The aim of this thesis is to contribute to a solution to the problem of chronic benzodiazepine use. To map the problem, to find the behavioural and psychological causes of the problem and to develop an effective intervention, a simplified version of the Precede/Proceed model was used. The purpose of this final chapter is to relate and integrate all the findings from the different studies described in the various chapters.
Summary of the main findings

Because of the problems associated with chronic benzodiazepine use, there is impetus to prevent and reduce chronic benzodiazepine use (Chapter 1). In this thesis, chronic use of benzodiazepines is defined as daily use for more than 3 months. The overall aim of the research presented in this thesis was to develop a 'tailor-made' intervention in order to reduce chronic use. A tailored intervention should be more effective than a standardized intervention, because the information - that should lead to psychological changes and, subsequently, to behavioural changes - is tailored to the characteristics of an individual.

Because it is known that there is often a lack of patient education regarding benzodiazepine use (1)(see also chapter 1), we examined in Chapter 2 how general practitioners and pharmacists actually think about benzodiazepine use. In order to increase and improve patient education, we investigated the psychological determinants related to the intention of the general practitioner and pharmacist to provide patient education about benzodiazepine use. This study revealed that intention was predicted by outcome expectations, social norm and self-efficacy. It became apparent that general practitioners and pharmacists have the intention to educate when they think that benzodiazepines have well-defined disadvantages, when the education they undertake leads to success, when they feel pressure to educate from their social environment, and when they feel capable of educating. Another important finding was that more than 38% of the respondents thought that educating patients took too much time. It might be desirable to have a tool available to remove the burden of this task from the practitioner.

In summary, chapter 1 presented the facts about all the disadvantages of chronic benzodiazepine use. Chapter 2 has shown that there is a need for a tool to educate patients, that takes the work out of practitioners’ hands. Together, these chapters suggest: 1) that there is a need for interventions to reduce chronic benzodiazepine use and; 2) that one way to support the broad dissemination of information on chronic use is to apply tailored patient education on a large scale. To be able to develop such an intervention, the psychological determinants of patients’ benzodiazepine use and cessation should be studied. This was done in chapters 3 and 4.

Thus, before developing tailored patient education, it is first of all important to know how benzodiazepine users themselves judge their benzodiazepine use, how they look at their illness and what their reasons are for using benzodiazepines and particular quantities of benzodiazepines. Patients are, after all, the ones who make the decision whether or not to use the drug once it is prescribed and to regulate the dose. A psychological model that has often been used to explain illness behaviour is the Common Sense Model of Leventhal (2). According to this model, illness behaviour can be explained by patients’ own perceptions of their illness. So, in Chapter 3 we looked at the illness perceptions with regard to the complaints or illness underlying benzodiazepine use. The extent to which these perceptions were related to the dose of benzodiazepine use was tested. To this end, we asked patients how they would feel about their complaints or illness "were they..."
Chapter 6

Summary and general discussion

not to use benzodiazepines.” The main findings of this chapter were that, out of the illness perceptions, ‘consequences’ and ‘control’ significantly predicted benzodiazepine use. Thus, the belief that their complaints would become more serious and the belief that patients had little control over the outcome of their complaints if they did not take benzodiazepines resulted in using a higher dose of benzodiazepines. These illness perceptions show that benzodiazepine users believe in the necessity of using benzodiazepines; they rely on benzodiazepines.

While chapter 3 provided insight into the psychology of benzodiazepine dosing, chapter 4 aimed to increase insight into the psychosocial determinants of benzodiazepine cessation. The computer-tailored intervention should target and change the psychosocial determinants that underlie benzodiazepine cessation. Chapter 4 showed that benzodiazepine users had a greater intention to quit and were more likely to quit their benzodiazepine intake if they perceived many positive consequences of cessation, while at the same time perceiving few negative consequences. In addition, higher self-efficacy was associated with cessation. These determinants of benzodiazepine cessation (i.e., self-efficacy and outcome expectations) were translated into intervention objectives, which were then operationalized into intervention texts that were stored on the computer. The output of the computer program – letters with tailored patient education composed of these different stored texts - was tested in chapter 5.

Tailored patient education mimics the process of individual counselling and feedback, to the extent that it can be provided through a written text. The expertise of the counsellor is documented in the computer program. In other words, computerized patient education involves adaptation of the content information to relevant patient characteristics, while at the same time it can be applied on a large scale. Even small effects can have a broad reach when applied on a large scale. And because counselling can now be given without seeing a counsellor, computer-tailored patient education is relatively low-cost.

The computer program produced two different tailored letters: single-tailedored letters and multiple-tailored letters. Single-tailored letters consisted of one letter of advice and multiple-tailored letters consisted of three different letters with a one-month interval. The multiple-tailored letters took into account the changes in benzodiazepine use over time. The aim of Chapter 5 was to compare the two different interventions with each other and to compare their effect with that of a standardized/non-tailored letter. The results showed that tailored letters were twice as effective as non-tailored letters in quitting benzodiazepine use, especially in the case of patients who were already intending to quit. We found, however, no differences between single and multiple-tailored letters.

The findings reported in the above summarized chapters raise several theoretical, practical and methodological issues to be discussed. To start with, some salient theoretical issues will be dealt with below.
Chapter 6

Summary and general discussion

Theoretical issues

The first issue concerns our conceptualization and the measurement of the illness beliefs assessed in the study presented in chapter 3. The illness beliefs were assessed by asking patients to imagine that they would not use benzodiazepines (or other tranquilizers or sedatives). The basic idea was that illness beliefs are related to behaviour because they indirectly refer to anticipated outcomes of the behaviour of using benzodiazepines.

Illness beliefs are expected to be related to benzodiazepine dosing through two different but related pathways. Firstly, the more seriously an illness is perceived, the more intensive a cure should be in order to be effective. Secondly, the more seriously an illness is perceived, the stronger the emotional reactions towards the illness will be and the more benzodiazepines may be used to lower this distress. Both pathways assume that the more seriously the illness is perceived, the higher the dose of benzodiazepines needed to cope with the illness or the reactions to the illness. This implicates that benzodiazepines are perceived as having desired effects. These effects can be considered to be the functions of benzodiazepine use and they comprise the core reason why patients engage in the behaviour of benzodiazepine use. If patients experience the desired relief of complaints or negative emotional reactions to their illness, this reinforces their benzodiazepine use.

Illness beliefs were assessed as the anticipation of the consequences and control if patients “were not to use benzodiazepines.” This latter addition was done for the following reason. In most chronic physical illnesses, such as rheumatoid arthritis, diabetes and asthma, it may be clear to patients that the basic state (genetic constitution) and progress of the pathology are not cured by the medication. Therefore, the beliefs about their illness may be relatively independent of the use and the effects of their medication. In contrast, in the case of complaints of anxiety and sleeping problems, this may be less clear. That is, these complaints are often temporary, they tend to fluctuate over time and are often contingent on environmental and social events. Furthermore, many patients self-medicate benzodiazepines; they use them “when necessary”. In addition, the illnesses or complaints for which benzodiazepines are prescribed are less clearly labelled. Most chronic physical illnesses have a clear identity and when a patient says that he has rheumatoid arthritis, this label is significant. In contrast, the complaints for which benzodiazepine users use their medication are less clearly defined and the illness label, when applied, is less clear. We argue that all these characteristics of the illnesses or complaints for which patients use their benzodiazepines make it more difficult for patients to distinguish between their illness or complaints on the one hand and the medication effects on the other hand. Therefore, the statement if you “were not to use benzodiazepines” was used to support patients in reporting their illness beliefs without being medicated. In conclusion, the study presented in chapter 3 shows that illness beliefs assessed in a ‘conditional format’ predict medication use.

Another issue that deserves greater attention is the finding in chapter 5 that dividing the tailored information into three different subsequent parts (letters) did not result in more quitters. The single tailored intervention and
the multiple tailored intervention did not differ significantly, despite the fact that the latter intervention consisted of three assessments and three subsequent letters. The rationale of spreading the information over time was that the process of change takes time. That is, for the cognitions that underlie behaviour to change, people need to attend to and process information, and to integrate it in their existing views of, for example, the consequences of their current behaviour. Stage models, such as the Transtheoretical model (5) explicitly acknowledge this phenomenon and implicate that interventions should be matched to stage. However, the information in our multiple tailored intervention was spread over time but not matched to stage because, as yet, little is known about stages in benzodiazepine cessation. Instead, the three letters followed the simple decision-making rationale that, first, people decide to change (first letter; weighing positive and negative outcome expectations) and after that they need to know how they can change (second letter; providing means to discontinue usage to increase self-efficacy). The third letter referred to both earlier letters. We must conclude that this particular way of integrating time in the delivery of the intervention did not prove to be more effective than the information it contained, as it did not perform better than delivering the information at once. Other studies have also shown the above result (6;7).

Two explanations may be suggested for the lack of difference in effects between the single and the multiple tailored letters. Firstly, the multiple tailored intervention may have contained elements that inhibit change. At least two elements that were not included in the single tailored intervention could be responsible for this. Firstly, the second and third letter contained feedback on changes in benzodiazepine use. It may be that these conclusions over time were perceived as a kind of “big brother is watching you,” which may have raised psychological defences. Secondly, and probably more importantly, the participants in the multiple tailored letter condition were contacted twice by telephone. The short contact may have deflected participants away from confrontation on problems of benzodiazepine use, which could have resulted in patients making up argumentations which contradict the message. Motivated counter-argumentation can then lead to denial of the message of the need to reduce their benzodiazepine intake. It is known in other health risk behaviours that these processes can occur (8). A second explanation for the lack of difference between the single and the multiple interventions may be the following. The multiple tailored intervention was based on the idea of change over time. However, it may be that the month interval between the subsequent letters did not fit the actual change in time. For example, the change in psychological factors underlying benzodiazepine use and cessation might take days or weeks, not months. In addition, it may be that in some people the information came just in time but in others it was mismatched to their need for information. The findings discussed here stress our almost complete lack of understanding of the speed of psychological and behavioural change.

Another issue that deserves further elaboration is why the single tailored intervention was more effective then the standardized general practitioner letter that served as the “usual care” control group. For a correct understanding
of the meaning of these results it is important to conceptualize the design as a “treatment package design” (Kazdin, 1986). That is, the design was not a test of the principle of tailoring information. It was a design to test whether one treatment package (one intervention) was more effective than another treatment package. In such a design, it is not of primary interest what elements in a package are responsible for its effects but only whether one package is more effective than the other. Still, for theoretical purposes and for further intervention development, it is of interest to find out why the single tailored intervention was more effective than the GP letter. There are at least three possibilities. Firstly, it may have been the amount of information. The single tailored intervention simply provided more text. This means that readers were assimilating the information longer. Instead of 30 seconds to read the GP letter, reading the single tailored intervention may have taken as long as five minutes. Secondly, the text was longer because it provided more arguments and recommendations. It may be that this led to a stronger motivation and to more perceived control compared to the GP letter. Thirdly, the tailoring of the information may, of course, have contributed to the greater effectiveness of the single tailored letter. Tailoring may lead to stronger self-referent encoding and, therefore, to greater psychological change.

Future studies could apply different dismantling designs to answer these questions and designs that can detect mediational changes, that is, the psychological changes that interventions bring about.

**Practical implications**

Study 2 suggested the need for developing a tool that educates patients and at the same time takes the work out of the hands of practitioners. This is why a computer-tailored education program was developed, which then proved to be effective.

Computerized patient education letters help the general practitioner and pharmacist to educate their patients more systematically, which can result in better physician-patient relationships. It is well known that there are positive benefits from good doctor-patient communications (8). Patients who receive more information about the diagnosis, the causes of a disease, or possible treatments and what these entail, are more satisfied than patients who receive less information (9). And that is exactly what this program also offers: information for the patient.

The two computerized tailored patient education letters can quite easily be implemented in the Dutch healthcare system. Before actually implementing the intervention, though, according to the Precede/Proceed model (see Chapter 1) it is important to conduct further research in how such an intervention can best be made. The last phase of the Precede/Proceed model is planning an intervention component to ensure that the program developed in the previous steps will be used and maintained over time for as long as it is needed. Effective health education and promotion programs will have little impact if they are never used or if they are discontinued while still needed to create the desired health impact (10). Without a planned intervention, the health promotion program may stay on the developers’ shelf if it is not
adopted, or on the organization’s shelf if it is adopted but not implemented. Systematic planning for each stage of the implementation of the program is thus essential if the program is to have optimal effects on the population for which we have designed it (11;12).

To be able to implement this program, all the people and organizations that are involved in the implementation and their motivations and barriers must be mapped. Dijkstra and Buunk (13) describe the implementation route in order to successfully organize and optimize the implementation. The implementation route consists of three steps: 1) mapping the actors; 2) assessing the motivations and the barriers for actors; and 3) identifying relevant policies. When the actors, organizations and policies have been identified and the motivation and barriers have been mapped, the program can be implemented. Because of this, we conducted an implementation study to find out which actors are involved, the opinion of these actors regarding the program, and the different policies related to it in order to find out where this program can best be implemented (see report of the Health Care Insurance Board (14). The results of this report were that the intervention could be implemented centrally (by one company in the Netherlands) or de-centrally (at the practice of the general practitioner or pharmacist). A qualitative study among general practitioners and pharmacists showed that both groups were positive about the intervention and the best way would be to have it embedded in their own computer information systems. The benefit of this use is that general practitioners and pharmacists are acquainted with their system. Medication reports could also be kept up-to-date in such a system. Besides the implementation in their own computer system, the Internet would also be an appropriate medium. It would then be accessible everywhere, and automatic updates are available of the patient’s medical history.

Such a web-based intervention should be implemented centrally. The intervention is then managed by one company or institute, such as, for example, a health insurance company. Another inventory (interviewing different companies in the Netherlands) showed that the various companies in the Netherlands were positive about managing such an intervention. A company can put our computer program on their website and invite their insured, for example, to visit their website. Another possibility is that a national campaign could invite benzodiazepine users to fill out a tailoring questionnaire, after which they will receive tailored patient education.

It is especially important that the program be adopted and delivered to the intended patients and ultimately routinized and institutionalized (15). Before actually implementing it, for instance, on the website of a company in the Netherlands, it is important to know first of all if the letters are also effective when the program is web-based. This is the reason why the program is now being tested in a practical setting: A company in the Netherlands has made our program web-based and is now testing it.
Methodological issues

One potential limitation pertains to the reliance on self-reporting measurements of benzodiazepine use. Self-reporting data may be subject to socially desirable and inaccurate responses. However, in the light of the dependence liability of benzodiazepines, the validity of the self-reporting assessment is valid according Geiselmann and Linden (16). They in fact found an average compliance coefficient of 0.8. Also, Oude Voshaar (17;18) found agreement of reported data and recorded benzodiazepine consumption at the end of follow-up. In addition to this, we have to bear in mind that prescription data in patient records should also be interpreted with some caution. Not all patients take their medication as prescribed. It cannot be guaranteed that patients take their drugs exactly in accordance with the general practitioner’s recommendations. There is also the possibility that patients may get their benzodiazepines from other sources. A report in the Netherlands showed that 89% of all prescriptions come from general practitioners (1). The rest come from other sources.

In the determinant study of benzodiazepine use (Chapter 4) and the study about illness beliefs (Chapter 3), participants were recruited using advertisements in magazines and local newspapers. This might have led to a select sample of benzodiazepine users, which could then have had a negative effect on the ability to generalize the results. However, offering the chance to win a bonus prize of € 25 might well have resolved this. It can be argued that using such a tempting prize could motivate benzodiazepine users who do not want to quit either. Thus, it could be the case that offering such a sum of money might lead to less-biased benzodiazepine users. One indication that the selection may not be large is the finding that in both populations of benzodiazepine users that were recruited, high proportions of participants had low to very low intentions to quit their use.

Out of the 4,000 packages with informed consent materials and the pre-test questionnaire that general practitioners were provided with to send to their patients, 861 patients returned the pre-test questionnaire. This selection was mainly due to non-response of the patients who were approached. Besides patients who did not want to participate, some general practitioners also excluded patients. This was explicitly allowed because it was considered that it was the general practitioner who should ultimately decide who could use a tailored education letter and who could not. Some patients could not be approached according to their general practitioner because of their personal problems. It was not the opportune moment to ask them to participate in the study. There was a further group of patients who were suffering from dementia. They could not fill out the questionnaire properly and read the tailored letters. Thus, the first selection was done by the general practitioner, the second selection was caused by non-response. A third selection of patients took place because only a proportion of the patients who responded at the pre-test (n=861) also responded at the twelve months post-test (n=537). This selection was due to drop-out. Because of these three selections, the ability to generalize the present findings cannot be assessed precisely. However, these selections are not by definition problematic for the validity.
of the findings reported in chapter 5. Firstly, the selection caused by the GP may even be seen as increasing the ecological validity: when the tailoring program is ultimately used in practice, it will be the general practitioner who decides who can be educated and who not. Secondly, as mentioned above, a large proportion of the pre-test respondents had no or only a low motivation to quit benzodiazepine use. Thus, the selection was seemingly not made - or made only to a limited extent - on the basis of the motivation to quit. In addition, in the actual use of our tailoring program, it is possible that the same selection of patients will be willing to receive tailored patient education. Again, this selection may not seriously threaten ecological validity. Thirdly, the selection due to drop-out did not differ for the conditions. Thus, the relative findings of effectiveness are not influenced by the drop-out. In conclusion, the threat for the ecological validity (or ability to generalize) caused by the selection may not be large if in future applications of the tailoring program a similar procedure will be used as in this study.

Suggestions for future studies

The present thesis has demonstrated the effectiveness of computerized patient education letters. Many questions have been answered and, despite an extensive research base for the application of the model used in this thesis, there is still a range of issues for future work to address. This section will highlight some of these.

One step forward might be to ask the patients whether they switched from benzodiazepines to alcohol, nicotine or other psychotropic drugs, since we know that individuals who engage in one form of addictive behaviour are more likely to engage in others as well (15). It could be that future interventions have to target multiple behaviours instead of focusing on one. That is, it should be ruled out that people stop benzodiazepine use but increase their drinking.

More sub-group analyses could have been conducted. In the thesis of Oude Voshaar (18), the biggest impact was on patients using more than 10 mg diazepam equivalent before receiving the letters. And patients who used more than 10 mg diazepam equivalent, who drank more than two units of alcohol a day, or who scored 3 or more on the Lack of Compliance scale of the Bendep-SRQ had a significantly higher risk of failing in the long term. Another suggestion for further research would therefore be to carry out more sub-group analyses. Besides, the fact that this would increase our insight into the medical, psychological and behavioural moderators of intervention effects and help build our theory on intervention effects, sub-group analyses may be used for policy decisions with regard to cost-effectiveness. For example, sub-group analyses may reveal the characteristics of patients with the biggest chance of benefiting from tailored patient education. Chapter 5 revealed one such sub-group, patients with an intention to change. In the other patients, the tailored interventions did not out-perform the GP letter, and cessation percentages remained low. These patients might be selected and approached to join another or a more intensive treatment.
We could also have looked at determinant change. One would expect that, for example, self-confidence would have increased after reading our tailored letters. In other words, were the letters successful in building up patient confidence and in convincing patients to be more positive about cessation as well as more negative about the effectiveness of benzodiazepines? In the study of Oenema (19), only slight changes in determinants were detected in the short-term follow-up. It could be the case that people need a period of time to assimilate all the information they have received. It would be interesting to measure the determinants and behaviour across different time points.

Although there are not many interventions for benzodiazepine reduction that have translated psychological and behavioural theories from a social-cognitive perspective into educational interventions, this thesis has succeeded in using theories in an effective computerized patient education program. The Precede/Proceed model supported the use of theories in intervention development. Also, we have demonstrated the application of these theories in the development of a computer program aimed at benzodiazepine cessation. Other computerized tailoring for other medication can now be considered as well. Computerized tailoring can help general practitioners to educate their patients about other health changes such as reducing alcohol consumption, increasing intake of healthier food, or physical exercise.

Future research could be done in order to determine whether there is an element of patient education (recognition of the picture, gender, content, or other elements), which especially determines its effectiveness. Such research would be advantageous because, after such research, the intervention could possibly be adapted so as to be more effective or to be just as effective in a shorter intervention; alternatively, it might well be that some information turns out to be conflicting. On the one hand, the letters have an understanding of the patient’s situation, but on the other hand the letters contain criticism. It would then also be possible to apply these results to any other behaviour that people want to change by means of a tailored intervention. On the one hand, this issue concerns general insight into bringing psychological and behavioural change using minimal, no-contact interventions that can be provided on a large scale. On the other hand, the issue concerns further research into the tailoring ingredients of tailored interventions. For example, the present tailoring program has been developed only in a basic version. It could be improved by a more tailored appearance, by including more personal characteristics (such as culture), or by including more feedback on the questionnaire. This could improve its effectiveness. Many questions with regard to tailored patient education letters have not yet been answered. Answers to these questions will partly come from experimental studies in a controlled laboratory setting.

In conclusion

Computer-tailored interventions are a promising line of endeavour for educating patients in medical settings. In this thesis it turned out that the effectiveness of computer-tailored patient education letters was twice that of
standard letters. Moreover, for patients already motivated to quit, the letters were even more effective. Although there is still a lot of work to be done, there is little doubt that tailored interventions can be useful tools to support health practitioners in educating patients.

References


