewed the participants face-to-face 20 to 40 days after the abortion. The entire interview was laptop-assisted and lasted on average 2.5 hours. Oral and written informed consent was obtained at the time of the interview. The women received a gift card of €50 for their participation. The study was approved by a local medical ethics committee of the Central Committee on Research involving Human Subjects.

3.2.2 Psychiatric history

Presence of lifetime DSM-IV disorders was assessed with the Composite International Diagnostic Interview (CIDI) version 3.0, which was developed in the World Mental Health (WMH) Survey Initiative (Alonso et al., 2004) of the World Health Organization (WHO). The CIDI 3.0 can be administered by trained lay-interviewers. Using a fully structured and extensive questioning procedure, CIDI 3.0 assesses all diagnostic criteria and symptoms required to determine presence of a variety of common mental disorders. The CIDI 3.0 was first produced in English and underwent a rigorous process of adaptation in order to obtain a conceptually and cross-culturally comparable version in Dutch (De Graaf et al., 2010a; De Graaf et al., 2008). Clinical calibration studies in over 30 countries found that the CIDI 3.0 assesses various anxiety, mood and substance use disorders with generally good validity in comparison to blinded clinical reappraisal with Structured Clinical Interviews for DSM-IV (Haro et al., 2006). Included internalizing disorders were mood disorders (major depression,

dysthymia, bipolar disorder) and anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder). Externalizing disorders were childhood impulse control disorders (attention deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder), substance use disorders (alcohol/drug abuse and dependence), and antisocial personality disorder. Childhood impulse control disorders were limited to respondents aged 18-44 because of concerns about recall bias in older respondents (Wittchen, 1994). Based on lifetime occurrence of any mental disorder, two groups were created: (a) women with a history of any mental disorder, and (b) women without this history (predictor variable). When a lifetime disorder had started shorter than a year before the interview, it was not included, in order to assure that disorders were not related to the current abortion.

3.2.3 Abortion decision difficulty

The items pre-abortion *doubt* (“To what extent did you have doubts regarding the abortion?”) and *experienced pressure* (“To what extent did you experience pressure of others (e.g., partner, family) to have an abortion?”) were measured with a 5-point scale (from ‘not at all’ to ‘to very large extent’, middle category ‘moderate’). The reverse-scored item post-abortion *decision uncertainty* (“To what extent do you stand by your abortion decision?”) was also measured with a 5-point scale (from ‘I don’t stand by it at all’ to ‘I completely stand by it’, middle category ‘neutral’). Because women who experience difficulties were of particular concern, we dichotomized both *doubt* and *decision uncertainty* into low = 0 (including the middle category) and high = 1. For *experienced pressure* we included the middle category ‘moderate’ in the high = 1 group, because most women did not experience any pressure.

3.2.4 Emotional burden

The first item focused on the abortion treatment itself (“Looking back at the abortion, to what extent did you find the abortion treatment itself – not the unwanted pregnancy – emotionally burdensome?”), and the second item on the unwanted pregnancy (“And to what extent did you find the unwanted pregnancy emotionally burdensome?”). Dichotomization of answer categories was the same as for *doubt*.

3.2.5 Post-abortion emotions

The six emotions measured were feelings of *relief*, *guilt*, *emptiness*, *closure*, *mourning/loss*, and *pride* (“proud of myself that I could do it”). We presented these in the form of statements, e.g., “After the abortion, I felt relieved”, with a 5-point scale ranging from ‘disagree a lot’ to ‘agree a lot’. Because women can experience both positive and negative emotions after an abortion (Kero & Lalos, 2000; Rocca et al., 2013), we created two emotion scales. The positive emotion scale originally consisted of the items relief, closure and pride ($\alpha = .64$), but we removed the item ‘pride’ which increased the reliability ($\alpha = .72$). The negative emotion scale ($\alpha = .80$) consisted of the emotions guilt, emptiness, and mourning/loss.

3.2.6 Post-abortion self-efficacy and coping

The four-item scale on *post-abortion self-efficacy* was adopted from Major et al. (1998). Items were translated into Dutch and slightly adapted, since they were assessed after the abortion and not before. Women rated the extent to which they were able to “think about children or babies comfortably”, “spend time around children or babies comfortably”, “have physical intimacy”, and “watch TV shows or read articles about abortion” ($\alpha = .78$). Responses were measured on a scale ranging from 1 ‘not at all’ to 5 ‘very well’. *Post-abortion coping* was measured by two coping scales of the Dutch shortened version of the Coping Inventory for Stressful Situations, the CISS-21 (Calsbeek et al., 2006; Endler & Parker, 1999). Following others (Major et al., 1998), we excluded the problem-oriented coping items scale because strategies such as ‘taking corrective action immediately’ seemed not conceptually relevant after an abortion. We adapted the instruction so that it would measure post-abortion coping specifically, and not general coping style: “[...] Please indicate to which extent you reacted this way after you had the abortion”.) Seven items measured *emotion oriented coping style* ($\alpha = .79$), e.g., “blame myself for having gotten into this situation”; and seven other items measured *avoidance oriented coping style* ($\alpha = .76$) e.g., “take some time off and get away from the situation”.

3.2.7 Covariates

We measured age, living situation (living together with a partner, living apart together, or no partner), relationship with progenitor (stable or unstable), having children (yes or no), western or non-western ethnicity (based on the definition of

Statistics Netherlands: non-western = respondent or at least one parent of the respondent was born in Morocco, Turkey, Surinam, the Dutch Antilles, Africa, Asia (excl. Japan/ Indonesia), or Latin-America; western = other), employment situation (paid job or not), household income (low versus medium or high), education level (primary/lower secondary, higher secondary, or higher professional education), urbanicity of residence (urban versus rural), mean gestational age (range 2-21 weeks), and prior abortions (yes or no).

3.2.8 Statistical analysis

First, a response analysis was conducted, in which sociodemographics and abortion history of the interviewed DAMHS sample were compared to (1) women in the non-response group who could not or did not want to participate, and (2) the full population of women treated in two abortion clinics during the recruitment period. Second, means and proportions of all outcome and covariate measures were calculated in order to describe the sample population. We also checked whether there were differences in prevalence rates between recruitment sites, using the Chi-squared test. Third, we selected covariates using a 10% criterion (Ten Have et al., 2005): if adding the covariate to the unadjusted regression analyses (predictor: psychiatric history) would change the regression coefficient by at least 10% for one or more of the outcome measures, it was selected as a covariate in our main regression analyses. Based on this, four covariates were selected for adjustment: age, living situation, children, and household income. Fourth, logistic and linear regression analyses were performed for the outcome variables, adjusting for the selected covariates. The analyses were repeated for three mutually exclusive subgroups of mental disorders: internalizing disorders only, externalizing disorders only, and comorbid internalizing and externalizing disorders. Testing was two-sided and statistical significance was considered to be $p < .05$. Statistical analyses were performed using SPSS 22.

3.3 Results

Out of the 1,077 women willing to be contacted, we attempted to contact a random selection of 919. Of these, 381 were not reachable, 120 could not make an appointment within the (rather narrow) time window for interviewing, 38 women did not show up at the interview, another 38 refused on reconsideration, and 10 women were omitted

after a second check on eligibility. 332 Women were interviewed. Seven interviews could not be completed, leaving 325 participants for analysis.

The response analysis showed that women in the interviewed sample were significantly older and less often of non-Western origin than the women in the non-response group ($n = 1,485$). Compared to the total population of Dutch women treated in two abortion clinics during the recruitment period, they were also more often living together, slightly higher educated, and less often had had abortions before. Participant flow and response analysis results are described more extensively elsewhere (Chapter 2).

Of the 325 respondents, 222 had had any lifetime mental disorder. Of these, 106 reported internalizing disorders only, 30 reported externalizing disorders only, and 86 both internalizing and externalizing disorders. In Table 3.1, descriptives of the outcome measures, sociodemographics and abortion-related variables are displayed for women with and without a history of mental disorders. Women with and without a psychiatric history did not differ in terms of gestational age ($F(1, 323) = .10, p = .76$), see Figure 3.1. There were no differences in prevalence rates between the 7 recruitment sites (Chi-square (6) = 6.64; $p = .36$).

Figure 3.1 Gestational age (pregnancy duration) in number of weeks from the first day of the last menstrual cycle to the date of abortion, for participants with ($n = 222$, light grey) and without ($n = 103$, dark grey) a history of mental disorders.

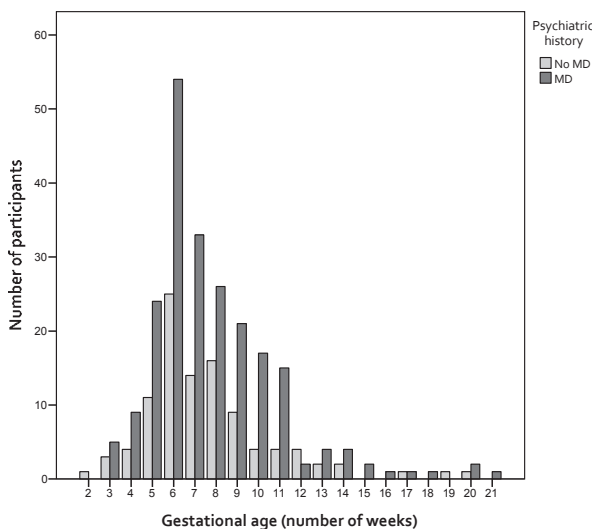


Table 3.1 Description of the Dutch Abortion and Mental Health Survey (DAMHS) sample.

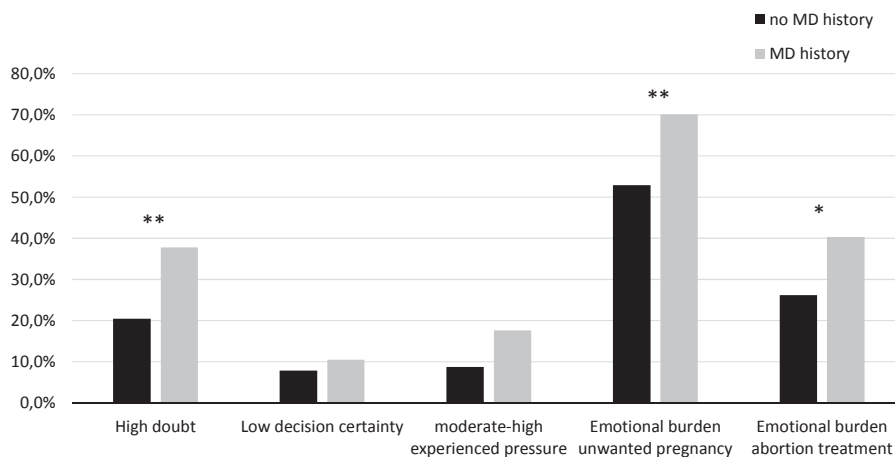
| | No history of MD ^a (n=103) | History of any MD (n=222) | Total Abortion Sample (n=325) |
|---|--|------------------------------|-------------------------------|
| Main outcome measures | | | |
| Decision difficulty (n (%)) | | | |
| Doubt (to large or very large extent) | 21 (20.4) | 84 (37.8) | 105 (32.3)** |
| Decision uncertainty (to large or very large extent) | 8 (7.8) | 23 (10.5) | 31 (9.6) |
| Experienced pressure (to moderate, large, or very large extent) | 9 (8.7) | 39 (17.6) | 48 (14.8)* |
| Emotional burden (n (%)) | | | |
| Of the unwanted pregnancy (to large or very large extent) | 54 (52.9) | 155 (70.1) | 209 (64.7)* |
| Of the abortion treatment (to large or very large extent) | 27 (26.2) | 89 (40.3) | 116 (35.8)* |
| Post-abortion emotions (Mean (SD)^b) | | | |
| Positive emotions scale ^c (2 items, range 2-10) | 7.66 (2.05) | 7.32 (2.24) | 7.43 (2.18) |
| Negative emotions scale ^d (3 items, range 3-15) | 7.73 (3.31) | 8.90 (3.42) | 8.53 (3.42)** |
| Abortion-specific self-efficacy and coping (Mean (SD)) | | | |
| Self-efficacy ^e (range 1-5) | 3.60 (.98) | 3.28 (1.00) | 3.38 (1.00)** |
| Emotion oriented coping scale (7 items, range 7-35) | 13.73 (5.35) | 16.97 (6.61) | 15.94 (6.41)*** |
| Avoidance oriented coping scale (7 items, range 7-35) | 16.76 (6.88) | 19.43 (6.83) | 18.58 (6.95)** |
| Sociodemographics and abortion-related variables | | | |
| Age (Mean (SD)) | 31.49 (8.44) | 29.03 (7.15) | 29.81 (7.66)** |
| Living situation (n (%)) | | | |
| With partner | 62 (60.2) | 84 (37.8) | 146 (44.9)*** |
| Living apart together | 32 (31.1) | 100 (45.0) | 132 (40.6)* |
| No partner (single) | 9 (8.7) | 38 (17.1) | 47 (14.5)* |
| Unstable relationship with progenitor (n (%)) | | | |
| | 12 (11.7) | 48 (21.6) | 60 (18.5)* |
| One or more children (n (%)) | | | |
| | 67 (65.0) | 108 (48.6) | 175 (53.8)** |
| Non-western ethnicity (n (%)) | | | |
| | 19 (18.4) | 50 (22.5) | 69 (21.2) |
| Unemployed (n (%)) | | | |
| | 31 (30.1) | 64 (28.8) | 95 (29.2) |
| Low household income (n (%)) | | | |
| | 33 (34.7) | 114 (51.8) | 147 (46.7)** |
| Education Level (n (%)) | | | |
| Primary/ lower secondary education | 21 (20.4) | 47 (21.2) | 68 (20.9) |
| Higher secondary education | 35 (34.0) | 88 (39.6) | 123 (37.8) |
| Higher professional education | 47 (45.6) | 87 (39.2) | 134 (41.2) |
| Urban (not rural) residency (n (%)) | | | |
| | 87 (84.5) | 197 (88.7) | 284 (87.4) |
| Gestational age^f (Mean (SD)) | | | |
| | 7.68 (3.09) | 7.79 (3.03) | 7.76 (3.05) |
| Second trimester pregnancy terminations (n (%)) | | | |
| | 7 (6.8) | 17 (7.7) | 24 (7.4) |
| One or more prior abortions (n (%)) | | | |
| | 33 (32.0) | 53 (23.9) | 86 (26.5) |

Note. Means and proportions were compared using the F-test and the Chi-squared test, respectively.

^a MD = mental disorder, as measured by the Composite International Diagnostic Interview (CIDI) 3.0 (present if onset of MD was more than 12 months ago). ^b SD = Standard Deviation. ^c 2 positive emotion items: 'relief' and 'closure'. ^d 3 negative emotion items: 'guilt', 'emptiness', and 'mourning/loss'. ^e Self-efficacy items: 'think about babies', 'spend time around babies', 'physical intimacy' and 'exposure to abortion in media'. Scale mean calculated when at least 3 out of 4 items were non-missing. ^f number of weeks from the first day of the last menstrual cycle to the date of abortion. * $p < .05$, ** $p < .01$, *** $p < .001$

A significantly larger proportion reported severe pre-abortion doubts in the psychiatric-history-group (37.8%) than in the no-psychiatric history group (20.4%), see Figure 3.2. Results of logistic regression analyses are displayed in Table 3.2. After adjustment for confounding, the odds to have experienced doubt to large or very large extent were over two times greater for women with a psychiatric history than for women without this history (OR = 2.30; 95% CI = 1.29-4.09; $p = .006$). Exploratory analysis revealed that this finding was strongest for women with a history of both internalizing and externalizing disorders (OR = 2.88; 95% CI = 1.47-5.63; $p = .002$). There were no significant differences between the two groups with regard to decision uncertainty. Although women with a psychiatric history more often had experienced pressure from others to have the abortion (17.6%) than women without this history (8.7%), statistical testing revealed that these differences were not significant anymore after adjustment for confounding.

Figure 3.2 Decision difficulty and emotional burden around the abortion among women with and without a history of mental disorders (MD).



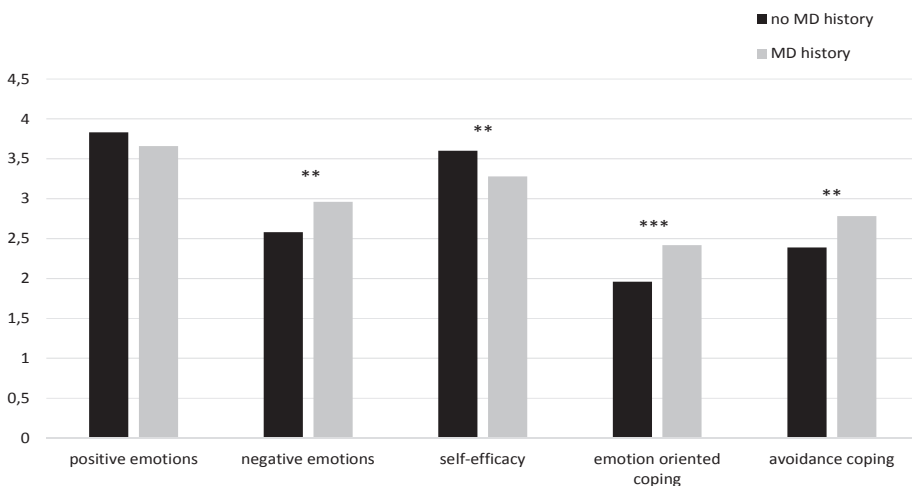
* = $p < .05$, ** = $p < .01$, *** = $p < .001$

Women in the psychiatric-history group more often experienced the unwanted pregnancy as burdensome (70.1%) than women in the no-psychiatric history group (52.9%); after covariate adjustment the odds to have experienced the pregnancy as burdensome were over two times greater for women in the psychiatric history group than for women in the no-psychiatric history group (OR = 2.23; 95% CI = 1.34-3.70; $p =$

.002). Women with a psychiatric history also more often experienced the abortion treatment as emotionally burdensome (40.3%) than women in the no-psychiatric-history group (26.2%); after adjustment the odds were almost two times greater for the psychiatric history group compared to the no-psychiatry group (OR = 1.93; 95% CI = 1.12-3.34; $p = .02$). In both cases, these results only held for respondents with internalizing disorders only or both internalizing and externalizing disorders.

Results of linear regression analyses are displayed in Table 3.3 (see also Figure 3.3). Psychiatric history was significantly associated with negative post-abortion emotions ($\beta = 0.16$; 95% CI = 0.05-0.28; $p = .004$), and this was predominant in women with internalizing disorders only. Psychiatric history was unrelated to positive emotions. Women with a psychiatric history scored lower on self-efficacy than women without this history ($\beta = -0.11$; 95% CI = -0.22-0.00; $p = .04$), and the beta's for the subgroups internalizing disorders and comorbid disorders were comparable to this. Psychiatric history was also associated with the use of both emotion oriented coping ($\beta = 0.22$; 95% CI = 0.11-0.33; $p < .001$) and avoidance oriented coping ($\beta = 0.12$; 95% CI = 0.01-0.24; $p = .03$). For emotion oriented coping, the pattern of results more or less held for all subgroups, but for avoidance oriented coping the results only held for the comorbid group.

Figure 3.3 Post-abortion emotions and self-efficacy and coping around the abortion among women with and without a history of mental disorders (MD).



* = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Table 3.2 Odds ratios^a (and 95% confidence intervals) from logistic regression analyses for abortion decision difficulty and emotional burden of the abortion treatment and the unwanted pregnancy, with predictor psychiatric history and type of psychiatric history.

| | Abortion decision difficulty | | | | | | Emotional burden | | | | | |
|------------------------------------|------------------------------|------|----------------------|-----|----------------------|-----|---------------------------|------|---------------------------|-----|---------------|---|
| | Doubt | | Decision uncertainty | | Experienced pressure | | Unwanted pregnancy burden | | Abortion treatment burden | | p | |
| n | OR (95% C.I.) | p | OR (95% C.I.) | p | OR (95% C.I.) | p | OR (95% C.I.) | p | OR (95% C.I.) | p | OR (95% C.I.) | p |
| Psychiatric history | | | | | | | | | | | | |
| No MD ^b | ref | | ref | | ref | | ref | | ref | | ref | |
| Any MD | 2.30 (1.29-4.09) | .006 | 1.50 (0.60-3.76) | .38 | 2.02 (0.92-4.43) | .08 | 2.23 (1.34-3.70) | .002 | 1.93 (1.12-3.34) | .02 | | |
| Type of psychiatric history | | | | | | | | | | | | |
| No MD | ref | | ref | | ref | | ref | | ref | | ref | |
| Int ^c MD only | 1.66 (0.87-3.18) | .13 | 1.46 (0.53-4.05) | .47 | 2.15 (0.86-5.39) | .10 | 2.16 (1.20-3.89) | .01 | 1.92 (1.03-3.48) | .04 | | |
| Ext ^d MD only | 2.13 (0.82-5.07) | .13 | 1.42 (0.32-6.29) | .64 | 2.92 (0.93-9.18) | .07 | 0.87 (0.37-2.02) | .74 | 1.78 (0.73-4.32) | .20 | | |
| Comorbid int + ext | 2.88 (1.47-5.63) | .002 | 1.53 (0.51-4.57) | .45 | 2.41 (0.96-6.01) | .06 | 2.86 (1.47-5.56) | .002 | 1.99 (1.02-3.76) | .04 | | |

^a Odds ratios are adjusted for covariates age, living situation, children, and household income. ^b MD = mental disorder, as measured by the Composite International Diagnostic Interview (CIDI) 3.0 (present if onset of MD was more than 12 months ago). ^c Internalizing disorders were mood disorders (major depression, dysthymia, bipolar disorder) and anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder). ^d Externalizing disorders were substance use disorders (alcohol/drug abuse and dependence), childhood impulse control disorders (attention deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder) and antisocial personality disorder.

Table 3.3 Standardized beta's^a (and 95% confidence intervals) from linear regression analyses for post-abortion emotions and post-abortion self-efficacy and coping with predictor psychiatric history and type of psychiatric history.

| | Post-abortion emotions | | | | Post-abortion self-efficacy and coping | | | | | | |
|------------------------------------|------------------------|--------------------|-------------------|-------------------|--|--------------------|-------------------------|------------------|---------------------------|-------------------|------|
| | Positive emotions | | Negative emotions | | Post-abortion self-efficacy | | Emotion oriented coping | | Avoidance oriented coping | | |
| | n | Beta (95% C.I.) | P | Beta (95% C.I.) | P | Beta (95% C.I.) | P | Beta (95% C.I.) | P | | |
| Psychiatric history | | | | | | | | | | | |
| No MD ^b | 103 | ref | | ref | | ref | | ref | | ref | |
| Any MD | 222 | -0.04 (-0.15-0.07) | .48 | 0.16 (0.05-0.28) | .004 | -0.11 (-0.22-0.00) | .04 | 0.22 (0.11-0.33) | <.001 | .12 (0.01-0.24) | .03 |
| Type of Psychiatric history | | | | | | | | | | | |
| No MD | 103 | ref | | ref | | ref | | ref | | ref | |
| Int ^c MD only | 106 | -0.05 (-0.18-0.09) | .49 | 0.20 (0.06-0.33) | .004 | -0.12 (-0.25-0.01) | .07 | 0.24 (0.11-0.37) | <.001 | 0.11 (-0.02-0.24) | .10 |
| Ext ^d MD only | 30 | -0.10 (-0.22-0.03) | .12 | 0.08 (-0.04-0.20) | .19 | -0.05 (-0.17-0.07) | .44 | 0.12 (0.00-0.24) | .05 | 0.08 (-0.04-0.20) | .20 |
| Comorbid int + ext | 86 | 0.05 (-0.09-0.18) | .48 | 0.13 (-0.01-0.26) | .06 | -0.12 (-0.25-0.01) | .08 | 0.19 (0.06-0.32) | .004 | 0.18 (0.05-0.31) | .007 |

^a Beta's are adjusted for covariates age, living situation, children, and household income. ^b MD = mental disorder, as measured by the Composite International Diagnostic Interview (CIDI) 3.0 (present if onset of MD was more than 12 months ago). ^c Internalizing disorders were mood disorders (major depression, dysthymia, bipolar disorder) and anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder). ^d Externalizing disorders were substance use disorders (alcohol/drug abuse and dependence), childhood impulse control disorders (attention deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder) and antisocial personality disorder.

3.4 Discussion

This study shows that women with a history of mental disorders in general experience the unwanted pregnancy and the abortion as more burdensome, they experience more pre-abortion doubts and post-abortion negative emotions, report lower post-abortion self-efficacy and use more emotion-oriented and avoidance oriented coping resources, than women without this history. Our results indicate that psychiatric history strongly affects how women experience the period before and after the abortion.

Doubt or ambivalence in the abortion decision process is common, but most women feel they are making the right decision (Kero & Lalos, 2000; Rocca et al., 2013). In line with this, we also found that most women stood behind their decision; even when pre-abortion doubt was high. Decision uncertainty was low in general and not affected by psychiatric history, whereas pre-abortion doubt was higher for women with previous mental disorders. Experienced pressure of partner and/or family members has been found to be a predictor of post-abortion distress (NCCMH, 2011; Söderberg et al., 1998), however, in our sample we did not find any significant group differences for experienced pressure after we controlled for confounders. This could be due to low levels of experienced pressure in both groups. Earlier studies showed that most women experience relief after an abortion, irrespective of the presence of other emotions (Kero & Lalos, 2000; Rocca et al., 2013). Because our positive emotion scale was largely based on the emotion 'relief', and all women scored at the high end of the scale, it comes as no surprise that we found no significant group differences regarding positive emotions. As for coping, it seems fitting that the psychiatric history group shows more emotion- and avoidance oriented coping, because they experience more burden and negative emotions, which might need to be 'regulated'. Theory and research also suggests that intense reactions to stressful events prompt more frequent use of a wide range of coping responses (Zimmer-Gembeck et al., 2012).

Results for doubt and avoidance oriented coping were strongest for the group with comorbid internalizing and externalizing disorders. The most vulnerable group in terms of psychiatric history experiences doubt the strongest. Perhaps it is most adaptive for this group to use avoidance oriented coping to deal with the irreversible abortion afterwards. Experienced burden and emotion oriented coping were strongest for both the comorbid group and the internalizing disorders group. Negative post-abortion emotions were strongest among women with internalizing disorders only compared to the other disorder groups. Because negative emotions are a core

characteristic of internalizing disorders, such as depression (APA, 2000), it could be expected to see them more often among women with internalizing disorders.

This study has several limitations. First, the response rate was relatively low. Yet the sample was only slightly selective compared to the abortion clinic population. The abortion clinic population is younger, more often single, lower educated, and of non-Western origin than our sample (Van Ditzhuijzen et al., 2013; Chapter 2). These characteristics are usually associated with a higher prevalence of mental disorders (De Graaf et al., 2010b). Therefore, if any bias would have occurred, our results are most likely to be conservative. Second, the group of women with externalizing disorders only was relatively small, which might have resulted in the absence of significant results in this group. Third, our measures were often single item scales or short versions of questionnaires. To do justice to the rich variety of experiences and complexity of the decision process, qualitative methods can be highly informative.

Despite these limitations, our study is strong because it combines the results of a highly reliable and valid diagnostic instrument, the CIDI 3.0, with pre- and post-abortion experience variables. Our findings indicate that psychiatric history is highly relevant for pre- and post-abortion experiences. Therefore, when investigating mental health consequences of abortion, pre-abortion mental health should be taken into account. From our results, we do not know whether a more difficult abortion decision process and a more stressful post-abortion experience have long-term mental health consequences. Nevertheless, when women show a particularly difficult decision process or extremely negative responses post-abortion, this might alert abortion clinicians to possible underlying psychiatric problems, unrelated to the abortion. Women with a psychiatric history might also benefit from extra support, in order to alleviate stress around the abortion. However, our results do not imply that this specific group would need or benefit from a mental health intervention. First of all, the lifetime disorders might not be present anymore at the time of abortion, and second, need for treatment of psychiatric disorders is a highly complex issue which cannot be based on diagnosis only (Ten Have et al., 2013).

CHAPTER 4

INCIDENCE AND RECURRENCE OF COMMON MENTAL DISORDERS AFTER ABORTION

Jenneke van Ditzhuijzen

Margreet ten Have

Ron de Graaf

Peter Lugtig

Carolus H.C.J. van Nijnatten

Wilma A.M. Vollebergh

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Author contributions: JvD developed the study concept and design, managed the data collection, performed the literature searches and data analysis, and wrote the manuscript. PL gave advice with regard to the study design (analysis method), assisted with the matching procedure, and conceptualized the Statistical Analysis section of the manuscript. WV, CvN, PL, MtH and RdG gave advice in all stages, and provided feedback to the manuscript. WV and CvN conceptualized the general DAMHS study, in cooperation with MtH and RdG who were responsible for the NEMESIS-2 data.

Abstract

To date, psychiatric epidemiology research in the field of abortion has used methods that do not allow causal interpretations, and conclusions about potential consequences of abortion remain disputable. To improve causal inference, we used exact matching in a prospective cohort study and matched 325 women who had an abortion 1-to-1 to controls on carefully selected confounders. Outcome measures were first-incidence and recurrence of common DSM-IV mental disorders (mood, anxiety, substance use disorders, and the aggregate measure ‘any mental disorder’) as measured with the Composite International Diagnostic Interview (CIDI) version 3.0, in the 2.5 to 3 years after the abortion. Although non-matched data suggested otherwise, women who had an abortion did not show significantly higher odds for incidence of ‘any mental disorder’, mood, anxiety and substance use disorders compared to women who were similar in background variables but did not have an abortion. Abortion did not increase the odds for recurrence of the three disorder categories, but for any mental disorder the higher odds in the abortion group remained significant after matching. It is unlikely that abortion causes common mental disorders in women without a psychiatric history. However, abortion might increase the risk of recurrence among women with a history of mental disorders.

4.1 Introduction

Over the last decade, a number of reviews on mental health consequences of abortion have been conducted (APA, 2008; Charles et al., 2008; Coleman, 2011; NCCMH, 2011; Robinson et al., 2009; Steinberg & Russo, 2009). These reviews showed that the field is severely hampered by methodological problems. With the exception of one review (Coleman, 2011), which has been critically refuted (e.g., Abel et al., 2012; Polis et al., 2012; Steinberg et al., 2012), all concluded that the highest quality empirical research so far has found no evidence that abortion increases the risk of mental disorders. As experiments would be unethical in this field, all claims are based on observational research. Even though some of these studies make use of carefully chosen reference groups and rigorously adjust for covariates, the methodological literature shows that other strategies, like matching, could offer additional insight (Kessler & Schatzberg, 2012), especially in situations in which standard regression methods perform poorly due to insufficient overlap in covariate distributions (Cook et al., 2008; Iacus et al., 2012; Stuart, 2010; Rosenbaum & Rubin, 1983). In the current study, we chose to use a prospective cohort design with 1-to-1 matching, to address a number of the most commonly mentioned methodological problems in this area of research.

One methodological problem in this field is that pre-existing mental health problems are inadequately measured, even though it is likely that these are predictive of post-abortion mental disorders (Gilchrist et al., 1995; Major et al., 2000). Former studies have shown that lifetime psychiatric disorders are highly prevalent among women having abortions (Steinberg et al., 2014; Van Ditzhuijzen et al., 2013, see Chapter 2), which could lead to incorrect attribution of these disorders to the abortion. Several studies have adjusted for pre-existing mental disorders, but in these studies abortion history was assessed through retrospective self-report (Fergusson et al., 2009; Mota et al., 2010; Steinberg & Finer, 2011; Steinberg et al., 2014), so that the order of abortion and mental disorder cannot be ascertained accurately (Charles et al., 2008; APA, 2008; Major et al., 2009, NCCMH, 2011). Other studies measured abortion history prospectively and controlled for pre-existing mental disorders, but these measured only a few disorders (Biggs et al., 2015; Major et al., 2000), or previous mental disorders were assessed by family doctors (Gilchrist et al., 1995) or based on psychiatric contact (Munk-Olsen et al., 2011), which could lead to serious underreporting of mental disorders. These findings should therefore be complemented with research using a strong structured diagnostic instrument to assess a wide variety of clinical-level

mental disorders, hereby taking into account the onset of these disorders in order to determine whether disorders were already present before the pregnancy was terminated. The current study fills this gap.

A second serious threat to validity in this type of research is confounding by covariates (APA, 2009; NCCMH, 2011). Since it is impossible to randomly assign women to an abortion or control condition, and there is no rigorous way to guarantee comparability between groups (Kessler & Schatzberg, 2012), alternative methods to regression adjustment could offer additional insight. One of the techniques that is strongly recommended in the methodological literature is matching, which allow one to analyze a non-experimental study so that it mimics characteristics of an experiment, because the distribution of baseline covariates is similar between groups (Austin, 2011). In the current study, we matched participants 1-to-1 on confounding covariates. This type of matching induces balance in the distributions of the measured covariates between the two cohorts, and simulation studies have also shown that it can reduce imbalance in unmeasured covariates considerably (Cook et al., 2008; Stuart, 2010; Stürmer et al., 2010).

A third methodological issue which has repeatedly been mentioned by review studies (e.g., APA, 2008; NCCMH, 2011), is the use of inappropriate reference groups, such as women who never had been pregnant, miscarried, or delivered a (presumably intended) pregnancy. The choice of reference group is dependent on the type of causal question (Charles et al., 2008). In this area of research, two different types of causal questions are often confused (Fergusson et al., 2009; Kessler & Schatzberg, 2012). The first question is whether abortion of an unwanted pregnancy has more, or less, adverse effects on mental health than its realistic alternatives (such as carrying the unwanted pregnancy to term). This question has recently been investigated by the Turnaway Study (e.g., Biggs et al., 2015; Foster et al., 2015; Rocca et al., 2013), using a reference group of women whose abortion requests were declined. This is an adequate design to investigate effects of abortion versus being denied an abortion, when the unwanted pregnancy is a given. The second question is whether the life event of termination of an unwanted pregnancy increases the risk of mental disorders. It is this question that is being addressed in the current study. In this study design, measures based on before-after intra-person comparisons are compared between groups which are matched on confounding covariates. This design provides information about the consequences of the whole life event, which is lost when focusing on the specific effect of abortion versus denial of abortion.

The main goal of this study is to investigate the incidence and recurrence of mental disorders after termination of an unwanted pregnancy. The research question is whether having an abortion of an unwanted pregnancy is associated with an increased risk for the development of (1) incident and (2) recurrent mental disorders at follow up (2.5 to 3 years later). We matched women who had an abortion of an unwanted pregnancy 1-to-1 on confounding covariates to women from the general population who did not have an abortion.

4.2 Method

4.2.1 Study design

The Dutch Abortion and Mental Health Study (DAMHS) was developed in close cooperation with the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2; De Graaf et al., 2010a; 2010b; 2012), therefore all outcome variables and covariates were measured in the exact same way. The reference cohort was taken from NEMESIS-2. All pregnancies in the abortion group were unwanted, therefore the term abortion also includes the unwanted pregnancy here. The study was based on the first two waves of these two cohort studies. By statistically matching individual women from the DAMHS study with individual women from NEMESIS-2, balance in the distributions of the covariates was induced, and pre-existing differences between the two cohorts were minimized.

4.2.2 Setting and participants

The DAMHS participants were recruited by clinical staff in Dutch abortion clinics. In the Netherlands, the large majority of abortions are performed in these specialized clinics (Ministerie van VWS-IGZ, 2014). Eight out of the sixteen existing clinics in the Netherlands were selected for the study, based on geographical location (four in the most urban/densely populated area in the west of the country, and four in smaller cities in the north, south, east and north-west of the country), clinic type (offering second trimester terminations (five out of eight), offering sexual health care (four out of eight), in order to recruit a representative sample of participants of the Dutch abortion population. One clinic could not participate due to reorganization, leaving seven clinics for recruitment. Shortly after the abortion procedure, staff members

asked the women to read the research flyer, complete a reply card, and deposit the card in a locked mailbox. The study enrolled Dutch-speaking women of 18 to 46 years old, obtaining an abortion (medical or aspiration, until a maximum of 22 weeks) for an unwanted pregnancy, without clear fetal or maternal medical indications. In three clinics recruitment was limited to predetermined days when enough staff was available; in the other four clinics, all eligible women were approached. We also collected demographic data from women who declined participation at recruitment, in order to do a response analysis.

Between April 2010 and January 2011, professionally trained female interviewers interviewed DAMHS participants face-to-face 20 to 40 days after the abortion (T₀), and again between December 2012 and November 2013, which was on average 2.7 years later (T₁). The mean duration of the interviews was around 2.5 h (T₀) and 1.5h (T₁). In both waves, participants received a gift card of 50 Euros.

We included from NEMESIS-2 women in the same age range as the DAMHS sample, and who reported they never experienced an abortion, in the reference group. The fieldwork for T₀ took place from November 2007 to July 2009, and the second wave (T₁) was held on average 3.0 years later, from November 2010 to June 2012. The sampling strategy and interview procedure of NEMESIS-2 are described in more detail elsewhere (De Graaf et al., 2012; Alonso et al., 2004). In both studies, written informed consent was obtained, and both studies were approved by a local medical ethics committee. All interviews were fully laptop-assisted and face-to-face.

4.2.3 Initial response (T₀)

In DAMHS, we interviewed 332 out of 909 (36.5%) eligible women at T₀, of which seven interviews could not be completed, leaving 325 participants for analysis. We were unable to interview 577 of these women, because they were unreachable, unavailable for the interview within the predefined period, or they refused participation on reconsideration (see also Figure 2.1). These women were re-approached to provide basic demographic details, which 158 women did. These data were then added to data of 1,327 eligible women who initially declined participation. We compared the study sample to this total non-response group of women who did not participate (n = 1,485). We also compared it to the total population of women treated in the fieldwork period in two abortion clinics (n = 2,625), because these data also contained education data, which the non-response group data did not. These two clinics provided data on the individual level. Women in the study sample were

significantly older (mean age 29.8 (SD = 7.7) versus 28.7 (SD = 7.3) and more often of Western origin (79% versus 69%) than women in the non-response group. Women in the study sample were more often higher educated (41% versus 24%) than women in the two-clinic abortion population. Participant flow and response analysis results of To are described more extensively in Chapter 2. NEMESIS-2 had an initial response rate at To of 65.1% (De Graaf et al., 2010a).

4.2.4 Attrition (T1)

At T1, 264 DAMHS participants (81.2%) were re-interviewed. Of the 1,902 women selected from NEMESIS-2 for this study at To, 1,496 were re-interviewed at T1 (78.7%). Of these NEMESIS-2 women, nine had undergone an abortion between both waves, leaving 1,487 participants for analysis. Attrition analysis revealed that in DAMHS, women aged 18-24 and 25-34 dropped out more often than women aged 35-46 (OR = 5.22, 95% CI = 1.88-14.52, $p = .002$; and OR = 2.95, 95% CI = 1.21-7.21, $p = .02$, respectively), and religious women more often discontinued participation than non-religious women (OR = 2.50, 95% CI = 1.17-5.34, $p = .02$). In NEMESIS-2, women without children (OR = 1.46, 95% CI = 1.09-1.96, $p = .01$), women without a partner (OR = 1.33, 95% CI = 1.01-1.77, $p = .045$), women of non-western ethnicity (OR = 2.46, 95% CI = 1.63-3.72, $p < .001$), and women with the lowest level of education (OR = 1.55, 95% CI = 1.14-2.10, $p = .005$) discontinued more often. Attrition was not associated with the three categories of mental disorders studied here.

4.2.5 Measures

Mental disorders

In both cohorts, presence of lifetime and last-year DSM-IV (APA, 2000) disorders was assessed at To with the Composite International Diagnostic Interview (CIDI) version 3.0 (Alonso et al., 2004; Haro et al., 2006). Organic exclusion rules were used to construct diagnoses, in order to ascertain that symptoms were not due to a somatic cause, an injury, or use of drugs, alcohol or medication. Clinical calibration studies in various countries found that the CIDI 3.0 assesses anxiety, mood and substance use disorders with generally good validity in comparison to blinded clinical reappraisal interviews with the SCID (Structured Clinical Interview for DSM-IV; Haro et al., 2006). Furthermore, we used a probing technique (described in Kessler et al., 2005) to determine age-of-onset and timing of diagnosis between measurements as accurate as

possible. At T₁, presence of mental disorders between both waves was assessed. The following disorders, relevant for this paper, were included: mood disorders (major depression, dysthymia, bipolar disorder); anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder); and substance use disorders (alcohol/drug abuse and dependence). For incidence, women who never had one or more disorders within a specific disorder category before T₀ were included in the at-risk group, irrelevant of whether they had a disorder in any of the other categories. For recurrence, women who had one or more disorders within a specific disorder category in their lifetime, but not in the 12 months before T₀, were included. By excluding 12-month prevalence, the correct order of events of abortion and disorder was ensured. In addition to the three disorder categories, we also included the aggregate measure any mental disorder. For this variable, the at-risk group for incidence consisted of women who never had a disorder in any of the three disorder categories. Likewise, recurrence referred to disorders in any of the three categories. For instance, women who had a mood disorder before T₀ and an anxiety disorder after T₀, were considered incident in terms of anxiety disorders, and recurrent in terms of any mental disorder.

Covariates

Demographic variables assessed at baseline were age category (18-24, 25-34, and 35-46 years); living situation (with or without a partner); having children (yes or no); western or non-western ethnicity (based on the definition of the Central Bureau of Statistics (CBS) Netherlands (see also Keij, 2000; Stronks et al., 2009): non-western = participant or at least one of the parents was born in Turkey, the Caribbean, Africa, Asia (excluding Japan/Indonesia) or Latin-America; western = other); considers herself religious (yes or no); employment situation (paid job or not); education level (primary education, lower secondary education, higher secondary education and higher professional education); and urbanicity of place of residence (urban or rural). Furthermore, we also included childhood abuse as a covariate, because it has been found that it can predispose for both mental disorders and abortion (e.g., Steinberg & Tschann, 2013). Childhood abuse was coded in the same way as in various NEMESIS-2 studies (e.g., De Graaf et al., 2003): '1' when at least one type of abuse (physical, sexual, psychological abuse or emotional neglect) had happened twice or more before age 16, or when sexual abuse had happened once before age 16.

4.2.6 Statistical analysis

First, descriptive analyses and logistic regression analyses were performed with unmatched data (DAMHS: $n = 264$, Reference: $n = 1,487$) only adjusting for the difference in time interval between T_0 and T_1 . Then, we chose covariates for matching using the following method. We first identified variables that have been associated with both abortion and mental health. As the literature provided mixed results with regard to covariates that might predict mental disorders after abortion (NCCMH, 2011), we selected confounders in a data-driven manner, based on their association ($p < .05$) with the predictor (abortion versus reference), and with at least one of the various outcome variables (incidence or recurrence of the categories of mental disorders). To satisfy the assumption of 'ignorable' assignment, it is important to include all covariates that are related to both predictor and outcome (Stuart, 2010). The following covariates were selected: age category, living situation, having children, western or non-western ethnicity, religion, employment situation, urbanicity of place of residence, and a history of childhood abuse; not selected was education. Income category had to be omitted because of missing values. The main outcome variables were incidence and recurrence of *any mental disorder*, which includes all disorder categories. As the calculation of incidence and recurrence is based on at-risk groups with and without previous disorders, we did not match on previous disorders for any mental disorder. Sample size did not allow matching on mental disorders other than the one measured in the specific disorder category.

All variables selected for matching were categorical. Matching was implemented in the Coarsened Exact Matching package (Iacus et al., 2011; 2012) in SPSS 20. We matched participants 1-to-1, and only kept exact matches. This implies that pairs of women from both cohorts are formed that are identical on all selected covariates. Matching was done on T_0 data, before attrition. We were able to find an exact NEMESIS-2 match for 273 cases in DAMHS. Of these 273 pairs (=546 cases in total), 123 cases were lost to follow up (44 in DAMHS, 79 in NEMESIS-2). We checked whether the matching had reduced imbalance in covariates using the chi-square test, and repeated this check with T_1 data after attrition. After this, logistic regression analyses were performed for each disorder on T_1 (both incidence and recurrence), for matched data; while adjusting for the length of the time interval between T_0 and T_1 in years. Because at-risk groups varied for each outcome, the number of cases at-risk are provided in the Tables. Testing was two-sided and statistical significance was considered to be $p < 0.05$.

4.3 Results

4.3.1 Descriptives

Descriptives of the DAMHS and the reference cohort at To are displayed in Table 4.1. The women in the abortion cohort were overall younger, more often single, without children, of non-western ethnicity, non-religious, unemployed, living in urban areas, and more often had experienced childhood abuse, than women in the reference cohort. There were no significant differences for level of education. After matching, balance was induced on the variables that were used for the matching. Even though attrition was selective in the full sample, this did not reintroduce imbalance in the distribution of the covariates in the matched samples. Therefore, no additional adjustment for covariates was needed. The distribution of the descriptives after matching and attrition are also shown in Table 4.1.

4.3.2 Incidence

Before taking covariates into account with the matching procedure, participants from the DAMHS cohort had significantly higher odds for incidence of any common mental disorder (OR = 3.80; 95% CI = 1.98-7.27, $p < .001$). The same was found for the three disorder categories mood disorders, anxiety disorders, and substance use disorders (see Table 4.2). However, when participants were matched on confounding covariates, all odds ratios for incidence were lowered and all confidence intervals included the null, rendering them non-significant. For anxiety and substance use disorders p -values were over .20, for mood disorders and for any mental disorder the p -values were .08.

4.3.3 Recurrence

For unmatched groups, participants from DAMHS had 2.76 times the odds (95% CI = 1.41-5.43, $p = .003$) for recurrence of any mental disorder compared to women from NEMESIS-2 (see Table 4.3). The odds for recurrence of anxiety disorders were also higher for DAMHS compared to NEMESIS-2 (OR = 3.27, 95% CI = 1.13-9.51; $p = .03$). For mood disorders and substance use disorders however, the differences in recurrence rates between the cohorts were non-significant. After matching, the results for any mental disorder remained significant (OR = 3.20, 95% CI = 1.02-9.99, $p = .046$) while the odds for anxiety disorders were no longer significant (OR = 6.70, 95% CI = .91-49.31, $p = .06$). For mood disorders, matching did not bring the recurrence rates of the

two groups closer to each other. The number of participants with recurrent substance use disorder was zero in the NEMESIS-2 cohort, therefore this parameter was fixed, and no odds ratio could be calculated.

Table 4.1 Baseline characteristics of the Dutch Abortion and Mental Health Study (DAMHS) cohort and the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2) reference cohort, before matching, after matching, and after matching and attrition.

| | Before matching | | | After matching | | | After matching and attrition | | |
|---|-----------------|--------------------|-----------------------|-----------------------------|------------------------------------|-----------------------|------------------------------|------------------------------------|-----------------------|
| | DAMHS (n=325) | NEMESIS-2 (n=1902) | <i>p</i> ^a | DAMHS Matched cases (n=273) | NEMESIS-2 Matched controls (n=273) | <i>p</i> ^a | DAMHS Matched cases (n=229) | NEMESIS-2 Matched controls (n=194) | <i>p</i> ^a |
| Age categories | n (%) | n (%) | | n (%) | n (%) | | n (%) | n (%) | |
| 18-24 | 107 (32.9) | 255 (13.4) | <.001 | 72 (26.4) | 72 (26.4) | 1 | 56 (24.5) | 49 (25.3) | .93 |
| 25-34 | 116 (35.7) | 600 (31.5) | | 103 (37.7) | 103 (37.7) | | 84 (36.7) | 73 (37.6) | |
| 35-46 | 102 (31.4) | 1047 (55.0) | | 98 (35.9) | 98 (35.9) | | 89 (38.9) | 72 (37.1) | |
| Living situation | | | <.001 | | | 1 | | | .32 |
| With partner | 146 (44.9) | 1297 (68.2) | | 127 (46.5) | 127 (46.5) | | 108 (47.2) | 101 (52.1) | |
| Without partner | 179 (55.1) | 605 (31.8) | | 146 (53.5) | 146 (53.5) | | 121 (52.8) | 93 (47.9) | |
| Children | | | .02 | | | 1 | | | .49 |
| One or more children | 175 (53.8) | 1158 (60.9) | | 145 (53.1) | 145 (53.1) | | 121 (52.8) | 109 (56.2) | |
| No children | 150 (46.2) | 744 (39.1) | | 128 (46.9) | 128 (46.9) | | 108 (47.2) | 85 (43.8) | |
| Ethnicity | | | <.001 | | | 1 | | | .84 |
| Western (Dutch + other Western ethnicity) | 256 (78.8) | 1774 (93.3) | | 233 (85.3) | 233 (85.3) | | 198 (86.5) | 169 (87.1) | |
| Non-Western ethnicity | 69 (21.2) | 128 (6.7) | | 40 (14.7) | 40 (14.7) | | 31 (13.5) | 25 (12.9) | |

| | | | | | | | | | |
|---|------------|--------------|------------|------------|------------|------------|------------|--|-----|
| Religion | | | | | | 1 | | | .62 |
| Considers herself not religious | 244 (75.1) | 1192 (62.7) | 212 (77.7) | 212 (77.7) | 185 (80.8) | 212 (77.7) | 153 (78.9) | | |
| Considers herself religious | 81 (24.9) | 710 (37.3) | 61 (22.3) | 61 (22.3) | 44 (19.2) | 61 (22.3) | 41 (21.1) | | |
| Employment situation | | | | | | 1 | | | .91 |
| Paid job | 230 (70.8) | 1,560 (82.0) | 205 (75.1) | 205 (75.1) | 176 (76.9) | 205 (75.1) | 150 (77.3) | | |
| No paid job | 95 (29.2) | 342 (18.0) | 68 (24.9) | 68 (24.9) | 53 (23.1) | 68 (24.9) | 44 (22.7) | | |
| Education | | | | | | .70 | | | .68 |
| Primary and lower secondary education | 68 (20.9) | 431 (22.7) | 52 (19.0) | 52 (19.0) | 39 (20.1) | 59 (21.6) | 39 (17.0) | | |
| Higher secondary education | 123 (37.8) | 733 (38.5) | 102 (37.4) | 102 (37.4) | 86 (37.6) | 103 (37.7) | 73 (37.6) | | |
| Higher professional education | 134 (41.2) | 738 (38.8) | 119 (43.6) | 119 (43.6) | 104 (45.4) | 111 (40.7) | 82 (42.3) | | |
| Urbanicity | | | | | | 1 | | | .83 |
| Rural | 41 (12.6) | 624 (32.8) | 39 (14.3) | 39 (14.3) | 36 (15.7) | 39 (14.3) | 29 (14.9) | | |
| City | 284 (87.4) | 1278 (67.2) | 234 (85.7) | 234 (85.7) | 193 (84.3) | 234 (85.7) | 165 (85.1) | | |
| Childhood abuse | | | | | | 1 | | | .96 |
| Once (sexual) and/or more than once (other) | 172 (52.9) | 550 (29.6) | 131 (48.0) | 131 (48.0) | 108 (47.2) | 131 (48.0) | 92 (47.4) | | |
| Never | 153 (47.1) | 1310 (57.4) | 142 (52.0) | 142 (52.0) | 121 (52.8) | 142 (52.0) | 102 (52.6) | | |

Note. Percentages are unweighted.

^a p - values are derived from two-sided χ^2 tests.

Table 4.2 Incidence of common mental disorders between T0 and T1 in unmatched and matched abortion group (DAMHS) and reference group (NEMESIS-2).

| INCIDENCE: cases / at-risk group (%) | Total | DAMHS | NEMESIS-2 | OR^a (95% CI) | p |
|---|------------------|-----------------|------------------|--------------------------------|----------|
| Non-matched | | | | | |
| Mood disorders | 77 / 1266 (6.1) | 19 / 159 (11.9) | 58 / 1107 (5.2) | 3.73 (1.93-7.21) | <.001 |
| Anxiety disorders | 107 / 1291 (8.3) | 23 / 153 (15.0) | 84 / 1138 (7.4) | 3.06 (1.69-5.53) | <.001 |
| Substance use disorders | 31 / 1542 (2.0) | 10 / 204 (4.9) | 21 / 1338 (1.6) | 4.39 (1.67-11.53) | .003 |
| Any common mental disorder | 101 / 962 (10.5) | 18 / 88 (20.5) | 83 / 874 (9.5) | 3.80 (1.98-7.26) | <.001 |
| Matched | | | | | |
| Mood disorders | 28 / 264 (10.6) | 17 / 135 (12.6) | 11 / 129 (8.5) | 2.32 (0.73-7.38) | .15 |
| Anxiety disorders | 35 / 274 (12.8) | 20 / 138 (14.5) | 15 / 136 (11.0) | 1.82 (0.63-5.29) | .27 |
| Substance use disorders | 15 / 345 (4.3) | 10 / 180 (5.6) | 5 / 165 (3.0) | 2.54 (0.52-12.42) | .25 |
| Any common mental disorder | 30 / 174 (17.2) | 17 / 78 (21.8) | 13 / 96 (13.5) | 2.68 (0.84-8.48) | .10 |

^aOdds ratios are adjusted for variation in the time interval between T0 and T1.

Note. *At-risk groups* consist of women who never had the disorder before T0 and were interviewed at both waves; *incident* cases are those participants of the at-risk group who developed one or more disorders within the disorder category between T0 and T1. Variables for matching were categorical and all associated with the predictor and at least one of the outcome variables of either incidence or recurrence: age category, living situation, western versus non-western ethnicity, children, urbanicity of residence, employment situation, religion, and history of childhood abuse.

Table 4.3 Recurrence of common mental disorders between T0 and T1 in unmatched and abortion group (DAMHS) and reference group (NEMESIS-2).

| RECURRENCE: cases / at-risk group (%) | Total | DAMHS | NEMESIS-2 | OR ^a (95% CI) | p |
|---|-----------------|----------------|-----------------|--------------------------|------|
| Non-matched | | | | | |
| Mood disorders | 63 / 329 (19.1) | 19 / 67 (28.4) | 44 / 262 (16.8) | 1.98 (0.90-4.35) | .09 |
| Anxiety disorders | 30 / 196 (15.3) | 12 / 46 (26.1) | 18 / 150 (12.0) | 3.27 (1.13-9.51) | .03 |
| Substance use disorders | 11 / 136 (8.1) | 7 / 36 (19.4) | 4 / 100 (4.0) | 1.41 (0.13-14.81) | .77 |
| Any common mental disorder ^c | 97 / 400 (24.3) | 31 / 77 (40.3) | 66 / 323 (20.4) | 2.76 (1.41-5.43) | .003 |
| Matched | | | | | |
| Mood disorders | 20 / 96 (20.8) | 16 / 61 (26.2) | 4 / 35 (11.4) | 3.72 (0.79-17.53) | .10 |
| Anxiety disorders | 13 / 62 (21.0) | 11 / 42 (26.2) | 2 / 20 (10.0) | 6.70 (0.91-49.31) | .06 |
| Substance use disorders | 6 / 46 (13.0) | 6 / 29 (20.7) | 0 / 17 (0.0) | Fixed ^b | .99 |
| Any common mental disorder ^c | 38 / 114 (33.3) | 28 / 71 (39.4) | 10 / 43 (23.3) | 3.20 (1.02-9.99) | .05 |

^a Odds ratios are adjusted for variation in the time interval between T0 and T1.

^b As there were no recurrent participants for substance use disorders in the NEMESIS-2 cohort, this B-parameter was fixed at 15.

^c The number of cases for any common mental disorder is not equal to the sum of the cases of the disorder categories, because participants were considered recurrent if they had a lifetime history of any disorder before T0 (but not in the last year before T0) and a disorder between T0 and T1, regardless of disorder category (for instance, participants with a lifetime mood disorder could develop an anxiety disorder after T0, which was considered recurrent in terms of any common mental disorder).

Note. *At-risk groups* consist of women who had one or more disorders in their lifetime, but not in the last year before T0, and were interviewed at both waves; *recurrent* cases are those participants of the at-risk group who developed one or more disorders within the disorder category between T0 and T1. Variables for matching were categorical and all associated with the predictor and at least one of the outcome variables of either incidence or recurrence: age category, living situation, western versus non-western ethnicity, children, urbanicity of residence, employment situation, religion, and history of childhood abuse.

4.4 Discussion

After 2.5 to 3 years post-abortion, we initially found differences in incidence of mental disorders in our unmatched and unadjusted data, but matching strongly attenuated the results by decreasing differences between the two cohorts. This implies that the initial differences in incidence of disorders in the 2.7 year period after the abortion, cannot be attributed to the event of the abortion (including the unwanted pregnancy); rather, they seem to be largely dependent on co-occurring variations in the measured covariates. After matching, the odds for the onset of a mental disorder were not significantly higher for the abortion cohort as compared to the reference group. From our results, it seems unlikely that abortion of an unwanted pregnancy increases the risk of incident mental disorders. This confirms conclusions of various former review studies (APA, 2008; Charles et al., 2008; NCCMH, 2011; Robinson et al., 2009; Steinberg & Russo, 2009). We were the first to investigate this with a design that assesses incidence and recurrence of mental disorders and uses exact matching to deal with confounding.

With regard to recurrence of mental disorders after abortion, we found initial (unmatched) differences in any mental disorder and anxiety disorders only. After matching, only the initial difference for any mental disorder remained significant. This means that the whole abortion experience (including the unwanted pregnancy) might slightly increase vulnerability for recurrence of mental disorders among women with a psychiatric history. We found in an earlier study that women with a psychiatric history (i.e., at risk for recurrence) do experience a more stressful pre- and post-abortion period than women without such a history (Van Ditzhuijzen et al., 2015, see Chapter 3). It is possible that this increased level of stress triggered recurrence of mental disorders among women with a psychiatric history. Because of the low power in the recurrence analyses, any interpretation has to be treated with caution. Furthermore, since the abortion and the unwanted pregnancy cannot be separated, we do not know to what extent this possible effect is related to the actual abortion procedure, or to being pregnant unwantedly. In an earlier study, we found that women reported more emotional burden related to experiencing the unwanted pregnancy than to experiencing the abortion treatment itself (Van Ditzhuijzen et al., 2015, see Chapter 3). Therefore it is unlikely that these possible effects would be related to the abortion treatment only.

4.4.1 Strengths and limitations

We have overcome several limitations that characterize abortion and mental health research (APA, 2008; Charles et al., 2008; Major et al., 2009). We distinguished incidence and recurrence in a prospective longitudinal study, in which the timing of the abortion and the disorders was measured accurately. Furthermore, we used careful and precise exact 1-to-1 matching, which is a rigorous method to deal with confounding (Cook et al., 2008; Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). Matching can be particularly useful when there is insufficient overlap in background variables between samples (Stuart, 2010). Therefore, this study offers additional insight to the literature in this field, in which these methods have not yet been used.

The following limitations should be mentioned. Despite our relatively large sample sizes, we lost participants due to matching and attrition, which resulted in relatively wide confidence intervals of the odds ratios, especially for recurrence. These power issues are an impediment for drawing firm conclusions regarding the association between abortion and recurrence of mental disorders. Second, we cannot be certain that we matched on all factors that were associated with abortion and subsequent mental disorders. Even though matching has the potential to reduce unmeasured confounding (Stürmer et al., 2010), it is unlikely that it removed all confounding completely. Third, the estimates are based on self-reported measures. Accurate recall of lifetime disorders is often questioned, resulting in underreporting of lifetime symptoms; therefore the incidence rates might be somewhat overestimated (De Graaf et al., 2013). There is however no reason to assume that the results of the DAMHS cohort are biased in a different manner by retrospective reporting than those of the reference cohort (Raphael & Cloitre, 1994). Fourth, there might have been underreporting of abortions in the NEMESIS-2 cohort. However, abortion is not as stigmatized in the Netherlands as in other countries (Kumar et al., 2009; Levels et al., 2010; Need et al., 2008). Also, in the confidential context of the face-to-face interview, women were already disclosing private information about their sexual health and other personal issues. Therefore, it seems unlikely that a substantial group of women would have lied to the interviewer about this. Furthermore, the abortion rate in the Netherlands is among the lowest in the world (Levels et al., 2012; Ministerie van VWS-IGZ, 2014), so even if there would have been some underreporting, the actual percentage would be small. Fifth, we cannot exclude the possibility that women in the reference group have had unwanted or mistimed pregnancies before. Even though women who become unintentionally pregnant may be quite different from women who do not, whether they terminate the pregnancy or decide otherwise, there is no

reason to believe that women in the reference group had had more previous unwanted pregnancies carried to term than women in DAMHS, and that this variable would have influenced our results.

Response and attrition analyses revealed that both the initial sample and the drop-out, albeit small, were slightly selective in terms of sociodemographic covariates. Yet there was no need to control for these variables, as the distributions of these parameters were balanced by 1-to-1 matching. Just like the experimental design, the matching design has the advantage that internal validity is strong, but this might come at the cost of slightly lower generalizability. Also, abortion studies are notorious for their low participation rates (APA, 2008; Foster et al., 2015), and the current study is no exception in that sense. Even though the matching dealt with the selectivity, we should remain prudent in generalizing the results.

4.4.2 Implications

To our knowledge, our study was the first to use 1-to-1 matching in examining associations between abortion and mental health. Our findings confirm the importance of considering pre-existing differences between abortion and reference groups, as they strongly confound possible linkages between abortion and mental health. Especially with regard to incidence of mental disorders, the impact of covariates is high. Future research should also make sure that reversed causality is ruled out, as a psychiatric history might predispose for negative life events such as unwanted pregnancy and abortion (NCCMH, 2011; Van Ditzhuijzen et al., 2013, see Chapter 2). These events could then, in turn, trigger recurrence in women with a psychiatric history. Our results suggest that termination of an unwanted pregnancy, as a life event, does not increase the risk of incidence of mental disorders among women without a psychiatric history, but could possibly slightly increase the risk for mental disorders among women with such a history, similar to the effects of other life events (e.g., Spijker et al., 2001). This process could be mediated by pre- and post-abortion experiences, which are also strongly affected by psychiatric history (see Chapter 3). With regard to abortion care practice, women with a psychiatric history might benefit from extra attention. However, it is critical to acknowledge the variability in women's backgrounds as well as their responses to abortion (APA, 2008; Robinson et al., 2009). Therefore we recommend that this extra attention is, at all times, tailored to women's individual needs (Van Ditzhuijzen et al., 2015, see Chapter 3).

CHAPTER 5

DOES ABORTION INCREASE THE INCIDENCE AND RECURRENCE OF MENTAL DISORDERS ON THE LONG TERM?

Jenneke van Ditzhuijzen

Margreet ten Have

Ron de Graaf

Carolus H.C.J. van Nijnatten

Wilma A.M. Vollebergh

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Abstract

Research looking at long-term (five years or more) effects of abortion on mental health, is scarce. In the current prospective cohort study, women were followed up for five to six years after an abortion. We used 1-to-1 matching to compare women who had abortions with women who did not have abortions with regard to incidence and recurrence of mood disorders (MOD), anxiety disorders (AND), substance use disorders (SUD), and the aggregate measure any mental disorder (AMD), in the 5 to 6 years after the abortion. Unmatched (i.e., uncontrolled) analyses revealed that having an abortion only heightened the risk of incidence SUD and AMD, but not on MOD and AND. For recurrence, only the odds for SUD were higher for the abortion cohort. After matching on confounding variables, abortion did not increase the likelihood that women more often had incident or recurrent mental disorders in the 5 to 6 years follow up period. It is unlikely that abortion causes new or recurrent mental disorders on the longer term, when confounders are taken into account.

5.1 Introduction

Although recent reviews have shown that there is no evidence that abortion ‘causes’ adverse mental health outcomes (APA, 2008; Charles et al., 2008; NCCMH, 2011), little is known about possible long-term mental health consequences of terminating an unwanted pregnancy. Conclusions are mostly based on cross-sectional, retrospective, and short-term cohort studies, therefore it can be argued that mental health problems that might develop on the longer term, are being missed in research.

The little long-term research that has been done so far, has some methodological drawbacks. A few prospective primary cohort studies followed women’s mental health for 2 years after an abortion (Major et al., 2000; Quinton et al., 2001), and for 5 years (Broen et al., 2005, 2006) but these had no comparison group, or compared to a miscarriage group (Broen et al., 2005), which may lead to an underestimation of potential effects. A very large and high-quality study with a 12-year follow up time was conducted by Munk-Olsen et al. (2011), but these results were based on data regarding psychiatric consultations, and it is known that not all women with mental disorders seek treatment, which might introduce selection or Berkson’s bias (Westreich, 2012). Lastly, the Turnaway Study (e.g., Biggs et al., 2015; Foster et al., 2015; Rocca et al., 2013) has followed a large group of women for 5 years post-abortion, but this study measured merely subclinical symptoms of a limited range of mental disorders, and they compared women who had an abortion to women who were denied abortions, which is a highly selective group.

In an earlier study (Chapter 4), we used 1-to-1 matching to remove variance from sociodemographic and childhood abuse confounders between women who had an abortion and controls who did not, and investigated whether abortion was associated with an increased incidence or recurrence of common mental disorders in the 2.5 to 3 years post-abortion. We found that abortion was not associated with higher incidence of disorders, but women who had an abortion who also had a history of mental disorders, were at slightly increased risk for recurrence of any mental disorder. It is important to find out whether this short-term effect of the abortion on recurrence of mental disorders remains present until 5 to 6 years post-abortion. In this study, we therefore repeated the analyses of Chapter 4, but we used three instead of two data waves. The research questions for the current study were whether abortion was associated with an increased risk for (1) incidence and (2) recurrence of mental disorders in the 5 to 6 years post-abortion.

5.2 Method

5.2.1 Design

In this prospective cohort study we compared women who had an abortion with women from the general population who never had an abortion. In research like this, it is impossible to use random assignment to treatment (abortion) or control condition, which implies that selectivity and confounding are inherent to this type of research. Matching methods were developed to solve this general problem (Cook et al., 2008; Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983). By statistically matching individual women from the DAMHS study with individual women from NEMESIS-2, complete balance in the distributions of the covariates was induced, and pre-existing differences between the two cohorts were minimized.

5.2.2 Setting

The study is based on three waves of the Dutch Abortion and Mental Health Study (DAMHS) and the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2). The DAMHS participants were recruited by clinical staff in seven Dutch abortion clinics. Shortly after the abortion procedure, staff members asked the women to read the research flyer, complete a reply card, and deposit the card in a locked mailbox. The study enrolled Dutch-speaking women of 18 to 46 years old, obtaining an abortion (medical or aspiration, until a maximum of 22 weeks) for an unwanted pregnancy, without clear fetal or maternal medical indications.

Participants were interviewed by professionally trained female interviewers at three time points, first, approximately 20 to 40 days post-abortion, between April 2010 and January 2011 (T₀), then between December 2012 and November 2013, which was on average 2.7 years later (T₁), and lastly, between April 2015 and November 2015 (T₂), on average 4.9 years post-abortion. The mean duration of the interviews was around 2.5 h (T₀) and 1.5h (T₁ and T₂). Participants received a gift card of 50 Euros for each interview.

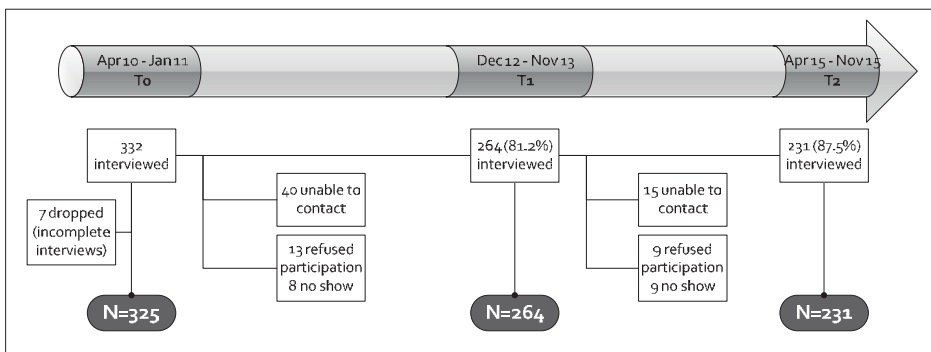
The reference cohort was taken from NEMESIS-2 (De Graaf et al., 2010a; 2010b; 2012). The sampling strategy and interview procedure of NEMESIS-2 are described in more detail elsewhere (De Graaf, 2010a; 2010b). We included women from NEMESIS-2 in the same age range as the DAMHS sample who reported they never experienced abortion. In both studies, written informed consent was obtained before each interview, and

both studies were approved by a local medical ethics committee. All interviews were fully laptop-assisted and face-to-face.

5.2.3 Participants

At To, we interviewed 325 participants. Results of a response analysis revealed that our sample was slightly selective; our sample was slightly older, more often of Western origin, and higher educated than women in the general abortion clinic client population. Participant flow and response analysis results of To are described more extensively in Chapter 2. The reference cohort was taken from NEMESIS-2, which had an initial response rate at To of 65.1% (De Graaf et al., 2010a; 2010b). We included 1,902 women in our reference cohort from NEMESIS-2; these women were selected on the basis of age (< 47 years old) and whether they reported having had an abortion (no abortion). Of the initial 325 participants of the DAMHS study, 264 (81.2%) were re-interviewed at T1, and of these women, 231 were interviewed at T2 (87.5%); see Figure 5.1. Of the 1,902 women selected from NEMESIS-2 for this study at To, 1,496 were re-interviewed at T1 (78.7%), and 1,297 at T2 (87.2%). Of these, 14 had undergone abortion between To and T2. They were excluded from the analysis, leaving 1,283 participants in the reference cohort.

Figure 5.1 Response and attrition between To-T2 in the DAMHS study.



5.2.4 Attrition

Overall, attrition between To and T2 was comparable for both cohorts. Attrition analysis showed that in DAMHS, women aged 18-24 at baseline dropped out more often than women aged 35-46 at baseline (OR = 4.67, 95% CI = 1.88-11.65, $p = .001$), as

well as women of non-western origin compared to women of Dutch or other western ethnicity (OR = 2.15, 95% CI = 1.08-4.27, $p = .03$). In NEMESIS-2, women without children at To (OR = 1.55, 95% CI = 1.20-2.00, $p = .001$), women of non-western ethnicity (OR = 2.22; 95% CI = 1.50-3.29, $p < .000$), and women with the two lowest levels of education (OR = 1.97, 95% CI = 1.06-3.64, $p = .03$; and OR = 1.60, 95% CI = 1.21-2.11, $p = .001$) discontinued more often. We also analyzed whether the mental disorder categories studied here were associated with attrition (while controlling for the demographic variables that were associated with attrition in one or both cohorts). In NEMESIS-2, but not in DAMHS, women who had anxiety disorders at To discontinued less often than women who did not have anxiety disorders (OR = 0.73, 95% CI = 0.53-0.99, $p = .04$). Mood disorders, substance abuse disorders, and the aggregate measure any mental disorder were not associated with attrition in the two cohorts.

5.2.5 Measures

Mental disorders

In both cohorts, presence of lifetime and last-year DSM-IV disorders was assessed at To with the Composite International Diagnostic Interview (CIDI) version 3.0 (Alonso et al., 2004; Haro et al., 2006). At T1 and T2, presence of mental disorders since the last interview was assessed. The following disorders, relevant for this paper, were included: mood disorders (MOD: major depression, dysthymia, bipolar disorder); anxiety disorders (AND: panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder); and substance use disorders (SUD: alcohol/drug abuse and dependence). For incidence, women who never had one or more disorders within a specific disorder category before To were included in the at-risk group, irrelevant of whether they had a disorder in any of the other categories. For recurrence, women who had one or more disorders within a specific disorder category in their lifetime, but not in the 12 months before To, were included. By excluding 12-month prevalent cases, the correct order of the events (abortion and mental disorder) was ensured. In addition to the three disorder categories, we also included the aggregate measure any mental disorder (AMD). For this variable, the at-risk group for incidence consisted of women who never had a disorder in any of the three disorder categories. Likewise, recurrence referred to disorders in any of the three categories.

Covariates

Demographic variables assessed at baseline were age category (18-24, 25-34 and 35-46 years); living situation (with or without a partner); having children (yes or no); western or non-western ethnicity (based on the definition of Statistics Netherlands: non-western = respondent or at least one parent of the respondent was born in Turkey, the Caribbean, Africa, Asia (excluding Japan/ Indonesia) or Latin-America; western = other); considers herself religious (yes or no); employment situation (paid job or not); education level (primary education, lower secondary education, higher secondary education and higher professional education); and urbanicity of place of residence (urban or rural). Furthermore, we also included childhood abuse as a covariate, because it has been found that childhood abuse can predispose for both mental disorders (Green et al., 2010; Kessler et al., 1997; Weich et al., 2009) and abortion (Boden et al., 2009; Russo & Denious, 2001; Steinberg & Tschann, 2013). Following other NEMESIS-2 studies (De Graaf et al., 2010a; 2010b), childhood abuse was scored '1' when sexual abuse had happened at least once and/or other types of abuse (emotional, psychological, and physical abuse) more than once before the age of 16.

5.2.6 Statistical analysis

First, logistic regression analyses were performed with unmatched data, only adjusting for the difference in time interval between T₀ and T₂. Then, we chose covariates for matching using the following method. Based on the literature, we first identified variables associated with both abortion and mental health. For each of these variables, we individually tested whether they were associated with the predictor (abortion versus control cohort), and second, whether they were associated with the various outcome variables (incidence or recurrence of the four categories of mental disorders at T₂). We selected only those variables that predicted both the predictor and at least one of the eight outcome variables. The following covariates were selected: age category, living situation, having children, western or non-western ethnicity, employment situation, living in an urban environment, and a history of childhood abuse.

All variables selected for matching were categorical. Matching was implemented in the Coarsened Exact Matching package (Iacus et al., 2011; 2012) in SPSS 22. We matched participants 1-to-1, and only kept exact matches. This implies that pairs of women from both cohorts are formed that are identical on all selected covariates, and differ only

with respect to having had an abortion. Matching was done on T_0 data, before attrition. After this, logistic regression analyses were performed for each disorder on T_2 (both incidence and recurrence), for matched data; while adjusting for the length of the time interval between T_0 and T_2 in years. Testing was two-sided and statistical significance was considered to be $p < 0.05$.

5.3 Results

Demographic descriptives of the DAMHS and the NEMESIS-2 cohort at T_0 are displayed in Chapter 4, Table 4.1.

5.3.1 Incidence

Before matching, participants who had an abortion had higher odds for incidence of AMD (OR = 3.88, 95% CI = 1.34-11.19, $p = .01$), and for SUD (OR = 5.02, 95% CI = 1.14-22.23, $p = .03$) than participants in the no-abortion group. The odds for incidence of MOD and AND were not significantly higher for the abortion group compared to controls before matching (see Table 5.1). After matching, the differences in incidence between the cohorts decreased to non-significance.

5.3.2 Recurrence

Before matching, participants in the DAMHS cohort had slightly higher odds for SUD only (OR = 17.20, 95% CI = 1.01-292.24, $p = .049$) than participants in NEMESIS-2, but this was not the case for MOD, AND, or AMD (see Table 5.2). Matching participants rendered the effect for SUD non-significant.

Table 5.1 Incidence of common mental disorders between T0 and T2 in unmatched and case-control matched abortion group (DAMHS) and reference group (NEMESIS-2).

| INCIDENCE (cases / at-risk group (%)) | Total | DAMHS | NEMESIS-2 | OR (95% CI) | p |
|--|-------------------|-----------------|------------------|--------------------|----------|
| NON-MATCHED | | | | | |
| Mood disorders | 127 / 1106 (11.5) | 28 / 137 (20.4) | 99 / 969 (10.2) | 2.94 (0.97-8.87) | .06 |
| Anxiety disorders | 130 / 1123 (11.6) | 27 / 137 (19.7) | 103 / 986 (10.4) | 1.97 (0.63-6.12) | .24 |
| Substance use disorders | 58 / 1343 (4.3) | 16 / 180 (8.9) | 42 / 1163 (3.6) | 5.02 (1.14-22.23) | .03 |
| Any common mental disorder | 153 / 850 (18.0) | 29 / 77 (37.7) | 124 / 773 (16.0) | 3.88 (1.34-11.19) | .01 |
| MATCHED (282^a pairs) | | | | | |
| Mood disorders | 42 / 254 (16.5) | 24 / 121 (19.8) | 18 / 133 (13.5) | 6.53 (0.99-43.19) | .052 |
| Anxiety disorders | 42 / 253 (16.6) | 23 / 124 (18.5) | 19 / 129 (14.7) | 1.14 (0.14-9.13) | .90 |
| Substance use disorders | 22 / 327 (6.7) | 15 / 164 (9.1) | 7 / 163 (4.3) | 7.35 (0.52-104.98) | .14 |
| Any common mental disorder ^b | 45 / 171 (26.3) | 25 / 68 (36.8) | 20 / 103 (19.4) | 3.66 (0.54-24.65) | .18 |

^a Matching was done with T0 data, before attrition; this is why the number of pairs after matching is larger than the smallest sample (DAMHS) at T2. ^b The number of cases for any common mental disorder is not equal to the sum of the cases of the disorder categories, because participants were considered recurrent if they had a lifetime history of any disorder before T0 (but not in the last year before T0) and a disorder between T0 and T2, regardless of disorder category (for instance, participants with a lifetime mood disorder could develop an anxiety disorder after T0, which was considered recurrent in terms of any common mental disorder). *Note.* At-risk groups for *Incidence* consist of women who never had the disorder before T0 and were interviewed at both waves; *incident* cases are those participants of the at-risk group who developed one or more disorders within the disorder category between T0 and T2. Odds ratios are adjusted for variation in the time interval between T0 and T2. Variables for matching were categorical and all associated with the predictor and at least one of the outcome variables of either incidence or recurrence: age category, living situation, western versus non-western ethnicity, children, urbanicity of residence, employment situation, and history of childhood abuse.

Table 5.2 Recurrence of common mental disorders between T0 and T2 in unmatched and case-control matched abortion group (DAMHS) and reference group (NEMESIS-2).

| RECURRENCE (cases / at-risk group (%)) | Total | DAMHS | NEMESIS-2 | OR (95% CI) | p |
|---|------------------|----------------|------------------|---------------------|----------|
| NON-MATCHED | | | | | |
| Mood disorders | 89 / 413 (21.5) | 24 / 79 (30.4) | 65 / 334 (19.5) | .66 (0.09-4.55) | .67 |
| Anxiety disorders | 44 / 246 (17.9) | 15 / 52 (28.8) | 29 / 194 (14.9) | 6.16 (0.93-40.76) | .06 |
| Substance use disorders | 27 / 169 (16.0) | 15 / 45 (33.3) | 12 / 124 (9.7) | 17.20 (1.01-292.24) | .049 |
| Any common mental disorder | 142 / 504 (28.2) | 39 / 88 (44.3) | 103 / 416 (24.8) | 1.07 (0.26-4.47) | .93 |
| MATCHED (282^a pairs) | | | | | |
| Mood disorders | 29 / 86 (33.7) | 23 / 59 (39.0) | 6 / 27 (22.2) | 0.25 (0.00-42.98) | .60 |
| Anxiety disorders | 21 / 59 (35.6) | 13 / 40 (32.5) | 8 / 19 (42.1) | 0.03 (0.00-6.22) | .20 |
| Substance use disorders | 13 / 37 (35.1) | 13 / 29 (44.8) | 0 / 8 (0) | Fixed ^c | |
| Any common mental disorder ^b | 49 / 99 (49.5) | 37 / 68 (54.4) | 12 / 31 (38.7) | 0.22 (0.00-13.15) | .47 |

^a Matching was done with T0 data, before attrition; this is why the number of pairs after matching is larger than the smallest sample (DAMHS) at T2. ^b The number of cases for any common mental disorder is not equal to the sum of the cases of the disorder categories, because participants were considered recurrent if they had a lifetime history of any disorder before T0 (but not in the last year before T0) and a disorder between T0 and T2, regardless of disorder category (for instance, participants with a lifetime mood disorder could develop an anxiety disorder after T0, which was considered recurrent in terms of any common mental disorder). ^c As there were no recurrent cases for substance use disorders in the NEMESIS-2 cohort, this B-parameter was fixed at 15. *Note.* At-risk groups for *Recurrence* consist of women who had one or more disorders in their lifetime, but not in the last year before T0, and were interviewed at all of the three waves; *recurrent* cases are those participants of the at-risk group who developed one or more disorders within the disorder category between T0 and T2. Odds ratios are adjusted for variation in the time interval between T0 and T2. Variables for matching were categorical and all associated with the predictor and at least one of the outcome variables of either incidence or recurrence: age category, living situation, western versus non-western ethnicity, children, urbanicity of residence, employment situation, and history of childhood abuse.

5.4 Discussion

In the period up until 5 to 6 years after an abortion, we initially found differences between cohorts in our unmatched and unadjusted data for incidence and recurrence of SUD, and in incidence of AMD, but not for other categories of disorders. These differences became non-significant after 1-to-1 matching on confounding variables. The initial differences are therefore not attributable to the abortion itself, but seem to be related to confounding variables.

Comparing the current findings to the findings after 2.5 to 3 years post-abortion (Chapter 4), it is noteworthy that even the 'raw', unmatched differences between the cohorts became smaller over time, especially for incidence. This is in line with findings that symptoms of mental health disorders decrease over time after an abortion (Foster et al., 2015). At both time points in our study, matching on confounders lead to disappearance of the increased risk of incidence. For recurrence, a small effect was visible on the shorter term, but this was no longer present after 5 to 6 years.

These findings show that it is highly unlikely that abortion is associated with the development of first-incident common mental disorders, which is in line with conclusions of various review studies (APA, 2008; Charles et al., 2008; NCCMH, 2011). Even though abortion might slightly elevate the risk of recurrence of previously experienced mental disorders on the shorter term, as was found earlier (see Chapter 4), on the longer term this effect does not hold.

The following limitations should be mentioned. The 1-to-1 matching procedure resulted in relatively wide confidence intervals of the odds ratios, especially for recurrence. But the lack of significant effects is not caused by the matching procedure; the unmatched data already revealed few differences. Second, we cannot be certain that we matched on all factors that were associated with abortion and subsequent mental disorders. Even though matching has the potential to reduce unmeasured confounding (Stürmer et al., 2010), it is unlikely that it removed all confounding completely. Third, just like the experimental design, the matching design has the advantage that internal validity is strong, but external validity is limited. Also, abortion studies usually have low participation rates (APA, 2008; Foster et al., 2015), and the current study is no exception in that sense. Even though the matching dealt with selectivity, we should remain prudent in generalizing the results.

To our knowledge, we have been the first to use 1-to-1 exact matching in examining the association between abortion and mental disorders. We have again confirmed that pre-existing differences are crucial, as they strongly confound the associations between abortion and mental health. If confounders are not controlled for in a stringent manner, differences between groups are likely to be falsely attributed to the abortion (APA, 2008; Charles et al., 2008).

CHAPTER 6

PREDICTORS OF COMMON MENTAL DISORDERS AMONG WOMEN WHO HAVE HAD AN ABORTION

Jenneke van Ditzhuijzen

Margreet ten Have

Ron de Graaf

Carolus H.C.J. van Nijnatten

Wilma A.M. Vollebergh

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Author contributions: JvD developed the study concept and design, managed the data collection, performed the literature searches and data analysis, and wrote the manuscript. WV, CvN, MtH and RdG gave advice and provided feedback. WV and CvN conceptualized the general DAMHS study, in cooperation with MtH and RdG.

Abstract

The aim of this study was to identify risk factors for mental disorders in women who have had an abortion. With data from the longitudinal Dutch Abortion and Mental Health Study (DAMHS) we investigated whether various baseline variables are related to the first-incidence or recurrence (hereafter called: incidence) of common mental disorders (mood, anxiety and substance use disorder) in the 2.7 years post-abortion, as assessed with the Composite International Diagnostic Interview (CIDI) version 3.0. At baseline (T₀), shortly after they had an abortion, 325 women were interviewed, of which 264 (81.2%) were re-interviewed at follow up (T₁). Incidence of any common mental disorder in the timeframe between T₀ and T₁ was assessed among women without a prevalent mental disorder at T₀. Predictors were abortion-related variables, social support variables, number of recent negative life events, and background variables (sociodemographics, childhood abuse, and history of mental disorders). Bivariate and multivariate logistic regressions were performed to study predictors of (2.7-year) incidence. Multivariate analyses showed that abortion-related variables were not associated with incidence of mental disorders. Low social support of the partner did not predict incidence either, but having an unstable relationship with the conception partner did. Number of recent negative life events strongly predicted incidence. Furthermore, women with previous mental disorders ran a higher risk of post-abortion disorders than women without previous disorders. Women with an unstable relationship with the conception partner, a higher number of recent negative life events, and previous mental disorders, are at risk for mental disorders after abortion. Even though these risks are not abortion-specific, the abortion care setting may be a good place to be extra attentive to these risk factors.

6.1 Introduction

Several studies have found that women who had an abortion, more often have lifetime mental disorders (e.g., Coleman et al., 2009/2011; Mota et al., 2010); but it is also clear that these disorders mostly predate the pregnancy (e.g., Gilchrist et al., 1995; Steinberg & Finer, 2011). Recent literature reviews have concluded that there is no evidence that abortion ‘causes’ mental disorders (APA, 2008; Charles & Polis, 2008; NCCMH, 2011). At the same time, studies have found that among women who had an abortion, mental disorder histories are much more common compared to women who did not have abortions (Van Ditzhuijzen et al., 2013, see Chapter 2) or women giving birth (Steinberg et al., 2014). These findings suggest that women who have had an abortion, or at least some categories or groups of women among them, could be more vulnerable to future mental health disorders. Therefore, it is important to study determinants of the first-incidence or the recurrence (hereafter called: incidence) of mental disorders among women who have had an abortion.

Very few studies so far have investigated risk factors for the incidence of mental disorders after an abortion, which is more useful than prevalence as an outcome measure when it comes to understanding the etiology and risk factors associated with the development of disorders (Rothman et al., 2012). One study looked at incidence of psychiatric contact after an abortion (Munk-Olsen et al., 2011). Yet it is known that not all people with mental disorders will seek treatment, which might introduce selection or Berkson’s bias (Westreich, 2012). These findings should therefore be complemented with research using a strong structured diagnostic instrument to assess incidence of a wide variety of clinical-level mental disorders. The current study aims to fill that gap, and therefore adds valuable insight to the literature.

Various authors have hypothesized that variables related to the abortion and/or the unwanted pregnancy (hereafter: *abortion-related variables*) could be predictive of mental disorders. For example, women who have later abortions (second trimester) might experience more problems after abortion than women who have first trimester abortions (e.g., Söderberg et al., 1998), however, the opposite has been found as well (Biggs et al., 2015; Rocca et al., 2015). Women who have had multiple abortions could be more at risk for mental disorders than women who have had one abortion (Major et al., 2009; Steinberg & Russo, 2008), although others have found that these effects disappear after adjustment for covariates (Steinberg & Finer, 2011). Furthermore, we have found that abortion-related factors such as decision difficulty, low self-efficacy

for coping with the abortion, post-abortion avoidance oriented coping, experienced emotional burden, and negative post-abortion emotions are influenced by psychiatric history (Van Ditzhuijzen et al., 2015, Chapter 3), and these factors might also affect mental health on the long term. It has indeed been found that decision difficulty about the abortion predicted depression scores six months post-abortion (Broen et al., 2006) and negative emotions two years post-abortion (Major et al., 2000). Furthermore, low self-efficacy and avoidance oriented coping have been found to be related to depression symptoms (Cozzarelli, 1993; Major et al., 1990; Quinton et al., 2001; Broen et al., 2006), and negative post-abortion emotions to mental disorders among women who had an abortion (Fergusson et al., 2009). Thus, analyzing the potential role of these abortion-related variables in the development of mental disorders after abortion is highly important.

Two categories of variables that are closely related to abortion-related variables are *social support* and *recent negative life events*. Social support might function as an 'emotional buffer' in case of adverse events such as unwanted pregnancy and abortion, protecting against incidence of disorders (Dalgard et al., 1995). Empirical research confirmed that perceived social support is an important factor in women's post-abortion experiences (Major et al., 1997; NCCMH, 2011, Rocca et al., 2015), but also that the relationship between social support and depression symptoms might be mediated by self-efficacy and coping (Major et al., 1990; Saltzman & Holahan, 2002). Last-year negative life events have been associated with negative mental health in the general population (e.g., De Graaf et al., 2002), and with post-abortion anxiety, but not depression, in an abortion sample (Broen et al., 2006), and they could also play a role in the abortion decision itself (Jones, 2013). Both classes of variables could heighten the vulnerability for post-abortion mental disorders, either direct or indirect, and should therefore be taken into account.

When investigating the impact of abortion-related variables and pre-abortion negative experiences on mental health after abortion, it is also important to take background variables (*sociodemographics, childhood abuse*) into account. First, sociodemographic variables have been related to negative mental health outcomes in abortion groups. For example, age, parity, ethnicity, religion, employment status, income, and educational level have all been investigated as determinants of various negative mental health outcomes after abortion (Cogle et al., 2005; Major et al., 2000; Munk-Olsen et al., 2011; Pedersen 2007; 2008; Russo & Dabul, 1997; Schmiege & Russo, 2005;), however, findings for all of these variables were mixed (NCCMH, 2011). Second, childhood abuse has been consistently associated with mental disorders (e.g., Green et

al., 2010; Kessler et al., 1997), and also with abortion itself (Bleil et al., 2011; Boden et al., 2009; Steinberg & Tschann, 2013; Van Roode et al., 2009).

In the current study, we set out to identify factors that predict the incidence of common mental disorders among these women in the years after the abortion. We used a reliable and valid instrument, the Composite International Diagnostic Instrument (CIDI) 3.0 (Alonso et al., 2004) to measure mood, anxiety, and substance use disorders. Following Barbaglia et al. (2015), cases were defined incident of any mental disorder when they developed a disorder between T_0 and T_1 . Therefore, in this study, an incident case was either a first-onset or a recurrent one. The population at-risk was defined as respondents without a 1-month prevalence in any of the three disorder categories at T_0 . The main research question was: Which potential risk factors are related to the incidence of mental disorders in the 2.5 to 3 years (on average 2.7 years) after an abortion? Main predictors were abortion-related variables, social support variables and number of recent negative life events. Background variables were sociodemographics, childhood abuse, and having a history of mental disorders.

6.2 Methods

6.2.1 Setting

The study is based on the first two waves of the Dutch Abortion and Mental Health Study (DAMHS). The DAMHS participants were recruited by clinical staff in Dutch abortion clinics. In the Netherlands, the large majority of abortions are performed in these specialized clinics (IGZ, 2014). Seven out of the sixteen existing clinics participated in the study, which were selected on the basis of geographical location and clinic size, in order to recruit a representative sample of respondents from the whole country. Shortly after the abortion procedure, staff members asked the women to read the research flyer, complete a reply card, and deposit the card in a locked mailbox. The study enrolled Dutch-speaking women of 18 to 46 years old, obtaining an abortion (medical or aspiration, until a maximum of 22 weeks) for an unwanted pregnancy, without clear fetal or maternal medical indications.

Between April 2010 and January 2011, professionally trained female interviewers interviewed participants face-to-face 20 to 40 days after the abortion (T_0), and again between December 2012 and November 2013, which was on average 2.7 years later (T_1).

The mean duration of the interviews was around 2.5 h (T₀) and 1.5h (T₁). In both waves, participants received a gift card of 50 Euros.

6.2.2 Participants

We interviewed 332 out of 909 eligible women who were willing to participate at T₀, of which seven interviews could not be completed, leaving 325 participants for analysis. Participant flow and non-response analysis results of T₀ are described in Chapter 2. At T₁, 264 DAMHS participants (81.2%) were re-interviewed. Of the 61 cases that were lost to follow up, 32 women could not be traced, 8 women cancelled the interview last minute or did not show up at the interview, and 21 women did not want to participate anymore. Attrition analysis revealed that in DAMHS, women aged 18-34 dropped out more often than women aged 35-46 (OR = 8.37, 95% CI = 2.58-27.16, $p < .001$; and OR = 4.55, 95% CI = 1.63-12.74, $p = .004$, respectively), and religious women more often discontinued participation than non-religious women (OR = 2.50, 95% CI = 1.17-5.34, $p = .02$). Attrition was not associated with the three categories of mental disorders studied here.

6.2.3 Measures

Incidence of common mental disorders

Presence of DSM-IV disorders was assessed with the Composite International Diagnostic Interview (CIDI) version 3.0, which was developed adapted, and validated for the WHO World Mental Health Survey Initiative (Alonso et al., 2004; Haro et al., 2006; Kessler et al., 2007) and adapted in order to obtain a comparable version in Dutch (De Graaf et al., 2010a). The following common mental disorders, relevant for this paper, were included: mood disorders (major depression, dysthymia, bipolar disorder); anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder); and substance use disorders (alcohol/drug abuse and dependence); in addition, the aggregate measure 'any common mental disorder' (presence of one or more of all of the measured mental disorders) was included. At baseline a lifetime CIDI version was used; at follow up a CIDI version with as timeframe the period between baseline and follow up.

The outcome measure was incidence of any mental disorder in the period after the abortion between T₀ and T₁ (mean time interval was 2.7 years). In this study, an incident case was either a first-onset or a recurrent one, following Barbaglia et al.

(2015). The population at-risk was defined as respondents without a 1-month prevalence in any of the categories at To ($n=199$). Additional analyses were performed for incident categories of mood, anxiety, and substance use disorders.

Abortion-related variables

At To, we asked whether women had experienced one or more previous abortions (*multiple abortions*: yes = 1; no = reference). Gestational age was the number of weeks from the first day of the last menstruation until the termination of the pregnancy. From this variable, we calculated the number of women who terminated a *second trimester pregnancy* (after 13 weeks or more at the time of the procedure). The items *pre-abortion decision difficulty* ("To what extent did you have difficulty with making the decision to have an abortion?"), *emotional burden of the abortion* ("Looking back at the abortion, to what extent did you find the abortion procedure itself – not the unwanted pregnancy – emotionally burdensome?"), and *emotional burden of the unwanted pregnancy* ("And to what extent did you find the unwanted pregnancy emotionally burdensome?") were all measured with a 5-point scale (from 'not at all' to 'to very large extent', middle category 'moderate'). The reverse-scored item *post-abortion decision uncertainty* ("To what extent are you sure this was the right decision?") was also measured with a 5-point scale (from 'not at all' to 'completely', middle category 'neutral'). Because women who experience difficulties were of particular concern, we dichotomized all of these items into low=reference (scores 1, 2, and 3) and high=1 (scores 4 and 5).

The six post-abortion emotions measured at To were feelings of relief, guilt, emptiness, closure, mourning/loss, and pride ('proud of myself that I could do it'), and presented in the form of statements with a 5-point scale ranging from 'disagree a lot' to 'agree a lot'. The *positive emotion scale* originally consisted of the items relief, closure and pride ($\alpha = .64$), but we removed the item 'pride' which increased the reliability ($\alpha = .72$). The *negative emotion scale* ($\alpha=.80$) consisted of the emotions guilt, emptiness, and mourning/loss. The four-item scale on *post-abortion self-efficacy* ($\alpha = .78$) was a slightly adapted version from Major et al. (1998), since it was assessed after the abortion and not before. Women rated items (e.g., "To what extent were you able to spend time around children or babies comfortably?") on a scale ranging from 1 (not at all) to 5 (very well). Post-abortion coping was measured by two coping scales of the Dutch shortened version of the Coping Inventory for Stressful Situations, the CISS-21 (Calsbeek et al., 2006; Endler & Parker, 1999). We adapted the instruction so that it

would measure post-abortion coping specifically, and not general coping style: “[...] Please indicate to which extent you reacted this way after you had the abortion”. Seven items measured *emotion oriented coping style* ($\alpha = .79$), e.g., “blame myself for having gotten into this situation”; and seven other items measured *avoidance oriented coping style* ($\alpha = .76$) e.g., “take some time off and get away from the situation”.

Social support around the abortion

Women were asked to rate whether they had *experienced pressure* to have the abortion (“To what extent did you experience pressure of others (e.g., partner, family) to have an abortion?”) on a 5-point scale (from ‘not at all’ to ‘to very large extent’, middle category ‘moderate’). Because experienced pressure was generally low, we dichotomized this item into low=reference (scores 1 and 2) and high=1 (scores 3, 4, and 5).

We asked women what kind of relationship they had with the conception partner; they could choose between (1) current ‘steady’ partner, (2) a relationship which had ended in the meantime (since the time of the abortion), (3) an extramarital or extra-relationship affair, or (4) an unstable relationship. Responses were scored 0 on *unstable relationship* if they considered the conception partner their current partner (not necessarily living together), and 1 in all other instances.

Women were asked whether they had talked with other people about the intended abortion in the decision process (the partner or conception partner, mother, father, friend, other family member, other person), the *number of confidantes* was a count variable of these answers (range 0 - 6).

Social support was measured by the abortion-specific perceived social support and social conflict scale that Major et al. (1997) had adapted from the Social Provisions Scale (Russell & Cutrona, 1984; in Major et al., 1997). Women rated the extent to which their (conception) partner, their mother, their father, and a friend, in that order, each performed seven supportive behaviors in the period before the abortion, such as “Let you know he/she would be there for you no matter what you decided to do” (for a full list of items, see Major et al., 1997). Items for support were rated on a 5-point scale from ‘did not do this at all’ to ‘did this a great deal’, and averaged to yield a social support score for the conception partner ($\alpha = .88$) and (b) all other confidantes together ($\alpha = .90$). In total, 227 (85.9%) women confided in their partner or conception partner, and 202 women had discussed the abortion with other sources. In order not to lose cases in the regression analyses, we created dummy variables based on three

categories for social support ('high' = mean score ≥ 3.5 , 'low' = mean score < 3.5 , and 'did not tell').

Recent negative life events

Recent negative life events were assessed over the last 12 months before To, using an adapted version of the Brugha Life Events Section (Brugha et al., 1985). We asked whether the respondents had experienced the following events in the last 12 months: serious illness or injury; serious illness or injury of a close relative or partner; death of a brother, sister, child or partner; death of another close relative or close friend; a separation or divorce; a friendship break; a serious problem with a good friend, relative or neighbor; losing one's employment; serious financial problems; or other life events (open). We calculated a count variable for number of negative life events, with a potential range of 0 to 10. Abortion was not included as a life event.

Background variables

Sociodemographic variables were assessed at To. Age was measured continuously. Parity was a dichotomous measure of having no children versus having one or more children. Household income was the total net income of the respondent and her partner per month (in case she was cohabitating); under 1500 Euro was considered a low household income (low = 1, higher = reference). Education level was measured in eight categories, and then categorized in low = 1 (primary education or lower secondary education) and higher = reference (higher secondary education and higher professional education). Other measures were: being unemployed (yes = 1, no = reference); and considers herself religious (yes = 1, no = reference). Last, non-western ethnicity (yes = 1, no = reference) was based on the definition of Statistics Netherlands: respondent or at least one parent of the respondent had to be born in Turkey, the Caribbean, Africa, Asia (excluding Japan/ Indonesia) or Latin-America to qualify for this.

Childhood abuse concerned four types of abuse before the age of 16 and was measured in the same way as in the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2; De Graaf et al., 2010a; 2010b). *Physical childhood abuse* was scored '1' when it had happened at least twice before age 16. *Emotional neglect* and *psychological childhood abuse* were combined into one measure (*emotional/psychological abuse*), and scored in the same way; so if any emotional or psychological abuse had happened

at least twice, the score was '1'. *Sexual childhood abuse* was scored '1' when the sexual abuse had happened at least once before age 16.

Previous mental disorders: Cases were considered at risk for a recurrent disorder (1) if they had a lifetime disorder at baseline (or for the additional analyses of the separate categories: if they had a lifetime disorder at baseline from the category of mental disorders concerned), and for an incident disorder (0) if they never had a lifetime disorder at baseline (or for the additional analyses: if they never had a lifetime disorder at baseline from the category of mental disorders concerned). All participants who had a lifetime disorder, did not develop this disorder in the year of abortion, but longer than a year before T_0 , except for one case. This case was excluded in the analyses.

6.2.4 Statistical analysis

Since the literature is not consistent enough to derive hypotheses about specific determinants of prevalence of mental disorders, and virtually absent for incidence of mental disorders, we first explored which potential predictors were related to the incidence of mental disorders among women who had an abortion. We did this using bivariate logistic regression analyses for each outcome measure (incidence of any mental disorder, mood disorders, anxiety disorders and substance use disorders at T_1).

After that, the potential predictors with a p -value smaller than .10 were entered into multivariate logistic analyses. Testing was two-sided and statistical significance was considered to be $p < 0.05$. Analyses were performed with SPSS version 22.

6.3 Results

Of the 199 cases at risk for any mental disorder, 63 (23.9%) developed an incident disorder between T_0 and T_1 (Table 6.1). Of the *abortion-related variables*, high abortion treatment burden, post-abortion self-efficacy and post-abortion avoidance oriented coping predicted incidence of any mental disorder bivariate ($p < .10$, see Table 6.2). In the multivariate analysis, none of these abortion-related variables remained a significant predictor. For *social support*, low social support of the conception partner, having an unstable relationship, and low support of others predicted incidence in the bivariate model. Only unstable relationship remained

significant in the multivariate model (OR = 2.95, 95% CI = 1.04-8.34, $p = .04$). *Number of negative life events* in the last year predicted incidence both bi- and multivariately (OR = 1.40, 95% CI = 1.10-1.77, $p = .006$). Of the *sociodemographic* background variables, age and household income predicted incidence on the bivariate, but not on the multivariate level. *Previous mental disorders* was a significant predictor both bi- and multivariately: women who had a previous mental disorder ran a higher risk than women who never had any previous mental disorders (OR = 2.44, 95% CI = 1.16-5.15, $p = .02$). All types of childhood abuse (physical, psychological/emotional, and sexual abuse) predicted incidence bivariately, but not multivariately.

Table 6.1 First-incidence and recurrence rates of any mental disorder and the three disorder categories (mood, anxiety, and substance use disorders) for women who had an abortion.

| | First-incidence | Recurrence | Total: incidence |
|-------------------------|---------------------|---------------------|---------------------|
| | Cases / at-risk (%) | Cases / at-risk (%) | Cases / at-risk (%) |
| Any mental disorder | 18 / 88 (20.5) | 45 / 111 (40.5) | 63 / 199 (23.9) |
| Mood disorders | 19 / 159 (11.9) | 28 / 91 (30.8) | 47 / 250 (18.8) |
| Anxiety disorders | 23 / 153 (15.0) | 17 / 64 (26.6) | 40 / 217 (18.4) |
| Substance use disorders | 10 / 204 (4.9) | 14 / 51 (27.5) | 24 / 255 (9.4) |

For the categories of mood, anxiety, and substance use disorders, we here describe the results of the multivariate analyses only (See Tables 6.3 to 6.5). Abortion-related variables did not predict incidence of mood, anxiety, and substance use disorders. Low social support of the partner predicted mood disorders at T1 (OR = 2.62, 95% CI = 1.13-6.05, $p = .02$), but not the other disorder categories. Number of negative life events predicted anxiety disorders (OR = 1.36, 95% CI = 1.01-1.82, $p = .04$) and substance use disorders (OR = 1.49, 95% CI = 1.08-2.04, $p = .01$) at T1. Of the background variables, only physical childhood abuse was a significant predictor of incident anxiety disorders (OR = 4.02, 95% CI = 1.35-11.97, $p = .01$). Women at risk for a recurrent mood disorder ran a higher risk for an incident mood disorder than cases at risk for first-incident mood disorders, (OR = 2.83, 95% CI = 1.39-5.77, $p = .004$), but also for an incident

anxiety disorder (OR = 4.92, 95% CI = 1.96-12.36, $p = .001$). Women at risk for a recurrent anxiety disorder did not run a higher risk for anxiety disorders at T1 than women at risk for first-incident anxiety disorders, nor for any of the other disorder categories. Women at risk for a recurrent substance use disorder had a higher risk of incident substance use disorders at T1 than women at risk for first-incident substance use disorders (OR = 5.37, 95% CI = 2.01-14.34, $p = .001$), and also for mood disorders at T1 (OR = 2.37, 95% CI = 1.10-5.12, $p = .03$), and for anxiety disorders at T1 (OR = 3.07, 95% CI = 1.19-7.60, $p = .02$).

Table 6.2 Predictors of first-incident or recurrence of **any** mental disorder following abortion (at risk n=199).

| Predictor | n (%) or mean (SD) | Bivariate | | Multivariate | |
|--|--------------------|------------------|-------|-------------------|------|
| | | OR (95% CI) | p | OR (95% CI) | p |
| Abortion related variables | | | | | |
| Multiple abortions | 47 (23.6%) | 1.02 (0.50-2.05) | .97 | | |
| Second trimester pregnancy | 12 (6.0%) | 2.28 (0.71-7.38) | .17 | | |
| High pre-abortion decision difficulty ^c | 51 (25.6%) | 1.40 (0.72-2.74) | .32 | | |
| High pre-abortion decision uncertainty ^d | 14 (7.0%) | 0.57 (0.15-2.11) | .40 | | |
| High emotional burden of the unwanted pregnancy ^c | 125 (62.8%) | 1.04 (0.56-1.94) | .89 | | |
| High emotional burden of the abortion ^c | 64 (32.2%) | 2.22 (1.19-4.16) | .01 | 1.46 (0.68-3.15) | .33 |
| Post-abortion positive emotions (2-10) | 7.51 (2.19) | 1.09 (0.95-1.26) | .24 | | |
| Post-abortion negative emotions (3-15) | 8.04 (3.39) | 1.06 (0.97-1.16) | .22 | | |
| Post-abortion self-efficacy (1-5) | 3.53 (0.99) | 0.75 (0.55-1.02) | .06 | .99 (0.67-1.47) | .97 |
| Post-abortion emotion oriented coping (7-35) | 15.02 (5.97) | 1.04 (0.99-1.09) | .14 | | |
| Post-abortion avoidance oriented coping (7-35) | 18.32 (6.99) | 1.04 (1.00-1.09) | .06 | 1.04 (0.99-1.10) | .13 |
| Social support | | | | | |
| Experienced pressure ^e | 24 (12.1%) | 2.00 (0.84-4.76) | .12 | | |
| Unstable relationship | 31 (15.6%) | 2.75 (1.26-6.00) | .01 | 2.95 (1.04-8.34) | .04 |
| Number of confidantes ^f (0-6) | 2.65 (1.38) | 0.93 (0.75-1.16) | .52 | | |
| Support (conception) partner: <i>High</i> | 135 (67.8%) | Reference | | | |
| <i>Low</i> | 38 (19.1%) | 2.86 (1.36-6.01) | .006 | 2.07 (0.82-5.19) | .12 |
| <i>Did not tell</i> | 26 (13.1%) | 1.51 (0.62-3.70) | .37 | 0.89 (0.29-2.75) | .84 |
| Support others ^g : <i>High</i> | 129 (64.8%) | Reference | | | |
| <i>Low</i> | 18 (9.0%) | 2.40 (0.88-6.50) | .09 | 3.28 (0.98-10.90) | .053 |
| <i>Did not tell</i> | 52 (26.1%) | 1.06 (0.53-2.14) | .86 | 1.72 (0.65-4.58) | .28 |
| Negative life events (last year) (0-10) | 1.59 (1.45) | 1.48 (1.20-1.84) | <.001 | 1.40 (1.10-1.77) | .006 |
| Sociodemographics | | | | | |
| Age (18-46) | 31.39 (7.72) | 0.97 (0.93-1.01) | .09 | 0.96 (0.91-1.02) | .18 |
| Children | 115 (57.8%) | 0.80 (.44-1.45) | .46 | | |
| Low household income | 80 (40.2%) | 1.89 (1.03-3.47) | .04 | 1.22 (0.53-2.84) | .64 |
| Unemployed | 52 (26.1%) | 1.20 (0.61-2.35) | .59 | | |
| Lower education level | 35 (17.6%) | 1.57 (0.74-3.33) | .25 | | |
| Non-western ethnicity | 35 (17.6%) | 1.57 (0.74-3.33) | .25 | | |
| Religious | 42 (21.1%) | 0.83 (0.39-1.76) | .63 | | |
| Childhood abuse | | | | | |
| Physical childhood abuse ^a | 44 (22.1%) | 2.17 (1.09-4.33) | .03 | 2.33 (0.92-5.89) | .07 |
| Psychological/emotional childhood abuse ^a | 79 (39.7%) | 1.78 (0.97-3.26) | .06 | .93 (0.41-2.10) | .86 |
| Sexual childhood abuse ^b | 33 (16.6%) | 2.05 (0.96-4.39) | .07 | 1.23 (0.49-3.08) | .66 |
| Previous mental disorders | 111 (55.8%) | 2.65 (1.40-5.04) | .003 | 2.44 (1.16-5.15) | .02 |

^a Experienced at least twice before the age of 16. ^b Experienced at least once before the age of 16. ^c To large and very large extent (1) versus not at all, a little or moderate (0). ^d To large or very large extent (1) versus not at all, a little, or neutral (0). ^e To moderate, large or very large extent (1) versus not at all or a little (0). ^f Confidantes can be (conception) partner, mother, father, friend, other family member, or other person. ^g Others include mother, father and friend. *Note:* All predictors are measured at T0.

Table 6.3 Predictors of first-incident or recurrent **mood** disorders following abortion (at risk n=249).

| Predictor | n (%) or mean (SD) | Bivariate | | Multivariate | |
|--|-----------------------|------------------|-------|------------------|------|
| | | OR (95% CI) | p | OR (95% CI) | p |
| Abortion related variables | | | | | |
| Multiple abortions | 62 (24.9%) | 1.04 (0.50-2.16) | .91 | | |
| Second trimester pregnancy | 17 (6.8%) | 1.35 (0.42-4.35) | .61 | | |
| High pre-abortion decision difficulty ^c | 73 (29.3%) | 1.66 (0.85-3.23) | .14 | | |
| High pre-abortion decision uncertainty ^d | 18 (7.2%) | 1.25 (0.39-3.98) | .71 | | |
| High emotional burden of the unwanted pregnancy ^c | 161 (64.7%) | 0.77 (0.40-1.47) | .42 | | |
| High emotional burden of the abortion ^c | 86 (34.5%) | 1.22 (0.63-2.36) | .55 | | |
| Post-abortion positive emotions (2-10) | 7.40 (2.17) | 1.07 (0.92-1.24) | .40 | | |
| Post-abortion negative emotions (3-15) | 8.26 (3.38) | 1.01 (0.92-1.11) | .85 | | |
| Post-abortion self-efficacy (1-5) | 3.48 (0.98) | .90 (0.65-1.24) | .51 | | |
| Post-abortion emotion oriented coping (7-35) | 15.34 (6.14) | 1.02 (0.97-1.07) | .55 | | |
| Post-abortion avoidance oriented coping (7-35) | 18.57 (6.91) | 1.02 (0.98-1.07) | .35 | | |
| Social support | | | | | |
| Experienced pressure ^e | 32 (12.9%) | 1.24 (0.50-3.07) | .64 | | |
| Unstable relationship | 43 (17.3%) | 2.19 (1.04-4.63) | .04 | 1.88 (0.76-4.67) | .17 |
| Number of confidantes ^f (0-6) | 2.71 (1.41) | 0.95 (0.75-1.19) | .63 | | |
| Support (conception) partner: <i>High</i> | 168 (67.5%) | Reference | | | |
| <i>Low</i> | 46 (18.5%) | 3.20 (1.52-6.74) | .002 | 2.62 (1.13-6.05) | .02 |
| <i>Did not tell</i> | 35 (14.1%) | 1.50 (0.59-3.82) | .40 | 0.85 (0.30-2.44) | .77 |
| Support others ^g : <i>High</i> | 166 (66.7%) | Reference | | | |
| <i>Low</i> | 22 (8.8%) | 1.85 (0.67-5.14) | .24 | | |
| <i>Did not tell</i> | 61 (24.5%) | 1.34 (0.64-2.78) | .44 | | |
| Negative life events (last year) (0-10) | 1.58 (1.43) | 1.29 (1.05-1.59) | .02 | 1.16 (.92-1.47) | .22 |
| Sociodemographics | | | | | |
| Age (18-46) | 30.57 (7.58) | 0.98 (0.94-1.02) | .39 | | |
| Children | 136 (54.6%) | 1.15 (0.61-2.19) | .67 | | |
| Low household income | 110 (44.2%) | 3.02 (1.55-5.87) | .001 | 1.75 (0.79-3.87) | .17 |
| Unemployed | 68 (27.3%) | 1.89 (0.97-3.69) | .06 | 1.71 (0.78-3.77) | .18 |
| Lower education level | 45 (18.1%) | 1.76 (0.83-3.73) | .14 | | |
| Non-western ethnicity | 47 (18.9%) | 1.21 (0.55-2.64) | .64 | | |
| Religious | 52 (20.9%) | 1.03 (0.47-2.24) | .94 | | |
| Childhood abuse | | | | | |
| Physical childhood abuse ^a | 53 (21.3%) | 1.55 (0.75-3.20) | .24 | | |
| Psychological/emotional childhood abuse ^a | 104 (41.8%) | 1.97 (1.04-3.74) | .04 | 1.52 (0.73-3.14) | .26 |
| Sexual childhood abuse ^b | 40 (16.0%) | 1.83 (0.84-4.01) | .13 | | |
| Previous mental disorders | | | | | |
| Lifetime mood disorders | 91 (36.4%) | 3.25 (1.69-3.25) | <.001 | 2.83 (1.39-5.77) | .004 |
| Lifetime anxiety disorders | 100 (40.2%) | 1.73 (0.91-3.28) | .09 | 1.36 (0.67-2.77) | .40 |
| Lifetime substance use disorders | 57 (22.9%) | 2.93 (1.48-5.79) | .002 | 2.37 (1.10-5.12) | .03 |

^a Experienced at least twice before the age of 16. ^b Experienced at least once before the age of 16. ^c To large and very large extent (1) versus not at all, a little or moderate (0). ^d To large or very large extent (1) versus not at all, a little, or neutral (0). ^e To moderate, large or very large extent (1) versus not at all or a little (0). ^f Confidantes can be (conception) partner, mother, father, friend, other family member, or other person. ^g Others include mother, father and friend. *Note:* All predictors are measured at T0.

Table 6.4 Predictors of first-incident or recurrent **anxiety** disorders following abortion (at risk n=217).

| Predictor | n (%) or mean (SD) | Bivariate | | Multivariate | |
|--|--------------------|------------------|-------|-------------------|------|
| | | OR (95% CI) | p | OR (95% CI) | p |
| Abortion related variables | | | | | |
| Multiple abortions | 49 (22.6%) | 0.99 (0.44-2.26) | .99 | | |
| Second trimester pregnancy | 14 (6.5%) | 2.67 (0.84-8.44) | .095 | 1.45 (0.33-6.46) | .63 |
| High pre-abortion decision difficulty ^c | 60 (27.6%) | 1.53 (0.74-3.19) | .25 | | |
| High pre-abortion decision uncertainty ^d | 20 (9.2%) | 1.54 (0.53-4.53) | .43 | | |
| High emotional burden of the unwanted pregnancy ^c | 136 (62.7%) | 0.99 (0.49-2.01) | .98 | | |
| High emotional burden of the abortion ^c | 73 (33.6%) | 2.34 (1.16-4.70) | .02 | 1.98 (0.75-5.24) | .17 |
| Post-abortion positive emotions (2-10) | 7.45 (2.21) | 1.01 (0.87-1.18) | .88 | | |
| Post-abortion negative emotions (3-15) | 8.16 (3.37) | 1.10 (0.99-1.22) | .07 | 0.87 (0.72-1.05) | .16 |
| Post-abortion self-efficacy (1-5) | 3.49 (0.99) | 0.59 (0.42-0.84) | .003 | 0.61 (0.33-1.16) | .13 |
| Post-abortion emotion oriented coping (7-35) | 15.29 (6.08) | 1.07 (1.01-1.13) | .02 | 1.04 (0.95-1.14) | .44 |
| Post-abortion avoidance oriented coping (7-35) | 18.61 (7.14) | 1.04 (0.99-1.09) | .15 | | |
| Social support | | | | | |
| Experienced pressure ^e | 29 (13.4%) | 1.49 (0.59-3.79) | .40 | | |
| Unstable relationship | 35 (16.1%) | 2.42 (1.07-5.47) | .03 | 4.11 (1.38-12.22) | .01 |
| Number of confidantes ^f (0-6) | 2.68 (1.37) | 0.97 (0.75-1.24) | .79 | | |
| Support (conception) partner: <i>High</i> | 146 (67.3%) | Reference | | | |
| <i>Low</i> | 44 (20.3%) | 1.78 (0.79-4.03) | .16 | | |
| <i>Did not tell</i> | 27 (12.4%) | 1.53 (0.56-4.20) | .41 | | |
| Support others ^g : <i>High</i> | 146 (67.3%) | Reference | | | |
| <i>Low</i> | 18 (8.3%) | 0.53 (0.11-2.43) | .41 | | |
| <i>Did not tell</i> | 53 (24.4%) | 0.98 (0.44-2.19) | .96 | | |
| Negative life events (last year) (0-10) | 1.58 (1.43) | 1.46 (1.16-1.83) | .001 | 1.36 (1.01-1.82) | .04 |
| Sociodemographics | | | | | |
| Age (18-46) | 31.15 (7.77) | 0.96 (0.92-1.00) | .06 | 0.97 (0.91-1.04) | .41 |
| Children | 120 (55.3%) | 0.68 (0.34-1.36) | .27 | | |
| Low household income | 91 (41.9%) | 1.91 (0.96-3.82) | .07 | 0.76 (0.28-2.11) | .60 |
| Unemployed | 57 (26.3%) | 1.93 (0.93-3.99) | .08 | 1.99 (0.75-5.29) | .17 |
| Lower education level | 38 (17.5%) | 1.48 (0.64-3.44) | .36 | | |
| Non-western ethnicity | 39 (18.0%) | 1.70 (0.75-3.86) | .20 | | |
| Religious | 45 (20.7%) | 1.14 (0.50-2.60) | .76 | | |
| Childhood abuse | | | | | |
| Physical childhood abuse ^a | 47 (21.7%) | 3.14 (1.50-6.59) | .003 | 4.02 (1.35-11.97) | .01 |
| Psychological/emotional childhood abuse ^a | 86 (39.6%) | 1.90 (0.95-3.80) | .07 | 0.96 (0.33-2.76) | .94 |
| Sexual childhood abuse ^b | 38 (17.5%) | 2.93 (1.34-6.42) | .007 | 1.69 (0.61-4.64) | .31 |
| Previous mental disorders | | | | | |
| Lifetime mood disorders | 84 (38.7%) | 3.81 (1.85-7.84) | <.001 | 4.92 (1.96-12.36) | .001 |
| Lifetime anxiety disorders | 64 (29.5%) | 2.04 (1.01-4.16) | .05 | 1.08 (0.43-2.70) | .87 |
| Lifetime substance use disorders | 44 (20.3%) | 3.55 (1.68-7.51) | .001 | 3.07 (1.19-7.60) | .02 |

^a Experienced at least twice before the age of 16. ^b Experienced at least once before the age of 16. ^c To large and very large extent (1) versus not at all, a little or moderate (0). ^d To large or very large extent (1) versus not at all, a little, or neutral (0). ^e To moderate, large or very large extent (1) versus not at all or a little (0). ^f Confidantes can be (conception) partner, mother, father, friend, other family member, or other person. ^g Others include mother, father and friend. *Note:* All predictors are measured at T0.

Table 6.5 Predictors of first-incident or recurrent **substance use** disorders following abortion (at risk n=254).

| Predictor | n (%) or mean (SD) | Bivariate | | Multivariate | |
|--|-----------------------|-------------------|-------|-------------------|------|
| | | OR (95% CI) | p | OR (95% CI) | p |
| Abortion related variables | | | | | |
| Multiple abortions | 59 (23.2%) | 1.11 (0.42-2.95) | .83 | | |
| Second trimester pregnancy | 17 (6.7%) | 3.34 (1.00-11.20) | .051 | 1.73 (0.39-7.59) | .47 |
| High pre-abortion decision difficulty ^c | 77 (30.3%) | 1.43 (0.60-3.42) | .42 | | |
| High pre-abortion decision uncertainty ^d | 21 (8.3%) | 1.01 (0.22-4.62) | .99 | | |
| High emotional burden of the unwanted pregnancy ^c | 166 (65.4%) | 0.60 (0.26-1.39) | .23 | | |
| High emotional burden of the abortion ^c | 92 (36.2%) | 1.88 (0.81-4.37) | .15 | | |
| Post-abortion positive emotions (2-10) | 7.39 (2.20) | 0.94 (0.78-1.13) | .48 | | |
| Post-abortion negative emotions (3-15) | 8.39 (3.42) | 0.99 (0.87-1.12) | .83 | | |
| Post-abortion self-efficacy (1-5) | 3.42 (1.01) | 0.88 (0.58-1.32) | .53 | | |
| Post-abortion emotion oriented coping (7-35) | 15.77 (6.28) | 1.02 (0.95-1.09) | .59 | | |
| Post-abortion avoidance oriented coping (7-35) | 18.57 (6.92) | 1.02 (0.96-1.09) | .51 | | |
| Social support | | | | | |
| Experienced pressure ^e | 35 (13.8%) | 2.97 (1.13-7.80) | .03 | 1.46 (0.44-4.80) | .54 |
| Unstable relationship | 42 (16.5%) | 1.37 (0.48-3.91) | .55 | | |
| Number of confidantes ^f (0-6) | 2.69 (1.39) | 1.16 (0.87-1.56) | .32 | | |
| Support (conception) partner: <i>High</i> | 169 (66.5%) | Reference | | | |
| <i>Low</i> | 50 (19.7%) | 1.14 (0.39-3.31) | .81 | | |
| <i>Did not tell</i> | 35 (13.8%) | 1.33 (0.41-4.26) | .64 | | |
| Support others ^g : <i>High</i> | 171 (67.3%) | Reference | | | |
| <i>Low</i> | 22 (8.7%) | 2.15 (0.65-7.14) | .21 | | |
| <i>Did not tell</i> | 61 (24.0%) | 0.68 (0.22-2.12) | .68 | | |
| Negative life events (last year) (0-10) | 1.59 (1.42) | 1.63 (1.26-2.12) | <.001 | 1.49 (1.08-2.04) | .01 |
| Sociodemographics | | | | | |
| Age (18-46) | 30.65 (7.65) | 0.91 (0.85-0.97) | .003 | 0.93 (0.86-1.02) | .12 |
| Children | 139 (54.7%) | 0.46 (0.19-1.10) | .08 | 0.96 (0.30-3.06) | .95 |
| Low household income | 108 (42.5%) | 1.68 (0.72-3.90) | .23 | | |
| Unemployed | 69 (27.2%) | 1.70 (0.71-4.09) | .24 | | |
| Lower education level | 43 (16.9%) | 4.26 (1.75-10.40) | .001 | 2.53 (0.87-7.38) | .09 |
| Non-western ethnicity | 49 (19.3%) | 1.84 (0.72-4.73) | .20 | | |
| Religious | 53 (20.9%) | 0.74 (0.24-2.26) | .60 | | |
| Childhood abuse | | | | | |
| Physical childhood abuse ^a | 52 (20.5%) | 2.11 (0.85-5.25) | .11 | 1.25 (0.42-3.77) | .69 |
| Psychological/emotional childhood abuse ^a | 106 (41.7%) | 1.45 (0.62-3.36) | .39 | | |
| Sexual childhood abuse ^b | 41 (16.1%) | 0.72 (0.21-2.54) | .61 | | |
| Previous mental disorders | | | | | |
| Lifetime mood disorders | 99 (39.0%) | 0.93 (0.39-2.22) | .88 | | |
| Lifetime anxiety disorders | 106 (41.7%) | 1.20 (0.52-2.80) | .67 | | |
| Lifetime substance use disorders | 51 (20.1%) | 7.30 (3.02-17.69) | <.001 | 5.37 (2.01-14.34) | .001 |

^a Experienced at least twice before the age of 16. ^b Experienced at least once before the age of 16. ^c To large and very large extent (1) versus not at all, a little or moderate (0). ^d To large or very large extent (1) versus not at all, a little, or neutral (0). ^e To moderate, large or very large extent (1) versus not at all or a little (0). ^f Confidantes can be (conception) partner, mother, father, friend, other family member, or other person. ^g Others include mother, father and friend. *Note:* All predictors are measured at T1.

6.4 Discussion

In this study, we identified factors that predicted incidence of common mental disorders in the 2.5 to 3 years after the abortion. High abortion treatment burden, an unstable relationship, low partner support, number of negative life events, low household income, physical childhood abuse, and having had a previous mental disorder, were all predictors of mental disorders at T₁ on the bivariate level. In the multivariate analysis, only unstable relationship, number of negative life events, and having had a previous mental disorder predicted any mental disorder at T₁. This pattern of results was more or less similar in the analyses for incidence of the separate (mood, anxiety, substance use) disorder categories.

A remarkable finding was that abortion-related variables were not related to the incidence of mental disorders. This is an important result, given the earlier finding that high decision difficulty, post-abortion negative emotions and other pre-and post-abortion experience variables, were strongly associated with psychiatric history before the abortion (see Chapter 3). Thus, even though psychiatric history influences how the unwanted pregnancy and abortion are experienced, these abortion-related experiences in turn do not predict the incidence of disorders on the longer term once other risk factors for mental disorders are taken into account. Contrary to the findings of Fergusson et al. (2009), who measured post-abortion negative emotional reactions retrospectively years after the abortion, in our study baseline negative emotional reactions were not related to the post-abortion incidence of mental disorders.

Another relevant finding was that having an unstable relationship with the conception partner was a strong predictor of incident mental disorders. It has been found that having relationship problems is a frequently mentioned reason for abortion (Finer et al., 2005). Good relationships can form a strong foundation for positive mental health, and former research has shown that both happily married people and single people fare better - mental healthwise - than people who are unhappily married (Holt-Lunstadt et al., 2008). We found stronger associations for relationship stability than for social support of the partner. It is possible that the social support measure does not capture relationship strength to the same extent as asking participants directly whether they would characterize their relationship as stable. Another possibility is that the effect of low social support disappeared in the multivariate model because it was explained by other variables that were entered in the analysis, such as avoidance oriented coping. In other research it has indeed been found that social support effects

were mediated by self-efficacy and coping (Saltzman & Holahan, 2002; Major et al., 1990). Future research should further investigate how the partner role or relationship quality contributes to post-abortion mental health.

The finding that the number of recent negative life events strongly predicted incidence of mental disorders, also on the longer term, is similar to findings in general population research (e.g., Williams et al., 1981; De Graaf et al., 2002). The predictive power of the number of negative life events on incidence of mental disorders remained strong after controlling for the other covariates. Other research has shown that negative life events are highly prevalent among women who have unwanted pregnancies and abortions, and they are often interrelated (Jones et al., 2013), which the authors describe as a 'chain effect'. These life events could have contributed to getting pregnant unintentionally or deciding to terminate the pregnancy. Our results add to this theory by showing that the more recent life events a woman has experienced, the higher is the risk of future mental disorders after an abortion, even if factors related to the abortion itself are not predictive.

Overall, former psychopathology was the most consistent predictor in the various analyses for the different disorder categories. This is in line with earlier findings (e.g., APA, 2008; NCCMH, 2011; Steinberg & Finer, 2011). Having had former mental disorders could explain associations between abortion and mental health, in the sense that they predispose women for future psychopathology, irrespective of whether they terminated an unwanted pregnancy or not (e.g., Steinberg & Finer, 2011). Furthermore, women who have had an abortion are three times more likely to have had previous mental disorders than women who did not have an abortion (see Chapter 2). Former psychopathology should therefore always be considered in research investigating the link between abortion and mental health.

6.4.1 Strengths and limitations

Strengths of our study are that we used a reliable and valid instrument to assess a wide variety of common mental disorders, the CIDI 3.0; that we measured the presence of mental disorders twice (lifetime up until T_0 , and between T_0 and T_1) so that we could ascertain incidence of a wide range of mental disorder categories; and that we used a primary cohort of women who all had an abortion around the same time (about 4 weeks before the baseline interview). Moreover, the response at follow up was high, and attrition was barely selective. Nevertheless, a number of limitations warrant discussion.

First, although the total sample size was sufficient, our focus on incidence lowered the number of cases in the analyses, therefore it was not possible to investigate effects for first-incidence or recurrence separately. The sample size also did not allow differentiation in the incidence of different disorders within the disorder categories. Second, associations with unmeasured factors can never be ruled out in this type of research, even though our list of potential predictors was fairly extensive. Third, the incidence estimates are based on self-reported lifetime disorders at T₀ and 2.7-year disorders at T₁. Prior studies demonstrated that lifetime estimates of mental disorders are likely to be an underestimation, because of difficulties of accurate recall (Moffitt et al., 2010, Takayanagi et al., 2014). If this would be the case, it is likely that in reality more recurrent cases and less first-incident cases exist than we reported. As a consequence, the effect size of the risk factor ‘history of mental disorders’ in reality would be even stronger than reported here.

Furthermore, we need to recognize that this study was done in the Netherlands, and results might therefore not be generalizable to other contexts. Abortion in the Netherlands is free, legal, and available up until 22 weeks of gestation. The Dutch abortion law is among the most liberal in the world, yet the abortion rate is among the lowest in the world (Levels et al., 2010; IGZ, 2014). Factors like ‘access to abortion’ might be expected to confound associations in other contexts to a larger extent than in the Netherlands. Therefore the potential effects of abortion-related variables, but also social support and number of negative life events before the abortion, might be different in countries where circumstances are more restrictive, and women are faced with financial, legal, and other barriers in access to abortion care.

6.4.2 Implications

The current study was designed to identify risk factors for mental disorders after abortion, in case these do develop or recur. We did not find that specific abortion-related covariates predicted negative outcomes at T₁. In fact, factors that were associated with post-abortion mental disorders in this study seem to be non-abortion-specific, and other studies found that these also predict negative reactions to other types of stressful life events, even childbirth (Major et al., 2009). This supports the idea that compared to other life events, abortion does not pose specific risks on future mental health (APA, 2008).

Women with an unstable relationship with the conception partner, a higher number of recent negative life events, and a history of mental disorders, are at risk for future

mental disorders. Even though these risks are not abortion-specific, the abortion care setting may be a good place to be extra attentive to these risk factors. When women show a particularly intense and stressful decision process and abortion experience, this may alert abortion clinicians to possible underlying mental disorders, unrelated to the abortion (see Chapter 3). Post-abortion counseling may then be the best moment to refer women to general mental healthcare, if desired.

CHAPTER 7

GENERAL DISCUSSION

The main aim of this study was to investigate whether abortion increases the risk of mental disorders. In order to answer this question, we investigated not only mental health after the abortion, but also before, because previous mental health problems predict future mental health problems (NCCMH, 2011; APA, 2008). In addition, we investigated what factors were associated with mental health problems after an abortion, in case these did occur. In this thesis, the primary focus was on common DSM-IV mental disorders, but we also looked at more subjective measures of psychosocial health (such as emotions and experienced burden). In this chapter, the findings are first summarized, integrated and discussed. After that, methodological considerations, directions for future research, and implications for abortion care practice are suggested.

7.1 Discussion of the main findings

7.1.1 Are women who have abortions more (or less) likely to have had previous mental disorders, compared to women who did not have an abortion?

In Chapter 2, we found that women who have had an abortion were three times more likely to report a history of any mental disorder. For all categories of disorders and most separate mental disorders, DAMHS women were at least twice as likely to report a history of the disorder, than women from the reference group. Childhood conduct disorder and drug dependence discriminated best between the samples. Secondary analyses revealed that the results were the same when excluding the only participant with an onset of mental disorders in the last year before the abortion. They were also largely similar when excluding 86 women for whom this was not the first abortion; however, bipolar disorder, alcohol abuse, and alcohol dependence were no longer significantly predicted by psychiatric history when these women were excluded. This is consistent with former research showing that alcohol use was associated with having more than one abortion (Präger et al., 2007).

The results clearly demonstrated that women who have had an abortion are more likely to have had a history of mental disorders than women who have not had an abortion. This supports the notion that psychiatric history may explain associations that have been found between abortion and mental health in former research, and are therefore in line with the work of Steinberg and co-authors (e.g., Steinberg & Finer, 2011; 2012; Steinberg & Tschann, 2014). This finding also raises new questions. Why are

women with mental disorders overrepresented in the abortion clinic? Are they (a) more at risk for unintended pregnancy, or are they (b) more inclined to terminate an unintended pregnancy?

There are indications that women with mental disorders are at increased risk for unintended pregnancy. First of all, it has been found that childhood antisocial behavior (conduct disorder) is associated with sexual risk-taking behavior later in life (Ramrakha et al., 2007), and that conduct disorder is strongly associated with unwanted pregnancy (Pedersen & Mastekaasa, 2011). Other research suggests that women who score high on unconventionality are more likely to use substances and to engage in behaviors that increase their risk of unplanned pregnancy (Martino et al., 2006). This fits with our results, which show that conduct disorder and drug dependence, but also alcohol dependence and antisocial personality disorder, are important discriminators between women with and without an abortion history.

The second explanation would mean that for women with a psychiatric history, an unintended pregnancy may be more often unwanted. This could be mediated by factors related to mental disorders. For example, low self-esteem could be related to a more pessimistic outlook on the life they would offer a child, or to doubts regarding their parenting skills. Low self-esteem has also been associated with a variety of mental disorders, such as depression (De Jong et al., 2012; Orth et al., 2009a; Orth et al., 2009b; Roberts et al., 1996; Silverstone & Salsali, 2003), social anxiety (De Jong et al., 2012; Silverstone & Salsali, 2003) and substance abuse (Martino et al., 2006; Unger et al., 1997); but also with externalizing problems, such as antisocial behavior, aggression, and delinquency or criminal behavior (Donnellan et al., 2005; Trzesniewski et al., 2006). Other factors related to mental health, such as income or poverty, could also have mediated the choice for abortion (Lund et al., 2010; Schmiede & Russo, 2005;). Even without mediation by factors such as these, it is not unlikely that women who have been faced with problems before, envisage more problems than women without these experiences when they get pregnant unintentionally. Furthermore, they might also choose to terminate the unintended pregnancy because of their own mental health, not only because of low expectations of themselves as a parent, but also because they are afraid that they might pass on their genetic inclination for mental disorders to their offspring.

The two pathways are not mutually exclusive and could both explain the higher rate of abortion in women who report a history of mental disorders. As it is impossible to disentangle the event of the abortion from the unwanted pregnancy, this study cannot

identify which of these two pathways describes the reality most accurately. The findings described in Chapter 6 show that apart from psychiatric history, unstable relationships and negative life events are strong predictors of mental disorders after an abortion. This does not mean that these factors are also predisposing for abortion, but it is not unlikely that they do, since they are often mentioned as reasons for abortion or tend to co-occur with abortion, which has been described as a ‘chain-effect’ (Jones et al., 2013). This is consistent with the idea that mental disorders increase the risk for unintended pregnancy; perhaps mediated by other events or unstable relationships. At the same time, women who get pregnant in the midst of difficult life circumstances could also be more inclined to terminate an unintended pregnancy. Both pathways could therefore explain why women with previous mental disorders are overrepresented in abortion clinics.

7.1.2 To what extent does psychiatric history affect women’s pre- and post-abortion experiences?

In Chapter 3, we studied the impact of psychiatric history on women’s pre- and post-abortion experiences. We found that psychiatric history strongly affected these experiences. Women with a history of mental disorders experienced more pre-abortion decision difficulty (doubt), burden of pregnancy and abortion, and post-abortion negative emotions, self-efficacy, emotion-oriented and avoidance oriented coping. The most vulnerable group in terms of psychiatric history was the group with comorbid internalizing and externalizing disorders. This group experienced the most difficulty deciding on the abortion, and used the most avoidance oriented coping. Perhaps it was most adaptive for this group to use this type of coping to deal with the irreversible abortion. Negative post-abortion emotions were the most common among women with internalizing disorders only. This is hardly surprising, given that negative emotions are a core characteristic of internalizing disorders such as depression (APA, 2000).

In line with earlier findings (Kero & Lalos, 2000; Rocca et al., 2013), we also found that women in general were certain about their decision to terminate the pregnancy, even when pre-abortion doubt (decision difficulty – the term ‘doubt’ has a slightly more negative connotation in English than in Dutch) was high. Decision uncertainty was low in general, and so was experienced pressure. Both women with and without a history of mental disorders scored at the high end of the positive emotion scale.

Our findings indicate that psychiatric history is relevant for how women experience an abortion. Negative abortion experiences may, at least partially, stem from prior or underlying mental health problems.

7.1.3 Does abortion increase the incidence of mental disorders?

In Chapters 4 and 5, the incidence of mental disorders after an abortion was studied. At T₁, which was 2.5 to 3 years after baseline, the unmatched (unadjusted) analysis showed higher odds for incidence of all categories of mental disorders. After matching on age category, living situation, parity, ethnicity, religion, employment situation, urbanicity of residence, and a history of childhood abuse, the odds for a first-incident mental disorder were no longer significantly higher for women who had an abortion (DAMHS) compared to women who did not have an abortion (NEMESIS-2 reference group). This implies that the initial differences in first-incident disorders should not be attributed to the abortion, rather, they seem to be largely dependent on pre-existing differences between the cohorts. Therefore, it seems unlikely that the event itself – abortion of an unwanted pregnancy – increase the risk of new, incident mental disorders in the 2.5 to 3 years after abortion.

At T₂, which was 5 to 6 years after baseline, we found that the raw unmatched data showed less differences between the cohorts than after 2.5 to 3 years (only for substance use disorders and any mental disorder). It should be noted that the incidence measure at 5 to 6 years after baseline included the incidence until 2.5 to 3 years after baseline. If we were to look at the incidence of disorders between the second interview (at 2.5 to 3 years follow up) and the third interview (at 5 to 6 years follow up), we would have found even less effects. After matching, the effects disappeared. Taking the findings of both waves together, it seems unlikely that termination of an unwanted pregnancy ‘causes’ the onset of mental disorders.

However, abortion is associated with an elevated risk of incident disorders, mainly on the short term, when background variables are *not* taken into account. Shortly after the abortion, women who never had mental disorders before, more often develop disorders than women who do not go through the experience of terminating an unwanted pregnancy. This indicates that the abortion, just like any other life event, might have the capacity to ‘trigger’ dormant or subclinical disorders, which these women were already at increased risk for based on their background or other risk factors. Even though the abortion does not ‘cause’ the increased risk, it might be the case that the abortion functions as a catalyst, just like other negative life events

(Williams et al., 1981; De Graaf et al., 2002). Given that the decision process often involves intensive deliberation, evaluation of one's personal life and circumstances ('Where am I now?' 'Will I be able to raise a child in this situation?' 'What do I want with my life?' 'What do I have to offer?'), and a lot of mixed emotions, it is not surprising that it also gives way to other pre-existing determinants to increase the risk for disorders. On the long term, these potentially triggering effects peter out completely. Any potentially catalyzing effect of the abortion becomes negligible after 5 to 6 years.

These findings support the abortion-as-life-event view, and show that an abortion is not inherently harmful for mental health. This is in line with the results from the strongest international research (e.g., Gilchrist et al., 1995; Major et al., 2000; Munk-Olsen et al., 2011) and conclusions of the most thorough reviews of the literature (APA, 2008; NCCMH, 2011). Women who do develop disorders, seem to be already predisposed for these because other risk factors increase susceptibility for the incidence of mental disorders.

7.1.4 Does abortion increase the recurrence of mental disorders?

For recurrence, the unmatched samples differed only for anxiety disorders and any mental disorder after 2.5 to 3 years follow up. After matching, only the odds for recurrence of any mental disorder remained statistically significant. This means that an abortion could increase vulnerability for recurrence of mental disorders among women with a psychiatric history. Possibly, the stress associated with abortion triggered recurrence of a previous disorder, or a previously subclinical or comorbid disorder, in these women. However, the effects are small and power of these analyses is small, therefore any interpretation of these results needs to be treated with caution.

In Chapter 4, we took it a step further and looked at recurrence of common mental disorders after 5 to 6 years of follow up time. We used the same matching strategy as in Chapter 3, but now the outcome measure was 5 to 6 year recurrence of mental disorders. We found that the 'raw' (unmatched/ unadjusted) data showed no differences between the 2 groups for recurrence of mental disorders, with the exception of a marginally significant result for substance abuse. Matching on confounders made it impossible to analyze differences for substance abuse, because there were no cases with recurrent substance use disorders in the matched cases of the NEMESIS-2 sample.

Abortion might slightly elevate the risk of recurrence of previously experienced disorders, but on the longer term, this effect does not seem to hold. Even though the number of cases in the matched analyses is small, we can already see from the results of the unmatched analyses that in the long run, abortion does not increase the risk of recurrence. The finding that unmatched analyses for recurrence showed less differences between cohorts than unmatched analyses for incidence, might be an indication that women with previous mental disorders are already more 'alike' in both cohorts, which is why the matching did not affect the results as much as for incidence. It is not unlikely that women with previous mental disorders in the two cohorts show more overlap in background risk factors, than women without previous mental disorders. Since psychopathology has been associated with many risk factors, such as childhood abuse, negative life events, but also sociodemographic risk factors (Green et al., 2010; Kessler et al., 1997; De Graaf et al., 2002), it makes sense that women with a psychiatric history show more similarities in these predisposing variables, and that the individual variation is larger among women without these psychiatric histories.

7.1.5 Which risk factors are related to the incidence or recurrence of mental disorders after an abortion?

In Chapter 6, we looked at risk factors for the first-incidence and recurrence (together referred to as incidence) of disorders at T₁, 2.5 to 3 years after the abortion. Even though Chapter 4 showed that abortion was not related to first-incidence at T₁, there seemed to be a potential effect for recurrence of any mental disorder. Chapter 2 showed that mental disorder histories are much more common among women who had an abortion, compared to women who never had an abortion. Some categories of women might therefore be more vulnerable than others for future mental disorders.

We found that high abortion treatment burden, an unstable relationship, low partner support, number of recent negative life events, low household income, physical childhood abuse, and being at risk for a recurrent mental disorder (i.e., having a history of mental disorders), all predicted mental disorders at T₁ on the bivariate level. In the multivariate regression analysis, only unstable relationship, number of negative life events, and a history of mental disorders predicted any mental disorder at T₁. This pattern of results was more or less similar in the analyses for incidence of the separate (mood, anxiety, substance use) disorder categories.

Abortion-related variables were not associated with the first-incidence or recurrence of disorders. Even though psychiatric history strongly influenced a number of these

abortion-related variables (see chapter 3), the latter did not in turn predict incidence or recurrence of mental disorders on the longer term. In contrast to the findings of Fergusson et al. (2009), we did not find that the way women experience the unwanted pregnancy and the abortion was related to the development of DSM-IV clinical mental disorders. It should be noted that Fergusson and colleagues (2009) measured post-abortion negative emotional reactions retrospectively, years after the abortion, at the same measurement wave as the outcome variable prevalence of mental disorders. Because in general, the recollection of emotional reactions over time is poor (LeDoux, 1996; Levine & Safer, 2002; Oatley et al., 2006), and we also found that women overestimate their feelings of doubt with regard to the abortion years after the abortion as compared to shortly after the abortion (Van Ditzhuijzen et al., in preparation), we find Fergusson's findings not sufficiently convincing. It is more likely that psychological phenomena like cognitive dissonance (Festinger, 1956; Harmon-Jones & Mills, 1999) and mood-congruent retrieval (Bower, 1981; Drace, 2013) explain the findings of Fergusson and colleagues: women who experience mental disorders after an abortion, might be more inclined to think that they had strong negative emotional reactions, because they feel the need to 'explain' their current mental health state (cognitive dissonance), or simply because they remember more negative aspects of events (mood-congruent retrieval).

Having an unstable relationship and recent negative life events were determinants of incidence/recurrence at T₁, and so was former psychopathology. These variables could also have contributed to getting pregnant unintentionally, and/or to deciding to terminate the pregnancy. Since it is impossible to disentangle the abortion from the unwanted pregnancy (see also 7.1.1), and other evidence together suggests that both pathways might be in effect - at least with regard to the predictor previous mental disorders (Martino et al., 2006; Pedersen & Mastekaasa, 2011; Ramrakha et al., 2007; Silverstone & Salsali, 2003) - we do not know which of the two is the strongest explanatory hypothesis.

Former psychopathology was strongly predictive of incidence or recurrence at T₁ for each category of disorders; in this sense it was the most consistent predictor. This is in line with earlier findings (e.g., APA, 2008; NCCMH, 2011). Being at risk for recurrent mental disorders could explain associations between abortion and mental health, in the sense that they predispose women for future psychopathology, irrespective of whether they terminated an unwanted pregnancy or not (e.g., Steinberg & Finer, 2011).

To summarize, all risk factors associated with post-abortion incidence of mental disorders, seem to be non-abortion-specific. Other studies have also found that similar risk factors predicted negative reactions to other type of stressful life events, even childbirth (Major et al., 2009). This supports the idea that abortion does not pose any specific risks on future mental health, but that this is dependent of other vulnerability factors, just like the responses to other negative life events are highly variable and personal. These results thus support general stress-vulnerability theories asserting that the pathogenic effects of life stressors are more pronounced in more vulnerable persons (Monroe & Simmons, 1991; Ormel & Neeleman, 2000). The main findings of all chapters are summarized in Table 7.1.

Table 7.1 Summary of the main findings.

| Research question | Main findings |
|---|--|
| Are women who have abortions more (or less) likely to have had previous mental disorders, compared to women who did not have an abortion? | Women who had an abortion were three times more likely to report a history of any mental disorders; while controlling for sociodemographic differences. |
| To what extent does psychiatric history affect women's pre- and post-abortion experiences? | Women with previous mental disorders experienced more decision difficulty (doubt), burden, negative emotions, lower self-efficacy for coping, and used more emotion-oriented and avoidance oriented coping. |
| Does abortion increase the risk of first-incident mental disorders in the years after the abortion (short- and long-term)? | The abortion does not increase the risk of first-incidence of mental disorders when covariates are taken into account in a strict manner; not after 2.5 to 3 years, and also not after 5 to 6 years. |
| Does abortion increase the risk of recurrent mental disorders in the years after the abortion (short- and long-term)? | Abortion might increase the risk of recurrence of mental disorders on the shorter term (2.5 to 3 years), but this is no longer the case on the longer term (5 to 6 years). |
| Which potential risk factors are related to the incidence or recurrence of mental disorders after abortion? | Risk factors are: an unstable relationship with the partner, a higher number of recent negative life events, and a history of mental disorders. Abortion-related experiences are not related to the incidence or recurrence of mental disorders at 2.5 to 3 years post-abortion. |

7.2 Methodological considerations

With our study design we managed to overcome most of the methodological limitations that characterize the field (Charles et al., 2008; APA, 2008; Major et al., 2009; National Collaborating Centre for Mental Health, 2011; Robinson et al., 2009; Steinberg & Russo, 2009). In this section of the Discussion, we reflect on the methodological strengths and restrictions of this study.

7.2.1 Setting

We need to recognize that this study was done in the Netherlands. Results might therefore not be generalizable to other contexts. Abortion in the Netherlands is free, legal, and available up until 22 weeks of gestation. The Dutch abortion law is among the most liberal in the world, yet the abortion rate is among the lowest in the world (Levels et al., 2010; IGZ, 2015). Factors like ‘access to abortion’ might be expected to confound associations in other contexts to a larger extent than in the Netherlands. Therefore the potential effects of abortion-related variables, but also social support and number of negative life events before the abortion, might be different in countries where circumstances are more restrictive, and women are faced with financial, legal, and other barriers in access to abortion care. We can see this lack of generalizability as a downside, but at the same time the Netherlands is a very useful and valuable setting to do this kind of research in, because there is so little confounding from access-to-abortion variables. In other contexts we might have found post-abortion problems that would have been related to this low access, and not to the abortion or the unwanted pregnancy, and it is very difficult to control for this. Therefore, the Netherlands is an interesting setting for this type of research.

7.2.2 Sampling and design

With data of a large number of participants we were able to investigate the mental health of women who have had an abortion, both before the abortion and in the years thereafter. Our follow up time was relatively long, one of the longest so far in this field. The DAMHS cohort was a primary cohort, which ensured accurate measurement of timing of the abortion; all women had an abortion about 3 to 6 weeks before the baseline interview. Because the interview took place shortly after the abortion, recall bias for abortion related variables was minimized.

In Chapters 2, 4 and 5, the primary cohort of women who had an abortion (DAMHS) was compared to a reference cohort which was drawn from a large Dutch population-based study into mental health, NEMESIS-2. This national representative dataset is unique, strong and rich, and helps in answering many research questions on mental health. Nonetheless, we need to keep in mind that the circumstances, recruitment process, and timing of the interview were different between the two cohorts. The DAMHS cohort was set up while the first measurement of NEMESIS-2 had already ended (see Figure 1.2 in Chapter 1). This was one of the reasons why we used a matching design in Chapters 4 and 5. Matching largely solved this problem, because it diminishes variance in background variables.

7.2.3 Improving causal inference by 1-to-1 matching

The gold standard for evaluation of treatment effects is the randomized controlled trial (RCT), but this is unfeasible for evaluating effects of abortion and/or unwanted pregnancy. Randomization equalizes differences between groups with respect to measured and unmeasured characteristics. In non-experimental research like this, we cannot guarantee that groups are equivalent before baseline. In fact, we have seen in the first part of this thesis, that pre-baseline characteristics are quite dissimilar in our two samples, and that overlap in background variables is small. If groups are this inequivalent at baseline, differences in the outcomes may be due to these pre-existing group differences, and not to the exposure (termination of unwanted pregnancy, in this case). Non-experimental studies usually attempt to approximate the RCT design as much as possible by balancing groups on baseline characteristics. This can be done by regression adjustment, but also by matching on baseline covariates. Using matching “[...] allows one to design and analyze an observational (non-randomized) study so that it mimics some of the particular characteristics of a randomized controlled trial. In particular, the [...] distribution of observed baseline covariates will be similar between treated and untreated subjects.” (Austin, 2011; p. 399).

Matching techniques create better equivalence between groups as compared to regression adjustment (Dehejia & Wahba, 1999), and apart from reducing imbalance in measured covariates, they can also reduce unmeasured confounding (Cook et al., 2008). Furthermore, simulation studies have shown that matching reduces imbalance not only in observed covariates, but also in unobserved ones (e.g., Stürmer et al., 2010). When covariates not used in the matching are related to the variables included in the matching, this is the case. The idea is that cases and controls who are similar on

a set of variables, are likely to be similar on other variables that could not be measured. Others have also found that matched analyses are superior to unmatched analyses, even if regression adjustment was included” (Rubin & Thomas, 2000).

However, matching should not be seen in conflict with regression adjustment; in fact, the two are often used in combination (Stuart et al., 2010). Matching methods are particularly useful when there is insufficient overlap in covariates between two samples. “Selection models and regression models have been shown to perform poorly in situations where there is insufficient overlap, but their standard diagnostics do not involve checking this overlap (Dehejia and Wahba, 1999, 2002; Glazerman et al., 2003).” (Stuart, 2010, p.1). Therefore, regression adjustment is most likely not a strong enough method for investigating causal questions while comparing our two cohorts, because these were very different in composition (little overlap in covariate distributions) but also in terms of recruitment strategy.

Matching is not the ‘holy grail’ of estimating causal effects from non-randomized data. In some cases it can also bias the results, but this mainly applies to propensity score matching. The use of propensity scores (PS) for matching has been contested, because it prunes data randomly and therefore might introduce bias (e.g., King & Nielsen, 2016). This is precisely one of the reasons why Coarsened Exact Matching (CEM) was developed (Blackwell et al., 2010). In CEM, data are pruned not randomly but in a precise manner, so that you end up with the same pruned samples (in terms of covariate distributions). Compared to propensity score matching, CEM also has the advantage that increasing balance on one variable does not create imbalance on another variable, and it is less sensitive to measurement error (Iacus et al., 2011).

To our knowledge, we chose the most stringent and precise method for dealing with imbalance by using 1-to-1 case-control matching. However, a drawback of this technique is that cases are discarded for which no match can be found, reducing sample size. However, it could be argued that sample sizes can be smaller when these matching designs are used, because the standards for observational studies no longer apply. Nevertheless, with regard to recurrence of mental disorders (Chapters 4 and 5), the sample sizes were too small, and therefore these findings should be interpreted with caution. For incidence however, sample sizes after matching were sufficient. Since incidence is most informative with regard to the question whether abortion increases the risk of mental disorders or not, we are confident that our conclusions adequately reflect the relationships (or lack thereof) between abortion and the development of subsequent mental disorders.

7.2.4 Selectivity: initial response and attrition

The relatively low response rate at baseline is inherent to the subject of the research. Abortion research is notorious for its low response rates and high attrition (APA, 2008; Foster et al., 2015). For many women, abortion is a private matter. As a consequence, the abortion sample was slightly selective; compared to women in the total abortion population, women in our abortion sample were slightly older, more often living together with a partner, and more often had higher (professional) education. These demographic characteristics are generally associated with a lower prevalence of mental disorders (De Graaf et al., 2010b). Therefore it seems more likely that our data are an underestimation, rather than an inflation, of the prevalence of mental disorders in the total abortion population.

Further, response and attrition analyses revealed that both the initial sample and the drop-out, albeit small, were slightly selective in terms of sociodemographic covariates. Yet there was no need to control for these variables, as the distributions of these parameters were completely balanced by 1-to-1 matching. Like the experimental design, the matching design has the advantage that internal validity of causal inference is strong, but this might come at the cost of lower generalizability. To generalize was not the first aim of this study. Rather, we examined the associations between abortion and subsequent mental health as stringently as possible, in order to increase causal inference. If we had been able to include a few more young, lower educated or non-Western women in the abortion sample, perhaps this would have enlarged the at-risk groups for recurrence, as these demographic characteristics are generally associated with a higher prevalence of psychiatric problems (De Graaf et al., 2010b). However, these women would then have been matched to women with a similar background in the reference cohort, hereby reducing pre-existing differences between the cohorts. It might have increased the power of the analyses for recurrence, but it would not have affected the outcomes and the content of our conclusions.

Despite the general representativeness of NEMESIS-2, some subgroups were undersampled in the reference group, such as young persons (which has indeed been shown in Chapter 2), but also institutionalized persons. Further, we also found that women in NEMESIS-2 reported less abortions than one would have expected based on national registry data. We do not know if there has been underreporting of abortion in the reference group, or that this is the consequence of undersampling of certain subgroups of women. If underreporting of abortion has been the case, the number of unreported abortions in the reference group would be almost negligibly small, since

the abortion rate in the Netherlands is very low (see Introduction). If this bias is caused by selectivity, the use of the matching paradigm would have solved this. For these reasons, we think that selectivity in the reference cohort has not influenced our findings.

A last thought on the subject of selection is that our sample could be selective because the women who participated were more willing to disclose. Because they were recruited in the abortion clinic, and because intimate abortion-related questions were asked in the interview before the CIDI 3.0 was administered, they might have been more prone to disclose sensitive information such as symptoms of mental disorders. In NEMESIS-2, women were approached with no reference to any specific context or sensitive situation. Therefore, women in the reference group might have been less inclined to be open about symptoms. The procedure of matching should remove this variance to a large extent. Still, it could be the case that problems in the abortion group have been overestimated, and that the matches in the reference cohort are more problematic cases. There is however no reason why this potential selectivity in the tendency to disclose would be changing over time and thus different over measurement waves. So for the incidence or recurrence rates, which are based on intra-person changes in mental health status over time, this selectivity would not have influenced our results.

7.2.5 Measurement of mental disorders

We used a reliable and valid instrument to assess mental disorders, the CIDI 3.0, which is widely used in many different countries (Kessler et al., 2007; Vollebergh et al., 2001). This instrument assesses lifetime diagnoses of a wide array of mental disorders, as well as incidence and recurrence of disorders post-abortion. It has been shown that CIDI-diagnoses are largely in agreement with blinded clinical reappraisal interviews with the SCID (Structured Clinical Interview for DSM-IV, Haro et al., 2006). However, the use of this instrument has some disadvantages as well.

First of all, the CIDI 3.0 relies on self-report, which could lead to underreporting. Studies have demonstrated that lifetime estimates of mental disorders are likely to be an underestimation, because of difficulties of accurate recall, compared to prospective measurement of symptoms (Moffitt et al., 2010, Takayanagi et al., 2014). If this would be the case in the current study as well, it is likely that in reality more recurrent cases and less first-incident cases exist than were reported. Therefore the incidence rates might be somewhat overestimated (De Graaf et al., 2013). As a consequence, the effect

size of the risk factor ‘history of mental disorders’ in reality would be even stronger than reported in Chapter 6 about risk factors.

Second, one could question the use of clear-cut dichotomies in the CIDI 3.0. These could oversimplify the reality of development of mental disorders, and lead to error. Some have suggested that mental disorders should be represented on a continuum (e.g., Hankin et al., 2005; Keyes, 2002; Van Os et al., 2000). Also, the CIDI 3.0 was designed to assess DSM-IV disorders, not the newer DSM-5 disorders, which include more criteria on severity. Future research in this field could include measures of subclinical symptoms, severity, and also temporal changes, including time-to-recurrence, to do more justice to the diversity in experiences of symptoms of mental disorders.

Measuring incidence (i.e., first-incidence and recurrence) as opposed to prevalence was another step in improving causal inference. Incidence is a more useful measure than prevalence when investigating the etiology of an outcome (Rothman, 2012), because it captures only those cases who did not have the disorder before. If we were to include women who had a disorder at baseline, which is generally the case when investigating prevalence of disorders, we would not be able to say whether the disorder developed because of the abortion, or was a mere continuation of a disorder with a chronic course. Therefore, incidence is a more appropriate outcome when trying to investigate whether or not, or to what extent, there are causal linkages between abortion and mental health. So far, most studies have measured prevalence - only a few studies measured incidence of mental disorders (e.g., Munk-Olsen et al., 2011; Biggs et al., 2015). The downside of using incidence is that women who had baseline symptoms need to be excluded, so that the order of events can be ascertained correctly. This also lowered sample size. In our opinion, this downside was more than compensated by the advantage of being able to assess incidence of disorders. Furthermore, we also checked to see if our results would have come out different if we measured 5-to-6 year prevalence of disorders after abortion instead of incidence and recurrence, but they did not. Future research could examine the developmental course of mental disorders among women who have abortions with a more chronic course of mental disorders.

A limitation of our study was that we only measured common mental disorders, and were not able to look at other disorders, such as schizophrenia, borderline personality disorder, and post-traumatic stress symptoms. Even though Post-Abortion-Syndrome is not recognized as a disorder or subcategory of PTSD in DSM-IV, DSM-5, and ICD-

10, and the research which found evidence for PAS (Coleman, 2005; Speckhard & Rue, 1992) has been critically refuted (e.g., Robinson et al., 2009; Stotland, 1992), abortion still might be traumatic for a small minority of women. We were not able to investigate this, because these disorders were not in the dataset.

7.2.6 Reference groups

The issue of reference groups and controlling for unintended or unwanted pregnancy is a major one in this field, and it still is a cause for debate between researchers. For this reason, we here discuss into more detail whether separating the abortion from the unwanted pregnancy is theoretically and practically a realistic endeavor to pursue.

Our research question does not disentangle the abortion from the unwanted pregnancy. It is important to know that we also do not claim to answer the causal question about the effect of abortion *given* the unwanted pregnancy. Rather, we wanted to know whether the life event of terminating an unwanted pregnancy was associated with post-abortion mental disorders. What characterizes an abortion is that it involves making the choice to terminate a pregnancy. It is not so much the unwanted pregnancy in itself, nor the medical procedure in itself, that characterize the event. Comparison to a group of women who did not terminate an unwanted pregnancy is not needed to answer the question whether experiencing this whole life event leads to mental disorders. We therefore used a reference group of women who were matched on background variables, but who did not have an abortion.

We think it is both theoretically questionable and practically infeasible to disentangle the abortion from the unwanted pregnancy, as they are completely intertwined. Therefore we cannot measure effects of just one of the two events, as separated from the other. Before we go into this further, we have to make clear what constitutes an unwanted pregnancy. In the literature, unintended pregnancies are usually subdivided in two categories: mistimed (unplanned) and unwanted. But these categories have fluid boundaries, and sometimes overlap completely. Would one consider a pregnancy mistimed or unwanted, when a woman decides to abort the pregnancy because she feels her family is complete? Or a woman who chooses to abort because she feels she might sink into a post-partum depression? Or a woman who chooses to abort because she feels her body can't cope with another pregnancy? Or a woman who desperately wants to have children, but surely not with this man? These are all realistic situations, in which the pregnancy is 'unwanted-at-the-moment', but may have been accepted at another time. They may be mistimed, but they are unwanted to the extent that the

women choose to have an abortion. Pregnancy intentions are not fixed, they are dependent on women's own interpretations of unwanted versus mistimed, and more importantly, they are subject to change over time (Poole et al., 2000; Joyce et al., 2000). If the attitude towards the pregnancy changes, perhaps after the baby is born, then how does this affect mental health? It is not unusual that a woman who seriously considers to have an abortion but then decides to keep the pregnancy, will forget all about her initial doubts and starts enjoying the pregnancy. Furthermore, even pregnancy intentions with regard to a pregnancy that has been terminated, can change over time. Since this is such a complex issue, we chose for a definition we believe is most useful: If a woman voluntarily chooses to have an abortion, after careful deliberation, we believe we can classify it as an unwanted pregnancy, irrespective of the reason she has, and irrespective of whether her pregnancy intention changes or not. By this definition, all abortions are of unwanted pregnancies, apart from those that were wanted but had to be terminated for medical reasons (which we excluded from our sample).

Investigating mental health effects of the abortion as disentangled from the unwanted pregnancy, seems feasible when one wants to compare the effects of the different options when the unwanted pregnancy is a given. Teasing the abortion apart from the unwanted pregnancy seems theoretically attractive, because whatever predisposes women to get pregnant unintentionally, would not be mixed in the equation. As attractive as this design seems in theory, it has many methodological disadvantages in practice. When comparing women who had an abortion of an unwanted pregnancy to women who carried an unwanted pregnancy to term, the latter women might have done this for several reasons.

Some women might *choose* to keep the pregnancy, in which case it is not unlikely that pregnancy intention changes, and women transfer from 'unwanted' to 'mistimed' or 'wanted' (e.g., Poole et al., 2000). In this case, we would be comparing women who had an abortion to women with wanted pregnancies. Other women *might carry an unwanted pregnancy to term, without changing pregnancy intention*, and without asking for an abortion. These women might feel forced to continue the pregnancy (perhaps their partner does not want an abortion), or they might be strongly morally opposed to abortion. These women might give the child up for adoption. This seems a very specific group, not representative of the larger group of women who carry an unwanted pregnancy to term. A third group of women might be *denied an abortion*, because of conscientious objection of the doctor, or because the pregnancy is too advanced and abortion is no longer a legal option. As the majority of abortions are

performed within a few weeks after finding out about the pregnancy, this is also a highly specific group - at least, in the Netherlands. These women are also faced with a whole range of other negative events, like the actual fact of being denied an abortion, being pregnant in unhappy circumstances, and perhaps giving the child up for adoption. Furthermore, women who are denied an abortion form a specific group. Their pregnancies are likely to be much more advanced, there usually are reasons for the late-term decision or discovery of the pregnancy. It is known that women who terminate later in the pregnancy face more financial obstacles, and are less often employed, for example (Kiley et al., 2010) than women who terminate in the first trimester (the largest group). The 'typical' woman who has an abortion is therefore in many ways very different from the 'typical' woman who is denied an abortion. It is also theoretically questionable to use this reference group if one wants to draw conclusions with regard to having an abortion, as women with unwanted pregnancies who did not ask for an abortion are left out of this comparison. It would not lead to a valid estimate of the effect of abortion versus carrying to term, but between women who did have, and those who were denied an abortion, which is a different research question.

In all situations, effects of other events that followed from carrying the unwanted pregnancy to term, are mixed in. Therefore they do not provide information about the unwanted pregnancy as separated from the abortion. These events have not been separated, but rather, various life events have been compared to other events (or multiple ones), which often further influence sociodemographic variables.

Furthermore, if we truly were to investigate the effects of abortion separated from the unwanted pregnancy, and form conclusions about the impact of the unwanted pregnancy as well, we would also need a group of women who had an abortion of a wanted pregnancy (e.g., for medical reasons). Clearly, this is an event of a totally different character. All in all, to investigate abortion as disentangled from the pregnancy, leads to innumerable issues.

Even if we would have wanted to investigate this last research question, this would not have been possible, because this group is almost non-existent in the Netherlands. An estimated 100 women per year are denied an abortion (NGvA, personal communication); most abortion requests (around 30,000 per year) are granted. The denied abortion requests all concern women that have pregnancies in which the fetus is viable (after 22-24 weeks pregnancy). This is a very small and highly specific group in the Netherlands, in contrast to other countries such as the US, where a large group

of women are in fact being denied abortion care. In the Netherlands, this is not the case, therefore it is not a relevant comparison, and not practically feasible either.

7.3 Directions for future research

The results of this thesis provide important insight in the mental health of women who have abortions, both before and after the event. In the former section on methodological considerations, some ideas for future research were mentioned. Below, we will further discuss these and add some more research directions which we consider relevant in this context.

First, the current work could be extended and knowledge deepened by looking at temporal and severity aspects of mental disorders after abortion, in order to address the diversity in experiences of symptoms of mental disorders. Because we did not find that the abortion increased the risk for incidence of mental disorders, but only slightly for recurrence (short-term only), the focus of these more in-depth analyses should be directed at the women who had prior mental disorders. Furthermore, focusing on temporal aspects might also enable examining the developmental course of mental disorders among women with a more chronic course of disorders. This way we might also be able to include women who had a mental disorder at baseline.

Second, we found that women who have abortions had a much higher prevalence of lifetime mental disorders. It seems highly clinically relevant to further our understanding of this link, by prospectively investigating reproductive events and choices, as well as contraceptive use, among women with a psychiatric history. Future research should therefore explore reproductive events and choices in the lives of women who are especially at risk for having abortions and/or unwanted pregnancies: women with mental disorders. Studies into the reproductive and mental health of women who are being treated in mental health care, seems a first step in gaining insight in why women with a history of mental disorders are more vulnerable to having an abortion.

We did not ask explicitly to what extent women experienced abortion-associated stigma, or stigma related to mental disorders. Yet it is known that women who experience stigmatization because of their abortion, have more problems with the abortion (Cockrill et al., 2013; Kumar et al., 2009; Major & Gramzow, 1999). When interviewing the women for the current study at the last follow up, many women

reported that they had not really thought about the abortion a lot (or not at all), until the interviewer contacted them. Many women confessed that they felt a bit guilty for not feeling bad about it, or expressed hesitantly that they had had no problems after the abortion. This information is purely anecdotal, but we think it highlights the importance of investigating experienced stigma, even in a country like the Netherlands. Therefore a third venture for new research would be the exploring of emotions and stigma around an abortion.

An interesting fourth direction for future research would be to investigate the mental health of women who travel to the Netherlands in order to have an abortion. In the Netherlands, about 10% of women who have abortions in specialized abortion clinics are women who do not live in the Netherlands. These women have had to overcome more barriers to have the abortion, such as travelling to the Netherlands, finding the financial resources to buy a ticket, and so on. For these women, the pregnancy situation might be much more problematic. This might lead to more stress and negative adjustment after abortion, but is also conceivable that these women are more relieved post abortion, as the abortion ended the problematic situation they were in. It would be interesting to investigate the mental health of this group of women, while controlling for pre-pregnancy mental disorders and other pre-existing differences.

The results described in Chapter 6 indicate that the partner relationship is highly important. Women who feel that the relationship with the partner is unstable, are at higher risk for incident mental disorders. Earlier research has also shown that one of the most commonly mentioned reasons to have an abortion is not feeling confident about the relationship. In this study we asked women whether they had experienced pressure to have the abortion, but we did not go into detail about this due to time constraints of the interview. More in-depth information about the partner role would be highly valuable. Pressure of the partner to have an abortion has perhaps more effects on women's experiences when it is in conflict with their own wishes, than when they also want to have the abortion. The opposite scenario is also possible, in which the partner wants to keep the pregnancy but the woman does not. The social context and role of the partner should be explored further, and we recommend that future research also includes the perspective of the men involved in the pregnancy.

In this thesis, we found that pre-existing differences between the abortion cohort and the reference cohort strongly confounded the association between abortion and mental health, seriously inflating outcome measures. Yet we also know that unwanted pregnancies and abortions happen in all layers of society. Nonetheless, it would be

worthwhile to investigate whether these pre-existing differences indicate that there is a specific subgroup within the abortion population or that these pre-existing differences are more widespread among the whole abortion population. For some part, the differences between the cohorts could be related to the sampling strategy or selectivity. We dealt with these pre-existing differences by matching on them, hereby minimizing their influence. It would however also be interesting to investigate how they are related to abortion and/or mental health.

7.4 Implications for practice

7.4.1 Prevention of mental disorders

This study showed that it is highly unlikely that abortion increases the risk of the incidence of mental disorders. Therefore, there is no reason to develop specific interventions for the prevention of mental disorders *as a result of the abortion*. However, because the prevalence of previous mental disorders is relatively high among women who have abortions, the abortion clinic might be a good place to be extra attentive to this. Women who present underlying mental health issues, could be referred to general mental healthcare for these issues.

In Chapter 3 it was found that women with a history of mental disorders respond more negatively to abortion than women without this history. When women show a particularly difficult decision process or extremely negative responses post-abortion, this might therefore alert abortion clinicians to possible underlying psychiatric problems, unrelated to the abortion. These women might benefit the most from extra support and possibly even referral to general mental healthcare. However, our results do not imply that these women should be targeted specifically for a mental health intervention. First of all, the disorders might not be present anymore at the time of abortion. Second, need for treatment of psychiatric disorders is a highly complex issue, which is not necessarily related to symptoms of mental disorders (Ten Have et al., 2013). Screening women for previous mental disorders before they are having an abortion seems inappropriate, because it creates the impression that getting an abortion is dependent on women's mental health status. However, when women show a lot of distress before or after the abortion, or underlying mental disorders come to the surface, when women have experienced many life events in the year before the abortion or are having relationship difficulties, nurses and doctors in the abortion

clinic might be attentive to these risk factors. Post-abortion counseling may then be the best moment to address these issues and refer to general mental healthcare, if desired.

It is important to note that the results of this thesis do not imply that most women who have abortions have mental health problems. Many psychologically healthy women experience unwanted pregnancies and choose to terminate pregnancies. It is also critical to acknowledge the variation in women's backgrounds, as well as their responses to abortion. Therefore we recommend that extra attention is, at all times, tailored to women's needs.

7.4.2 Supporting women who go through abortion

Women with a history of mental disorders experience more doubts, negative emotions, and emotional burden of the pregnancy and the abortion treatment. When women show a particularly difficult decision process or extremely negative responses post-abortion, this might alert abortion clinicians to possible underlying psychiatric problems, unrelated to the abortion. These women might also benefit from extra support around the abortion, to alleviate stress and lessen the impact of the event. However, it is not known whether extra support (and if so, what kind) would be beneficial or helpful for these women. That these women experience a more intense or painful process, does not mean that this should be 'fixed' with an intervention, especially since we found that these abortion-related variables did not in turn predict incidence or recurrence of mental disorders. However, these women's experiences might be improved by offering extra support before and after the abortion procedure. Future research could investigate the healthcare needs of these women.

7.4.3 Prevention of unwanted pregnancy and abortion?

This study has found that the prevalence of lifetime psychiatric histories is high among women who have abortions compared to women who never had an abortion. Women with a history of mental disorders are overrepresented in the abortion clinic. Conversely, among women with mental disorders, the prevalence of unwanted pregnancies and abortions might be higher compared to women without these disorders. This is relevant information for the purpose of prevention of unwanted pregnancies and abortions. Despite the relatively low abortion rate in the Netherlands, there is no reason to be complacent: many unwanted pregnancies could have been

prevented by using effective contraception. The results presented in this thesis suggest that future research should focus specifically on reproductive events and choices in the lives of those women who are particularly at risk for having an abortion and/or an unwanted pregnancy: women with mental disorders.

7.4.4 Valorisation activities

The results of the current study will be used in the revision of the Dutch guidelines for psychosocial counseling of women who think about terminating a pregnancy and the guidelines for psychosocial counseling of women who choose to have an abortion. They were also shared and discussed with doctors, nurses, psychologists and other professionals in the Dutch abortion care at a symposium in October 2016. In addition, a research report in Dutch and a lay summary will be disseminated among abortion facilities, options counseling providers, sexologists, and other professionals in the field.

Even though the current research does not indicate that abortion clinics drastically need to improve their psychosocial care, the results of this study could contribute to perpetuating a high standard of psychosocial care. We did not study healthcare needs of women or what is practically feasible in abortion clinics. Furthermore, the results of the current thesis could also help in targeting contraceptive counseling to those who would benefit most from it. It seems particularly worthwhile to talk about contraceptive use with those who are most at risk for both unwanted pregnancy and future mental disorders.

SUMMARY

The last decade has seen a renewed interest in international research about the question whether termination of an unwanted pregnancy is linked to subsequent mental health disorders (e.g., APA, 2008; Coleman, 2011; NCCMH, 2011). In the Netherlands, political debate about the potentially harmful effects of abortion on women's mental health arose around the same time. Certain political parties in the cabinet Balkenende-IV called for research on this subject, because it was recognized that it had not yet been studied in the Dutch context. In 2008, the Dutch Ministry of Public Health and Sports decided to grant funding to Utrecht University to conduct a longitudinal study, in close cooperation with the Netherlands Institute of Mental Health and Addiction (Trimbos Institute), into the mental health of women having abortions. This thesis is a product of that study.

International research in the field of abortion and mental health is characterized by methodological limitations, such as sample size issues, short follow up time, inappropriate reference groups, inaccurate measurement of mental disorders, insufficient control for psychiatric history and other risk factors, inadequate assessment of abortion timing (APA, 2008; NCCMH, 2011; Charles et al., 2008). The gold standard for evaluation of treatment effects is the randomized controlled trial (RCT), but this is ethically unfeasible for evaluating effects of abortion and/or unwanted pregnancy. Therefore two other types of studies have been used to answer questions with regard to abortion and subsequent mental health. First, some studies used subsamples from extant population studies in which the abortion is assessed retrospectively (e.g., Fergusson et al., 2009; Reardon & Cogle, 2002; Mota et al., 2010; Steinberg & Finer, 2011). These kind of studies are typically large, have long follow up periods, and use extensive diagnostic measurement of the presence of mental disorders. However, the subsamples of women who had an abortion are usually small, underreporting of abortion could be biasing the results, and the timing of the abortion cannot be ascertained correctly in these kind of studies, which is crucial to determine the order of events and exclude the possibility of reversed causality. The second type of studies makes use of primary cohorts of women who have had an abortion; these studies were designed specifically for investigating effects of abortion (e.g., Major et al., 2000; Foster et al., 2015). In these studies, the timing of abortion is measured accurately, and abortion-related variables can be investigated thoroughly. However, in these type of studies the measurement of mental disorders is most often limited to subclinical symptoms of only a few mental disorders. Selection effects are a potential threat to validity in these studies. Furthermore, follow up time is sometimes limited in these studies.

In the current study we aimed to combine the strongest features of the population cohort studies and the primary cohort studies. The preferred design would be a longitudinal primary cohort study with a long follow up time, measuring clinical-level mental disorders with a sensitive, specific, and reliable instrument. Furthermore, it would be important to thoroughly assess the pre-pregnancy presence of mental disorders, as well as other risk factors and abortion-related variables, because they might influence mental health and therefore confound any possible link between abortion and mental health.

The general goal of this thesis is to offer more conclusive insight into the mental health of women after an abortion, in particular, the development of clinical DSM-IV mental disorders. The main question in this study was whether women who have an induced abortion of an unwanted pregnancy are at increased risk for mental disorders, compared to women who never had an abortion. An underlying question is to what extent possible differences between these groups can be attributed to the abortion. In order to answer these questions, we would first need data on the lifetime prevalence of mental disorders - the psychiatric history - before the abortion. Furthermore, one would need to distinguish between mental disorders that have a first-onset after the abortion (incidence) from mental disorders with an onset in the past (before the abortion), which recurred again after the abortion (recurrence). We also wanted to know how having a history of mental disorders might affect the experiences around an abortion. Lastly, we aimed to identify risk factors for mental disorders after an abortion, in case these do occur.

The research questions have been investigated in a longitudinal cohort study of women aged 18-48 who had an abortion, the Dutch Abortion and Mental Health Study (DAMHS), which could be compared to data of women in the same age range who did not report an abortion in the Netherlands Mental Health Survey and Incidence Study-2 (NEMESIS-2). NEMESIS-2 is a large Dutch population study about mental health, coordinated by the Netherlands Institute on Mental Health and Addiction (Trimbos Institute). The interview questions of DAMHS were developed to be largely the same as in NEMESIS-2, so that data could be compared. In particular, both studies used the same diagnostic instrument, the Composite International Diagnostic Interview (CIDI) 3.0, to measure common mental disorders. These disorders were mood disorders (major depression, dysthymia, bipolar disorder), anxiety disorders (panic disorder, agoraphobia, social phobia, specific phobia, generalized anxiety disorder), childhood impulse control disorders (ADHD, conduct disorder, oppositional defiant disorder), substance abuse (alcohol/drug abuse and dependence), and antisocial personality

disorder. Measurement of sociodemographics and other potential risk factors were also adopted from NEMESIS-2. In DAMHS we added an extra section to the interview about characteristics of the abortion, pre- and post-abortion experiences, the decision process, emotions and how women dealt with it. In NEMESIS-2, participants were interviewed three times over the course of six years, in DAMHS, we did the same in a period of five years. DAMHS women were informed about the study in seven abortion clinics by clinical staff, after which they were contacted by interviewers to make a face-to-face appointment. In the first wave, 325 interviews were completed in DAMHS; in the second wave, we re-interviewed 264 of these women; and in the third wave, 231 women remained in the study.

In **Chapter 2**, we investigated whether women who have abortions ($n = 325$) more often have had previous mental disorders before the abortion compared to controls from NEMESIS-2 ($n = 1902$). The lifetime prevalence of any mental disorder was 68.3% among DAMHS women, and 42.2% among NEMESIS-2 women. The likelihood that women had a history of mental disorders was significantly higher in the abortion group compared to the reference group. In these analyses we controlled for age category, cohabiting, employment status, education level, western or non-western ethnicity, and degree of urbanization. These results support the notion that psychiatric history may explain associations that have been found between abortion and mental health. Psychiatric history should therefore always be taken into account when investigating causal questions about effects of abortion.

In **Chapter 3** the impact of this psychiatric history on how women experience an abortion was studied. Compared to women without a psychiatric history, women with previous mental disorders had more difficulty deciding (doubt), experienced more emotional burden with regard to the unwanted pregnancy and the abortion procedure, experienced more negative emotions, scored lower on abortion-related self-efficacy, and used more avoidance and emotion-related coping. There were no differences in experienced pressure of others, decision satisfaction, and positive post-abortion emotions. Psychiatric history strongly affected women's pre- and post-abortion experiences in terms of doubt, stress, and burden, but it did not affect the extent to which women were certain about their decision. Thus, negative abortion experiences may, at least partially, stem from underlying mental disorders.

In **Chapters 4 and 5**, we investigated whether having an abortion increased the risk of first-onset (incidence) and the recurrence of mental disorders. To improve causal inference, a 1-to-1 case-control exact matching design was used. Matching methods

were specifically designed for this (Cook et al., 2008; Blackwell et al., 2009; Iacus et al., 2011); they are particularly useful in situations when there is insufficient overlap in covariates between two samples (Stuart, 2010). In addition, simulation studies have shown that matching not only reduces or removes imbalance in measured confounders, but also can reduce imbalance in unmeasured ones (e.g., Stürmer et al., 2010). For each case in DAMHS, an exact match in terms of selected covariates was found in NEMESIS-2, and all cases without a match were discarded. Covariates for matching were selected on the basis of their confounding nature: they were strongly associated with both the outcome (incidence of mental disorders) and the predictor (having had an abortion). By doing this, we created equivalence between groups in the measured confounders.

In unmatched data, we initially found differences in *incidence* of all groups of mental disorders in our unmatched samples after 2.5 to 3 years, but the matching procedure strongly attenuated these results to the point of non-significance. This implies that if women do develop disorders, this seems to be largely dependent on co-occurring variations in measured covariates. After 5 to 6 years, there were fewer initial differences between unmatched samples for incidence (only for substance use disorders and for the aggregate measure any common mental disorder), but the matching again decreased these differences. When confounding covariates are taken into account, the risk of incidence of mental disorders was not significantly higher for DAMHS women compared to controls.

With regard to *recurrence*, we found initial differences after 2.5 to 3 years in unmatched data for anxiety disorders and the aggregate measure any mental disorder only. Matching also attenuated the results, but after matching, the initial effect for any mental disorder remained significant. This could imply that the whole abortion experience may increase vulnerability for recurrence of mental disorders among women with a psychiatric history. However, the effect for recurrence was marginally significant ($p = .05$), and the number of cases in these final analyses was low, therefore we should interpret these results with caution. After 5 to 6 years, these possible effects had dissipated, also in the 'raw' unmatched results. The abortion might trigger mental disorders among women who are already at increased vulnerability because they had mental disorders before, but in the long run, any possible effect of the abortion seems to become negligible.

In **Chapter 6**, we set out to identify risk factors that were related to the incidence or recurrence of mental disorders among women who have had an abortion, in case

mental disorders do occur. Based on the literature we selected a number of (categories) of potential risk factors. Bivariate and multivariate regression analyses were performed to study predictors of incidence or recurrence (a combined measure) of mental disorders after 2.5 to 3 years post-abortion. These analyses showed that abortion-related variables (such as decision difficulty, negative post-abortion emotions, but also the number of previous abortions) did not predict the outcome. Having an unstable relationship with the conception partner did, and so did the number of recent negative life events (measured at baseline), and having had previous mental disorders. This last risk factor was the most consistent predictor in all categories of disorders (mood, anxiety, substance use, any).

The findings described in this thesis support the abortion-as-life-event view, and show that an abortion is not inherently harmful for mental health, in terms of the development of mental disorders. This is in line with the conclusions of the highest quality empirical studies (e.g., Gilchrist et al., 1995; Major et al., 2000; Munk-Olsen et al., 2011) and with conclusions of the most thorough reviews of the literature (APA, 2008; NCCMH, 2011). With the exception of one review study (Coleman, 2011), which has been critically refuted (e.g., Abel et al., 2012; Polis et al., 2012; Steinberg et al., 2012), all review studies concluded that there is no evidence that women who terminate unwanted pregnancies have an increased chance to develop subsequent mental disorders (e.g., APA, 2008; NCCMH, 2011; Charles et al., 2008). The results further indicate that when women do develop disorders, this is strongly related to vulnerability factors such as psychiatric history. This also has been found in other international research (e.g., Steinberg & Finer, 2011).

This study is an important contribution to the evidence so far, because it has overcome methodological limitations that characterize research on abortion and mental health, such as small samples, short follow up times, inaccurate assessment of abortion timing, and limited measurement of mental disorders. It is the first study in the field distinguishing incidence and recurrence, which is much more informative for causal inference than measuring mere prevalence (e.g., Rothman, 2012). We also were the first to use a 1-to-1 matching procedure in this context, which is a rigorous method to deal with confounding (Rosenbaum & Rubin, 1983; Dehejia & Wahba, 2002; Cook et al., 2008).

The results of this thesis provide important insight into the mental health of women who have abortions, both before and after the event. We have also shown how previous mental disorders affect pre- and post-abortion experiences. We have

confirmed the relevance of pre-existing differences (co-occurring risk factors) between women who have abortions and women who do not. It is of utmost importance to adequately measure and deal with pre-abortion mental health and co-occurring risks in research examining post-abortion mental health.

Based on this study, there is no reason to develop specific interventions for the prevention of mental disorders *as a result of the abortion*, because the abortion does not increase the risk of the development of disorders (when co-occurring risk-factors are taken into account). Because the prevalence of previous mental disorders is relatively high among women who have abortions, the abortion clinic might be a good place to be extra attentive to this. Women who present underlying mental health issues, could be referred to general mental healthcare for these issues; post-abortion care may be the most appropriate time for this.

This study also raises new questions. Why are women with mental disorders overrepresented in the abortion clinic? Are they more at risk for unintended pregnancy, or are they more inclined to terminate a pregnancy? Future research could provide more insight in this relationship. It seems highly clinically relevant that future research specifically focuses on reproductive events and choices in the lives of those women who are most at risk for having an abortion and/ or an unwanted pregnancy: women with mental disorders.

SAMENVATTING

In het laatste decennium is er in internationaal onderzoek opnieuw interesse ontstaan in de vraag of het afbreken van een ongewenste zwangerschap psychische aandoeningen tot gevolg heeft (o.a. APA, 2008; NCCMH, 2011). Ook in Nederland is het politieke debat over de mogelijk schadelijke gevolgen van abortus op de psychische gezondheid van vrouwen in dezelfde periode opnieuw opgekomen. In Nederland was dit nog niet eerder onderzocht; enkele politieke partijen in het kabinet Balkenende-IV verzochten dan ook om onderzoek naar dit onderwerp. In 2008 besloot het Ministerie van Volksgezondheid en Sport om een longitudinaal onderzoek te bekostigen naar de psychische gezondheid van vrouwen die een abortus meemaken. Dit onderzoek is uitgevoerd door de Universiteit Utrecht in samenwerking met het Trimbos Instituut. Dit onderzoek bracht het onderhavige proefschrift voort.

Internationaal onderzoek op het gebied van abortus en psychische gezondheid wordt gekenmerkt door methodologische beperkingen, zoals kleine onderzoeksgroepen, korte opvolgperiodes, ongeschikte referentiegroepen, onnauwkeurige meting van psychische aandoeningen, onvoldoende controle voor psychiatrische voorgeschiedenis en andere risicofactoren, inadequate meting van de timing van de abortus (APA, 2008; NCCMG, 2011; Charles et al., 2008). De 'gouden standaard' in wetenschappelijke evaluatie van behandelingseffecten, is de gerandomiseerde gecontroleerde trial (randomized controlled trial, RCT), maar deze methode is ethisch gezien vanzelfsprekend onmogelijk toe te passen om effecten van abortus en/of ongewenste zwangerschap te kunnen meten. Daarom worden gewoonlijk twee andere typen studies gebruikt om vragen te beantwoorden over eventuele psychische gevolgen van abortus. Ten eerste gebruiken sommige studies subsamples van bestaande populatiestudies waarin op retrospectieve wijze is gevraagd of men een abortus heeft meegemaakt (o.a.: Fergusson et al., 2009; Reardon & Cogle, 2002; Mota et al., 2010; Steinberg & Finer, 2011). Dergelijke studies kennen meestal een groot aantal deelnemers, hebben lange opvolgperiodes, en gebruiken uitgebreide diagnostische instrumenten om diverse psychische aandoeningen te meten. De subsamples van vrouwen die een abortus hebben meegemaakt binnen deze populatiestudies zijn echter meestal klein, onderrapportage van abortus zou de resultaten kunnen vertekenen, en de timing van de abortus kan niet precies worden gemeten, wat wel cruciaal is om de volgorde van gebeurtenissen vast te stellen, om de mogelijkheid uit te sluiten dat de psychische aandoeningen de abortus voorspellen, in plaats van andersom (omgekeerde causaliteit). Het tweede type studies maakt gebruik van zogenaamde primaire cohorten van vrouwen die een abortus meemaken; deze studies zijn speciaal ontworpen om effecten van abortus te onderzoeken (o.a.: Major et al.,

2000; Foster et al., 2015). In deze studies wordt de timing van de abortus wel accuraat gemeten, en abortus-gerelateerde variabelen kunnen uitgebreid onderzocht worden. In dit type studies is de meting van psychische aandoeningen echter over het algemeen beperkt tot subklinische symptomen van slechts een aantal psychische aandoeningen. Selectie-effecten vormen een potentiële bedreiging voor de validiteit in dergelijke studies. Verder is de opvolgperiode van de respondenten hier over het algemeen beperkt.

In de studie die in dit proefschrift besproken wordt, is getracht om de sterkste punten van de populatiestudies met die van de primaire cohortstudies te combineren. Het meest ideale onderzoeksdesign zou een longitudinale primaire cohortstudie zijn met een lange opvolgperiode en een groot aantal respondenten, waarin gebruik wordt gemaakt van een sterk en betrouwbaar instrument om een ruime variatie aan klinische psychische aandoeningen te meten. Bovendien is het van belang dat de aanwezigheid van psychische aandoeningen vóór de ongewenste zwangerschap grondig in kaart wordt gebracht, evenals andere risicofactoren en abortus-gerelateerde factoren, omdat deze ook de psychische gezondheid kunnen beïnvloeden en hiermee bevindingen van een eventuele relatie tussen abortus en psychische gezondheid kunnen verstoren ('confounding').

Het algemene doel van dit proefschrift is om sluitend inzicht te bieden in de psychische gezondheid van vrouwen nadat zij een abortus hebben meegemaakt. Het gaat hierbij om de ontwikkeling van klinische DSM-IV psychische aandoeningen. De hoofdvraag van deze studie was of vrouwen die een abortus provocatus hebben van een ongewenste zwangerschap een verhoogd risico hebben op psychische aandoeningen vergeleken met vrouwen die nooit een abortus hebben meegemaakt. Een onderliggende vraag hierbij is in hoeverre eventuele verschillen aan de abortus kunnen worden toegeschreven. Om deze vragen te kunnen beantwoorden, hebben we als eerste gegevens nodig over de 'lifetime' prevalentie van psychische aandoeningen – de psychiatrische voorgeschiedenis – van vóór de ongewenste zwangerschap. Verder is het nodig om onderscheid te maken tussen psychische aandoeningen die na de abortus voor het eerst zijn opgetreden (incidentie), en psychische aandoeningen die al eerder in het verleden zijn ontstaan, maar na de abortus opnieuw zijn opgetreden ('recurrence'). We wilden daarnaast ook weten wat de impact is van een geschiedenis van psychische aandoeningen op hoe vrouwen een ongewenste zwangerschap en abortus ervaren en ermee omgaan. Tenslotte wilden we ook risicofactoren identificeren voor psychische aandoeningen na een abortus, in geval deze optreden.

De onderzoeksvragen zijn onderzocht in een longitudinale primaire cohortstudie bij vrouwen die een abortus meemaakten, de 'Dutch Abortion and Mental Health Study' (DAMHS), welke kon worden vergeleken met data van vrouwen die geen abortus hadden meegemaakt uit de 'Netherlands Mental Health Survey and Incidence Study-2' (NEMESIS-2). NEMESIS-2 is een grote Nederlandse populatiestudie over psychische gezondheid, die gecoördineerd wordt door het Trimbos Instituut. De interviewvragen van DAMHS waren grotendeels gelijk aan die van NEMESIS-2, zodat de data vergelijkbaar waren. Beide studies maakten gebruik van hetzelfde diagnostische instrument, de 'Composite International Diagnostic Interview (CIDI) version 3.0. De psychische aandoeningen die gemeten werden, waren stemmingsstoornissen (depressie in engere zin, dysthymie, bipolaire stoornis), angststoornissen (paniekstoornis, agorafobie, sociale fobie, specifieke fobie, 'generalized anxiety disorder'), stoornissen in middelengebruik (alcohol/ drugs misbruik en afhankelijkheid), ontwikkelingsstoornissen (ADHD, antisociale gedragsstoornis, oppositioneel opstandige gedragsstoornis), en de antisociale persoonlijkheidsstoornis. De sociaal-demografische maten en andere potentiële risicofactoren werden op dezelfde manier als in NEMESIS-2 uitgevraagd. In NEMESIS-2 werden de deelnemers drie keer geïnterviewd over een periode van zes jaar. In DAMHS werd hetzelfde gedaan, maar dan in een periode van ongeveer vijf jaar. De deelnemers aan DAMHS werden op de studie gewezen door medewerkers van zeven abortusklinieken verspreid over Nederland, waarna zij door getrainde interviewers werden benaderd om een face-to-face afspraak te maken. In de eerste meting werden 325 interviews afgerond in DAMHS, waarvan er 264 op het tweede meetmoment opnieuw werden geïnterviewd, en uiteindelijk in de derde meting hiervan 231 vrouwen overbleven.

In **hoofdstuk 2** is onderzocht of vrouwen die een abortus meemaken (n=325) vaker een geschiedenis van psychische aandoeningen hadden in vergelijking met een controlegroep uit NEMESIS-2 (n = 1902). De lifetime prevalentie van enigerlei psychische aandoening was 68,3% onder DAMHS vrouwen en 42,2% onder NEMESIS-2 vrouwen. De waarschijnlijkheid dat vrouwen eerder psychische aandoeningen hadden gehad, was driemaal zo groot in de abortusgroep in vergelijking met de controlegroep. In deze analyses werd gecontroleerd voor leeftijdscategorie, al dan niet samenwonend met een partner zijn, al dan niet werkeloos zijn, opleidingsniveau, Westerse of niet-Westerse etniciteit, en urbanisatiegraad. Deze resultaten ondersteunen het idee dat psychiatrische voorgeschiedenis eerdere gevonden associaties tussen abortus en psychische gezondheid kan verklaren. Het is dan ook

nodig om dit soort variabelen altijd mee te nemen als men causale vragen over de effecten van een abortus onderzoekt.

In **hoofdstuk 3** is gekeken in hoeverre een psychiatrische voorgeschiedenis van invloed is op de ervaringen voor en na een abortus. Vergeleken met vrouwen zonder deze geschiedenis, ervaaarden vrouwen met eerdere psychische aandoeningen meer twijfel over de beslissing, meer emotionele belasting van de ongewenste zwangerschap en de abortusbehandeling, meer negatieve emoties, zij scoorden lager op abortusspecifieke self-efficacy en gebruikten meer vermijdende en emotiegericht coping. Er waren geen verschillen in ervaren druk van anderen, tevredenheid met de beslissing, en positieve emoties na de abortus (zoals opluchting). Een psychiatrische voorgeschiedenis was dus sterk van invloed op de ervaringen rond de abortus in termen van twijfel, stress en emotionele last, maar was niet van invloed op de mate waarin vrouwen achter hun beslissing stonden.

In **hoofdstukken 4 en 5** onderzochten we of het meemaken van abortus het risico verhoogde op het voor het eerst optreden (incidentie) en het hernieuwd optreden ('recurrence') van psychische aandoeningen. Om de mogelijkheden tot het doen van causale uitspraken te vergroten, is gebruik gemaakt van een 1-op-1 'case-control' exact matching design. Matching methodes zijn speciaal hiervoor ontwikkeld (Cook et al., 2008; Blackwell et al., 2009; Iacus et al., 2011), en ze zijn vooral bruikbaar wanneer er onvoldoende overlap is tussen twee steekproeven in covariaten (Stuart, 2010). Daarnaast hebben simulatiestudies aangetoond dat matching niet alleen disbalans in gemeten 'confounders' (variabelen die de relatie tussen predictor en uitkomst verstoren omdat ze met beiden geassocieerd zijn), maar ook in andere achtergrondvariabelen die niet gemeten zijn (o.a. Stürmer et al., 2010). Voor de respondenten (cases) in DAMHS werd een exacte match gezocht in NEMESIS-2 (controls) wat betreft achtergrondvariabelen, en alle overige respondenten werden niet meegenomen in de analyses. De achtergrondvariabelen waarop respondenten werden gematcht waren sterk geassocieerd met zowel de uitkomst (incidentie of hernieuwd optreden van psychische aandoeningen) en met de predictor (het al dan niet hebben meegemaakt van een abortus). Op deze manier werden de twee cohorten 'gelijk gemaakt' wat betreft gemeten confounders.

In de ongematchte data vonden we in eerste instantie verschillen in *incidentie* op alle groepen psychische aandoeningen na 2,5 tot 3 jaar, maar na de matching van de cohorten op de achtergrondvariabelen bleek de waarschijnlijkheid dat vrouwen een psychische aandoening ontwikkelden niet significant hoger wanneer zij een abortus

hadden meegemaakt dan wanneer dit niet het geval was. Dit betekent dat wanneer vrouwen voor het eerst psychische aandoeningen ontwikkelen na een abortus, dit in grote mate afhankelijk is van variaties in andere risicofactoren. Na 5 to 6 jaar werden er minder verschillen gevonden in de ongematchte, ongecontroleerde data voor incidentie (alleen voor stoornissen in middelengebruik en de totaalmaat enigerlei psychische aandoening), maar de matching op achtergrondvariabelen zorgde er opnieuw voor dat deze effecten verdwenen.

Met betrekking tot het hernieuwd optreden van psychische aandoeningen (*recurrence*), vonden we na 2,5 tot 3 jaar in de ongematchte gegevens alleen verschillen voor angststoornissen en de totaalmaat enigerlei psychische aandoening. Het matchen was wederom van invloed, maar voor recurrence bleef het effect voor enigerlei psychische aandoening ook na de matching significant. Dit kan betekenen dat de hele abortuservaring de kwetsbaarheid voor het hernieuwd optreden van psychische stoornissen vergroot onder vrouwen die al eerder (vóór de abortus) psychische aandoeningen hebben meegemaakt. Echter, het aantal cases in deze analyses was tamelijk klein, en het effect marginaal significant ($p = .05$), waardoor voorzichtigheid geboden is bij het interpreteren van deze resultaten. Na 5 tot 6 jaar waren deze mogelijke effecten verdwenen, ook in de ruwe, ongematchte resultaten. De abortuservaring zou dus een 'trigger' kunnen zijn voor psychische aandoeningen onder vrouwen die al een verhoogd risico hebben op psychische aandoeningen vanwege hun geschiedenis, maar op de lange termijn lijken deze effecten verwaarloosbaar te worden.

Hoofdstuk 6 had tot doel om risicofactoren te identificeren die gerelateerd waren aan de incidentie of terugkeer van psychische aandoeningen onder vrouwen die een abortus hadden meegemaakt, in het geval zich deze ontwikkelden. Op basis van de literatuur werden allereerst een aantal (categorieën van) potentiële risicofactoren geselecteerd. Vervolgens werden bivariate en multivariate regressie-analyses uitgevoerd om te bestuderen of deze factoren de incidentie of recurrence (een gecombineerde maat) van psychische aandoeningen na 2.5 tot 3 jaar post-abortus voorspelden. Uit deze analyses bleek dat abortusgerelateerde variabelen (zoals moeite met de beslissing, negatieve post-abortus emoties, maar ook het hebben meegemaakt van eerdere abortussen) geen voorspellers vormden voor het voor het eerst of hernieuwd optreden van psychische aandoeningen na de abortus. Een onstabiele relatie met de verwekker, een hoger aantal meegemaakte negatieve levensgebeurtenissen in het jaar vóór de abortus, maar ook eerdere psychische aandoeningen, vormden daarentegen wel significante predictoren. Eerdere psychische

aandoeningen was de meest consistente predictor omdat deze in alle categorieën aandoeningen (stemmingsstoornissen, angststoornissen, stoornissen in middelengebruik en enigerlei psychische aandoening) naar voren kwam als voorspeller.

De bevindingen die in dit proefschrift besproken zijn, ondersteunen het idee dat de abortus een levensgebeurtenis is, die niet inherent schadelijk is voor de psychische gezondheid van de vrouwen die deze gebeurtenis meemaken. Dit komt overeen met de conclusies van empirische studies van hoge kwaliteit (zoals Gilchrist et al., 1995; Major et al., 2000; Munk-Olsen et al., 2011) en met conclusies van de meest grondige reviewstudies op dit gebied (APA, 2008; NCCMH, 2011). Met uitzondering van één reviewstudie (Coleman, 2011), die zeer kritisch ontvangen is (o.a. Abel et al., 2012; Polis et al., 2012; Steinberg et al., 2012), vonden alle reviewstudies dat er geen aanwijzingen zijn dat vrouwen die ongewenste zwangerschappen afbreken een verhoogd risico hebben om ten gevolge van de abortus psychische aandoeningen te ontwikkelen (o.a., APA, 2008; NCCMH, 2011; Charles et al., 2008). De resultaten wijzen er verder op dat wanneer vrouwen wél stoornissen ontwikkelen na een abortus, dit sterk gerelateerd is aan kwetsbaarheidsfactoren zoals een voorgeschiedenis van psychische aandoeningen. Dit is ook in ander internationaal onderzoek gevonden (o.a. Steinberg & Finer, 2011).

Deze studie vormt een belangrijke bijdrage aan het onderzoek op dit gebied, omdat er tegemoet gekomen is aan belangrijke methodologische beperkingen die onderzoek op dit gebied kenmerken, zoals kleine steekproefgroottes, korte opvolgperiodes, niet accuraat kunnen vaststellen wanneer de abortus heeft plaatsgevonden, en beperkte meetinstrumenten voor psychische aandoeningen. Het is de eerste studie op dit gebied waarin onderscheid is gemaakt tussen het voor het eerst optreden en het hernieuwd optreden van psychische aandoeningen, wat informatiever is wanneer men beoogt om causale uitspraken te doen dan het meten van de prevalentie (Rothman et al., 2012), omdat er ten tijde van de abortus géén sprake was van psychische aandoeningen en hiermee de volgorde van de gebeurtenissen kan worden vastgesteld. Dit onderzoek was ook het eerste onderzoek in deze context waarin gebruik werd gemaakt van een 1-op-1 matching procedure, hetgeen een meer rigoreuze methode is voor het omgaan met confounding in dit type onderzoek dan de gebruikelijke manier van controleren voor covariaten in een regressiemodel (Rosenbaum & Rubin, 1983; Dehejia & Wahba, 2002; Cook et al., 2008).

De resultaten van dit proefschrift verschaffen belangrijk inzicht in de psychische gezondheid van vrouwen die een abortus meemaken, zowel vóór als na de abortus.

Daarnaast is beschreven hoe een psychiatrische voorgeschiedenis van invloed is op de ervaringen van vrouwen voorafgaand en vlak na de abortus. Ook is opnieuw de relevantie aangetoond van reeds bestaande verschillen tussen vrouwen die een abortus meemaken en vrouwen die deze ervaring niet hebben. Het is dan ook van zeer groot belang dat deze onderliggende verschillen in achtergrondvariabelen goed gemeten worden en hiervoor adequaat wordt gecontroleerd in onderzoek naar psychische gevolgen van abortus.

De conclusies van deze studie vormen geen aanleiding om specifieke interventies te ontwikkelen ter voorkoming van het optreden van psychische stoornissen ten gevolge van een abortus, omdat de abortus het risico op psychische aandoeningen niet verhoogt (wanneer rekening is gehouden met achtergrondvariabelen). Omdat de prevalentie van eerdere psychische aandoeningen relatief hoog is onder vrouwen die een abortus meemaken, kan de abortuskliniek mogelijk wel een goede plek zijn om extra attent te zijn op mogelijke eerdere psychische problemen. Vrouwen bij wie duidelijk sprake lijkt te zijn van onderliggende psychische problematiek, hebben mogelijk baat bij doorverwijzing naar reguliere geestelijke gezondheidszorg voor deze problemen; de nazorg na de abortus lijkt hiervoor het meest geschikte moment.

Deze studie roept ook nieuwe vragen op. Waarom zijn vrouwen met een geschiedenis van eerdere psychische aandoeningen oververtegenwoordigd in de abortuskliniek? Hebben vrouwen met deze kwetsbaarheid een verhoogde kans om ongewenst zwanger te raken, of zijn ze meer geneigd om een ongewenste zwangerschap af te breken? Toekomstig onderzoek zou meer inzicht kunnen verschaffen in de achtergrond van deze relatie. Het lijkt tevens relevant voor de klinische praktijk dat vervolgonderzoek zich specifiek richt op de reproductieve gebeurtenissen en keuzes in de levens van die vrouwen die een verhoogd risico lopen op het meemaken van een abortus, te weten vrouwen met psychische aandoeningen.

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ABOUT THE AUTHOR

Jenneke van Ditzhuijzen (Nijmegen, 1975) studied Psychology at the University of Amsterdam, and obtained her Master's degree (cum laude) in Experimental Psychology in 2002. In her studies, she focused on emotion, cognition, and conscious & unconscious processing, completed courses in clinical psychology, and did a neuropsychological research internship in Cambridge (UK). During and after her studies, Jenneke worked as a sociotherapist in mental health care. After her studies, she worked as a research assistant and teacher at the University of Amsterdam, as a trainer in Cape Town (South-Africa), and as a project officer at Correlation European Network Social Inclusion & Health (the Rainbow Foundation). In 2006, Jenneke started to work as an independent researcher-consultant on various research projects at the local, national and European level. The main focus of this work has been on vulnerable groups, high-risk behavior, and behavior change. During her PhD, which was spread out over 7 years, Jenneke was able to continue some of her freelance activities. She also worked as a lecturer at Utrecht University, and visited the 'Advancing New Standards in Reproductive Health' (ANSIRH) program of the University of California San Francisco. Jenneke currently works as a postdoctoral researcher and lecturer at Utrecht University.

Scientific publications

Published or in press

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