Alcohol and Cardiovascular Disease: Impact of Life Events and Social Support

A Primary Care-based Longitudinal Study

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IVO

Stellingen behorend bij het proefschrift

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1. Als de relatie tussen 'life events' en alcoholgebruik wordt onderzocht in de algemene bevolking is het belangrijk om een model te specificeren waarin bufferende factoren, zoals sociale steun en copingstijlen zijn meegenomen (dit proefschrift).

2. Het paradoxale fenomeen dat in dit onderzoek wordt aangeduid met de term 'worried ill', geeft aan dat onderzoek naar de effecten van risicofactoren en/of gedrag als gevolg van selectieve deelname aan onderzoek niet eenduidig kunnen worden geïnterpreteerd (dit proefschrift).

3. Als je niet de tijd en middelen hebt om bij alle personen uit een cohort middels interview-vragenlijsten het alcoholgebruik gedurende iemands hele leven te meten, dan is de Lifetime Drinking History questionnaire een bruikbaar alternatief (dit proefschrift).

4. Of mensen meer of minder alcohol gaan drinken, nadat ze een 'life event' hebben doorgemaakt wordt mede bepaald door de copingstijl die ze hanteren (dit proefschrift).

5. Alcoholgebruik heeft geen stressbufferende werking in de relatie tussen 'life events' and hart- en vaatziekten (dit proefschrift).

6. Hetzelfde 'life event' kan door verschillende personen, maar ook door eenzelfde persoon zowel negatief als positief worden ervaren.

7. Het ervaren van stress en het drinken van alcohol tijdens de zwangerschap is schadelijk voor het ongeboren kind. De vraag of alcohol een mogelijke stressbufferende werking heeft is binnen deze relatie dus niet relevant.

8. De intentie van medisch ethische commissies om mensen tegen 'onethisch' onderzoek te beschermen heeft als mogelijk neveneffect dat de positie van kwetsbare groepen in de samenleving verzwakt en ze geen recht meer hebben om zelf te beslissen of ze wel of niet mee willen doen aan onderzoek.

9. Zingen verhoogd de weerstand en is goed tegen stress (Kreutz et al., Journal of Behavioral Medicine, 2004).

10. Om overbelasting bij mantelzorgers te voorkomen dienen ze preventief ondersteund te worden, hier ligt een taak voor de huisarts (de Feijter, Huisarts in praktijk, 2009).

11. Een Fries heet in Limburg Hollander en vice versa.

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A Primary Care-based Longitudinal Study

Alcohol en hart- en vaatziekten: impact van life events en sociale steun

een longitudinale studie in de eerstelijnszorg

Proefschrift

ter verkrijging van de graad van doctor aan de
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Life is what happens to you, while you're busy making other plans

(John Lennon, song: Beautiful Boy)

Contents

chapter 1

Introduction

Introduction

The relationship between alcohol use and cardiovascular disease is repeatedly investigated in epidemiological studies, and mostly described as J-shaped or U-shaped with a higher risk for non-drinkers and heavy drinkers, and a lower risk for moderate drinkers (1). However, there is still a scientific debate on the apparent protective effects of alcohol use on coronary heart disease, which is not ready to be closed down (2, 3). Several possible biological mechanisms have been brought forward to explain the apparent beneficial effects of moderate alcohol use (4, 5). Alcohol use has been found to increase high-density lipoprotein cholesterol, to reduce blood clotting and platelet aggregation, to decrease insulin resistance and increase insulin sensitivity, to reduce plasma homocysteine levels, to increase paraoxonase activity, and to raise oestrogen levels. Negative effects of increased alcohol use are an increase in blood pressure and damage to myocardial tissue. The question remains whether alcohol use is really beneficial, there might be other explanations, such as psychological mechanisms or methodological pitfalls, relevant in explaining the J-shaped curve in addition to these potential biological explanations.

One of the critiques on epidemiological studies reporting these protective effects of moderate alcohol use states that a systematic error might be operating in these studies, referring to including people with pre-existing disease, and using a merged group of never drinkers, former drinkers, and occasional drinkers as reference group (2, 6). For example, Corrao et al., (1), and Fillmore et al., (2) found that there is considerable confounding bias as studies, which estimates are properly adjusted for the main known risk factors of cardiovascular disease tend to report lower protective effects of alcohol use. Another potential bias, and alternative partial explanation for the J-shape, could be that the observed risk relationship between alcohol use and mortality is produced by symptoms and disease present before or at the start of the study (6). Implying that people stop drinking due to ill health (“sick quitters”) or likely never start drinking because of pre-existing disease, whereas healthy people do not change their drinking, indicating that non-drinkers could possibly differ from drinkers regarding health risk profile. In previous studies, it was concluded that by including people with pre-existing disease, and by using a merged category of never drinkers, former drinkers, and occasional drinkers as reference group, one appears to overestimate the possible lower risk of moderate alcohol intake on the risk of cardiovascular events (1, 2, 6-8).

Another problem in research on alcohol use is that there is no gold standard for measuring alcohol use. There is a variety of questions and questionnaires, ranging from one simple question to extensive questionnaires on alcohol use. Despite these varieties, most studies on the relationship between alcohol use and cardiovascular disease are based on current drinking or intake in the recent past, and not on lifetime drinking habits (9). If people indeed decrease their drinking or even stop drinking due to ill health, it is important to take lifetime intake into account if the relationship between alcohol use and cardiovascular disease is investigated.

Besides the methodological considerations described above, psychological variables could also influence the relationship between alcohol use and cardiovascular disease or mortality, and these variables are often not taken into account (10, 11). There are complex interactions between alcohol use, psychological variables (such as stress and/or social support), and health (11). The buffering hypothesis posits that impact of stress may differ if resources for dealing with stress (for example, social support or coping style) are available. Tension reduction is considered to be an important reason for people to consume alcohol (12, 13). It was hypothesized, that alcohol has potent stress dampening or stress buffering effect, and might thus modify the negative effects of stress (14, 15). Stress has been found to be a risk factor for coronary heart disease (16). There are several possible biological mechanisms connecting psychosocial stressors to coronary heart disease (17-19), some along similar pathways as the relationship between alcohol use and coronary heart disease. The body reacts to stress by creating a state of alertness, by releasing catecholamines and corticosteroids, and by increasing the heart rate and blood pressure. An increase in heart rate and blood pressure promotes damage to the endothelium, which makes it more susceptible to inflammation and lipid deposits. Stress has also found to be linked to changes in processes relevant to clotting processes (hemostatis and thrombosis), such as coronary vasoconstriction, platelet aggregation, or plaque rupture. Furthermore, it is found that stress affects the immune system and increases inflammation, which are found to be related to cardiovascular diseases and the course of coronary heart disease. Finally, stress is found to be related to the development of the metabolic syndrome and insulin resistance (17-19).

Stress can be operationalized in different ways. Divisions can be made in objective stressors, and stress as perceived by a person, and between the acute or more chronic nature of stress. In this thesis, it is operationalized as experiences of negative life events, such as death of a spouse and loss of employment, being more objective and acute stressors. Life events have been found to be coronary heart disease triggers (18, 20), and in case-control studies, it was found that people who experienced a myocardial infarction reported more stressful life events in the preceding period than controls (21-23).

As was described above, an important function of the use of alcoholic beverages is to alleviate the negative feelings of stress (12-15). From the literature it was found that among moderate drinkers the relationship between life events and depression was weaker than among either abstainers or heavy drinkers (24, 25). If alcohol use indeed modifies the effects of stress, one could hypothesize that non-drinkers would lack this possibility to alleviate stress, and are more vulnerable for the negative effects of stress. If moderate drinkers would indeed benefit from their drinking, the stress buffering effect of alcohol use could offer an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease or mortality.

Observed relationships between risk factors or behaviors (for instance, alcohol use, or life events) and outcomes (for instance, cardiovascular disease) in cohort studies may be biased, if respondents differ from nonrespondents. If nonresponse is random, the threat to the generalizability of the results of the study is limited (26, 27), but if it is not random, it may lead to bias in study outcomes (26, 28). If the people who respond to the study differ from the persons who did not respond on the exposure or target variable of the study, the likelihood of nonresponse bias increases (28). Objective retrospective and prospective

health information derived from general practitioner registries is available for both respondents and nonrespondents, allowing to conduct a nonresponse analysis.

Although many epidemiological studies have found a higher risk for non-drinkers and heavy drinkers in getting a cardiovascular disease, and a lower risk for moderate drinkers, the possible mechanisms that could explain this relationship remain unclear, and are still open for debate. Besides possible biological explanations, there might be other explanations, such as methodological pitfalls and psychological mechanisms. In this thesis it will be investigated whether a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease. Data come from the Leefwijze En Gezondheid Onderzoek (LEGO, Lifestyle and Health Study) a prospective cohort study, aiming to investigate whether factors other than strictly biological, could be accountable for the observed lower risk of cardiovascular events for moderate drinkers. The cohort consists of 16,210 men and women aged 45-70 years, who are followed for a five-year period (1996-2001). Alcohol consumption is measured extensively in the Lifestyle and Health Study using three methods, a quantity-frequency questionnaire about alcohol intake over the past year, a Weekly Recall about actual consumption in the past week, and also a new self-administered questionnaire on lifetime exposure to alcohol use, called the Lifetime Drinking History questionnaire (LDH-q); previously only interview data were available on lifetime exposure.

Research questions

This thesis describes five studies whose research question are summarized below:

- What is the relationship between negative life events and alcohol use in the general population, based on a literature review?
- What is the relationship between response behaviour and health status at baseline and survival in a 5-year follow-up period in the Lifestyle and Health Study?
- What are the test-retest reliability and the construct validity of the Lifetime Drinking History questionnaire?
- What is the relationship between negative life events and alcohol use in a longitudinal cohort study, and is this relationship modified by gender, coping style, and/or social support?
- What is the relationship between negative life events and cardiovascular disease, and is this relationship modified by alcohol use, coping style, and/or social support?

Outline of the thesis

Chapter 2 presents a critical review of research into the relationship between negative life events and alcohol use in the general population, published between 1990 and 2005. Focus will be on general drinking behavior (excluding clinical studies focusing on heavy drinking and abuse or dependence), and special attention is given to the study design (longitudinal or cross-sectional).

Chapter 3 describes the study population and the study design of the Lifestyle and Health Study and the different methods used.

In chapter 4 the results of a nonresponse analysis are reported. Unlike the case in most studies, objective retrospective and prospective health information is available in the Lifestyle and Health Study for both the respondents and the nonrespondents. Therefore, the association between response behavior and health status at baseline, and survival in a five-year follow-up period could be assessed. It is also investigated whether reasons for nonresponse are associated with health status at baseline.

A new alcohol questionnaire is used in the Lifestyle and Health Study, called the Lifetime Drinking History questionnaire (LDH-q). The quality, construct validity, and test-retest reliability of the self-administered format of the LDH-q are tested and the results are reported in chapter 5.

In chapter 6 the relationship between negative life events and alcohol use in a longitudinal design is investigated. To make a correct estimation of the effect of negative life events on alcohol use, it seems important to specify a model that includes possible modifying factors such as gender, coping style and social support, as well as baseline consumption. The results of the analysis will be presented in this chapter.

In chapter 7 the relationship between negative life events and non-fatal and fatal cardiovascular disease, and the intermediate role of alcohol use on this relationship, is examined longitudinally. To make a correct estimation of the effect of negative life events on non-fatal and fatal cardiovascular disease, also possible other modifying factors, besides alcohol consumption, such as social support, and coping resources will be included in the model.

In the final chapter of this thesis, chapter 8, the main findings, strengths and limitations are discussed. In this general discussion, also implications for practice and future research are addressed.

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chapter 2

overview

A literature overview of the relationship between life events and alcohol use in the general population

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Abstract

Aims

A critical review of the evidence of effects of stressful life events on alcohol use in the general population, with a particular focus on study design.

Methods

A literature search in Medline was conducted, covering the period from 1990 to 2005, to identify articles in which the relationship between life events and alcohol use in the general population (i.e. non-problem drinking population) was investigated. Samples with a limited age range (e.g. college students) were excluded. Twelve studies with a cross-sectional design, and four articles with a longitudinal design were included in this review.

Results

Four cross-sectional studies found evidence that experiencing life events is related to higher alcohol use, three other studies, however, found no such association. The relationship between specific life events and alcohol use in the five remaining cross-sectional studies is less clear-cut. Being a victim of crime was associated with higher alcohol use, but divorce and financial problems were related to both higher and lower alcohol use. Health-related life events were found to be associated with lower alcohol use. In studies with a longitudinal design, it was found that health-related life events and financial problems caused a decrease in alcohol use, and life events related to spouse, friends and relatives, and retiring led to an increase in alcohol use.

Conclusions

Evidence points towards a relationship between the occurrence of life events and alcohol use in the general population. The direction of the effect is, however, not unequivocal. When life events are operationalized or categorized separately they are not only related to an increased alcohol use but also to a decreased alcohol use. Specification of the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption, is important for a correct estimation of the effect of negative life events.

Introduction

Tension-reduction is considered to be an important functional reason for people using alcohol (1). Positive expectancies of alcohol use are found to be related positively to alcohol use (2). Obviously, people have positive expectancies concerning the stressreducing effects of alcohol use, and these positive expectancies are important mediators in the connection between experienced stress and alcohol use (3). Because tension-reduction is considered a significant motivational factor and reinforcer of alcohol use, it has played an important role in research on the aetiology of heavy drinking and abuse. In this article, the focus is, however, not on heavy drinking and abuse, but on a review of the relationship between stressful experiences and alcohol use in the general population.

From a tension-reduction point of view, alcohol use is viewed as a means of stress regulation. In their reviews, Greeley and Oei (3) and Sher (4) concluded that alcohol has potent stress dampening or stress buffering effects. Especially in experimental animal studies, social stressors have been found to be related to alcohol ingestion (3). In experimental human studies, results were less clear (3). Variation in effects for different types of stressors and large individual differences further diffuse the picture (5). Sher (4) confers that more than the direct pharmacological effects, contextual and psychological factors determine the extent in which alcohol use dampens the response to stress. This contention is supported in a review by Pohorecky (6), who found that both prospective and retrospective studies generally support an effect of stress on alcohol use. In prospective studies, however, this role of stress in alcohol use was clearer among alcoholics. She also concluded that stress appears to play a role in the control of alcohol use by adolescents but not in the use of alcohol in the elderly or among women. She claimed in her review that the tension reduction hypothesis (TRH), which posits that alcohol reduces tension, and people are motivated to use alcohol to reduce tension, was no longer adequate as an overall theory of alcohol use or abuse. It is now generally accepted that the tension-reduction effect of alcohol, is among one of several reinforcers of drinking, although still important. The aim of this article is to review the studies on the relationship between stress and alcohol use, published since 1990.

To investigate this relationship between stress and alcohol use, it is necessary to define the term stress used in this article. As noted above, not all stressors seem to act equally in eliciting a response in the drinker. Stress can be operationalized in different ways. A division can be made in perceived and objective stress, and in chronic and acute stressors. For example, Johnstone et al., (5) describes four ways of operationalizing stress. First, stress is predominantly measured as negative life events, which include undesirable happenings such as death of a spouse and loss of employment. Second, it is operationalized as chronic conditions or enduring situations, such as job stress. Third, it is measured as personal emotional distress, such as anxiety and depression. And a fourth way is the operationalization as minor daily irritation or hassles.

The first category, threatening life events (acute and objective) are among the most potent contextual stressors, and research has focussed on the contingent effect of life events and alcohol abuse, and addiction (5). In their review, O'Doherty and Davies (7) concluded that relapsers in alcohol-treatment

programmes reported a higher negative life events score compared with non-relapsers. For the relationship between life events and addiction, however, no strong model emerged. They also mentioned the problem of causal interpretation since most studies are cross-sectional in design using retrospective data. Longitudinal designs are better suited for studying the connection between specific life events and drinking behaviour. Pohorecky (6), reported in her review that some research does support a positive relationship between life events and alcohol use and others found no relationship.

Is it possible that moderate drinkers benefit from their drinking? Neff and Husaini (8) found that among abstainers or heavy drinkers life events were more strongly related to depressive symptomatology than among moderate drinkers. This result was confirmed by Lipton (9) who also found that light-to-moderate drinkers experienced less depressive effects of life events than persons in the nondrinking or heavy drinking categories. The author suggests a possible stress buffering effect of alcohol use. These studies cannot prove whether alcohol is consumed as an adaptive response to the experience of a negative life event or whether light-to-moderate drinking is a typical element of individuals who are less sensitive to stress. If, however, alcohol use has a stress dampening or stress buffering effect one could argue that moderate drinkers benefit from drinking, in the sense that they are less vulnerable to the negative effects of stress. Psychological stress is generally considered as one of the most important psychosocial risk factors in coronary heart diseases (10). If moderate drinkers would indeed benefit from their drinking, this could possibly offer an additional explanation for the J-shaped risk relationship between alcohol use and mortality or cardiovascular disease. Studies of the relationship between alcohol use and mortality or cardiovascular disease are mainly based on the general population. In order to shed light on the relationship between life events and alcohol consumption status, it is necessary to investigate this relationship in the general population.

The purpose of this article is to give an overview of research into the relationship between life events and alcohol use in the general population, published since the review by Pohorecky (6). Focus will be on general drinking behaviour (excluding clinical studies focussing on heavy drinking and abuse or dependence), and special attention is given to the design aspect (longitudinal or cross-sectional). Compared with younger people, the risk of cardiovascular diseases is higher for people >45 years of age. With the benefits of drinking as a possible explanation for the J-shaped curve in mind, special interest is shown towards alcohol use in the general population >45 years of age. Main research questions are: 1) Is the occurrence of negative life events associated with alcohol consumption in the general population? 2) Does the occurrence of a negative life event lead to an increase in alcohol consumption in the general population?

Materials and Methods

A literature search in Medline was conducted, covering the period from 1990 to 2005. Six articles (11-16), in which the relationship between life events and alcohol use in the general population was studied, were taken as the starting point to decide which key words would be used for the selection of articles for this review. The following key words were used: 'psychological stress'; 'life-change-events'; 'alcohol-drinking/

epidemiological'; and 'alcohol-drinking/psychology'. After combining these key words, the six articles (11-16) were still in the search results. Within Medline a language restriction, of Dutch, English, and German was applied. Second, a restriction was made concerning type of population, and only studies with human subjects were allowed.

After combining the key words and the two restrictions, about 200 articles were identified. Although not all articles included research concerning the relationship between life events and alcohol use in the general population, and for that reason were not relevant for this review, a further selection using additional key words was impossible, without losing one or more of the original six articles (11-16). So, all abstracts, and in case of doubt, the full article was screened for relevance. Since the prime question concerns general drinking behaviour, articles describing the relationship between life events and alcohol abuse, alcoholism, addiction, or drinking problems were excluded. Articles describing experimental studies, and studies with a sample from a limited age range (e.g. college students), or a sample not representative for the general population (e.g. alcoholics) were excluded. The former criterion was also chosen because of the focus on epidemiological studies on stress and cardiovascular disease, and because the risk of cardiovascular diseases is higher for people >45 years of age, predominately samples of middle-aged participants were eventually included. Studies with a wider age distribution, for example from 15 to 74 years were also included. An additional reason why younger samples were excluded from this review is that young people are in their formative years of drinking, and their drinking pattern is still developing, which makes it difficult to interpret the effect of life events on alcohol use. Finally, 16 articles (11-26) fulfilled all these criteria and were selected for this review.

Information about the sample, life events measures, and relevant findings concerning the relationship between life events and alcohol use were extracted from the articles and summarized into two separate tables, one describing the studies with a cross-sectional design, and the other describing the studies with a longitudinal design.

Results

Of the 16 selected studies, 12 were of cross-sectional design described in Table 1, and four were of a longitudinal design described in Table 2. The studies differed in the way alcohol consumption had been measured. Three studies merely assessed drinking status, whether a person was a drinker or an abstainer (17, 18, 21). One study assessed only quantity of drinking (23), while most others applied a quantity-frequency measure. A single study (13) specified relationships between quantity and frequency of drinking, on the one hand and different life events on the other. The variation among the different studies in how alcohol use was measured was too small to make a meaningful distinction between the studies; therefore, the possible effect of how alcohol use was measured on the relationship between life events and alcohol use will, for that reason, be disregarded in the rest of this article.

Cross-sectional studies

In Table 1, a distinction is made between studies in which total number of life events was analysed and those in which specific types of life events were treated separately. Four studies (17, 20, 22, 23) found a significant association between total number of life events and increased alcohol use, and three studies (12, 14, 15) found no such relationship. Two studies (16, 26) investigated both the relationship between total number of life events and alcohol use, and the relationship between specific life events and alcohol use. The three remaining cross-sectional studies (18, 21, 24) investigated the relationship between specific types of life events and alcohol use. The five cross-sectional studies (16, 18, 21, 24, 26), which looked at the relationship between specific life events and alcohol use, will be described in the next four paragraphs.

In their study on stressors and alcohol use, Jose et al., (16) looked at both total number of life events and specific life events in relation to alcohol use. They compared light to moderate drinkers, on the one hand, with abstainers and with heavy drinkers, on the other hand. Only in men, total number of life events was positively associated with heavy drinking. For the specific life events it was found that being divorced was positively associated with both abstaining and heavy drinking among men. Being a victim of crime and experiencing of financial difficulties were positively associated with heavy drinking in men. In women, being divorced was negatively associated with abstaining, having moved was positively associated with abstaining, and experiencing the death of a close relative was negatively associated with heavy drinking.

Dawson et al., (26) also looked at both total number of life events and grouped life events in relation to alcohol use. For the total number of stressful life events, they found that drinkers experiencing six or more stressful life events had a higher average daily intake of alcohol and had a higher frequency of heavy drinking, compared with drinkers who did not experience a stressful life event. For the grouped life events it was found that, at the bivariate level, health-related life events were not associated with alcohol use, but social, legal, and job-related stress were significantly associated with alcohol use. At the multivariate model, all stress measures were found to be associated with alcohol use. The direction of the associations between the grouped life events and alcohol use were as follows: frequency of heavy drinking showed the strongest positive association with stress levels, but frequency of moderate drinking decreased as stress levels increased, except for social stress, which showed an increased frequency of moderate drinking as social stress level increased. The relationship between life events and alcohol use was found for both men and women, but in the multivariate model a significant interaction between gender and life events was found, which implies that the effect of life events on alcohol use was stronger for men. Job-related and legal stress were found to be more strongly associated with alcohol use than were social and health-related stress.

Krause (18) looked at health problems and financial difficulties in relation to drinking status and found that health problems were positively associated with abstinence. Krause (18) concluded also that subjective religiosity operated as a coping resource. He found that health problems were related with higher levels of subjective religiosity, which in turn was related to a higher probability of abstinence. Financial difficulties, on the other hand, were related with lower levels of subjective religiosity, implying that people experiencing financial difficulties would be more likely to use alcohol. In the study by Welte and Mirand (12), no relationship

was found between total number of life events and alcohol use. Welte (24) performed a more extensive analysis on the same data using four groups of life events: financial problems, loneliness, poor health, and difficulty with access to the world outside the home. Although the effect sizes were small and explained about 2% or less of total variance, he found that higher stress levels were associated with lower alcohol use.

Jennison (21) looked at spouse-related events and events related to friends or relatives in relationship to alcohol use. Spouse-related events were operationalized as 'getting divorced'. The life events related to friends and relatives were operationalized as 'relatives being hospitalized' and 'relatives becoming unemployed'. These events were found to be positively associated with excessive drinking.

A few studies also investigated factors, which possibly could influence the relationship between life events and alcohol use. Factors included, for example, expectancies, coping, social support, and education. Droomers et al., (14) looked at the educational gradient, but found no interaction with life events and alcohol use. Dawson et al., (26) checked whether persons with economic or psychological vulnerability were more responsive to stress than those without such vulnerabilities. They found that psychological vulnerability did not modify the association between life events and alcohol use. With respect to economic vulnerability, results were mixed; there was some evidence that poverty intensified the effects of job stress on alcohol use. Welte and Mirand (12) found no relationship between life events and alcohol use, even after controlling for coping style or level of social support. Cooper et al., (20) found, on the other hand, that persons with positive expectancies for the effect of alcohol, and using avoidant forms of emotion coping, were more vulnerable for increased alcohol use after exposure to life events. Cooper et al., (20) also found that after exposure to life events, high levels of support mitigated subjects' increased alcohol use. As described earlier, Krause (18) found evidence that subjective religiosity functioned as a coping resource, after exposure to health problems. Jennison (21) found that supportive resources of spouse, family, friends, and church reduced excessive drinking in response to life events.

Longitudinal studies

Results of four studies with a longitudinal design are given in Table 2, and concern only specific types of life events. Three longitudinal studies investigated health-related life events in relation to alcohol use and found that health-related life events were related to a decrease in alcohol use (11, 13, 25). Health-related life events were operationalized as initial health stressors (13), persons diagnosed with new chronic disease (25), hospitalization (11, 25), and admission to a nursing home (11). Two longitudinal studies looked at the relationship between financial problems and alcohol use (13, 19), of which one study found a relationship with a decrease in alcohol use (13).

One longitudinal study examined the relationship between retirement and alcohol use, and found that retiring was related with increased alcohol use (25). Two longitudinal studies looked at the relationship between spouse-related life events and alcohol use. Getting divorced, a spouse-related life event, was related with an increase in alcohol use (19, 25). Becoming widowed, another spouse-related life event, was found to be related with an increase in alcohol use in one study (25). In another study (19), no such relationship was found. Two longitudinal studies investigated the relationship between life events related

to friends or relatives and alcohol use (11, 19). These life events were operationalized as losing a friend because of a move (11), death of a close friend (11), and relatives being hospitalized (19). One study (11) found that these respective life events were related with an increase in alcohol use. The second study (19) did not find an increase in alcohol use after the death of a close friend.

The observation period and the outcome measures of the four longitudinal studies differed. Brennan et al., (13) had an observation period of four years and measured exposure to negative life events and drinking behaviour three times: baseline, one year later and four years later. They found that the strength of the relationship between life events and alcohol use was strongest over T1-T2 (one year) interval, less strong over T1-T2 (three year) interval, and least strong over T1-T3 (four year) interval. They conducted a LISREL analysis, accounting for previous drinking behaviour. Glass et al., (11) had a baseline measure, and a follow-up measurement three years later. Alcohol use measured at follow-up was the dependent variable, and alcohol use measured at baseline was added as a covariate in the analysis. They also found a significant interaction between baseline alcohol use and life events, indicating that the effects found are stronger among those who drink more at baseline. Perreira and Sloan (25) had four waves with a two year interval. They modelled change in alcohol use over the entire six year of follow-up. But they also looked at the relationship between life events experienced between waves one and two, two and three, and three and four, and change in alcohol use between waves three and four, to test whether associations between life events and alcohol use became weaker as time following events lapsed. They found that for hospitalization, alcohol use decreased around the time of the event and rebounded subsequently, but for retirement they observed an increase in the same two year period in which the person retired, and also in the period after that. Romelsjö et al., (19) had an observation period of nine years and modelled change in alcohol use by subtracting the baseline measure from the follow-up measurement nine years later.

The above results all concern the effects of life events on subsequent alcohol use. Brennan et al., (13), however, also looked at the reverse, the effects of alcohol use on life events. They found, that for women a higher frequency of alcohol use was associated with fewer life events, fewer health stressors, and also with fewer financial stressors. For men, they found that a higher frequency of alcohol use was associated with fewer health stressors.

Three of the longitudinal studies also controlled for factors that possibly could influence the relationship between life events and alcohol use. Perreira and Sloan (25), for example, controlled for social support, self-rated coping skills, and socio-demographic characteristics. As mentioned earlier, Glass et al., (11) found an interaction between baseline alcohol use and life events, but they also controlled for, for example, demographic variables and social network size. And finally, Romelsjö et al., (19) adjusted for demographic variables, health status, and psychosocial factors (e.g. social isolation, and depression). All three studies controlled for the factors described above, but they did not provide information whether or to what extent these variables modified the relationship between life events and alcohol use.

Table 1: Cross-sectional studies on relationship between life events and alcohol use

Study	Sample	Life events measures	Relevant findings	Conclusions
Cole et al., (1990) (17)	6,747 adult males, employees	Life events (total number)		Life events were positively associated with alcohol use
Cooper et al., (1992) (20)	510 men and 806 women (drinking population) Aged 19-87 years	Negative life events (total number)	Being male, holding strong positive expectancies for alcohol's effects, and using avoidant forms of emotion coping, were vulnerability factors High levels of support buffered the relationship between life events and alcohol use, but exacerbated the relationship between life events and drinking problems	Negative life events were positively associated with alcohol use and abuse
Dawson et al., (2005) (26)	13,067 men and 13,879 women (non-institutionalized, adult-, and drinking-population)	Stressful life events (total number, and grouped: health related stress; social stress; job stress; legal stress)	Experiencing six or more stressful events were associated with a higher average daily intake of alcohol and a higher frequency of heavy drinking Health-related events: bivariately, not associated with alcohol use. In multi-variate model, a positive association found with frequency of heavy drinking, and a negative association with frequency of moderate drinking Job, and legal stress: positive association with frequency of heavy drinking, and negative association with frequency of moderate drinking Social stress: positive association with frequency of heavy drinking, and frequency of moderate drinking Found an interaction between life events and gender, implying a stronger effect of life events on alcohol use for men	Stressful life events were positively associated with frequency of heavy drinking, and negatively associated with frequency of moderate drinking
Droomers et al., (1999) (14)	1,006 men and 756 women (non-institutionalized, general-, and drinking-population) Aged 25-74 years	Negative life events (total number)	Found no support that the relationship between life events and alcohol use is different for people with different educational levels	No association between life events and alcohol use
Frone et al., (1994) (22)	606 men and 1,001 women Aged 19-65 years	Negative life events (total number)	Found an interaction of life events with gender: negative life events where more strongly related to alcohol use among men than among women	Negative life events were positively associated with alcohol use
Graham and Schmidt (1999) (15)	826 men and women Aged 63-96 years	Negative life events (total number)		Negative life events were not significantly related to alcohol use
Jennison (1992) (21)	537 men and 877 women, general population Aged 60 years and older	Role losses	Divorce, lost employment of relatives, relatives hospitalized or disabled were associated with excessive drinking Supportive resources of spouse, family, friends, and church reduces excessive-drinking response to life events	Life events were associated with excessive drinking

(**Continued**)

Table 1 Continued

Study	Sample	Life events measures	Relevant findings	Conclusions
Krause (1991) (18)	526 men and 1,081 women Aged 60 years and older	Financial difficulty and Health problems	More health problems were associated with a higher level of subjective religiosity, which was related to a higher probability of abstinence More financial problems were associated with a lower level of subjective religiosity, which was related to a lower probability of abstinence	Health problems were directly, and indirectly positively associated with abstinence
Ragland et al., (1995) (23)	1,853 urban transit operators Aged 25-65 years	Life events (total number)		An increase in life events was associated with both a higher average number of drinks per week as with heavy drinking
San Jose et al., (2000) (16)	3,750 men and women, non-institutionalized, general population Aged 15-74 years	Life events (total number, and specific)	Men: divorce was positively associated with abstinence Women: divorce was negatively associated with abstinence and having moved positively related to abstinence Men: being a victim of crime, getting divorced or breaking up, worsening of financial position, and reporting one or more life events were positively related to heavy drinking Women: death of a close friend or relative was negatively related to heavy drinking	Some life events were positively associated with abstinence or heavy drinking, and others were negatively associated with abstinence or heavy drinking
Welte and Mirand (1995) (12)	2,325 men and women Aged 60 years and older	Stressful life events (total number)	Taking coping style or level of social support into account no relationship between life events and alcohol use was found Controlling for sex on the other hand, a significant although weak relationship between life events and heavy drinking was found, for both men and women	Life events were not associated with alcohol use or with current heavy drinking
Welte (1998) (24)	2,325 men and women. Aged 60 years and older	Stressful life events Grouped: financial problems, loneliness, poor health, and difficulty with access to the world outside the home		More life events were associated with less drinking. But the effect sizes were very small

Table 2: Longitudinal studies on relationship between life events and alcohol use

Study	Sample	Life events measures	Relevant findings	Conclusions
Brennan et al., (1999) (13)	941 men and 621 women, with outpatient contact in past 3 year Aged 55-65 years	Negative life events, health stressors, financial stressors, and spouse stressors	Men: more financial stressors were associated with a decrease in quantity and frequency Women: more initial health stressors were associated with a decrease in quantity and frequency, and more financial stressors were associated with a decrease in frequency Men: more spouse stressors, and in women: more negative life events and financial stressors were associated with an increase in drinking problems	Life events were associated with a decrease in alcohol use
Glass et al., (1995) (11)	798 men and 1.242 women, non-institutionalized Aged 65 years and older	Life events (specific)	Men: hospitalization and nursing home admission were associated with decrease in alcohol use Women: losing friend because of a move and death of close friend were associated with increase in alcohol use. Nursing home admission associated with decreased alcohol use Average drinking levels declined considerably among the heavy drinking group. In heavy drinking men and women: loss of a friend because of a move and close relative sick or injured showed alcohol use declined less, hospitalization, and nursing home admission showed a greater decline In heavy drinking men: victim of crime showed a greater decline in alcohol use In heavy drinking women: death close friend, and victim of crime, alcohol use declined less	Life events were associated with a decrease in alcohol use, others were associated with an increase Baseline drinking influenced relation between life events and alcohol use
Perreira and Sloan (2001) (25)	3.907 men and 3.824 women, Aged 51-61 years	Life events Grouped: health events, employment events, family events	Divorce and retiring associated with increased alcohol use Hospitalization, diagnosed with new chronic condition associated with decreased alcohol use For problem drinkers, getting divorced was associated with decreased alcohol use For men becoming widowed associated with increased alcohol use	Life events were associated with a decrease in alcohol use, others were associated with an increase
Romelsjö et al., (1991) (19)	2.152 men and 2.682 women, non-institutionalized Aged 22 years and older	Life events (specific)	Divorce was associated with increased alcohol use	Only divorce was associated with an increase in alcohol use

Discussion

In summary, of the 12 cross-sectional studies, four studies found evidence that higher stress levels are related to higher alcohol use. Three studies, however, found no such association. The relationship between specific types of life events and alcohol use is less clear-cut. Specific types of life events are not only related with higher alcohol use, but also with lower alcohol use. Being a victim of crime, for example, was associated with higher alcohol use, but divorce and financial problems were related with both higher and lower alcohol use, and health problems were found to be related with lower alcohol use. In studies with a longitudinal design this differences in effect of specific life events on alcohol use is even clearer. Health-related life events and financial problems precede a decrease in alcohol use, whereas life events related to spouse, friends and relatives, and retiring seem to cause an increase in alcohol use.

In this review, it becomes apparent that effects of negative life events may cancel each other out when combined in a summarized measure. As described above, reaction to one event may be towards heavier drinking, when other events may evoke a decline in drinking. Except in the study by Dawson et al., (26) who found that both total number of life events and the grouped life events were associated with a higher frequency of heavy drinking. But they also found that job-related and legal stress were more strongly associated with alcohol use than were social and health-related stress. The difference in total versus specific types of life events is most evident in the two studies from Welte and Mirand (12), and Welte (24), in which different analyses were performed on the same sample. When they used total number of life events, they found no relationship between life events and alcohol use. In the second study, Welte (24) analysed the same data, but this time he grouped the life events into four categories. In this second study, life events were related to lower alcohol use, although the effect sizes were small. This difference in the effect on alcohol use between total number of life events and specific life events was also found in the study by Jose et al., (16). When looking at the total number of life events, they only found a positive association with heavy drinking in men. When considering specific life events, they found that some life events (for example, being a victim of crime) were related with higher alcohol use, and others (for example, death of a close relative) with lower alcohol use. It can be hypothesized from this review that, results from studies into the relationship between total number of life events and alcohol use may be biased.

The review reveals that the impact of life events on alcohol use may be different for men and women. Dawson et al., (26) and Frone et al., (22) found an interaction between life events and gender, which implied that the effect of life events on alcohol use was stronger for the male gender. It becomes apparent from the reviewed studies that men and women differ in their exposure to life events, both in type and frequency. For example, Conger et al., (27) found that men reported more difficulties in life areas related to work and personal finances, whereas women reported more life events in their social network. The two genders also seem to differ in the way they express distress. Glass et al., (11) found, for example, that spouse-specific events were more likely to influence alcohol use in men. Probably, men tend to express their distress by alcohol or drug use, while women, on the other hand, express their distress more with symptoms of depression and anxiety. Abbey et al., (1) found that reasons for drinking alcohol also differ between men and women. Coping and social motives for drinking seem to be more important for men than for women.

The above review lends support to the idea that stressful life events have an impact on drinking, and that this effect may be buffered by a third factor. The buffering hypothesis posits that the impact of life events on alcohol use may be different if resources for dealing with stress (e.g. coping, social support, or religiosity) are available. Persons having less social support might use alcohol to relieve their stress after experiencing a negative life event, whereas those with ample social resources would be less likely to use alcohol in such an instrumental way. Also other factors might bias the reported effects of life events on alcohol use. For example, health-related life events were found to be related to a decrease in alcohol use (11, 13, 25). This could be explained by factors other than the buffering hypothesis, for example, alcohol might exacerbate a health problem or a person is advised by a physician to drink less. And in the case of hospitalization, restrictions on the availability of alcoholic drinks might explain the decrease in alcohol use. To complicate matters further, one has to consider the possibility that the effects of life events on subsequent drinking or changes in drinking may be dependent on the drinking level of the person experiencing these events. This implies an interaction effect, as was reported by Glass et al., (11). They found that the impact of life events was dependent upon baseline drinking. Heavy drinkers showed a larger (proportional) decrease in consumption in response to health-related life events and a smaller (proportional) decrease in reaction to life events related to spouse, friends, or relatives. The interactions of the impact of life event with baseline consumption in the Glass et al., (11) study underscores the necessity for a careful specification of variables in a comprehensive model to be tested.

A last issue addressed here concerns the direction of effect. It may be contended that heavy drinking itself may inflict negative life experiences in the drinker. In the reviewed studies, the study by Brennan et al., (13) looked specifically at the effects of alcohol use on life events. Contrary to expectations, they found that a higher frequency of alcohol use was associated with fewer life events. The direction of effect, and temporal fluctuations in the relationship between life events and alcohol use, can of course not be detected using a cross-sectional design. As recommended by O'Doherty and Davies (7) and Pohorecky (6) disentangling possible reciprocal effects require carefully designed longitudinal studies. In this respect, the time window between the measurement of life events and alcohol use is essential. For example, hospitalization (11, 25) and nursing home admission (11, 25) were found to be associated with a decline in alcohol use. Perreira and Sloan (25) found in their study that drinking indeed decreases after hospitalization, but rebounds subsequently. Brennan et al., (13) found that the relationship between life events and alcohol use was strongest over the one year interval, and became weaker as 'time after experiencing a life event' becomes larger. It could be hypothesized that the effect of life events on alcohol use might disappear after a while. This could explain why, for example, Romelsjö et al., (19) only found a relationship between divorce and an increase in alcohol use, and the effects of the other life events measured in this study had disappeared at the follow-up 9 years later. This underlines the importance of the timing of follow-up measurements, i.e. this choice seems to determine the outcome.

In conclusion, evidence shows that life events affect alcohol use, particularly when these events are operationalized separately or categorized. At a single point in time, people who have experienced health-related life events in the near past tend to have a lower alcohol use, while crime victims tend to show higher levels. When looking prospectively, health-related life events and financial problems precede a decrease in

consumption, and negative events occurring in spouse, friends, or relatives, and retirement seem to lead to an increase in alcohol use. Specification of the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption, seem important for a correct estimation of the effect of negative life events.

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chapter 3

onderzoek

Leefwijze En Gezondheid Onderzoek (LEGO)

Aims, population, and design

Aims

Many epidemiological studies have investigated the relationship between alcohol use and cardiovascular disease, this relationship is mostly described as J-shaped or U-shaped with a higher risk for non-drinkers and heavy drinkers, and a lower risk for moderate drinkers (1). There are several possible biological explanations brought forward to explain the beneficial effects of moderate alcohol use (2, 3). However, there is still a scientific debate on the apparent protective effects of alcohol use on coronary heart disease, which is not ready to be closed down (4, 5). A systematic error might be operating in epidemiological studies reporting the protective effects of moderate alcohol use against cardiovascular disease, referring to including people with pre-existing disease, and using a merged group with never drinkers, former drinkers, and occasional drinkers as reference group (4, 6). Another point is that, the relationship between alcohol use and coronary heart disease is probably much more complicated, and psychological factors (for example, stress and social support) are often not taken into account (7, 8). The aim of the Leefwijze En Gezondheid Onderzoek (LEGO, Lifestyle and Health Study) a prospective cohort study is to investigate whether factors other than strictly biological, could be accountable for the observed lower risk of cardiovascular events for moderate drinkers.

In the thesis of Ingrid Friesema (9), the focus is on methodological aspects as possible explanations of the J-shaped curve. Previous studies almost all measured current alcohol intake at baseline in a mostly adult or elderly population. Alcohol intake is divided into current, past and lifetime drinking, and the effect of alcohol intake measurement is discussed. Different methods for measuring current alcohol intake are compared, and the impact of model specification on the relationship is evaluated. Another explanation is that pre-existing diseases could produce the J- or U-shaped relationship. Alcohol intake would then be more like an intermediate factor between health, and mortality and morbidity. These questions have been dealt with in the thesis of Ingrid Friesema and will be discussed in the general discussion.

Psychological variables, (such as stress and/or social support) could also influence the relationship between alcohol use and cardiovascular disease or mortality, and are often not taken into account (7, 8). There are complex interactions between alcohol use, psychological variables and health (8). Stress has been found to be a risk factor for coronary heart disease. Alcoholic beverages might be used by people to alleviate the negative feelings of stress. If alcohol use indeed modifies the effects of stress, one could hypothesize that non-drinkers would lack this possibility to alleviate stress, and are more vulnerable for the negative effects of stress. If moderate drinkers would indeed benefit from their drinking, the stress buffering effect of alcohol could offer an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease or mortality. The focus of this thesis is on the possible influence of negative life events, social support and/or coping style on the relationship between alcohol use and cardiovascular disease.

Study population and general practitioners

The study population consisted of men and women born between 1926 and 1951. The registries of general practitioners (GPs) were used as the sampling frame. Coverage of the target population by this

sampling frame is high since, as a result of Dutch health insurance regulations, nearly all inhabitants of the Netherlands are insured and registered with a GP. Furthermore, the GP has a function as gatekeeper for admissions to a hospital or a specialist (10, 11). In the period 1995-1997, 78.1% of adults aged 45 to 64 years visited their GP in a one-year period with a mean total of 4.0 visits (12). For people 65 years or older, this was 86.0% and 6.2 visits. GPs have, in general, detailed information regarding health status of their patients (11). An additional advantage of using the registration system of a GP is that background information of patients (gender, age, and address) is available.

General practitioners were sought through regional health institutes in the province of Limburg and the city of Rotterdam including surrounding area. These regions were chosen for historical reasons, namely men as well as women differ in alcohol abstinence and drinking patterns between these regions (13). GPs could only participate if they registered or were going to register the health problems of their patients in a computerized database. This database was necessary to identify participants and extract their health problems. In 1994 about 37% of the Dutch GPs used a computerized medical module, which increased considerably to 80% in 1997 (14).

Terminally ill patients with life expectancies of less than three months, persons with severe dementia, mentally disabled persons and institutionalized persons were excluded from the cohort. After exclusion, all remaining persons aged 45 to 70 years in the registries of the GPs received a baseline questionnaire. Persons not having a command of the Dutch language were not directly excluded, but will probably not have been able to fill in the questionnaire. The intention was to exclude also persons with cardiovascular disease and related health problems, present before the baseline of the study. However, the health status was not available for every participant at the start of the study. Therefore, it was decided to either correct for it in the analyses, or to exclude these persons in some of the analyses.

Cohort size

The estimated cohort size was based upon calculations for the minimal number of cases with myocardial infarction. Simulated multivariate power analyses were done, calculating that 300 cases with incident myocardial infarction would be necessary. Initially a cohort size of ± 16,600 persons was calculated when assuming a response rate of 75% per year. The incidence of myocardial infarction used was, however, overestimated. New calculations produced a cohort size of ± 25,000 persons. As an average general practice in the Netherlands includes 2,350 patients of whom 32.9% are in the age of 45-74 (n=773 patients), 32 practices were needed. Finally, 31,556 persons were selected scattered among 33 practices and one health centre. Three of the 33 practices lay outside the two chosen areas, but were still included.

Study design

The prospective cohort study started July 1st, 1996 with a baseline questionnaire. Persons who refused to participate at baseline in 1996 could indicate this by returning an empty questionnaire to the researchers, or apply to their GP with a request of removal from the study, and were excluded for follow-up. In order to heighten the response, a second baseline questionnaire was sent to all nonresponders of the baseline questionnaire in 1996, one year later. The follow-up period ended on June 30th, 2001. Due to financial and efficiency reasons it was not possible to process all the questionnaire data of all respondents, therefore, a case-cohort approach was applied, involving the selection of a random sample at baseline (15), further referred as subcohort. Advantages of this approach are the ease of selection of the sample, the possibility of using one single sample for multiple outcomes and substantial reductions in time and costs of data collection and/or analyses with a minimal loss of efficiency compared to a full cohort study (16-18). A disadvantage is the need for a more complex analysis (15, 18). The sample size was 20% of all respondents at both baseline measurements, with a proportional equal sample of both baseline responses and stratified to practice. The data of the subcohort and of all incident cases in the total cohort of respondents were processed for analyses. Data collection consisted of self-administered questionnaires and health problems registered by GPs.

Questionnaires and response

Questionnaires: course and response

The study started by sending all selected individuals (n=31,556) a baseline questionnaire in spring 1996 (figure 1). A total of 207 persons appeared to be incorrectly included, and were excluded afterwards, leaving a cohort size of 31,349 persons. Individuals who sent back a blank questionnaire or who applied to the GP with a request of removal from the study, where registered as **refusals** (18.8%). The nonrespondents of the baseline questionnaire in 1996 received the baseline questionnaire again in spring 1997, whereas the respondents of baseline 1996 received the follow-up questionnaire 1997. Further, all persons who responded to either the baseline questionnaire in 1996 or in 1997 (51.7%) received in spring 1998, 1999, and 2000, a follow-up questionnaire independently of their response to the preceding follow-up questionnaires, except those who died during the follow-up period. Table 1 shows the distribution of gender of the response for the total cohort and the subcohort. In chapter 4 the results of the nonresponse analyses are reported.

Table 1: Response by gender for the total cohort and the subcohort

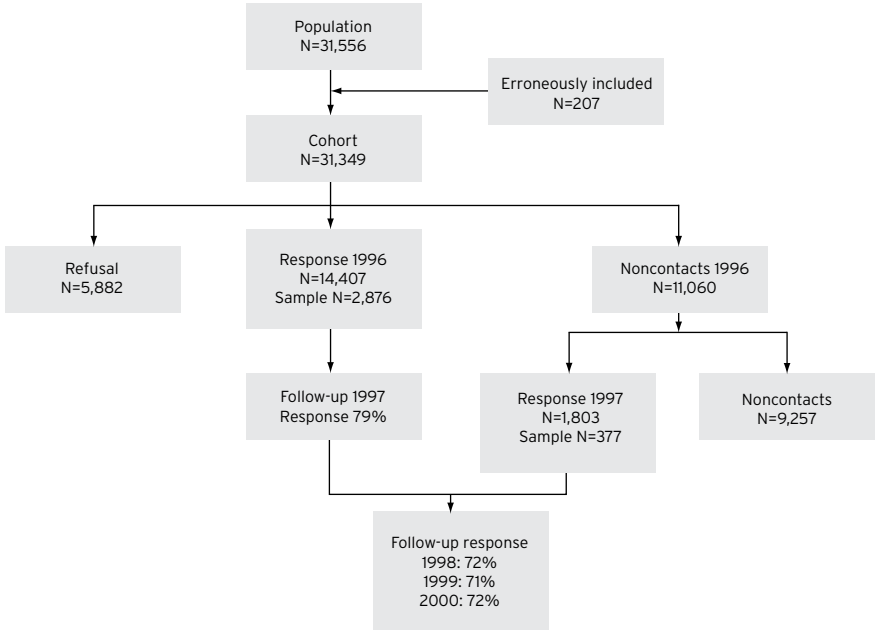
	Total cohort			Subcohort		
	Men	Women	Total	Men	Women	Total
Baseline 1996	7,052	7,355	14,407	1,428	1,448	2,876
Baseline 1997	884	919	1,803	180	197	377
Noncontacts	4,907	4,350	9,257			
Refusal	2,973	2,909	5,882			
Total	15,816	15,533	31,349	1,608	1,645	3,253

Baseline and follow-up questionnaires

Respondents filled in the baseline questionnaire and a maximum of four follow-up questionnaires. The baseline questionnaire was about twice as long as the follow-up questionnaires. Main issues of the baseline questionnaire were demographic variables (e.g. age, sex, education, job, and religion), behavioral factors (e.g. diet, alcohol consumption, smoking habits, and physical activity), health and attitude towards health

(e.g. subjective health, obesity, vital exhaustion, attitude towards health related aspects of alcohol intake), life events, coping style, and social environment (e.g. working status, civil status, and social support). The follow-up questionnaires were less extensive and contained two types of issues, namely factors playing a crucial part in the study, like alcohol consumption and life events, and factors with a (potential) high intra-individual variance, for example subjective health. Four follow-up questionnaires, which were not completely identical, were sent with an interval of one year.

Figure 1: Flow chart of the response



Life events

Life events were measured in the baseline as well as in the follow-up questionnaires. The 12 most frequently occurring and (moderate to severe) threatening life events were measured with the "List of Threatening Experiences" (LTE) (19). Respondents were asked to report whether they had experienced a negative life event in the preceding 24 months (baseline) or 12 months (follow-up). Items inquired about, for example, a death of a close friend, separation due to marital difficulties, or a major financial crisis. In this thesis the focus is on the sum of all reported negative life events and on four subscales of negative life events. The sum of all life events has a minimum score of no events (0) versus a maximum of 12 events. Because the occurrence of more than 4 events was rare the summated score of negative life events was truncated at four, and divided into four categories (0, 1, 2, 3 or more). The Cronbach's alpha of the scale of 12 negative life events based on the subcohort in the Lifestyle and Health Study was quite low (0.56) which indicates that the coherence of these 12 negative life events is not very high. Therefore, an analysis of the structure of the scale into clusters of negative life events was performed. Principal component analysis (PCA) has led to the construction of

4 subscales of the following categories of events. **1) Illness or bereavement** (4 questions: 1. serious illness or injury to subject; 2. serious illness or injury to a close relative; 3. death of first-degree relative including child or spouse; and 4. death of close family, friend or second-degree relative) **2) Employment problems** (2 questions: 1. unemployed/ seeking work for more than one month; and 2. subject became unemployed) **3) Spouse or relational problems** (2 questions: 1. separation due to marital difficulties; and 2. broke off a steady relationship) **4) Social problems** (4 questions: 1. serious problem with a close friend, neighbor or relative; 2. major financial crisis; 3. problems with police or court appearance; and 4. something valuable being lost or stolen).

Alcohol intake measurement

Alcohol intake was measured in detail in the baseline as well as in the follow-up questionnaires. Three types of self-reports of alcohol intake were used, namely a 7-day recall or Weekly Recall (WR), a Quantity-Frequency questionnaire about alcohol intake in the last year (QF-last-year), and the Lifetime Drinking History questionnaire (LDH-q).

Alcohol consumption was asked separately for beer, wine, and spirits in both the WR and the QF-last-year. The WR asks for actual drinking per day of the last week, as the QF-last-year is a summary of drinking in last year. The respondent had to generalize his consumption and abstract it into a usual frequency and quantity. The beverage-specific week consumptions were added up to total week consumption. The WR and the QF-last-year were entered in the baseline as well as in all follow-up questionnaires.

The LDH-q was developed for use in the Lifestyle and Health Study (20), because only interview-formats existed for asking for lifetime alcohol intake (21-23), and the Lifestyle and Health Study cohort was too large to interview all individuals. As the LDH-q had never been used before, except for the pilot study, it was administered twice: once in the baseline questionnaire and a shortened version in the follow-up questionnaire 1997. This enabled the examination of the utility of the LDH-q. The reliability and the validity of the LDH-q were tested; the results are described in chapter 5. The LDH-q is composed of five age periods which are based on transitions in normal human lives, comprising youth (aged 12-18 years), young adulthood (aged 19-27 years), adulthood (aged 28-44 years), middle-age (aged 45-60 years), and old-age (aged ≥ 61 years). For each period, quantity and frequency of alcohol consumption was assessed. Other items were variability of drinking, type of beverage, context of drinking, and attempts to quit. These last items were included in the baseline questionnaire, but left out the shortened version of the follow-up questionnaire of 1997.

Stress-moderating factors

Social support in the past 12 months, was measured in the baseline questionnaire as well as in follow-up questionnaire of 1999 and of 2000, with a Dutch validated social support scale, the Inventory for Social Reliance (De Inventarisatielijst Sociale Betrokkenheid, ISB) (24). The ISB measures qualitative aspects of social support, and consists of three scales: perceived support (5 items), actual support (3 items) and social contacts (2 items). Scores were rated on a 4-point scale, using a scale ranging from one (hardly ever) to four (frequently). Cronbach's alpha for the perceived support scale, actual support scale, and social contacts scale -measured in the baseline questionnaire- based on the subcohort in the Lifestyle and Health Study were respectively 0.87, 0.75, and 0.74.

Coping-style was measured in the baseline questionnaire, using the self-administered questionnaire version of a validated German questionnaire, the Berne Coping Forms (Berner Bewältigungsformen, BEFO) (25), which was translated into Dutch for the Lifestyle and Health Study. This instrument consists of 30 questions about coping with crisis situations (such as illness, divorce, or loosing a job), grouped into three dimensions: action coping (10 items), cognition coping (11 items), and emotion coping (7 items). Scores were rated on a 5-point scale, using a scale ranging from 0 (not at all) to four (very strongly). Cronbach's alpha for the action coping scale, cognition coping scale, and emotion coping scale based on the subcohort in the Lifestyle and Health Study were respectively 0.61, 0.63, and 0.45 (overall Cronbach's alpha was 0.79).

Health problems and endpoints

Medical databases

Information on health problems of the cohort members was derived from the computerized registration systems of the GPs. Although all GPs register the same items of their patients, there are different software packages in use. Within the Lifestyle and Health Study three different packages were used: MicroHis, Elias, and Medicom. Besides changes within the three packages during the follow-up period, some GPs also altered their package. Before each extraction of health problems, a survey was made of the packages and upgrades in use among the GPs, as each package and upgrade required a separate programme for extraction. Cohort members could be identified within the databases of the GPs by a specific flag. The health problems of patients with that particular flag were extracted for the Lifestyle and Health Study.

In the Lifestyle and Health Study, only coded and non-directly identifiable data were used. All individuals had a unique number composed of the number of the general practice given at the start of the study and the patient number as given by the GP. These unique numbers, sometimes completed with gender and date of birth, were used in the communication between the GPs and the research group. This design was approved by the review committee of the Registration Network Family Practices of the Maastricht University.

Health information of refusals or noncontacts

Only coded data and non-directly identifiable were used in the Lifestyle and Health Study. In effect, patients registered in the practice were informed by their GP of his or her general intention to participate in future scientific medical research. Patients could personally object to such participation. The initial cohort consisted of patients not objecting to the use of non-directly identifiable and coded medical information. According to the GPs, no patients initially objected to such participation. In the nonresponse analysis, described in chapter 4, information of these patients of the initial cohort is used up to the start of this particular study. Each subject had the costless opportunity to object to participate in the Lifestyle and Health Study. It was passed on to the GP, if a person refused to participate in the Lifestyle and Health Study. GPs were asked to make a retrospective problem list of these refusals. The retrospective problem list consisted of nine specified diagnoses (cardiovascular disease (seven diagnoses), diabetes mellitus, and hypercholesterolaemia), which were retrieved for incorporation in the nonresponse analysis. Of these refusals, no further prospective medical information was obtained, and health problems presented after baseline were not extracted. Persons

who did not return a baseline questionnaire in 1996 or 1997, and who did not actively refuse participation were defined as noncontacts. As the GPs only knew who refused participation, noncontacts and respondents were handled the same by the GP and problem lists were extracted for both groups. Of the respondents and noncontacts, prospective information on morbidity and mortality was used (coded and non-directly identifiable data) for the nonresponse analysis. This is in accordance with the current Code for Adequate Secondary Use of Data in the Netherlands (Gedragscode Gezondheidsonderzoek, 2004) (26).

Problem lists

A medical database consists of a large scale of health problems. As short-term, minor health problems are of less interest in the present study, it was chosen to use only health problems registered in the so-called 'problem list'. A problem list with accurately entered medical problems gives a fast and complete overview of all relevant past and present health problems of a patient. A health problem should be placed on the problem list if it is 'anything that has required, does or may require health care management and has affected or could significantly affect a person's physical or emotional well-being' (27). Several types of problems can be distinguished: risk factors, patterns of complaints, abnormal findings, diagnoses, and other problems (27, 28). Every health problem was given an ICPC-code (International Classification of Primary Care (29)), which enables categorization of health problems.

The following data were extracted from the problem list for each participant:

- problem number (normally in order of time of diagnosis);
- ICPC-code;
- description of the health problem;
- starting date and, when applicable, final date of the health problem;
- active or blind problem (still of interest or a problem of the past);
- data stop of the problem list with the reason (deceased, moved, switched to an other GP, etc).

Quality of problem lists

Quality of the problem lists has been surveyed in several ways. First, the problem lists have been extracted several times, during the follow-up period of the Lifestyle and Health Study, with a maximum of six times. Only the last extraction was used for analyses. The other extractions were done to get insight in the number of patients with a problem list as well as the mean number of problems per patient. Furthermore, the succession of extractions gave insight in the improvement of input of the problem lists, which was used to give feedback to the GPs.

Basically, all relevant problems during the whole life of a patient had to be entered on the problem list. GPs, however, started recording health problems systematically on the so called "green card" since the sixties, where as the cohort members are born between 1926 and 1951. If relevant health problems were missing on the problem list, in most cases it will have been health problems diagnosed during youth or young adulthood.

Inspection of the last extraction revealed that also, for the Lifestyle and Health Study, irrelevant items were entered on the problem lists. These items, such as flu vaccination and blood type, were separated

from the relevant health problems. In addition, about 10% of the health problems did not have an ICPC-code, which were added on the problem list, if possible. Both adjustments were done by the research group.

An extra quality check was done for some specific diagnoses, i.e. coronary heart disease (ICPC-codes K74, K75 and K76), heart failure (K77), hypertension (K86 and K87), transient ischemic attack and cerebrovascular accident (K89 and K90), and diabetes mellitus (T90). The prevalences of these diagnoses were calculated per practice and compared to the prevalence reported in the Registration Network of Family Practices (Registratienet Huisartspraktijken, RNH). The RNH was established in 1988, and is an initiative of the department of General Practice of the University Maastricht (11). The RNH consists of 56 GPs in 23 practices who register the health problems of their patients. Staff members from the university monitor the quality and give feedback to the GPs. The RNH, therefore, seems an appropriate database for comparison. If a prevalence of one of the specific diagnosis in a Lifestyle and Health Study practice was more than one standard deviation below the mean prevalence of the RNH, a quality control was done. This control consisted of searching for patients who used specific medication for the disease, based on the ATC-code (Anatomical Therapeutic Chemical-code, (30)), but were lacking the concerning ICPC-code. The patients, who were identified by the research team, were discussed with the GP and if applicable the research team added the ICPC-code to the problem list of these patients.

Problem lists: course

In 1996, all GPs were enabled to follow a course about the making of problem lists in an attempt to align the way it is done. Floppy disks for extraction of problem lists were sent in winter 1997-1998, last trimester 1998, spring 2000, spring 2001, autumn 2001, and finally the last extraction was done for some GPs in 2002 and for the remaining GPs in 2003, depending on the last necessary input of problem lists and the quality control. One GP failed to report the health status of his patients. So, these individuals had to be excluded from the analysis with data about health problems and endpoints. Table 2 presents the involved numbers. Table 3 shows the number of problem lists available after exclusion of the individuals of the excluded practice.

Reports

The GPs were asked to report all incident cases of non-fatal myocardial infarctions and all deaths occurring between July 1st, 1996, and July 1st, 2001, to the research team, as soon as possible after presentation. The report consisted of a form which was send by fax to the research team, most GPs also phoned to the research team, as double-check. As a result of the lower number of persons developing a non-fatal myocardial infarction as expected, reports of incident cases of sudden imminent myocardial infarction were later added to the form. This lower number was partly caused by an increase of preventive operations in patients with imminent myocardial infarction. Therefore, patients with imminent myocardial infarction who underwent surgery in four weeks after the first presentation of the symptoms to the GP were also included. For both, sudden imminent and non-fatal myocardial infarction, the GP had to report whether it was the first presentation or a recurrent event. Reports of deaths were categorized into nine clusters: fatal myocardial infarction; other cardiac disease; cerebrovasculair accident (CVA); vascular (non-cardiac and non-cerebral) disease; cancer; infections or autoimmune disease; violence or accidents; suicide; and unknown or other causes.

Table 2: Number of individuals registered in the excluded practice

	Total cohort			Subcohort		
	Men	Women	Total	Men	Women	Total
Baseline 1996	110	134	244	27	26	53
Baseline 1997	27	36	63	5	5	10
Noncontacts	187	174	361			
Refusal	25	27	52			
Total	349	371	720	32	31	63

Table 3: Number of problem lists by response*

	Problem list	No problem list	Total
Respondents	13,856 (87.1%)	2,047 (12.9%)	15,903
– subcohort	3,125 (96.1%)	128 (3.9%)	3,253
Noncontacts	6,518 (73.3%)	2,378 (26.7%)	8,896
Total	20,374 (82.2%)	4,425 (17.8%)	24,799

* excluding refusals and individuals of the excluded practice

Verification and quality of reports

The reports were verified in two ways. First, the reports were compared with the problem lists. In case of discrepancy the GP was contacted for clarification of the ambiguity. A second verification was performed for the cases with a first myocardial infarction who agreed to be interviewed. Their medical records were searched for diagnostic ECGs and lab results at the time of the event, all done with informed consent of the patient. A cardiologist evaluated these data. Medical records of those 81 patients were evaluated of which, according to the cardiologist, 79 (97.5%) had had definite myocardial infarction and 2 patients had had a possible myocardial infarction. Finally, the total number of myocardial infarctions in the cohort were compared to the nationwide admissions into hospitals (31), which did not reveal large differences in incidence.

Loss to follow-up

Loss to follow-up arose if a participant left a participating practice and his new GP was not one of the other participating GPs. These moves were not kept up to date systematically. Every year, the addresses of all respondents were verified, in order to prevent sending the annual follow-up questionnaire to addresses of persons who had died, or had moved. Secondly, problem lists are stored in the archive of the database of the GPs, mentioning the reason of archiving, for example death or move, and mostly mentioning the date of filing. Finally, in the last year of the study GPs were asked to report if patients moved from their practice. However, not all GPs reported accurately. If someone had moved, the follow-up period stopped on the date given by the GP. If this date was not available, the filing date of the medical record was used, and in case this was also missing the date of the most recent health problem was used, to determine the follow-up period.

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chapter 4

follow-up

Lower prevalence of heart disease, but higher mortality risk during follow-up among nonrespondents to a cohort study

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Abstract

Objective

The primary aim was to assess the association between response behavior and health status at baseline, and survival in a 5-year follow-up period. A secondary aim was to assess whether reasons for nonresponse were associated with health status at baseline.

Study Design and Settings

Data came from a prospective study cohort consisting of 31,349 men and women aged 45-70 years. Objective retrospective and prospective health information derived from general practitioner registries was available for both respondents and nonrespondents.

Results

Results show that among respondents coronary heart disease was more prevalent. Compared with respondents, noncontacts had a higher mortality risk during follow-up. Refusals had hypercholesterolemia more often than did noncontacts, and coronary heart disease or diabetes mellitus less often.

Conclusion

The paradoxical results that respondents are less healthy at baseline but prospectively have a lower mortality risk may point to a selection effect indicating that the 'worried ill' are more inclined to participate. This effect could imply that observed relationships between risk factors or behaviors and outcomes in cohort studies may be attenuated.

Introduction

A decreasing trend in response rates in epidemiological studies and health surveys in the Netherlands has been observed. Response rates as low as 30% and 50% are not uncommon (1, 2). If nonresponse is random, the threat to the generalizability of the results of the study is limited (1, 3). If nonresponse is not random, it may lead to bias in study outcomes (1, 4). The likelihood of nonresponse bias increases when nonrespondents differ from respondents on the exposure or target variable of the study (4). One approach to dealing with nonresponse bias is to increase response rates. This cannot be a general rule, however, as seen from a methodological article by Stang and Jockel (5), who showed that under certain conditions studies with low response rates may be less biased than studies with high response rates. In addition, Austin et al., (6) showed that the odds ratio was not biased when subject participation was related only either to the exposure or to the outcome of the study.

To determine whether nonresponse is random it is necessary to compare respondents with nonrespondents on both exposure and outcome (4). Information is often limited to a few background characteristics available from population registries, which often serve as a sampling frame (7).

Previous studies found differences between respondents and nonrespondents concerning background or demographic characteristics (1, 8-14); for example, nonresponse was higher among men (8, 9-10) and among the less educated (1, 10-13).

If nonrespondents differ from respondents on the target variable, the likelihood of nonresponse bias will increase. Often, information regarding the target variable in health surveys is unavailable for nonrespondents. Respondents have been found to be healthier than the general population, which displays the so-called healthy volunteer effect (4). A similar effect was reported by Paganini-Hill et al., (15), who found that users of medical services and health screening procedures tended to be early respondents to a health survey. These early respondents were typified as ''worried well'', a term originally introduced by Criqui et al., (16), people who are healthy and yet (compared to the less healthy nonrespondents) worry more about their health, and for that reason visit their physician more regularly, receive more disease detection screening, and follow healthy lifestyle practices more often (15).

This healthy volunteer effect has been found in several studies. Respondents were found to have a better general health (13, 17), and nonrespondents were found to have more often hypertension (10, 13, 18), a history of diabetes (13, 16), a history of hospitalization for heart failure (16), myocardial infarction (13, 19), stroke (13, 17, 18), and macrovascular disease (11). Exceptions are lipid disorders (13, 16) and a family history of cardiovascular problems (14, 16), which seem to be more prevalent among respondents.

Few studies have looked into response behavior and survival rates. Mortality rates were found to be higher in nonrespondents, which again indicates that nonrespondents are less healthy than respondents (9, 19-24).

Reasons for participation and nonparticipation may be related to the topic or design of the study. For example, if the topic of a survey was important to a person (saliency), response was found to be higher (25). The phenomenon of the ''worried well'' is an example of the effect of saliency. Others, however, may refuse cooperation because of privacy reasons, or because of the perceived burden. Apart from identifying a distinction between participants and active refusals, research has also documented differences in health-related variables between categories of nonresponse, such as refusals or untraceable subjects. Etter and Perneger (26) found that persons who explicitly refused to participate had higher health care expenditures compared with persons who moved or failed to return the questionnaire. Pope and Croft (27) found that refusers consulted their general practitioner more often than what they termed ghosts (incorrect addresses, moved, and so on).

Unlike the case with most studies, objective retrospective and prospective health information was available in the present study for both respondents and nonrespondents. Our primary aim was to assess the association between response behavior and health status at baseline, and survival in a 5-year follow-up period. A secondary aim was to assess whether reasons for nonresponse were associated with health status at baseline. Data come from the Lifestyle and Health Study (Leefwijze en Gezondheid Onderzoek: LEGO), a prospective cohort study on cardiovascular disease in the general Dutch population of men and women, aged 45-70 years. The main research questions were:

1. Do respondents and nonrespondents differ regarding cardiovascular health problems and risk factors at the start of this cohort study?
2. Among nonrespondents, do refusals and noncontacts differ regarding cardiovascular health problems and risk factors at the start of this cohort study?
3. Is the all-cause mortality rate higher in noncontacts than in respondents?

Materials and methods

Design and population

The LEGO study started in 1996 with a baseline questionnaire. The target population consists of men and women aged 45-70 from the Dutch general population. The registries of general practitioners (GPs) were used as the sampling frame. Coverage of the target population is high, because the GP is considered to be the gatekeeper in the Dutch health care system. Nearly all patients are registered with a GP (28). More than 80% of the general population have visited their GP at least once a year (29). GPs have detailed information regarding health status of their patients (28).

The sample consisted of 34 participating general practices in the western and southeastern part of the Netherlands (for practical reasons, choice of practice was restricted to these two regions). The western part is more urbanized. GPs were sought through regional health institutes until a sufficient sample size (~32,000 subjects) was reached. GPs excluded terminal patients, patients with severe dementia, mentally disabled patients, and institutionalized patients. All other patients aged 45-70 registered with the participating GPs were included in the LEGO study and received a baseline questionnaire. In 1996, the baseline

questionnaire was sent to 31,556 subjects. The questionnaire included questions about health, lifestyle (e.g., alcohol consumption), life events, coping styles, and mood, among others. Some subjects (n = 207) were excluded by the GP, but mistakenly received a baseline questionnaire and were excluded afterwards, which leaves a cohort of 31,349 subjects. Persons who refused to participate at baseline could indicate this by returning an empty questionnaire to the researchers, and were then excluded for follow-up.

To all respondents of baseline 1996, a follow-up questionnaire was sent a year later. A second baseline questionnaire was sent to the nonrespondents of baseline 1996, excluding those who refused participation at baseline 1996 in the same period in 1997 as the follow-up questionnaire was sent to the respondents. The number of persons responding to baseline 1997 was too small to create separate response groups (such as early and late respondents).

In the present study respondents are defined as persons who responded to either the baseline questionnaire in 1996 or in 1997. Nonrespondents consisted of both refusals and noncontacts. Refusals are defined as persons who actively refused to participate at either the baseline in 1996 or in 1997. Noncontacts are defined as persons who did not return a baseline questionnaire in 1996 or in 1997, and who did not actively refuse cooperation.

The study design using only coded and not directly identifiable data was approved by the review committee of the Registration Network Family Practice of the University of Maastricht. The initial cohort consisted of patients not objecting to the use of their medical information. Before the GPs started data collection, they informed their patients about the participation of the practice in scientific medical research. Patients could personally object to such participation. According to the GPs, no patient initially objected to such participation. Information on the patients not objecting to the use of medical information is used up to the start of this particular study. Each subject had the costless opportunity to object to this particular study. For these refusals, no further prospective medical information was obtained. Of the respondents and noncontacts, prospective information on mortality was used. This is in accordance with the current Code for Adequate Secondary Use of Data in the Netherlands (Gedragscode Gezondheidsonderzoek, 2004) (30).

Data

Patient medical information was obtained through the GPs, who filed all relevant health problems of the past and during the follow-up period on a so-called problem list, which is an essential part of the medical record. A relevant health problem is defined as ''anything that has, does, or may require health care management, and has or could significantly affect a person's physical or emotional well being'' (31). Health problems were categorized according to ICPC-codes (International Classification of Primary Care) (32). GPs received a file containing information about the study and instructions about the registration of the cardiovascular health problems and risk factors. In addition, all GPs also received training aimed at improving consensus regarding the registration of diagnoses according to the ICPC.

Because one GP failed to report the health status of his patients, these subjects (307 respondents, 52 refusals, and 361 noncontacts) had to be excluded, leaving 30,629 subjects for the analysis regarding background variables.

Cardiovascular health problems and risk factors are of specific interest in the LEGO study. For 12.9% (n = 2,047) of respondents and 26.7% (n = 2,378) of noncontacts, no complete problem list was available, they were excluded from the analyses. No problem list was available for the refusals. To compare the different response groups, GPs were asked to write down on a list, for refusals, whether one of the cardiovascular health problems or risk factors was present before July 1996. No list was available for 1.4% (n = 79) of refusals, they were also excluded. These exclusions reduced the sample to 26,125 subjects for the analysis regarding cardiovascular health problems and risk factors.

The cardiovascular health problems extracted from the problem list of respondents and noncontacts, and from the list of refusals, were (a) coronary heart disease, defined as angina pectoris, acute myocardial infarction, or chronic ischemic heart disease, (b) heart failure, (c) nonfatal stroke, and (d) other arterial obstructive or peripheral vascular disease. The risk factors extracted were (a) hypertension with involvement of target organs, (b) diabetes mellitus, and (c) hypercholesterolemia.

A quality check of the data from the GPs was performed. Frequencies of myocardial infarction in the present study were found to be comparable to those of nationwide admissions into hospitals (33). Prevalence and incidence of cardiovascular health problems and risk factors in the present study were comparable to the number of cardiovascular health problems and risk factors in an established registration network, the Registration Network of Family Practices (28). Data on the problem list were checked by the researchers, and, if necessary, corrected in accordance with the ICPC.

A GP had to report to the researchers when one of the patients of the cohort died during the follow-up period (1996-2001). To preserve privacy, a GP was not informed of the status of a patient as a respondent or noncontact. Survival status is known for respondents and noncontacts, but not for refusals. Death rates in the present study were found to be somewhat lower than death rates in the total Dutch population; the distribution over the different causes of death, however, was comparable (although a small overrepresentation of cardiovascular deaths was found in the present study) (34).

For all GPs and most subjects, a postal code for either neighborhood or district was available. This provided a link to the demographic and socioeconomic characteristics of neighborhood or district (as collected by Statistics Netherlands) included in the analyses: degree of urbanization, ethnic diversity (percentage of non-Western), percentage of persons living alone, and mean income per resident (35). Correlation between characteristics of neighborhood and district was high, between .65 and .90 (hereafter, for 'neighborhood' read 'neighborhood or district'). When no postal code was available for a subject, the GP's code was used to link the information to the patient.

Data analysis

First, a comparison between respondents and nonrespondents was made, in the way most studies classify nonrespondents. Second, a comparison between refusals and noncontacts was made, providing insight into the effect of different reasons of nonresponse in the present study. A third comparison, between respondents and noncontacts, yielded information on mortality during follow-up.

Respondents and nonrespondents, refusals and noncontacts, and respondents and noncontacts were compared bivariately on age, gender, cardiovascular health and risk factors, and demographic variables. Statistical significance was assessed through chi-square tests for categorical variables and t-tests for continuous variables. Next, probability of response was modeled by age, gender, demographic variables, and cardiovascular health and risk factors. Among nonrespondents, probability of refusal was modeled by age, gender, demographic variables, and cardiovascular health and risk factors.

Multiple logistic regression analyses were conducted to model response probability, taking into account all independent variables simultaneously. First, interaction of gender with cardiovascular health and risk factors were tested. With the α- level set at .05, the least significant interaction was manually excluded from the model (i.e., we used the backward method). Second, when all nonsignificant interaction effects were excluded from the model, the least significant variable was manually excluded from the model until a model with statistical significant variables remains. Respondents and noncontacts were then compared bivariately on number of deaths. Finally, probability of death was modeled by response behavior, age, gender, and cardiovascular health problems and risk factors. Subjects who moved during the follow-up period were excluded from the last two analyses, because no information was available regarding death. Because no information was available regarding death rates for refusals, respondents could not be compared with nonrespondents for mortality.

Because sampling followed a two-stage procedure, subjects are considered to be nested in 33 general practices. To take this group structure into account, an analysis of covariance (ANCOVA) approach was used to correct for potential bias due to correlated data, with patient's registered with one of the 33 participating GPs entered as 32 dummy variables in the logistic analysis. A patient's registration with one of the participating GPs was entered as 33 - 1 dummy variables in the logistic analysis. Essentially, this procedure is similar to a random coefficient approach (36). The study did not have a priori hypotheses concerning the impact of general practice characteristics on the response variable. The dummy variable for the GPs is entered only to secure a correct estimation of our principal parameters and its effect is not interpreted substantively (36).

Results

Gross response rate was 51.7% (n = 16,210), 18.8% (n = 5,882) actively refused, and 29.5% (n = 9,257) did not respond. Data on subject characteristics and demographic variables are based on 30,629 cohort members from the 33 remaining GPs. Cardiovascular health and risk factors are based on the 26,125 cohort members for whom health information was available. Mortality rates are based on 22,362 cohort members, including respondents and noncontacts, and excluding persons who moved during follow-up.

Respondents vs. nonrespondents

Bivariate analyses showed that respondents had a higher percentage of coronary heart disease (CHD), and a higher percentage of hypercholesterolemia (Table 1). Of the subjects with hypercholesterolemia, 24.3% had also CHD (data not shown). Multiple logistic regression analysis revealed an interaction between CHD and gender (OR = 1.35, 95% CI = 1.08 - 1.68) and between heart failure and gender (OR = 0.32, 95% CI = 0.16 - 0.66) (Table 2). Analyses were performed separately for male and female (data not shown). The separate analyses showed that male respondents were more likely to have CHD (OR = 1.36, 95% CI = 1.21 - 1.53) and were less likely to have heart failure (OR = 0.53, 95% CI = 0.33 - 0.84). Female respondents were more likely to have heart failure (OR = 1.62, 95% CI = 0.94 - 2.80), but the difference was not statistically significant. Hypercholesterolemia was no longer a predictor of response in the multivariate analysis. Nonrespondents were more likely to be male, and more likely to live in urban neighborhoods (Table 1). The multivariate analysis also showed that nonrespondents were more likely to be male (OR = 0.89, 95% CI = 0.84 - 0.94) (Table 2).

Refusals vs. noncontacts

Among refusals and noncontacts, refusals had a higher percentage of hypercholesterolemia and of hypertension with involvement of target organs (Table 1). The multivariate analysis revealed that, among nonrespondents, the refusals were more likely than noncontacts to have hypercholesterolemia (OR = 1.40, 95% CI = 1.19 - 1.66), and were less likely to have CHD (OR = 0.85, 95% CI = 0.72 - 0.99) and diabetes mellitus (OR = 0.77, 95% CI = 0.64 - 0.93) (Table 2). No interaction effect was found for gender. Refusals were found to be older, and noncontacts were more likely to live in urban neighborhoods or districts (Table 1).

Table 1: Comparison of respondents and nonrespondents, refusals and noncontacts, and respondents and noncontacts by subject characteristics and demographic variables and history of cardiovascular health problems and risk factors

				Nonrespondents	
		Respondents	Nonrespondents	Refusals	Noncontacts
Variables	Total, no.	[=51.9%], %	[=48.1%], %	[=39.6%], %	[=60.4%], %
Subject characteristics (n = 30,629)					
Gender					
Men	15,467	49.0[a,*]	52.1	50.6[b,**]	53.1[c,**]
Women	15,162	51.0	47.9	49.4	46.9
Age, years[†]					
44-49	8,692	28.4[a,*]	28.4	23.4[b,**]	31.7[c,**]
50-54	6,652	20.8	22.8	20.2	24.4
55-59	5,639	18.4	18.5	19.0	18.1
60-64	4,697	15.6	15.0	17.6	13.3
65-73	4,943	16.9	15.4	19.7	12.5
Demographic characteristics (n = 30,629)					
Degree of urbanization					
Very high	4,500	13.9[a,*]	15.6	11.0[b,**]	18.6[c,**]
High	4,329	15.1	13.1	14.6	12.1
Intermediate	7,951	26.0	25.9	28.3	24.3
Low	8,262	26.7	27.3	29.1	26.1
Very low	5,587	18.4	18.1	16.9	18.9
Non-Western ethnicity, % (SD)		7.53 (8.6)[a,*]	7.94 (9.9)	7.21 (8.3)[b,**]	8.42 (10.9)[c,**]
Living alone, % (SD)		19.17 (8.2)[a,*]	19.62 (8.4)	19.60 (7.2)[b,**]	19.64 (9.2)[c,**]
Mean income, euros (SD)		14,980 (1,208)[a,*]	14,915 (1,144)	15,004 (1,055)[b,**]	14,857 (1,195)[c,**]
Positive history of cardiovascular health problems and risk factors (n = 26,125)[d]					
Coronary heart disease	1,824	7.5[a,*]	6.4	6.4	6.3[c,**]
Heart failure	136	0.5	0.5	0.6	0.5
Hypertension with involvement of target organs	928	3.5	3.5	4.1[b,**]	3.1
Nonfatal stroke	480	1.7	1.9	2.1	1.8
Other arterial obstructive or peripheral vascular disease	381	1.4	1.5	1.6	1.5
Diabetes mellitus	1,091	4.0	4.3	4.0	4.6
Hypercholesterolemia	1,635	6.6[a,*]	5.9	7.2[b,**]	4.7[c,**]

Abbreviation: SD, standard deviation.

[*] P <.05.

[**] P <.01.

[†] Six nonrespondents had no problem list who were automatically dropped from the multivariate analysis.

[a] Significant differences between respondents and nonrespondents.

[b] Significant differences between refusals and noncontacts.

[c] Significant differences between respondents and noncontacts.

[d] Sample excludes 4,504 patients for whom no problem list was available: 2,047 respondents, 2,378 noncontacts, and 79 refusals.

Table 2: Adjusted odds ratios and 95% confidence intervals from multiple logistic regression analysis for subject characteristics, demographic variables and history of cardiovascular health problems and risk factors

	Adjusted OR (95% CI)		
Variables	Respondents vs. nonrespondents[a]	Refusals versus noncontacts[b]	Respondents versus noncontacts[c]
Male gender	0.89 (0.84-0.94)	-	0.89 (0.83-0.94)
Age, years[*]			
44-49	1.02 (0.94-1.10)	0.59 (0.52-0.66)	0.75 (0.68-0.83)
50-54	0.90 (0.83-0.97)	0.63 (0.56-0.71)	0.69 (0.62-0.76)
55-59	0.98 (0.90-1.06)	0.78 (0.69-0.89)	0.84 (0.75-0.93)
60-64	0.97 (0.89-1.06)	0.91 (0.79-1.03)	0.91 (0.81-1.01)
65-73[d]	1.00	1.00	1.00
Degree of urbanization			
very high	1.44 (1.12-1.85)	0.09 (0.04-0.19)	-
high	0.65 (0.53-0.79)	2.30 (1.54-3.44)	-
intermediate	0.58 (0.48-0.71)	6.46 (4.36-9.58)	-
low	0.74 (0.65-0.85)	3.54 (2.71-4.63)	-
very low[d]	1.00	1.00	-
Percentage non-Western	-	0.97 (0.96-0.98)	-
Percentage living alone	-	1.02 (1.01-1.04)	-
Positive history of cardiovascular health problems and risk factors			
Coronary heart disease	1.01 (0.84-1.22)	0.85 (0.72-0.99)	1.15 (1.01-1.31)
Heart failure	1.60 (0.93-2.77)	-	2.13 (0.94-4.84)
Hypertension with involvement of target organs	-	-	-
Nonfatal stroke	-	-	-
Other arterial obstructive or peripheral vascular disease	-	-	-
Diabetes mellitus	-	0.77 (0.64-0.93)	0.81 (0.70-0.94)
Hypercholesterolemia	-	1.40 (1.19-1.66)	1.33 (1.16-1.53)
Interaction with gender			
Coronary heart disease × Gender	1.35 (1.08-1.68)	-	-
Heart failure × Gender	0.32 (0.16-0.66)	-	0.23 (0.09-0.62)

Abbreviations: CI, confidence interval OR, odds ratio.

[*] Six nonrespondents had no problem list who automatically dropped from the analysis.

[a] Adjusted for general practice, gender, age, history of coronary heart disease, history of heart failure, degree of urbanization, interaction between history of coronary heart disease and gender, and interaction between history of heart failure and gender. Odds of responding was modeled.

[b] Adjusted for general practice, age, history of coronary heart disease, history of diabetes mellitus, history of hypercholesterolemia, degree of urbanization, and persons living alone. Odds of refusal was modeled.

[c] Adjusted for general practice, gender, age, history of coronary heart disease, history of heart failure, history of diabetes mellitus, history of hypercholesterolaemia, and interaction between history of heart failure and gender. Odds of responding was modeled.

[d] Reference category.

Respondents vs. noncontacts

Concerning all-cause mortality rates in noncontacts and respondents, death rates by age group rose with increasing age, and death rates were higher for men (Table 3). Although the bivariate analysis revealed no significant differences in death rates between respondents and noncontacts, the multiple logistic regression analysis (Table 4) showed that response behavior was a significant predictor of mortality (OR = 0.78, 95% CI = 0.67 - 0.90): noncontacts had a higher risk of dying during follow-up, even when corrected for age, gender, and cardiovascular health and risk factors. No interaction effect was found for gender. The bivariate analysis (Table 1) between respondents and noncontacts showed that respondents had a higher percentage of CHD, and had a higher percentage of hypercholesterolemia. The multivariate analysis (Table 2) revealed that, compared with noncontacts, respondents more often had CHD (OR = 1.15, 95% CI = 1.01 - 1.31) and hypercholesterolemia (OR = 1.33, 95% CI = 1.16 - 1.53), but less often had diabetes mellitus (OR = 0.81, 95% CI = 0.70 - 0.94).

Subjects who moved during the follow-up period were excluded from the analyses concerning all-cause mortality. In a separate analysis, a comparison was made between persons who did or did not move during follow-up (data not shown). Of the noncontacts, 11.2% moved, compared with 9.0% of the respondents. People who moved during follow-up were found to have a higher percentage of heart failure at the start of the study (0.9% vs. 0.5%), but this is based on <15 cases; it is thus not to be expected that findings from people who moved would influence the results concerning all-cause mortality.

Table 3: Deaths by gender and age group in respondents and noncontacts at 5 year follow-up

	Deaths, no (%)			
	Respondents (n= 14,467)	Noncontacts (n=7,895)	Combined (n=22,362)	Total in sample, no.
Men				
44-49	25 (1.2)	23 (1.8)	48 (1.4)	3,337
50-54	38 (2.5)	34 (3.3)	72 (2.8)	2,538
55-59	54 (4.1)	30 (3.7)	84 (4.0)	2,118
60-64	72 (6.6)	41 (7.6)	113 (6.9)	1,635
65-73	144 (12.5)	75 (15.2)	219 (13.3)	1,642
Total	333 (4.7)	203 (4.9)	536 (4.8)	11,270
Women				
44-49	27 (1.3)	15 (1.3)	42 (1.3)	3,203
50-54	31 (2.0)	17 (1.9)	48 (2.0)	2,431
55-59	24 (1.8)	21 (3.3)	45 (2.3)	1,982
60-64	50 (4.2)	20 (3.9)	70 (4.1)	1,693
65-73	80 (6.3)	43 (8.5)	123 (6.9)	1,783
Total	212 (2.9)	116 (3.1)	328 (3.0)	11,092

Table 4: Adjusted odds ratio and 95% confidence intervals from multiple logistic regression analysis for mortality vs. survival for response behavior, subject characteristics, and history of cardiovascular health problems and risk factors

	Mortality[a] vs. survival, OR (95% CI)
Response behavior: respondents (vs. noncontacts)	0.78 (0.67-0.90)
Male gender	1.60 (1.38-1.85)
Age, years	
44-49	0.18 (0.14-0.24)
50-54	0.30 (0.24-0.37)
55-59	0.36 (0.29-0.45)
60-64	0.59 (0.48-0.71)
65-73[b]	1.00
Positive history of cardiovascular health problems and risk factors	
Coronary heart disease	1.54 (1.25-1.91)
Heart failure	3.36 (2.02-6.00)
Hypertension with involvement of target organs	1.38 (1.04-1.83)
Nonfatal stroke	2.34 (1.69-3.23)
Other arterial obstructive or peripheral vascular disease	2.62 (1.86-3.70)
Diabetes mellitus	1.54 (1.18-1.99)
Hypercholesterolemia	1.29 (1.00-1.66)

People who moved during follow-up were excluded from the analyses.

Abbreviations: CI, confidence interval; OR, odds ratio.

[a] Adjusted for general ractice, and other variables. Odds of mortality was modeled.

[b] Reference category

Discussion

The present study investigated differences between respondents and nonrespondents regarding health, and found nonrespondents to be healthier with regard to CHD. Mortality rate during follow-up, was found to be higher for noncontacts compared with respondents. And finally, refusals were found to be healthier than noncontacts regarding cardiovascular health, but have more risk factors regarding CHD.

Contrary to expectation, nonrespondents were found to be healthier with regard to CHD than respondents, especially among male nonrespondents. The odds of responding is 1.36 times higher for males with CHD. This result differs from the general findings in the literature that respondents are healthy volunteers (11,

13, 19). As discussed in the introduction, saliency could be a trigger for people to respond to a survey, for example the phenomenon ''worried well''. In the present study the respondents were found to be less healthy, and cannot be considered as ''worried well''. Probably, this saliency is most linked with the worries, people have regarding a topic. People with CHD are ill, and are advised to change their lifestyle into a healthy one, which might increase their worries regarding their health, and these worries may motivate a subject to respond to a questionnaire on health. So perhaps these respondents have to be regarded as the ''worried ill''.

Regarding cardiovascular risk factors no differences in hypertension were found between respondents and nonrespondents. This results differs from previous studies in which nonrespondents had more often hypertension (10, 13, 18). There might be a difference in definition of hypertension. In the present study, hypertension was defined as hypertension with involvement of target organs, no statement can be made regarding hypertension without involvement of target organs.

The difference in prevalence of another cardiovascular risk factor, hypercholesterolemia was small (~1%). In accordance with previous studies hypercholesterolemia was found more prevalent among respondents (13, 16). But, as seen from the multiple logistic regression model, hypercholesterolemia was not associated with response behavior. A word of caution has to be made, the probability of underrecording of hypercholesterolemia is high in the Dutch situation, compared with other countries. A positive cardiovascular risk profile is an indication for cholesterol measurement in the Netherlands national guidelines on cholesterol for screening and management of hypercholesterolemia (37). A patient has a positive risk profile, if at least one of the six cardiovascular risk factors (CHD in patients history; signs of familial hypercholesterolemia; familial hyperlipidemia in a relative; CHD in sibling or parent <60 years; hypertension; or diabetes mellitus) mentioned in the Dutch guidelines is present (37). In contrast with the Dutch situation, where only people at risk are tested, are the United States guidelines which recommend that all adults aged 20 - 70 should be screened. For example, in a Dutch study it was found that of those with a positive risk profile only one third had had their cholesterol measured (37). They also found that of all the patients in the Dutch study, only 12% (37) were tested, compared with 67% (38) of adults in a study from the United States.

Paradoxically, respondents seem less healthy at baseline than nonrespondents, but prospectively have a lower mortality risk. After correction for age, gender, cardiovascular health, and risk factors, mortality risk remains higher for noncontacts compared with respondents, which is in line with results from previous studies (9, 19-23). Excess mortality among the noncontacts could ensue when respondents are more health conscious and see their doctor more often (better surveillance) and get better care, parallel to the idea of the worried ill. Secondly, excess mortality could be caused not by CHD, but by some other disease (e.g. cancer). Thirdly, the higher prevalence of diabetes among noncontacts could have led to the excess mortality observed. A separate analysis was performed to compare causes of death between respondents and noncontacts (data not shown). This comparison revealed no differences between respondents and noncontacts regarding causes of death, there might be other factors not measured in the present study which could explain the differences in mortality risk.

As described in the introduction the likelihood of nonresponse bias increases when nonrespondents differ from respondents on both the outcome and the exposure. For the nonrespondents, no information was available regarding health behavioral risk factors, such as alcohol consumption, smoking, or depression. People with CHD are advised to change their lifestyle into a healthy one. It could be speculated that the respondents also differ from the nonrespondents with regard to health behavioral risk factors. Which might partly explain the differences in mortality risk. To answer this question information regarding the exposure variable is necessary.

Results showed differences regarding cardiovascular health within reasons of nonresponse in the present study. The odds of refusal was lower, about 0.85 in subjects with CHD, and also lower in subjects with diabetes mellitus, about 0.77. However, the odds of refusal was 1.40 times higher in subjects with hypercholesterolemia. CHD and diabetes mellitus are considered to be health problems or diseases, whereas hypercholesterolemia is considered to be a risk factor. This difference in health and risk factor indicates that refusals are healthier compared with noncontacts, but have more risk factors regarding CHD. There is no clear explanation why refusals differ in health from noncontacts. It can be speculated that because refusals are healthier, they are not inclined to respond to a questionnaire about health. Possibly other factors explain why some subjects explicitly refuse participation. One factor, also investigated in the present study, could be degree of urbanization. Noncontacts are for example living in urban neighborhoods, who are more anonymous, which increases the probability of not responding.

The response rate in the present study (~52%) is slightly higher than typical response rates in the Netherlands (30% - 50%) (1, 2). A large cohort study on diet and cancer in the Netherlands, using a postal questionnaire had a response rate of ~35% (39). A possible explanation for the higher response rate in the LEGO study is the role of the GP. The invitation letter that accompanied the questionnaire was signed by the GP, who is typically considered to be an authority. People are more inclined to respond to a questionnaire if the request is supported by an authority (1, 40). In particular, persons with CHD have a history of treatment, the GP plays an important role in the treatment, and therefore the GP could be an authority to his patient.

The finding of overrepresentation of subjects with CHD at baseline among respondents seems to pose less of a threat to validity of substantive analyses concerning the association between a determinant and CHD. The finding that during the follow-up period nonrespondents are less well off as regards all-cause mortality may indicate that respondents may be better monitored and receive more or better care, which would mitigate the negative effects of certain risk factors or health-related behaviors. This could imply that observed relationships between such factors or behaviors and outcomes in respondents may be attenuated compared to nonrespondents.

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chapter 5

measure

Measurement of lifetime alcohol intake: Utility of a self-administered questionnaire

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Abstract

Prior epidemiologic research revealing cardioprotective effects of alcohol intake has systematically neglected lifetime exposure to alcohol, which may cause serious bias in conclusions regarding drinking and heart disease risk. Departing from use of an earlier interview schedule, the authors of the present 1996-2001 cohort study developed a self-administered Lifetime Drinking History questionnaire (LDH-q). A total of 16,211 Dutch men and women older than age 45 years participated by completing the baseline questionnaire. A random sample of 3,255 men and women was used to determine the reliability and validity of the LDH-q. Test-retest reliability was assessed by means of the intraclass correlation coefficient and kappa scores. Correlations between lifetime and current intake scores were used to assess discriminant and convergent validity. Both reliability and validity appeared to be reasonably high compared with results obtained by using interview formats to measure lifetime alcohol intake. Reliability of the LDH-q was higher for men than for women, probably because of the more frequent and regular drinking of men. Indices of validity were similar for men (0.75) and women (0.70). Results show that the LDH-q can be a useful instrument in large-scale cohort studies.

Introduction

Epidemiologic research on the relation between alcohol intake and coronary heart disease has led to the generally accepted idea that moderate intake of alcohol is beneficial to health (1-6). Coronary heart disease does not occur suddenly but is a preliminary outcome of an atherosclerotic process. This process may start early in life: Visible lipid deposits have been found in adolescents and even in children (7-11). Clinical studies suggest that the cardioprotective effects of alcohol may be generated by certain lipoproteins, decreased platelet function, and increased fibrinolysis (12). Of these effects of alcohol, some seem to be immediate or short term, such as blood platelet aggregation. In such instances, there is no need to consider lifetime exposure because it would explain little of the variation in risk. Because most population studies measure alcohol intake by means of self-reports with short reference periods (13), it should not come as a surprise that results from these studies often confirm these immediate, short-term beneficial effects. However, for other outcomes, such as arterial lipid formation or high blood pressure, exposure to alcohol throughout life may affect risk. When, for example, the natural course of atherosclerosis is considered, an additive or cumulative effect of lifetime alcohol exposure is conceivable, necessitating measurement of lifetime intake. Unfortunately, measuring alcohol intake, especially earlier in life, is not straightforward.

A general problem in measuring alcohol intake is the absence of a "gold standard". Self-reports are the simplest method but are prone to response bias. However, other, more objective techniques such as use of biomarkers of alcohol intake do not seem more valid than self-reports when the reference period is stretched over some time (14-16). Since accuracy of recall of an autobiographic event is affected by the elapsed time since the event occurred (next to saliency of the event and its frequency of occurrence), extending the reference period to a lifetime probably will affect the accuracy of such self-reports (17). Research into the quality of self-reports for lifetime intake is scarce, however. To our knowledge, only one study is available in which selfreported drinking (actual intake in the last week) was directly compared with recall of intake during that period 18 years later (18). Paradoxically, intake recalled 18 years later was, on average, found to be higher than when intake was assessed immediately after the drinking occurred. However, current intake was not related to the size of the discrepancy in reports, suggesting absence of differential bias in the self-reports after 18 years.

Results on the stability of self-reports of lifetime drinking from three studies in which an interview schedule was used showed moderate-to-high correlations ranging from 0.73 to 0.94 for total lifetime intake (19-21). However, in large cohort studies, interviewing all participants is often not feasible, and one has to resort to a self-administered questionnaire format. Despite the potential cost of an increased number of missing values and inconsistencies often attributed to a lower perception of threat when self-administered questionnaires are used (22), self-administered questionnaire formats yield similar or even better results than personal interviews when alcohol intake is measured (22-24).

In the present 1996-2001 study, the quality of the self-administered format of the Lifetime Drinking History questionnaire (LDH-q) was tested in a large cohort study, the Lifestyle and Health Study (in Dutch, abbreviated as the LEGO study). The LDH-q was developed in an earlier pilot study (25) on the basis of an inter-

view schedule (26), since no self-administered questionnaire about lifetime drinking was available. In the present study, test-retest reliability of the LDH-q was estimated. The construct validity of the LDH-q was tested by comparing it with two measures of current drinking, assuming that scores for corresponding drinking periods should show a high correlation. It was further presumed that the further back in time the intake for which the subject was reporting occurred, the lower its correlation with current intake.

Materials and methods

Population

The LDH-q was developed primarily for measuring lifetime exposure to alcohol in a large prospective cohort study. The data in this article were derived from the Dutch Lifestyle and Health Study, which started in 1996. The study cohort was composed of men and women born between 1925 and 1951 and registered at 34 participating general practices. Coverage of the general population by patient registration in primary practices is high in the Netherlands. In the period 1995-1997, an estimated 78-86 percent of all men and women aged 45 years or older visited their general practitioner at least once in a 1-year period (27). The primary practices were drawn from two regions of the Netherlands, southeastern and western, because of differences in past drinking patterns. Historically, the southeastern region, compared with the western region, is characterized by a low alcohol abstinence rate among men but a relatively high abstinence rate among women and by a higher intake among men versus a relatively lower intake among women (28, 29). Participation of practices was sought with the help of municipal health authorities and through the network of practices of the Department of General Practice of the University of Maastricht (30). No particular criteria were used in selection other than number of patients and availability of medical information. The study design, in which only anonymous data were used, was approved by the review committee of the Registration Network Family Practices. Informed consent was obtained by using a letter explaining the questionnaire.

After patients with terminal disease, patients with severe dementia, mentally disabled patients, and institutionalized patients were excluded, 31,348 persons were presented with a baseline questionnaire. Those who refused to participate (18.7 percent) could indicate so by returning a blank questionnaire. These persons were then removed from the cohort. To all other nonrespondents (35.3 percent), a second baseline questionnaire was sent out in 1997. From these respondents (n = 1,803), no retest data were available. Of the 14,408 baseline-1996 respondents, 77.2 percent responded to the follow-up questionnaire with the retest. Preliminary data did not reveal differences in age or sex between respondents and nonrespondents.

From the 16,211 persons constituting the cohort, a random sample of 3,255 was drawn. For this sample, questionnaires were processed and data were made available for analysis.

Alcohol intake

Alcohol intake was measured by using three methods: the LDH-q; a quantity-frequency index of intake in the last year, measured at baseline (QF-last-year); and the weekly recall. For the latter, actual intake in the past week was reported.

The self-administration format of the LDH-q is based on the interview schedule of the Lifetime Drinking History (19), which was in turn an adaptation of a format suggested by Rohan (31). The interview schedule of the Lifetime Drinking History provides quantitative data on patterns of alcohol intake starting from onset of regular drinking and was intended primarily to assess the drinking history of heavy drinkers. The major alteration made to the LDH-q was in the format of the drinking periods. In the interview schedule of the Lifetime Drinking History, drinking periods are not fixed but "floating"; the respondent defines the different drinking periods in his or her life. These periods are demarcated by changes in drinking behavior, which the respondent qualifies as large. However, such a free format is too complicated to use in a self-administered questionnaire context, so the drinking periods in the LDH-q were presented as fixed. Nevertheless, comparison of a free format and the floating format of the Cognitive Lifetime Drinking History interview did not lead to differences in results (21). In the pilot study, the LDH-q was compared with the interview schedule of the Lifetime Drinking History in a sample of 45 male social drinkers (25). The test-retest correlation was about 0.70, a figure easily affected by a few outliers caused by routing errors. The conclusion was that, after some major (routing) adjustments, the LDH-q could yield a reliability profile similar to the one for the interview schedule of the Lifetime Drinking History.

For the present study, the LDH-q was conducted twice in the spring, 1 year apart. The LDH-q was part of the baseline questionnaire. The 1997 follow-up questionnaire was slightly shorter; the main indices of drinking were retained but questions about reasons for discontinuing drinking were omitted. The LDH-q starts off with a question about age (in years) at onset of drinking, defined as consuming the "first, full glass" of alcohol. Then, respondents are asked about their usual frequency of drinking (eight options ranging from "every day" to "never") and their usual quantity per occasion (in glasses) during each age period. Five drinking periods were defined: youth (aged 12-18 years), young adult (aged 19-27 years), adult (aged 28-45 years), middle age (aged 46-60 years), and elderly (aged ≥ 61 years) (25). Usual quantity and usual frequency, converted to fit a weekly frequency, were multiplied to form an index of usual intake for each drinking period. Cumulated index scores for the drinking periods were added to produce an estimate of total lifetime intake. Additional questions in the original version inquiring about variability, that is, the frequency of binge drinking, type of beverage (beer, wine, spirits), drinking context, and attempts to quit, were omitted from the retest version.

Additional drinking indicators in both the test and retest versions of the LDH-q were QF-last-year and a measure of actual drinking during the last week (weekly recall). Both indices measured alcohol intake separately for beer, wine, and spirits.

Analysis

Test-retest reliability was assessed by calculating the kappa measure for a binary variable or the single-score intraclass correlation coefficient (ICC) for one-way models (32). The ICC is closely related to the kappa measure and, under some conditions, is a special case of weighted kappa (33). An advantage of the ICC is correction for possible systematic variation between two measurements or methods in addition to application of only the variation between subjects and the random variation in the Pearson's correlation coefficient (34). ICCs were calculated for frequency, quantity, and total weekly intake for each drinking period and for

lifetime intake. The indices were examined for influential cases by using Cook's distance. ICC changes of more than 0.10 for one or two cases were considered influential, and those cases were excluded temporarily.

Construct validity was determined by comparing the LDH-q with the QF-last-year and the weekly recall, all measured in the baseline questionnaire. The five drinking periods were also compared with each other. The rationale behind these tests is that the association between intake scores for different drinking periods should be weaker the further apart in time they are. If reporting bias is large, it would be reflected in equally high correlations between reported intake over periods even far apart in time. Construct validity was determined for alcohol intake per week by using Spearman's correlation coefficient because the variables used probably do not follow a normal distribution. Furthermore, if there is a normal distribution, Spearman's ρ will be equal to Pearson's correlation coefficient (35).

Finally, an aspect of face validity was investigated by comparing trends in the cohort with those in the Dutch population at large over the period 1950-1995. Mean alcohol intake in the cohort (in liters of pure alcohol per year) for the years 1950, 1955, and so on up to 1995 was calculated for comparison with per-capita intake for these years in the Netherlands. Drinks were converted to liters of pure alcohol, assuming that one glass contains 12.5 ml of pure alcohol. Data for all cohort members were used in the calculation, with those for members not (yet) drinking set to zero. When per-capita intake was calculated (based on sales data), data for Dutch inhabitants of all ages were included in the denominator (36).

Results

Baseline data were available for 1,608 men and 1,647 women, of whom 1,427 men and 1,450 women had responded in 1996. About half of the respondents were aged 44-54 years. The distribution over the five 5-year age categories was equal to the distribution of these groups in the Netherlands (37).

Drinking behavior

Table 1 shows that, compared with older men, younger men started drinking earlier in life ($p < 0.01$) and tended to report consuming more drinks per week during each life period, which was significant for reports of drinking by young adults, adults, and elderly men. A similar pattern was found for women (table 2), with significant trends in reports about age at onset for young adults, adults, and middle-aged women. When tables 1 and 2 are compared, it becomes obvious that, for each life period, men reported consuming at least twice as many drinks per week as women did, and they started drinking about 2 years earlier. Both men and women reported consuming more drinks per week according to the weekly recall than to the QF-last-year, except for men aged 60-64 years. However, this finding was statistically significant for men aged 44-59 years only. The gender differences were consistent across the age range in the sample. The expected differences between the two regions were found for men only. For women, no significant differences or inverse differences in drinking pattern were found.

Table 1: Age at onset of alcohol intake and mean number of glasses comnsumed per week per drinking period in relation to age at baseline for male drinkers in the Netherland, 1996-2001

		Age at baseline (years)									
Alcohol intake	No. of men	44-49		50-54		55-59		60-64		65-71	
		Mean	SD*	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age of onset (years)	1,496	16.4	2.7	16.7	2.8	17.1	3.0	17.6	3.4	18.6	4.5
Drinking period											
Youth	1,010	6.9	10.1	6.7	15.4	5.5	7.5	4.8	6.8	6.3	17.7
Young adult	1,334	14.6	15.4	13.0	15.9	10.1	12.6	7.7	9.1	7.2	14.5
Adult	1,354	14.8	16.4	12.5	14.6	12.3	18.3	7.9	10.0	8.2	14.1
Middle age	1,355	13.1	12.9	12.5	14.0	12.6	12.9	11.0	16.6	11.3	17.1
Elderly	347	0		0		0		11.6	17.6	10.2	15.5
Mean lifetime intake	1,503	13.2	13.6	11.8	12.3	10.8	12.0	8.0	10.0	8.1	13.5
QF last year*	1,110	14.9	15.7	14.1	14.1	12.8	13.1	14.5	20.5	11.7	10.6
Weekly recall	1,032	16.7	13.5	16.8	13.8	14.4	11.8	14.1	12.9	13.7	11.2

* SD, standard deviation; QF-last-year, quantity-frequency index of alcohol intake in the last year, measured at baseline.

Table 2: Age at onset of alcohol intake and mean number of glasses consumed per week per drinking period in relation to age at baseline for female drinkers in the Netherland, 1996-2001

		Age at baseline (years)									
Alcohol intake	No. of women	44-49		50-54		55-59		60-64		65-71	
		Mean	SD*	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age of onset (years)	1,275	18.2	3.6	18.8	3.9	20.4	4.9	21.3	5.1	21.1	5.8
Drinking period											
Youth	501	2.0	6.1	1.3	1.8	1.6	3.1	0.9	1.2	1.7	2.2
Young adult	1,020	3.3	4.2	3.0	3.8	1.8	2.2	1.4	2.6	1.9	2.9
Adult	1,087	5.6	7.5	5.1	7.8	4.1	6.5	2.9	5.1	2.8	4.2
Middle age	1,076	6.0	6.0	5.6	7.1	5.7	7.6	4.1	6.3	5.0	6.8
Elderly	270	0		0		0		4.8	7.2	5.8	7.6
Mean lifetime intake	1,297	4.5	5.7	4.2	5.6	3.9	5.9	2.6	4.4	3.0	4.3
QF last year*	925	8.3	13.7	6.7	8.0	7.1	9.2	5.8	7.8	7.7	9.3
Weekly recall	765	9.0	8.1	8.9	8.7	8.3	7.2	6.5	6.7	8.3	8.1

* SD, standard deviation; QF-last-year, quantity-frequency index of alcohol intake in the last year, measured at baseline.

Test-retest reliability

Baseline and follow-up data were available for 1,074 men and 1,085 women. However, 31 men and 87 women were excluded from the study because of incomplete alcohol intake data for either year; six men and seven women did not complete the alcohol questions for both years. The LDH-q specifically asks the respondent if he or she has been a lifelong abstainer. Of the women, 6.0 percent, compared with 1.2 percent of the men, indicated on both questionnaires that they had never drunk any alcohol. Answers about lifelong abstention were inconsistent more often among women (8.1 percent) than among men (1.5 percent). The kappa measure of agreement for this question was 0.61 for men and 0.55 for women. Combining this specific question with information from subsequent questions on alcohol intake revealed a conflict for another six men and 37 women who seemed to be "ever" drinkers. In all, when information from both questionnaires was used, 15 men (1.4 percent) and 74 women (7.4 percent) could be considered lifelong abstainers on both occasions. These 89 persons were excluded from the remaining test-retest analyses, leaving 1,028 men and 924 women.

Table 3 shows the ICCs for the LDH-q. The ICC for age at onset was low, especially for men (0.21). In some instances, current age instead of age at onset was given. Correction was made by combining age at onset with information on drinking during the first drinking period, increasing the ICCs to 0.60 for men and 0.61 for women.

The ICCs for the drinking indices during different drinking periods ranged from 0.44 to 0.88 for men but were somewhat lower for women (range, 0.42-0.88). This finding especially concerned the ICCs for quantity per occasion; they ranged from 0.68 to 0.77 for men and from 0.50 to 0.62 for women. The ICCs for reports about the "youth" period were, in general, the lowest. Finally, the ICCs for mean lifetime intake were 0.75 for men and 0.70 for women. ICC values were calculated separately for the different 5-year age categories. There did not seem to be a trend with age, although the ICCs seemed the lowest for the oldest men. In another analysis (results not shown), beer preference among men and wine preference among women did not lead to any relevant differences in reliability outcomes for either category.

Construct validity

The Spearman's correlation coefficient between both measurements of current intake was 0.83 for men and 0.81 for women. Table 4 shows the correlations between both indices of current intake and the intake estimates for the different drinking periods. The correlations between QF-last-year and quantity-frequency index of alcohol intake per week (QF) indices for different drinking periods were somewhat higher than those between the weekly recall and period-specific QF measures. The greater the interval between current intake and the LDH-q drinking period, the lower the correlation. In particular, intake estimates for youth and young adulthood were poorly correlated with self-reports of current drinking. From adulthood on, correlations with current intake indices increased. Self-reports over periods overlapping with current intake, that is, "middle age" for persons no older than age 60 years and "elderly" for persons aged 61 years or older, showed the highest correlations. The correlations between current intake and mean lifetime intake were between 0.63 and 0.78.

Table 3: Test-retest reliability of the LDH-q,* excluding lifelong abstainers of alcohol, administered to study participants in the Netherlands, 1996-2001

	Men			Women		
Alcohol intake	No.	ICC*	95% CI*	No.	ICC*	95% CI*
Age at onset	984	0.21	0.15-0.27	779	0.52	0.46-0.57
First drinking period	1,014	0.60	0.56-0.64	850	0.61	0.57-0.65
Frequency						
Youth	913	0.48	0.43-0.53	703	0.42	0.36-0.48
Young adults	986	0.64	0.61-0.68	793	0.53	0.48-0.58
Adults	995	0.72	0.69-0.75	870	0.75	0.72-0.78
Middle age	994	0.78	0.75-0.80	865	0.79	0.76-0.81
Elderly	284	0.80	0.75-0.84	230	0.77	0.72-0.82
Quantity						
Youth	863	0.68	0.64-0.71	663	0.56	0.50-0.61
Young adults	929	0.75	0.72-0.78	734	0.62	0.57-0.66
Adults	949	0.72	0.69-0.75	803	0.57	0.52-0.61
Middle age	961	0.72	0.69-0.75	821	0.54	0.49-0.58
Elderly	277	0.77	0.72-0.82	223	0.50	0.40-0.59
Quantity × Frequency						
Youth	855	0.44	0.39-0.50	655	0.50†	0.45-0.56
Young adults	922	0.74	0.71-0.77	727	0.66‡	0.61-0.70
Adults	938	0.74	0.71-0.77	796	0.83‡	0.81-0.85
Middle age	955	0.73	0.70-0.76	814	0.79	0.76-0.81
Elderly	267	0.88	0.85-0.90	217	0.88	0.84-0.91
Total lifetime intake	**1,007**	**0.75**	**0.72-0.77**	**891**	**0.70**	**0.66-0.73**

* LDH-q, Lifetime Drinking History questionnaire; ICC, intraclass correlation coefficient; CI, confidence interval.

† After exclusion of one case whose data influenced the correlation coefficient by more than 0.10.

‡ After exclusion of two cases whose data influenced the correlation coefficient by more than 0.10.

Table 4: Spearman's correlation coefficients between current and past alcohol intake of study participants in the Netherlands, 1996-2001

	Current alcohol intake							
	Men				Women			
Past alcohol intake	QF-last-year*		Weekly recall		QF-last-year		Weekly recall	
	No.	r	No.	r	No.	r	No.	r
QF* Youth	743	0.20	696	0.20	351	0.23	303	0.17
QF Young adults	990	0.37	922	0.35	724	0.45	606	0.35
QF Adults	1012	0.67	940	0.62	791	0.68	667	0.56
QF Middle age ≤ 60 years† ≥ 61 years †	 748 299	 0.87 0.72	 700 274	 0.78 0.70	 616 216	 0.89 0.81	 509 181	 0.79 0.62
QF Elderly	321	0.87	292	0.81	240	0.93	199	0.76
Mean lifetime intake	1,102	0.66	1024	0.63	902	0.78	749	0.68

* QF-last-year, quantity-frequency index of alcohol intake in the last year, measured art baseline; QF, quantity-frequency index of alcohol intake per week.

† Age at baseline.

In table 5, the results of the comparison of the five drinking periods are shown. Two trends became apparent. First, correlations were lower between reports of drinking the further apart in time the reports were made. For example, the correlation between reports over the last period (elderly) and drinking during youth was as low as 0.07 for men. The correlations increased to 0.25, 0.56, and 0.80 for periods approaching current age (last row of table 5). Second, as age increased, the correlation between two adjacent, contiguous life periods increased. For example, the correlations on the diagonal in table 5 increased from 0.60 to 0.80 for men and from 0.54 to 0.88 for women.

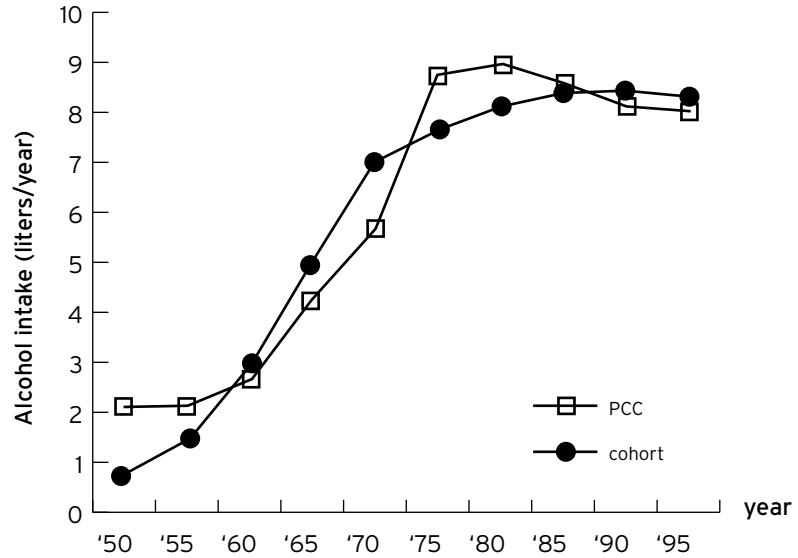
Table 5: Spearman's correlation coefficients between average weekly alcohol intake estimates for five different drinking periods in the Netherlands, 1996-2001

Drinking period	Drinking period							
	Youth		Young adults		Adults		Middle age	
	Men	Women	Men	Women	Men	Women	Men	Women
Young adults	0.60	0.54						
Adults	0.40	0.37	0.66	0.71				
Middle age	0.24	0.28	0.43	0.49	0.78	0.78		
Elderly	0.07	0.23	0.25	0.33	0.56	0.62	0.80	0.88

Per-capita intake

Figure 1 compares per-capita intake in the Netherlands (36) with mean intake in the cohort during the same years. The averages, in liters of alcohol consumed per capita, in the Dutch population and the cohort were similar, and they increased equally through the years. The same trends were found for age-specific intakes plotted against per-capita intake (data not shown).

Figure 1. Per-capita alcohol intake in the Netherlands (PCC) and mean alcohol intake in the study cohort (n = 3,255) (in liters of pure alcohol per year) between 1950 and 1995.



Discussion

The present study investigated the stability and validity of self-reports of lifetime drinking behavior in a self-administered questionnaire (the LDH-q). Correlation coefficients were used as indicators for test-retest reliability of self-reports of intake collected one year apart. Stability of self-reported lifetime intake was found to be reasonable: 0.75 for men and 0.70 for women. As expected, reliability of self-reported intake decreased as the reference period became further back in time, with the lowest ICCs of about 0.50 for intake during youth (12-18 years of age).

In the present study, men on average claimed to have started drinking about 2 years before women did and drank about twice as much as women. Both younger men and women tended to report a greater alcohol intake than the elderly during the same drinking period. This finding is consistent with the trend in per-capita intake in the Netherlands, which increased substantially from 2.1 liters of pure alcohol in 1955 to 9.4

liters in 1979 (36). Although comparable trends were found for mean alcohol intake and percapita intake, the composition of the populations differs. The cohort was a fixed population aging as time passed, whereas the age of the Dutch population was reasonably stable. On the other hand, differences in alcohol intake between age categories were small relative to the period effects, and all age categories showed a similar trend in intake between the 1950s and the 1990s (29). Such an increase in overall intake over the years could affect self-reports of alcohol intake, as was found by Simpura and Poikolainen (18). They reported a tendency by respondents to overestimate their intake of 18 years ago, suggesting a period effect caused by the large increase in per-capita intake in Finland during that period. Whether overestimation occurred in the present study could not be examined. However, if there was overestimation due to an increase in overall intake, one would not expect the trends in intake estimates for both populations to be so similar.

The reliability of reports of lifetime drinking behavior seemed slightly higher for men than for women. A possible reason might be the drinking pattern, which is less frequent and less regular among women (38), increasing the difficulty in remembering their intake. A similar memory effect may be present for reporting alcohol intake during youth because it concerns the distant past and is characterized by an irregular drinking pattern (39). Low test-retest correlations for intake during youth found in the present study were reported earlier for women (40) and veterans (20).

The LDH-q yielded low estimates of lifelong abstention. Only 1.2 percent of men and 6.0 percent of women could be identified as lifelong teetotalers. In earlier Dutch surveys, estimates of nondrinking usually were about 10 percent for men and 25 percent for women (27, 29, 41), as was also found in the QF-last-year in the present study (13.0 percent for men and 27.6 percent for women). This information could indicate that using nondrinking rates collected during normal drinking inquiries as indicators of lifelong abstention rates causes these rates to be overestimated.

The low correlation for age at onset may have been partly due to problems some people had in understanding the question correctly; some filled in their current age. When this problem occurred, it was corrected by taking the youngest age for the first drinking period. Doing so provided a noticeable increase in the test-retest correlation for men (from 0.21 to 0.60) and a small increase for women (from 0.52 to 0.61). The revised correlation for women was comparable to reliability estimates for age at onset with a test-retest interval of 5 years in an interview assessing lifetime drinking history (40). To prevent misunderstandings in the future, one could tie the question about age at onset closer to the drinking periods.

The ICCs for the frequency questions were lower than those for the open-ended quantity questions and the quantityfrequency weekly intakes. Here, a disadvantage of the ICC could have played a role. In general, the ICC tended to be higher the larger the variation was between subjects (34). Restriction of the variation, as was the case for the frequency question, will lower the ICC. However, the ICCs for mean lifetime intake in this study (0.75 for men and 0.70 for women) were comparable to results for the LDH interview formats, ranging from 0.70 to 0.93 (19-21).

The finding that correlations decreased with an increase in the interval between self-reports on drinking during two drinking periods and with an increase in the interval between drinking period and current intake indicates reasonable construct validity. However, recall of early drinking periods was comparatively poor in this study, which could have interfered with estimation of construct validity. The high correlations between current intake and reports for the most recent drinking period fell within the range of test-retest figures for normal current intake tests (15). There seemed to be no difference between men and women regarding this validity aspect.

The correlations between the summary measures for the most recent LDH-q drinking period and over the past year were higher than those between the weekly recall method and the LDH-q. Explanations for this difference may be the similar format of the QF methods and the fact that weekly recall is more sensitive to temporal fluctuations. One could argue that the moderately high correlation between current drinking estimates and lifetime intake estimates (between 0.66 and 0.78; table 4) would make use of the latter redundant. In an earlier study (25), computer simulations indeed showed that a J-shaped risk curve between a lifetime intake measure and some outcome could not be reproduced if the correlation between this measure and a current intake measure fell below 0.60. Values of more than 0.60 would not alter the finding reported in many epidemiologic studies of a J-shaped risk curve. However, a correlation of 0.70, although comparatively high, still leaves much variation unexplained ($R^2 \leq 0.49$). In addition, one should not ignore the possibility that the value of the correlations between lifetime and current intakes may well vary by drinking habits and over time.

Until the current study, data on lifetime alcohol intake were all collected by means of interviews. In large-scale population studies, interviews are not feasible, and self-administration is an alternative. A drawback of using a self-administrated questionnaire is the lack of control over the response situation, and lack of guidance, should a respondent fail to understand a question or a routing indication. A large number of respondents who did not complete particular sections of the questionnaire could point to high cognitive complexity. However, only six men and seven women did not complete the LDH-q on both occasions.

In conclusion, test-retest reliability of the LDH-q was within the range normally found for self-report measures of drinking. Construct validity checks, such as decreased correlations with increased time lag, seem to indicate that response effects remained within limits. Finally, the LDH-q yielded results comparable to those for interview measures of lifetime drinking. For studies in which the effects of alcohol are cumulative rather than substitutive, assessment of lifetime exposure is necessary. In such cases, the LDH-q seems a suitable measure.

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chapter 6

coping style

Coping style mediates impact of stress on alcohol use: a prospective population based study

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Abstract

Aims

This study examines the relationship between stressful life events and alcohol use in a longitudinal cohort study, and investigates whether gender, coping style and social support modify this relationship.

Design, setting and participants

Data analysed in this paper come from a sample of 1608 men and 1645 women drawn randomly from the cohort known as the Dutch Lifestyle and Health Study, consisting of 16 210 men and women aged 45-70 years, who were followed-up for 4 years (1996-2000).

Measurement

Alcohol use (recent and in the more distant past), occurrence of threatening life events, coping style (action, cognitive and emotion coping), social support (perceived, actual support and social contacts) and other potential confounding factors were assessed with five annual self-administered questionnaires. The data were analysed with a mixed-effects modelling technique, controlling for interactions with time and gender.

Findings and conclusion

An interaction effect was found between experiencing a negative life event and emotion coping on alcohol use. A positive relationship was found between the occurrence of negative life events and alcohol use in subjects scoring high on emotion coping, and a negative one among subjects scoring low on emotion coping. Cognitive coping, action coping, actual support, social contacts and gender did not modify the relationship between life events and alcohol use. However, having a more cognitive coping style or more social contacts was associated with a lower level of alcohol use, whereas having an action coping style and receiving more actual social support was associated with a higher drinking level. It seems plausible that people scoring high on emotion coping, characterized by a passive, resigned, indulgent and self-accusatory coping style, increase their alcohol use after experiencing a negative life event.

Introduction

Tension reduction is considered to be an important motive for using alcohol (1, 2). Alcohol use is often used to relieve distress caused by stressful situations, and feelings of stress may become important triggers for alcohol use. In their reviews, Greeley & Oei (3) and Sher (4) concluded that alcohol indeed has potent stress-dampening, or stress-buffering effects, but variation in effects for different types of stressors and large individual differences diffuse the picture (5). Sher (4) has argued that the extent to which alcohol use dampens the response to stress is determined not only by the direct pharmacological effects of alcohol, but also by a variety of contextual and psychological factors. Pohorecky (6) supported this argument, and found that both prospective and retrospective studies generally support an effect of stress on alcohol use.

Threatening life events are among the most potent contextual stressors, and research has focused on the contingent effect of such life events on alcohol abuse and addiction (5), particularly in clinical populations (7). Little research is known in which the potential impact of stressful experiences and alcohol use in non-clinical populations has been studied. The focus of the present study is not on alcohol abuse as such, but on alcohol use in the general population. In reviewing the literature on life events in relation to alcohol use in the general population, it has been found that negative life events affect alcohol use in the general population; however, the direction of the effect is not unequivocal (8). In particular, when these events are operationalized into separate categories (e.g. health-related events) some are found to be related with an increase, others with a decrease in the use of alcohol. It may well be that effects of specific negative life events may cancel each other out when combined in a summarized measure. The use of separate or categorized life events would thus be preferable.

Most studies on the impact of life events on alcohol use base their findings on cross-sectional study designs, which creates the problem of causal interpretation (6, 7). It may be contended that heavy drinking itself causes negative life-experiences in drinkers. This underscores the need for studies with a longitudinal design, which are better suited to disentangle possible reciprocal effects between life events and alcohol use.

As described in the review by Veenstra et al., (8), stressful life events have an impact on drinking, but this effect may be buffered by third factors. The buffering hypothesis posits that the impact of life events on alcohol use may differ if resources for dealing with stress (for example, coping style or social support) are available. Subjects reporting low levels of social support might consume alcohol to relieve their stress after experiencing a negative life event, whereas those with ample social resources would be less likely to use alcohol in such an instrumental way. Glass et al., (9) found that the impact of life events was dependent upon drinking. Heavy drinkers showed a larger (proportional) decrease in consumption in response to health-related life events, and a smaller (proportional) decrease in reaction to life events related to spouse, friends or relatives. This implies an interaction effect with subject's drinking history.

This study examines longitudinally the relationship between negative life events and alcohol use. To make a correct estimation of the effect of negative life events on alcohol use, it seems important to specify a model that includes possible modifying factors such as gender, social support and coping resources, as

well as baseline consumption. In this study five main research questions are addressed: (i) do individuals with a history of drinking heavily have a higher probability of experiencing threatening life events than moderate drinkers; (ii) what is the relationship between experiencing life events and alcohol use over a period of five years; (iii) does social support and/or coping style modify the relationship between life events and alcohol use; and (iv) does type of life event make a difference? This is investigated by analysing not only a summative measure but also subscales. (v) Are there gender differences in the relationships specified above?

Methods

Design and population

The Lifestyle and Health Study (LEGO) is a prospective cohort study on cardiovascular disease in the general Dutch population of men and women aged 45-70 years. The LEGO study started in 1996 with a baseline questionnaire, followed by four annual follow-up questionnaires. The registries of general practitioners (GPs) were used as the sampling frame. Coverage of the target population is high, as the GP is the gatekeeper in the Dutch health-care system, and almost all people are registered with a GP (10, 11).

The study design, using only coded and non-directly identifiable data, was approved by the review committee of the Registration Network Family Practice of the University of Maastricht. Of the ca. 31 000 subjects, 51.7% responded to the mailed questionnaire (12). The data in this paper come from a sample of 1608 men and 1645 women, drawn randomly from the respondents at baseline.

Measures

Life events

The 12 most frequently occurring and (moderate to severe) threatening life events were measured with the List of Threatening Experiences (LTE) (13). At baseline, subjects were asked about experiences of negative life events in the preceding 24 months. At the follow-up measurements the reference period was the past 12 months. In this study the focus is on the sum of all reported negative life events, and on four subscales of negative life events. The sum of all life events has a minimum score of no events (0) versus a maximum of 12 events (Cronbach's alpha 0.56). Because the occurrence of more than four events was rare, the sumscore of negative life events was divided into four categories (0, 1, 2, 3 or more). Analysis of the structure of the scale regarding clusters of negative life events was performed, because the type of negative life events may have a differential effect on alcohol use. In the present study, principal component analysis (PCA) has led to the construction of four subscales of the following categories of events: (i) illness or bereavement (four questions: for example, illness to subject or a relative, or death of a relative) (Cronbach's alpha 0.44); (ii) employment problems (two questions: for example, unemployed or became unemployed) (Cronbach's alpha 0.77); (iii) spousal or relational problems (two questions: for example, separation due to marital difficulties) (Cronbach's alpha 0.61); and (iv) social problems (four questions: for example, major financial crisis, or problems with police) (Cronbach's alpha 0.41).

Alcohol use

Usual alcohol consumption in the past year was assessed with a quantity-frequency type questionnaire at all five moments, separately for beer, wine and spirits. The beverage-specific week consumptions were added up to a total week consumption. At baseline, life-time intake was measured by the Lifetime Drinking History questionnaire (LDH-q), a validated self-administered questionnaire about alcohol intake since the first glass drunk (14, 15). The LDH-q consists of reports over five age periods, comprising youth (aged 12-18 years), young adulthood (aged 19-27 years), adulthood (aged 28-44 years), middle age (aged 45-60 years) and old age (aged ≥ 61 years).

Stress moderating factors

Social support in the past 12 months was measured with a validated Dutch social support scale, the Inventory for Social Reliance (De Inventarisatielijst Sociale Betrokkenheid (ISB)) (16). The ISB measures qualitative aspects of social support, and consists of three scales: perceived support (five items), actual support (three items) and social contacts (two items). Cronbach's alpha for the perceived support scale, actual support scale and social contacts scale in the present study were, respectively, 0.87, 0.75 and 0.74.

Coping style was measured using the self-administered questionnaire version of a validated German questionnaire, the Bernese Coping modes (Berner Bewältigungsformen (BEFO)) (17), which was translated into Dutch for the LEGO study. This instrument consists of 30 questions about coping style, with crisis situations (such as illness, divorce or losing a job) grouped into three dimensions: action coping (10 items), cognitive coping (11 items) and emotion coping (seven items). Cronbach's alpha for the action coping scale, cognitive coping scale and emotion coping scale in the present study were, respectively, 0.61, 0.63 and 0.45. (overall Cronbach's alpha was 0.79).

Possible confounders

Besides marital status, whether or not a respondent was living together with a partner was also assessed. These two questions were combined and dichotomized into respondents who were married or living together with a partner, versus respondents not married or living alone.

Income, put into four categories (less than €1450; €1450 up to €2085; €2085 or more; and unknown), and level of education into four categories (low; middle; high; and unknown) were also considered as possible confounders.

Statistical analysis

Cross-sectional analysis

To test whether subjects with a history of heavy drinking might have a higher probability of experiencing life events linear regression analysis was performed, with gender and age as covariates. In order to investigate possible differences in the effect of alcohol use on the probability of experiencing life events between men and women, five 'alcohol use and gender' interaction effects were added to the regression analysis,

one for each age period of the LDH-q. Dependent variable was the number of life events experienced during the 2-year reference period before the start of the study, and independent variables were average drinking levels in the age periods specified by the LDH-q.

Longitudinal analysis

Multi-level analyses, using linear mixed-effects modelling in SPSS, were used to investigate the longitudinal relationship between life events and alcohol use. Observations within an arbitrary subject over time are correlated in longitudinal studies. Multi-level analysis is a suitable technique for the analysis of longitudinal data, as it accounts for the dependency of the observations within subjects. In linear mixed-effects modelling this dependency can be accounted for by allowing the regression coefficients to vary between subjects. First, the covariance structure of the complete model was assessed using restricted maximum likelihood (REML). After the covariance structure was assessed, the final model was developed by using the backward method (18).

The original sample at baseline consisted of 1608 men and 1645 women. Based on the LDH-q and on the questions from the quantity-frequency questionnaire about last year measured at the follow-up measurements, 145 subjects (121 men and 24 women) were considered to be life-long abstainers, and were excluded from the longitudinal analysis. People with missing data at baseline on life events, alcohol use, social support and coping were also excluded from the longitudinal analysis, leaving 2399 subjects (1123 women and 1276 men) for the longitudinal analysis. Separate analyses were conducted using sum of life events and the four subscales of the LTE as a predictor of mean alcohol use.

With the α level set at 0.05, the least significant interaction with a P-value greater than 0.05 was excluded manually from the model (following the backward method). In order to test for a difference in effect of life events over time and differences in effect between men and women over time, the interaction terms 'life events and time' and 'gender and time' were left in the equation regardless of whether or not they were statistically significant. Similarly, the interaction between life events and gender was left in the equation for the purpose of estimating the differential effect of life events on alcohol use for men and women. Besides these three interaction effects, the following variables were also left in the model in order to answer the research questions: time, life events and gender. After all non-significant interaction effects (except for the aforementioned interactions) were excluded from the model, the least significant variable with a significance level greater than 0.05 was excluded manually from the model (except for time, life events and gender) until a model with the above-mentioned interactions and variables and statistical significant variables remained.

Results

Basic data

Mean alcohol use at baseline was 11.9 glasses per week for men and 5.1 glasses per week for women. Differences in mean alcohol use between baseline and follow-up measurements were very small (Table 1).

Table 1: Average alcohol use (in glasses per week) for men and women in 5 consecutive years, as measured with the Quantity-Frequency questionnaire about last year's drinking

	Measurement 1		Measurement 2		Measurement 3		Measurement 4		Measurement 5	
	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n	Mean (SD)	n
Men	11.9 (12.9)	1458	11.9 (13.2)	1015	12.5 (13.0)	960	12.1 (13.0)	920	12.8 (13.9)	789
Women	5.1 (8.0)	1427	4.7 (7.5)	957	5.5 (8.9)	893	5.8 (9.0)	828	5.5 (8.9)	756

On average, about half of all subjects experienced a negative life event in a follow-up year. Because the reference period at baseline extended over 2 years, the number of subjects who experienced a life event was higher at baseline (67% and 68% of the men and women, respectively). Looking at the four subscales, illness or bereavement events were experienced most frequently (Table 2).

Table 2: Numbers and percentage of men and women reporting life events in the past two years (measurement 1) and past year (measurement 2-5) on the LTE

	Measurement 1		Measurement 2		Measurement 3		Measurement 4		Measurement 5	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Men										
Missing life events	62	(3.9)	435	(27.1)	524	(32.6)	582	(36.2)	713	(44.3)
Sum of life events										
0	512	(33.1)	586	(50.0)	516	(47.6)	429	(41.8)	460	(51.4)
1	432	(27.9)	306	(26.1)	300	(27.7)	297	(28.9)	242	(27.0)
2	292	(18.9)	174	(14.8)	167	(15.4)	190	(18.5)	119	(13.3)
>3	310	(20.1)	107	(9.1)	101	(9.3)	110	(10.7)	74	(8.3)
Subscale scores of life events scale										
Illness or bereavement										
Experienced an event	844	(54.6)	461	(39.3)	454	(41.9)	509	(49.6)	365	(40.8)
Spousal or relational problems										
Experienced an event	50	(3.2)	28	(2.4)	22	(2.0)	21	(2.0)	24	(2.7)
Employment problems										
Experienced an event	181	(11.7)	91	(7.8)	65	(6.0)	54	(5.3)	43	(4.8)
Social problems										
Experienced an event	379	(24.5)	184	(15.7)	171	(15.8)	164	(16.0)	113	(12.6)

	Measurement 1		Measurement 2		Measurement 3		Measurement 4		Measurement 5	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Women										
Missing life events	56	(3.4)	465	(28.3)	534	(32.5)	601	(36.5)	743	(45.2)
Sum of life events										
0	498	(31.3)	509	(43.1)	514	(46.3)	407	(39.0)	412	(45.7)
1	438	(27.6)	355	(30.1)	330	(29.7)	306	(29.3)	252	(27.9)
2	308	(19.4)	203	(17.2)	156	(14.0)	199	(19.1)	156	(17.3)
>3	345	(21.7)	113	(9.6)	111	(10.0)	132	(12.6)	82	(9.1)
Subscale scores of life events scale										
Illness or bereavement										
Experienced an event	963	(60.6)	526	(44.6)	505	(45.5)	570	(54.6)	422	(46.8)
Spousal or relational problems										
Experienced an event	61	(3.8)	27	(2.3)	25	(2.3)	23	(2.2)	20	(2.2)
Employment problems										
Experienced an event	164	(10.3)	96	(8.1)	53	(4.8)	45	(4.3)	35	(3.9)
Social problems										
Experienced an event	365	(23.0)	213	(18.1)	163	(14.7)	143	(13.7)	128	(14.2)

Drinking history and occurrence of life events as measured at baseline

The outcome of the linear regression, testing whether a history of drinking heavily predicts the number of life events experienced at baseline (reversed causation), did not reveal a statistically significant interaction effect between alcohol use and gender. It was found that a higher mean alcohol use in the most recent age period of the LDH-q was associated with the number of life events experienced in the 2-year reference period measured at baseline. Adding drinking data from more distant (younger) age periods to the model did not lead to model improvement. Thus, the impact of drinking history does not appear to be very large. In effect, an increase in mean alcohol use of 10 glasses per week was associated with a 6% higher LTE score (data not shown).

Dropouts and intermittent missing data

Logistic regressions revealed no relationship between the principal outcome variable in the multi-level analysis (alcohol use) or one of the predicting variables (life events, age, and gender), on one hand, and dropping-out and intermittent missing data on the other hand (data not shown). Based on this analysis, one could assume that missing data occur completely at random (MCAR).

Multi-level analysis

Interaction effects of coping style in the random intercept model 1: life events sumscore as a predictor of alcohol use

The random intercept model, with alcohol use as dependent variable and sum of life events as predictor, showed a significant interaction effect between the sumscore of life events and the score on emotion coping, which is presented graphically in Fig. 1. In summary, the result implies that among those who score high on emotion coping, subjects who experience three or more life events have a higher mean alcohol use compared with subjects who do not experience a life event. Among those who score low on emotion coping, subjects who experience no life events have a higher mean alcohol use compared with subjects who experience three or more life events.

Interaction effects of coping style in the random intercept model 2: life events subscales as predictors of alcohol use

The random intercept model with alcohol use as dependent variable and the scores on subscales of life events as predictors showed a significant interaction effect only between the scores on subscale illness or bereavement and emotion coping, which is presented graphically in Fig. 2. This is comparable to the interaction between the sum of life events with emotion coping. In summary, the result implies that among those scoring high on emotion coping, subjects who experience an illness or bereavement event report a higher mean alcohol use compared with subjects who do not experience such an event. Among those who score low on emotion coping, subjects who do not experience an illness or bereavement event report a higher mean alcohol use, compared with subjects who experience such an event. The other subscales of life events were found not to be statistically significant predictors of mean alcohol use.

Main effects of coping style and social support in models 1 and 2

Because other outcomes for the model with the sumscore of life events (model 1) and the model with subscale scores of life events (model 2) were comparable, they will be described jointly in the following paragraphs.

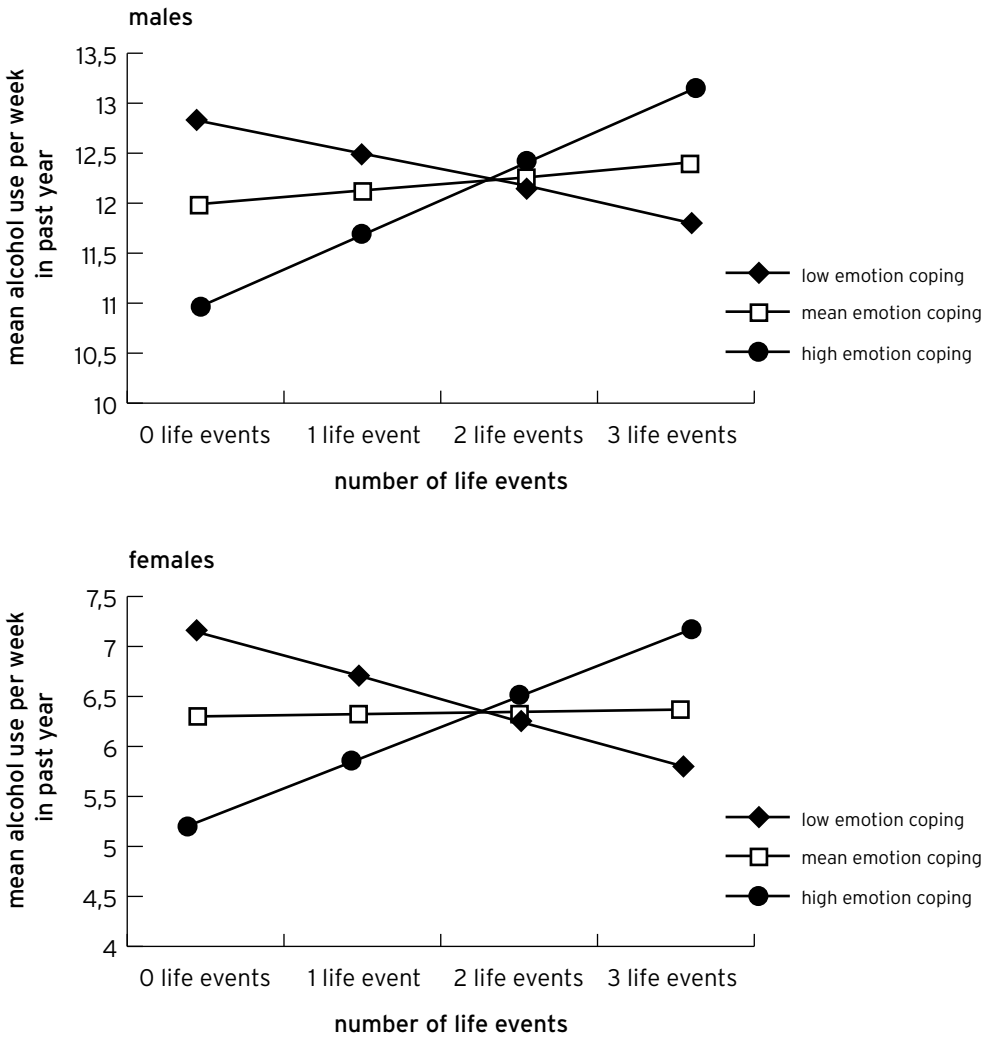
Action coping and cognitive coping were found not to modify the relationship between life events and mean alcohol use. Scoring high on action coping was associated generally with a higher alcohol use, whereas scoring high on cognitive coping was associated with a lower alcohol use.

Scoring high on actually received social support was associated with a higher alcohol use, whereas scoring high on social contacts was associated with a lower alcohol use. Both measures of social support were found not to modify the relationship between life events and alcohol use. Perceived support was not associated significantly with mean alcohol use, and was dropped from the final model.

Effects of gender in models 1 and 2

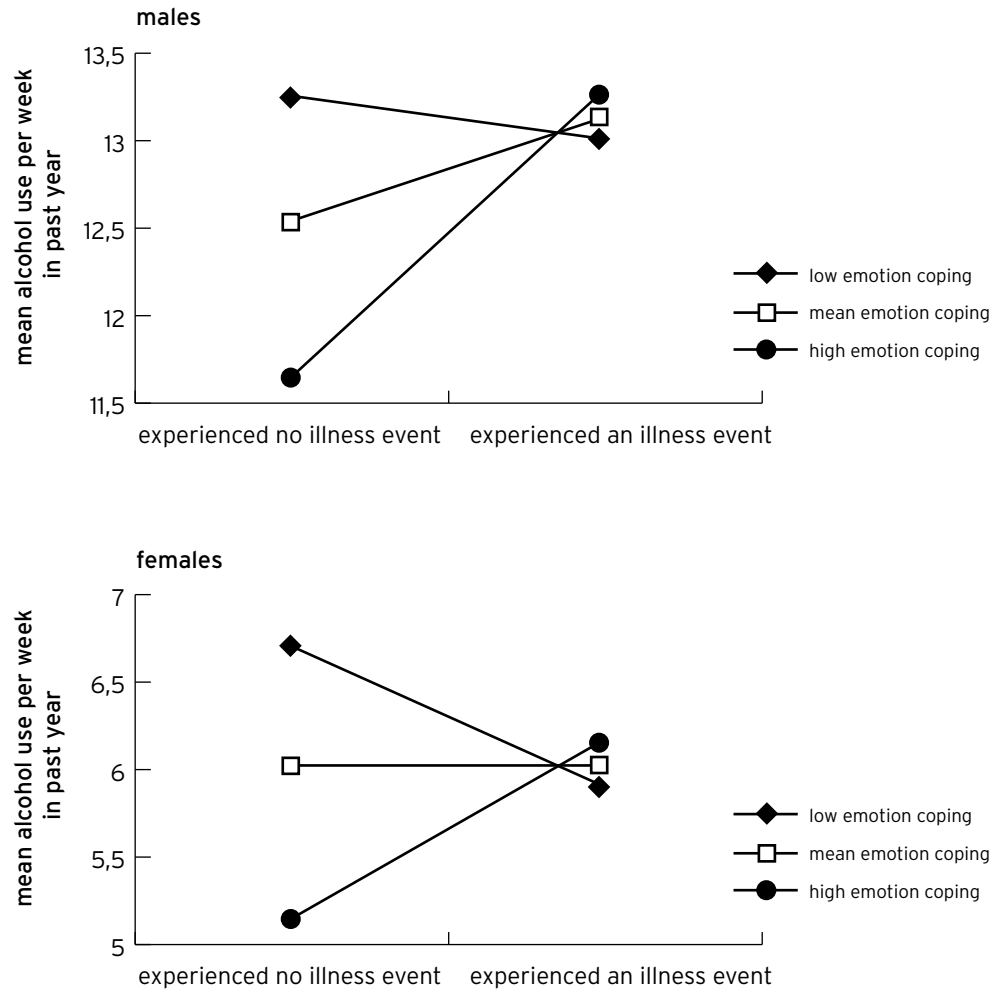
As expected, men generally have a higher mean alcohol use thanwomen, yet no significant interaction was found between gender and life events.

Figure 1: Model-based estimates* of mean alcohol use per week in past year, with number of life events as predictor, for three categories of emotion coping, males and females



* The random intercept model with alcohol use as dependent variable and number of life events as predictor contained also the following covariates: Gender, actual social support, social contacts, action coping, cognitive coping, emotion coping, time, income, drinking status at baseline, interaction between life events and gender, interaction between life events and emotion coping, interaction between gender and time, and interaction between life events and time.

Figure 2: Model-based estimates* of mean alcohol use per week in past year, with illness or bereavement as predictor, for three categories of emotion coping, males and females



* The random intercept model with alcohol use as dependent variable and the subscales of life events as predictors, contained also the following covariates: Gender, actual social support, social contacts, action coping, cognitive coping, emotion coping, time, income, drinking status at baseline, interaction between illness or bereavement and gender, interaction between employment problems and gender, interaction between spousal or relational problems and gender, interaction between social problems and gender, interaction between illness or bereavement and emotion coping, interaction between gender and time, interaction between illness or bereavement and time, interaction between employment problems and time, interaction between spousal or relational problems and time, and interaction between social problems and time.

Discussion

The main finding was that emotion coping can be regarded as a vulnerability factor in the relationship between life events and alcohol use in a longitudinal design. Subjects scoring high on emotion coping increase their alcohol use after experiencing a negative life event, and subjects scoring low on emotion coping decrease their alcohol use after experiencing a negative life event. Scoring high on action coping was associated generally with higher alcohol use, whereas scoring high on cognitive coping was associated with lower alcohol use. Scoring high on actual support was associated with higher alcohol use, whereas scoring high on social contacts was associated with lower alcohol use. Action coping, cognitive coping, actual support and social contacts were found not to have a modifying function in the relationship between life events and alcohol use. Men reported a higher mean alcohol use, but no differences were found in the relationship between life events and alcohol use between men and women.

The coping styles as measured in the present study are indicators of how a subject attempts to deal with psychosocial crises. In the present study, a coping style which focuses on feelings and emotional content as a strategy to deal with life events was found to be a vulnerability factor, in that it leads to higher consumption. This finding is in accordance with a previous study from Cooper et al., (19). It remains an open question as to why individuals with an emotion-orientated style of coping, characterized as passive, indulgent, resigned and self-accusatory when facing hardships, increase their consumption. More qualitative studies, or data on drinking motives or expectancies, are needed to see whether alcohol is actually used as a means to relieve stress and feel better.

Contrary to expectations and to the findings of Cooper et al., (19), none of the indicators of social support was found to modify the relationship between life events and alcohol use; nor was perceived social support, indicating availability of emotional support by others when needed, associated with drinking in the study. The other indicators of social support were found to be confounders in the relationship between life events and alcohol use. Actual received social support was associated positively, whereas frequent social contacts were associated negatively with alcohol use. Both indicators correlated only moderately ($r = 0.37$). Actual received social support refers to the degree of confidentiality in social relationships and the opportunities subjects have to be intimate with someone, and it may be indicative of a higher emotional quality of the social relationships or a greater strength of the ties in the subject's social network. It may well be that the higher consumption among those receiving more actual support is the result of a functional use of drinking, as drinking is generally thought to facilitate social communication. This motivational explanation is, however, in contrast to Skog's sociological theory that social integration implies better regulation and control of drinking (20). More in line with this idea, assuming that fewer social calls are indicative of social isolation, is the result that the more isolated subjects in the current sample drink more heavily. In the same paper, however, Skog complicates matters by presenting evidence for a J-shaped relationship of social isolation and consumption, with abstainers and heavy drinkers sharing higher levels of social isolation. Other studies have come to similar conclusions (21, 22). The data in the current study are insufficiently detailed for a decisive test for either a motivational or sociological explanation.

When looking at the relationship between the scores on the subscales of life events and alcohol use, one can observe only a significant effect for illness or bereavement events. The hypothesis that the effect of specific negative life events may cancel each other out when combined in a summarized measure could not be confirmed in the present study. One of the reasons might lie in the absolute number of events in the four subscales. Illness- or bereavement-related events were experienced by a large proportion of the sample (between 40% and 50%). The other subscales, employment problems (between 5% and 12%), spousal or relational problems (between 2% and 3%) and social problems (between 13% and 25%), were experienced less frequently. The relatively low frequency may be responsible for statistical non-significance in predicting change in alcohol use. Although not significant, the direction of the effects differed between the subscales. Social problems had a positive regression coefficient, while the other subscales had a negative regression coefficient. Indicative of the more than average contribution of the illness or bereavement subscale to the sumscore in subjects aged 45 years and older, the direction of the effect on alcohol use was similar to that of the sum of life events. Generalization to younger age categories may be limited.

From the review by Veenstra et al., (8), it became apparent that life events had a different impact on the drinking behaviour of men and women. For example, Glass et al., (9) found men to bemore reactive to difficulties in life areas related to work and personal finances and express their distress in alcohol or drug use, whereas women are more responsive to life events occurring in their social network, and tend to express their distress more with symptoms of depression and anxiety. The present study cannot replicate the latter findings, as data on depression and anxiety are lacking. Regarding alcohol use, and contrary to the findings of Glass et al., (9), no differences between men and women were found in the relationship between life events and alcohol use. Age composition of the sample with a relatively large contribution of illness- or bereavement-related events and low statistical power due to low incidence of other events are a probable cause for the lack of gender effects.

It was found that a high average alcohol use in the period before baseline was associated with experiencing life events in the 2 reference years before the start of the study. Apparently, overall drinking pattern affects the individual's vulnerability to negative life experiences. To some, this may even appear to be an understatement. Although the effect was small, the result suggests that there is also a reverse course in causation: drinking is not only affected by stress, but drinking could also be instrumental in causing adverse life events. The results in this study are suggestive of an increase in consumption after experiencing a life event by people scoring high on emotion coping but this may, strictly speaking, be an over-interpretation. The observational design and analysis in this study does not permit causal inferences. A limitation here is that consumption and life events have been measured at the same time, and covered the same reference period. More specific data on temporal contingency between life events and consumption would add to the plausibility of the conclusion that people react to negative life events with a change in drinking. This would imply recording of both events and consumption on a continuous basis, with short time-periods. An example of such a technique is the so-called 'experience sampling method', a time-sampling technique. It is, however, difficult to implement in a population study. The present study, even while not providing full proof, makes plausible that alcohol use changes after experiencing life events, the direction of which is depending on the person's coping style.

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chapter 7

Impact of life events on cardiovascular disease is not modified by alcohol use, coping, or social support

Submitted as:
Marja Y Veenstra, Paul HHM Lemmens, Frans ES Tan, Ingrid HM Friesema, Henk FL Garretsen, J André Knottnerus, Paul J Zwietering. Impact of life events on cardiovascular disease is not modified by alcohol use, coping, or social support.

Abstract

Objective

To prospectively examine the relationship between negative life events and cardiovascular disease, and to examine if alcohol use, coping style and social support modify this relationship. Both alcohol use and social support have been put forward to modify the negative impact of stress on coronary heart disease. If so, these factors could offer an additional explanation for the J-shaped risk curve in studies on alcohol use and coronary risk.

Methods

Prospective cohort study among a sample of 3253 men and women drawn randomly from the Dutch Lifestyle and Health Study, consisting of 16,210 people aged 45-70 years, who were followed-up annually for 5 years. Medical information was derived from general practice registries. Occurrence of negative life events in the year previous to the cardiovascular event, alcohol use (recent), coping style, social support, and potential confounding factors were assessed with 5 annual self-administered questionnaires. Data have been analysed with multiple logistic regression analysis.

Results

The relationship between life events and cardiovascular disease was not modified by alcohol use, coping style, or social support. It appeared that women have a higher risk for a cardiovascular event within one year after experiencing one or more life events, while among men this association is reversed (respectively 3.39 and 0.73 within drinkers of 1-14.9 glasses/week).

Conclusions

No evidence was found that a stress buffering effect of alcohol use, coping style, or social support could offer an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease.

Introduction

Stress is a risk factor for coronary heart disease (CHD) (1). There are several possible biological mechanisms connecting psychosocial stressors to CHD (2-4). The body reacts to stress by creating a state of alertness, by releasing catecholamines and corticosteroids, and by increasing the heart rate and blood pressure. An increase in heart rate and blood pressure promotes damage to the endothelium, which makes it more susceptible to inflammation and lipid deposits. Stress has also been found to be linked to changes in processes relevant to clotting processes (hemostatis and thrombosis), such as coronary vasoconstriction, platelet aggregation, or plaque rupture. And stress is found to be related to the development of the metabolic syndrome and insulin resistance (2-4).

Psychosocial stress can be operationalized in different ways. Divisions can be made in objective stressors, and stress as perceived by a person, and between the acute or more chronic nature of stress. In this study, it is operationalized as experiences of negative life events, such as death of a spouse and loss of employment, being more objective and acute stressors. Life events have been found to be CHD triggers (3, 5). In case-control studies investigating this particular relationship, it was found that people who experienced a myocardial infarction reported more stressful life events in the preceding period than controls (6-8). A disadvantage of case-control studies is both the recall bias and the impossibility to interpret the observed association as causal. It is possible that cases have not experienced more life events, but recall more events because they search for a possible cause for their heart attack, and attach a meaning to life events in the process, which could lead to selective recall or interpret events as more upsetting. In order to overcome recall bias, and investigate causality, it is preferable to investigate the relationship between life events and CHD in a prospective study.

The relationship between alcohol use and CHD is mostly described as J-shaped or U-shaped with a higher risk for non-drinkers and heavy drinkers, and a lower risk for moderate drinkers (9). Several possible biological mechanisms have been brought forward to explain the beneficial effects of moderate alcohol use (10, 11). Positive effects of alcohol use are increase in high-density lipoprotein cholesterol, to reduce blood clotting and platelet aggregation, to decrease insulin resistance and increase insulin sensitivity, to reduce plasma homocysteine levels, to increase paraoxonase activity, and raising oestrogen levels. Negative effects of increased alcohol use are an increase in blood pressure and damage to myocardial tissue. As outlined above, stress has been shown to have a negative impact on CHD risk, some along similar pathways. Little is known, however, about the relationship between stress and alcohol use in their effects on CHD risk.

The impact of stress on CHD might be modified by lifestyle, such as alcohol consumption (2, 12). It was hypothesized that alcohol has potent stress-dampening or stress-buffering effect, and might thus modify the negative effects of stress (13, 14). It appeared that among moderate drinkers the relationship between life events and depression was weaker than among either abstainers or heavy drinkers (15, 16). From a review (17) it was concluded that stressful life events indeed have an impact on drinking, but that this effect is expectedly buffered by third factors. The impact of life events on alcohol use appears to differ if other resources for dealing with stress (for example, social support and/or coping style) are available.

Social support has been found to play an important role in the development and progression of CHD, even though the specific mechanisms are not fully clear (3). People scoring high on emotion coping increased their alcohol use after experiencing a negative life event (18). If alcohol use indeed modifies the effects of stress, one could hypothesize that non-drinkers would lack this possibility to alleviate stress, and are more vulnerable for the negative effects of stress. Since moderate drinkers are often found to benefit from their drinking, the stress buffering effect of alcohol could offer an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease or mortality.

In the present study, it will be investigated if alcohol use, coping style, and/or social support modify the relationship between life events and cardiovascular disease. This study uses five repeated assessments of alcohol use and life events, allowing a prospective assessment of the relationship between negative life events and non-fatal and fatal cardiovascular disease, avoiding recall bias and limiting the time period between life events and cardiovascular disease to a maximum of one year. Three main research questions are addressed: (1) Does experiencing a life event lead to a higher risk of getting a non-fatal and fatal cardiovascular disease? (2) Does alcohol consumption modify the relationship between life events and non-fatal and fatal cardiovascular disease? (3) Does social support and/or coping style modify the relationship between life events and non-fatal and fatal cardiovascular disease?

Methods

Design and population

The Lifestyle and Health Study (LEGO) is a prospective cohort study on cardiovascular disease in the Dutch general population of men and women aged 45 to 70 years. The cohort was established in June 1996 using databases from 34 general practices spread over two regions in the south-eastern and western part of the Netherlands. Practices were recruited by Regional Services for Public Health. Coverage of the target population is high, since the general practitioner (GP) is the gatekeeper in the Dutch health care system, and almost all people are registered with a GP (19, 20).

In June 1996, the baseline questionnaire was sent to all men and women aged between 45 and 70 years registered with these 34 practices. Terminal patients, patients with severe dementia, patients with learning difficulties, and institutionalized patients were excluded in advance. Of the ca. 31,000 subjects 51.7% responded to the baseline questionnaire (21). Informed consent was obtained in a letter presenting the questionnaire. The participants were followed up until June 2001, and received a follow-up questionnaire each year between 1997 and 2000. A nonresponse analysis did not reveal differences in demographic variables between respondents and nonrespondents (21). However, respondents had slightly more often pre-existing CHD than nonrespondents, and also had a lower mortality risk during follow-up.

The data in this paper come from a sample of 1608 men and 1645 women, drawn randomly from the respondents at baseline. The study protocol was approved by the review committee of the Registration Network Family Practice of the Maastricht University.

Measures

Cardiovascular events

Patient medical information was obtained through the GPs, who filed all relevant health problems of the past and during the follow-up period (from July 1996 to June 2001) on a so-called problem list, which is an essential part of the medical record (22). Health problems were categorized according to the ICPC-codes (International Classification of Primary Care) (23).

Incident cases of cardiovascular events (fatal and non-fatal) occurring in the follow-up period, were derived from the problem lists and were reported by the GPs. Cardiovascular events on the problem lists were specified as CHD (ICPC-code K74 or K75 or K76), heart failure (K77) and/or stroke (K89 or K90). All myocardial infarctions and all deaths occurring in the follow-up period were reported by the GPs to the research team as soon as possible after presentation. Cause of death was reported by the GP using nine main categories: myocardial infarction, other cardiac deaths, stroke, other vascular deaths, cancer, infection or autoimmune diseases, violence or accident, suicide, and other or unknown causes. Of these nine categories, fatal myocardial infarctions, other cardiac deaths, fatal stroke and other vascular deaths were included in the cardiovascular events. Discrepancies between problem lists and reports were traced and resolved with the GPs. A more detailed description of how the medical information was obtained and how the quality was checked is described elsewhere (21, 24).

Life events

The 12 most frequently occurring and negative life events were measured with the "List of Threatening Experiences" (LTE) (25). At baseline subjects were asked about experiences of negative life events in the preceding 24 months. At the follow-up measurements the reference period was the past 12 months. Items inquired about, for example, a death of a close friend, separation due to marital difficulties, or a major financial crisis. In this paper the focus is on the sum of all reported negative life events. The sum of all life events has a minimum score of no events (0) versus a maximum of 12 events. Because the occurrence of more than 4 events was rare the sumscore was divided into four categories (0, 1, 2, 3 or more). Because of the limited number of people experiencing a cardiovascular event, life events were dichotomized in the multivariate analysis into "experienced no life events" versus "experienced one or more life events" in the year previous to the cardiovascular event.

Alcohol use

Usual alcohol consumption in the past year was assessed with a Quantity-Frequency type questionnaire at all five measurements, separately for beer, wine, and spirits. The beverage-specific week consumptions were added up to a total week consumption, and divided into three categories: non-drinkers and drinkers of < 1 glass/week; drinkers of 1-14.9 glasses/week; and drinkers of ≥ 15 glasses per week.

Social support

Social support in the past 12 months was measured with a validated Dutch social support scale, the Inventory for Social Reliance (De Inventarisatielijst Sociale Betrokkenheid, ISB) (26). The ISB measures

qualitative aspects of social support, and consists of three scales: perceived support (five items), actual received support (three items) and social contacts (two items). Cronbach's alpha for the perceived support scale, actual support scale, and social contacts scale in the present study were considered reasonable at 0.87, 0.75, and 0.74, respectively.

Coping style

Coping style was measured using the self-administered questionnaire version of a validated German questionnaire, the Berne Coping Forms (Berner Bewältigungsformen, BEFO) (27), which was translated into Dutch. This instrument consists of 30 questions about coping style with crisis situations (such as illness, divorce, or loosing a job), grouped into three dimensions: action coping (10 items), cognitive coping (11 items), and emotion coping (seven items). Cronbach's alpha for the action coping scale, cognitive coping scale, and emotion coping scale in the present study were 0.61, 0.63, and 0.45, respectively.

Other potential confounders

Other potential confounders were, age (five categories), gender, body mass index (continuous), smoking indicated as pack years (non-smokers, categorization of number of pack years in quartiles and a category missing), physical activities (categorization in quintiles and a category missing), and diagnosed with CHD in the past. To prevent that people who had only a missing on pack years and/or physical activities dropped from the analysis the missings for these two potential confounders were included in the analysis.

Statistical analysis

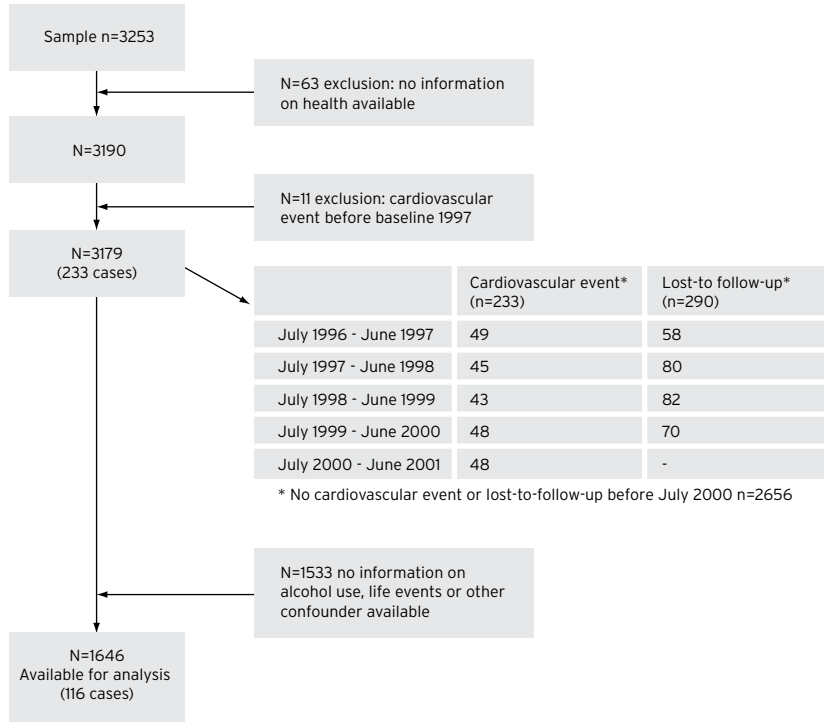
The effect of experiencing life events one year previous to the cardiovascular event (acute effect) was investigated. In order to decide which questionnaire was filled in previously to the cardiovascular event, and would be used in the analyses, the follow-up period was divided into five periods. Life events and alcohol use were used from the questionnaire previous to the period in which the cardiovascular event occurred, or the person became lost-to-follow-up (with regard to information about health). For the other people, the follow-up questionnaire of 2000 was used.

Multiple logistic regression analysis was used to investigate the relationship between life events and cardiovascular disease, and the effect of alcohol use, social support and/or coping on this relationship. The original sample at baseline consisted of 3253 men and women. As a result of one GP failing to report the health status of his patients, 63 subjects had to be excluded. In addition, eight people experienced a cardiovascular event, and three became lost-to-follow-up by the GP, before they filled in the baseline questionnaire and were excluded, leaving 3179 subjects. Using a longitudinal study design -with five questionnaires- resulted in that some people dropped out at a certain follow-up, but could re-enter at a later follow-up. If a person dropped out at the required (follow-up) questionnaire, subjects were dropped from the analysis. Attrition is not always preventable, and overall attrition in the LEGO-study was comparable to other studies, with about 21% at follow-up 1997 and about 28% at the other follow-up questionnaires (data not shown). 1533 subjects dropped from the analysis due to missing data on life events, alcohol use and/or,

to a lesser extent, one of the other variables. Leaving 1530 subjects with no cardiovascular event and 116 subjects who experienced a cardiovascular event during the follow-up period, for the multivariate analysis (see flowchart).

It was investigated with logistic regression analysis if there was a relationship between the predicting variables at baseline (experienced life events, alcohol use, age and gender), on the one hand, and dropping-out from the analysis due to missing of the required (follow-up) questionnaire, on the other (data not shown).

Flowchart: number of people who experienced a cardiovascular event, or became lost-to-follow-up, and number of people for analysis



	Cardiovascular event* (n=233)	Lost-to follow-up* (n=290)
July 1996 - June 1997	49	58
July 1997 - June 1998	45	80
July 1998 - June 1999	43	82
July 1999 - June 2000	48	70
July 2000 - June 2001	48	-

* No cardiovascular event or lost-to-follow-up before July 2000 n=2656

*Life events and alcohol use were used from the questionnaire previous to this period. For period one (July 1996 - June 1997) this was the baseline questionnaire, for period two (July 1997 - June 1998) this was the first follow-up, and so on.

Model specification

Because the health status was not available for every participant at the start of the study, it was not possible to exclude persons from the cohort who had cardiovascular disease or related health problems before the start of the study. Therefore, it was decided to correct for it in the analyses, and to test if there was an interaction effect between life events and previous CHD.

The starting model included life events, alcohol use, social support, coping, and the potential confounders mentioned above. It also included the following interactions: between life events and gender, life events and age, life events and alcohol use, life events and perceived support, life events and actual support, life events and mutual visits, life events and emotion coping, life events and action coping, life events and cognitive coping, and between life events and diagnosed with CHD in the past.

Model selection

Models were first tested with the backward method to assess which interaction effects were statistically significant (according to the log likelihood ratio). In order to test whether alcohol use modified the relationship between life events and cardiovascular disease, the interaction between alcohol use and life events was left in the model regardless of the p-value. After all non-significant interaction effects were excluded from the model, the same procedure was followed to exclude the statistically non-significant main effects, except for those who were part of the interaction effect(s), until a model with the above-mentioned interactions and variables, and (according to the log likelihood ratio) statistically significant interactions and variables remained.

Results

Basic data

Table 1: Number of people who experienced a cardiovascular event (CVD-event) and people who did not experience a CVD-event during the follow-up period, for the total group and separately for men and women

		Men	Women	Total
cardiovasculair event (including cvd-mortality)	Yes CVD	150 (9.6%)	83 (5.2%)	233 (7.3%)
	No CVD	1419	1527	2946
	Total	1569	1610	3179

Of the 3179 subjects, 7.3% (n=233 persons) experienced a cardiovascular event (fatal or nonfatal) in the follow-up period. The percentage of men who experienced a cardiovascular event was higher (9.6%, n=150) compared with the percentage of the women (5.2%, n=83) (table 1).

With regard to age, about 29% of the subjects were in the age category 44 years to 49 years old; about 21% in the category from 50 to 54 years old; about 18% from 55 to 59 years old; about 16% from 60 to 64 years old; and about 16% were 65 years or older. The distribution of age over the five age categories was comparable between men and women (data not shown).

The numbers of subjects who experienced a cardiovascular event in one of the periods between two questionnaires were comparable (about 50 people) between the five periods. The numbers of subjects who became lost-to-follow-up were also more or less comparable between the different periods. Of the

2946 people experiencing no cardiovascular event in the follow-up period, 2656 subjects were not lost-to-follow-up and, if available, information on life events, and alcohol use was derived from the follow-up questionnaire of 2000 (see flowchart).

Table 2: Numbers and percentage of people who experienced cardiovascular event (CVD-event) and people who did not experience a CVD-event during the follow-up period, for the total group, and for men and women, separately for number of life events reported in the year previous to the CVD-event

	Total group			Men			Women		
1 year before CVD-event	CVD-event	No CVD-event	Total	CVD-event	No CVD-event	Total	CVD-event	No CVD-event	Total
Experienced no life event	71 (6.9%)	962	1033	56 (10.2%)	493	549	15 (3.1%)	469	484
Experienced 1 life event	46 (7.8%)	540	586	28 (9.6%)	263	291	18 (6.1%)	277	295
Experienced 2 life events	30 (8.4%)	328	358	18 (11.0%)	146	164	12 (6.2%)	182	194
Experienced ≥ 3 life events	25 (10.8%)	206	231	14 (12.7%)	96	110	11 (9.1%)	110	121
Total	172	2036	2208	116	998	1114	56	1038	1094

The percentage of people experiencing a cardiovascular event increased from about 7% among the people who experienced no negative life events in the year previous to the cardiovascular event, to about 11% among people who experienced three or more life events. These differences were not statistically significant. Among men, the percentages also increased slightly from about 10% to about 13%, again not statistically significant. Among women, however, a threefold increase (from about 3% to about 9%) was found, which was statistically significant (table 2).

In the category non-drinkers-<1 glass/week, the percentage experiencing a cardiovascular event was higher for those who experienced one or more life events compared to those experiencing no life events, for both men (respectively 16% and 12.2%) and women (respectively 9.5% and 4.5%). Among men, both with a mean alcohol use of 1-14.9 glasses/week and a mean alcohol use of more than 15 glasses per week, the percentage of experiencing a cardiovascular event was comparable between those who experienced no life event and those with one or more life events. Among women with a mean alcohol use of 1-14.9 glasses/week the percentage of people experiencing a cardiovascular event was again higher for the people who experienced one or more life events compared with experiencing no life events (respectively 3.9% and 1.2%). The number of women with a mean alcohol use of more than 15 glasses per week was too small to compare between those who experienced no life event and those with one or more (table 3).

Table 3: Numbers and percentage of people who experienced cardiovascular event (CVD-event) and people who did not experience a CVD-event during the follow-up period, for the total group, and for men and women, separately for the three drinking categories, and separately for people experiencing no life events, and experiencing one or more life events in the year previous to the CVD-event

	Men				Women		
1 year before CVD-event		CVD-event	No CVD-event	Total	CVD-event	No CVD-event	Total
Non-<1 glass/week	No life event	12 (12.2%)	86	98	8 (4.5%)	170	178
	One or more life events	15 (16.0%)	79	94	19 (9.5%)	182	201
1-14.9 glasses/week	No life event	20 (8.8%)	206	226	2 (1.2%)	164	166
	One or more life events	21 (8.6%)	222	243	10 (3.9%)	245	255
≥ 15 glasses/week	No life event	18 (11.0%)	146	164	-	48	48
	One or more life events	16 (9.9%)	146	162	3 (6.0%)	47	50
Total		102	885	987	42	856	898

Table 4: Relative Risk estimation of getting a fatal or non-fatal cardiovascular event, after experiencing one or more life events compared to experienced no life events in the year previous to the cardiovascular event, based on the logistic regression model*, separately for men and women, and for three categories of alcohol consumption

	Men	Women
Non-<1 glass/week	0.57	2.61
1-14.9 glasses/week	0.73	3.39
≥ 15 glasses/week	0.79	3.70

* The logistic regression model with getting a fatal or non-fatal cardiovascular event as dependent variable and experienced no life events compared with experienced one or more life events in the year previous to the cardiovascular event as predictor, contained also the following covariates: Gender, age, alcohol use, actual received social support, social contacts, pack years, body mass index, diagnosed with coronary heart disease in the past, baseline questionnaire or follow-up questionnaire used, interaction between gender and life events, and interaction between life events and alcohol use.

Missing: people who dropped from the analysis compared with those who did not

Experiencing a life event at baseline and age were not found to be statistically significant related to dropping-out (data not shown). Gender was found to be statistically significant related to dropping out. Women had a higher change of dropping out of the study. Alcohol use was also found to be statistically significant related to dropping out; compared with drinkers of ≥ 15 glasses per week at baseline, non-drinkers and drinkers of < 1 glass/week at baseline were found to have a higher change of dropping out, and drinkers of 1-14.9 glasses/week at baseline were found to have a lower risk.

Logistic regression analysis

Life events

A statistically significant interaction effect was found between life events and gender. In summary, women who experienced one or more life events in the year previous to the cardiovascular event, have a higher risk of getting a cardiovascular event compared with women who experienced no life events in the year previous to the cardiovascular event. For men, however, the effect of life events on cardiovascular events is in the opposite direction; implying that men who experienced one or more life events in the year previous to the cardiovascular event have a lower risk of getting a cardiovascular event compared with men who experienced no life events in the year previous to the cardiovascular event (table 4).

Alcohol use

The interaction between life events and alcohol use was tested in order to investigate whether alcohol use modifies the relationship between life events and cardiovascular disease. This interaction effect was not statistically significant, and the effect of life events on cardiovascular disease does not depend on the level of alcohol use (table 4).

Coping style and social support

None of the coping dimensions were found to modify the relationship between life events and cardiovascular disease.

Neither was social support found to modify the relationship between life events and cardiovascular disease. Scoring high on social contacts was found to protect subjects from getting a cardiovascular disease. Although the effect was small, scoring high on actual received social support was found to be a risk factor for cardiovascular disease.

Cardiovascular disease present before start of the study

No statistically significant interaction effect between life events and previous cardiovascular disease was found in the present study. A separate analysis was conducted, in which people with previous cardiovascular disease were excluded, to check if the effect of alcohol use on the relationship between life events and cardiovascular disease differed for this group (data not shown). It appeared that in this latter analysis, alcohol use also did not modify the relationship between life events and cardiovascular disease in people without previous cardiovascular disease, either.

Discussion

The aim of the present study was to investigate longitudinally the relationship between negative life events and (non-fatal and fatal) cardiovascular disease, and the modifying role of alcohol use on this relationship. The main finding was that the effect of life events experienced in the year previous to the cardiovascular event on cardiovascular disease differed between men and women. Men have a lower risk of getting cardiovascular disease when experiencing one or more life events, compared with experiencing no life events, where women have a higher risk of getting cardiovascular disease when experiencing one or more life events. Alcohol use, coping style and social support did not modify the relationship between life events and cardiovascular disease. Scoring high on social contacts was found to be associated with a lower risk of getting a cardiovascular disease, whereas scoring high on actual received social support was found to be associated with a higher risk.

In line with results from previous case-control studies (6-8), women had a higher risk of getting a cardiovascular disease after experiencing life events. Contrary to expectations, men, however, appeared to have a lower risk of getting a heart disease after experiencing life events. This is in line with a study from Melamed et al., (12), who also found a negative association between life events and systolic and diastolic blood pressure, triglycerides and uric acid. There is no clear explanation why the effects of life events on cardiovascular disease differ between men and women, and why experiencing life events protects males from getting a cardiovascular disease. Maybe women are more prone to the effects of life events than men. Social support and coping style did not modify the relationship between life events and cardiovascular disease, so the reasoning that subjects use their social network to deal with life events could not be confirmed in the present study, and does not offer an explanation for the differences between men and women.

It is possible that an unknown factor, not measured in the present study, plays a role in the connection between life events and cardiovascular diseases which might explain the differences between men and women. Melamed et al., (12), for example, suggested that the connection between life events and cardiovascular disease are linked through pathways, other than elevation of blood pressure and/or serum lipid/lipoprotein levels. A possible suggestion might be that stress may cause cardiovascular disease through risk behaviors, for example alcohol use (2, 12). It was hypothesized in the present study, that if alcohol buffers the negative effects of stress, non-drinkers would lack this possibility to alleviate stress and therefore are more vulnerable for the negative effects of stress. However, no support was found for this hypothesis in the present study, as alcohol did not modify the relationship between life events and cardiovascular disease. As described in the introduction, moderate drinkers appeared to suffer less from stress than either abstainers or heavy drinkers (15, 16). In those studies, depression was used as outcome. In the present study experiencing a cardiovascular event was used as the outcome. Maybe the effect of life events on depression manifests itself quicker than the effect on cardiovascular disease, which makes it indeed possible to find an acute effect of alcohol use on the relationship between life events and depression, but not on the relationship between life events and cardiovascular disease, which takes a longer time to develop and to become manifest.

Because of the limited number of people experiencing a cardiovascular event, life events were dichotomized into experienced no life event versus experienced one or more life events in the year previous to the cardiovascular event. Therefore it was only possible to investigate the effect of experiencing a life event on cardiovascular disease and not whether the risk of getting a cardiovascular disease increases if a person experiences more life events. It was also not possible, again due to the small numbers, to investigate if type of life events experienced had a different effect on the risk of cardiovascular event. From a previous study with the same subjects it is known that illness or bereavement events are the events experienced most by the subjects (18), and have a more than average contribution to the sum score in subjects aged 45 years and older.

In previous studies, it was stated that using a merged group with never drinkers, former drinkers, and occasional drinkers as reference group appears to overestimate the possible lower risk of moderate alcohol intake on the risk of cardiovascular events (9, 28-30). In the present study, the numbers were too small to make a distinction between lifetime abstainers and ex-drinkers, and for practical reasons, alcohol use was divided into three categories. No effect was found of alcohol use on the relationship between life events and a cardiovascular event, so this possible overestimate of the effect is probably negligible.

In a related study, using data from the same cohort, it was found that risk of all-cause mortality and cardiovascular events is primarily based on current drinking at baseline and not on lifetime drinking habits and drinking in the distant past (24). This makes it plausible that the effects of alcohol use are acute and not long term. So if there is an effect of alcohol use on the relationship between life events and cardiovascular events it would be preferable to test the stress buffering hypothesis by looking at alcohol use in the year previous to the cardiovascular event.

Unfortunately, alcohol use and life events are measured at the same time, and share the same reference period, so it cannot be ruled out that alcohol use changed after experiencing a life event. It would be necessary for subjects to report their alcohol use both before and after experiencing a negative life event, in order to ensure information on temporal contingency of life events and consumption. This would imply recording on a continuous basis, with short time periods. Example of such a technique is the so-called Experience Sampling Method, a time-sampling technique, although practically difficult to implement in a population study.

Contrary to expectations, social support did not modify the relationship between life events and cardiovascular disease. In line with previous research, scoring high on social contacts was found to be associated with a lower risk of getting a cardiovascular disease (5, 31). Scoring high on actual received social support, however, was found to be associated with a higher risk in the present study. Actual received social support refers to the degree of confidentiality in social relationships, the opportunities subjects have to be intimate with someone, and it could be indicative of a higher emotional quality of the social relationships or a greater strength of the ties in the subject's social network. It could be hypothesized that social support improves after a person experiences a cardiovascular event, but social support was measured before a person experiences a cardiovascular event, so this explanation is not applicable. Vogt et al., (32), found incidence of ischemic heart disease to be weakly related to social networks, but social network measures were found to be associated with survival among ischemic heart disease patients. They hypothesized that

having an appropriate resource for dealing with a problem, regardless of the nature of that problem, is more effective in recovering from illness, instead of preventing it from happening.

Missing data on life events and/or alcohol use during follow-up due to attrition could potentially bias the observed association between life events, alcohol use and cardiovascular events. Experiencing a life event at baseline and age were not found to be statistically significant related to missing data one year previous to the cardiovascular event. Women, however, had a higher chance of missing data. And being an abstainer or drinking less than 1 glass per week at baseline had the highest chance of having missing data in the year previous to the cardiovascular event, compared with drinkers of ≥ 15 glasses per week at baseline, and drinkers of 1-14.9 glasses/week at baseline had the lowest chance. It can only be speculated what the impact of this could be on the results of the present study. Thygesen et al., (33) also found that people with high alcohol intake and abstainers had a higher chance of dropping out, yet they also reported that it did not influence the observed relationship between alcohol intake and mortality.

One of the major advantages of the present study is that it has a longitudinal design. The experienced life events are reported and documented before a subject experiences a cardiovascular event, which made it possible to investigate causality, and overcome recall bias. This design decreases the chance that a person alters his perceptions about life events as a result of experiencing a cardiovascular event.

From the present study, it can be concluded that women have a higher risk of getting a cardiovascular event after experiencing one or more life events, compared with experiencing no life events, where men, on the other hand, have a lower risk of getting a cardiovascular event after experiencing one or more life events, compared with experiencing no life events. The relationship between life events and cardiovascular disease was not modified by coping, social support, or alcohol use; and no evidence was found that a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease.

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chapter 8

discussion

General discussion

Introduction

Scientists still argue about the potential beneficial effects of moderate alcohol use on cardiovascular disease (1). High alcohol intake can cause serious health problems, and before the message is given to people that alcohol indeed has protective effects for cardiovascular disease, it is important to investigate possible explanations. Although many epidemiological studies have repeatedly described the relationship between alcohol use and cardiovascular disease as J-shaped or U-shaped with a higher risk for non-drinkers and heavy drinkers, and a lower risk for moderate drinkers (2), the possible mechanisms that could explain this relationship remain unclear (3, 4). Several possible biological explanations are brought forward (5, 6), but do not entirely explain the J-shaped curve. Other explanations, such as psychological mechanisms or methodological pitfalls might also be relevant.

Psychological variables are often not taken into account in the relationship between alcohol use and cardiovascular disease or mortality (7, 8). There are complex interactions between alcohol use, psychological variables (such as stress and/or social support), and health (8). The buffering hypothesis posits that impact of stress may differ if resources for dealing with stress (for example, social support or coping style) are available. Tension reduction is considered to be an important reason for people to consume alcohol (9, 10). It was hypothesized, that alcohol has potent stress dampening or stress buffering effect, and might thus modify the negative effects of stress (11, 12). The aim of this thesis was to investigate whether a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease.

Stress can be operationalized in different ways. Divisions can be made between objective stressors, and stress as perceived by a person, and between the acute or more chronic nature of stress. In this thesis, it is operationalized as experiences of negative life events, such as death of a spouse and loss of employment, being more objective and acute stressors.

Data came from the Leefwijze En Gezondheid Onderzoek (LEGO, Lifestyle and Health Study) a prospective cohort study, aiming to investigate whether factors other than strictly biological, could be accountable for the observed lower risk of cardiovascular events for moderate drinkers. The cohort consisted of 16,210 men and women aged 45-70 years, who responded to the baseline questionnaire and were followed for a five-year period (1996-2001).

In this chapter the main findings, strengths, and limitations are discussed, and also implications for future research are addressed.

Main findings

Life events and alcohol use

A critical review (chapter 2) of the literature published between 1990 and 2005, found evidence that points towards a relationship between the occurrence of life events and alcohol use in the general population. However, it becomes apparent, that when life events are operationalized or categorized separately they are not only related to an increased alcohol use but also to a decreased alcohol use. Health-related life events and financial problems were found to precede a decrease in consumption, and negative events occurring in spouse, friends, or relatives, and retirement seem to lead to an increase in alcohol use. For a correct estimation of the effect of negative life events, it is important to specificy the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption.

Chapter 6 describes the longitudinal study on the relationship between negative life events and alcohol use with data from the Lifestyle and Health Study. The hypothesis that the effect of specific negative life events may cancel each other out, when combined in a summarized measure could not be confirmed in chapter 6. When looking at the relationship between the scores on subscales of life events and alcohol use, one can observe only a significant effect for illness or bereavement events. One of the reasons might lie in the number of events experienced. Illness or bereavement events were experienced by a large proportion of the group (between 40% and 50%), the other subscales, employment problems (between 5% and 12%), spousal or relational problems (between 2% and 3%), and social problems (between 13% and 25%) less frequent.

Another finding from the longitudinal study (chapter 6), was that emotion coping can be regarded as a vulnerability factor in this relationship, implying a positive relationship between the occurrence of negative life events and alcohol use in subjects scoring high on emotion coping, and a negative one among subjects scoring low on emotion coping. This finding is in line with results from a study from Cooper et al., (13). However, it is not clear why people with this coping style increase their drinking after experiencing life events. Emotion coping is often considered to be a relatively ineffective coping strategy, and it is conceivable that people scoring high on emotion coping use alcohol as an alternative coping strategy. Cognitive coping, action coping, actual support, social contacts and gender did not modify the relationship between life events and alcohol use. However, having a more cognitive coping style or more social contacts was associated with lower alcohol use, whereas having an action coping style and receiving more actual social support was associated with higher alcohol use.

Nonresponse

The Lifestyle and Health Study consisted of 31,349 men and women aged 45-70 years, of which 51.7% responded to the mailed questionnaire (chapter 3). If nonresponse is random, the threat to the generalizability of the results of the study is limited (14, 15), but if it is not random, it may lead to bias in study outcomes (14, 16). When nonrespondents differ from respondents on the exposure or target variable of the study, the likelihood of nonresponse bias increases (16). Objective retrospective and prospective health information derived from general practitioner registries was available for both respondents and

nonrespondents, allowing a nonresponse analysis (chapter 4). Contrary to expectations, nonrespondents were found to be healthier at baseline regarding coronary heart disease. In general, respondents are found to be healthier than the general population, commonly reffered to as the so-called healthy volunteer effect (16-19). The higher mortality risk found for noncontacts compared with respondents is in line with results from previous studies (17, 20-24). Criqui et al., (25), introduced the term ''worried well'', people who are healthy and yet (compared to the less healthy nonrespondents) worry more about their health, and for that reason visit their physician more regularly, receive more disease detection screening, and follow healthy lifestyle practices more often (26). In this thesis the respondents cannot be considered as ''worried well'', as they were found to be less healthy. We introduced the term ''worried ill'' in chapter 4. As discussed in chapter 4 saliency could be a trigger for people to respond to a survey, and is, probably, most linked with the worries people have regarding a topic. People with coronary heart disease are ill, and are advised to change their lifestyle into a healthy one, which might increase their worries regarding their health, and these worries may motivate a subject to respond to a questionnaire on health. Parallel to this idea, if respondents are more health conscious and when they are seeing their doctor more often (better surveillance) and get better care, mitigates the negative effects of certain risk factors or health-related behaviors, and as a result mortality risk decreases. This paradoxical results that respondents were less healthy at baseline but prospectively had a lower mortality risk, could imply that observed relationships between risk factors or behaviors and outcomes in cohort studies may be attenuated.

To determine whether nonresponse is random it is necessary to compare respondents with nonrespondents on both exposure and outcome (16). For the nonrespondents, no information was available regarding the exposure variable of this study, health behavioral risk factors, such as alcohol consumption. If people with coronary heart disease are indeed advised to change their lifestyle into a healthy one, it could be speculated that the respondents also differ from the nonrespondents with regard to health behavioral risk factors. In a nonresponse follow-up study, it was found that among nonresponders both abstainers and frequent excessive drinkers were found to be overrepresented (27). In this thesis, the number of heavy drinkers in the analyses was found to be low, and a possible selective nonresponse of heavy drinkers can not be excluded, which may have attenuated the results for this group of drinkers, but will have had little effect on the results for the other groups.

Measurement of alcohol use

In chapter 5 the reliability and validity were examined of a new self-administered questionnaire called the Lifetime Drinking History questionnaire (LDH-q) in a sample of the Lifestyle and Health Study, drawn randomly at baseline. In research on alcohol use, there is no gold standard for measuring alcohol use. Alcohol intake of a person is often difficult to measure, for several reasons. First, alcohol use of people fluctuates and changes over time (28-30). Second, alcohol use is often based on a self-report, and people appear to have the tendency to underreport their alcohol intake (31). However, measuring alcohol intake by means of a self-report is rather easy and cheap compared with, for example, biochemical tests and do not seem to be less valid (32, 33). If there is a suspicion that alcohol intake is underestimated, assessment of both quantity and frequency of alcohol use, for beer, wine and liquor, separately, (as was done in this thesis) will yield the most realistic levels of intake (34). Most studies on the relationship between

alcohol use and cardiovascular disease are based on current drinking or intake in the recent past, and not on lifetime drinking habits (35). In this thesis, alcohol use was measured extensively, and the reliability and validity of the LDH-q, reported in Chapter 5, both appeared to be reasonably high, indicating that the LDH-q can be a useful instrument in large-scale cohort studies, to assess lifetime exposure.

Stress buffering effect of alcohol use

It was hypothesized that if alcohol buffers the negative effects of stress, non-drinkers would lack this possibility to alleviate stress and therefore are more vulnerable for the negative effects of stress. From the study into the relationship between negative life events and cardiovascular disease (chapter 7), it appeared that women had a higher risk for a cardiovascular event within one year after experiencing one or more life events, while among men this association was reversed. In this thesis, no support was found that alcohol use modified the relationship between life events and cardiovascular disease, and no evidence was found that a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease. There are, however, some considerations that should be taken into account, before it can be concluded that alcohol indeed does not buffer the negative effects of stress.

Strengths and limitations

Case-cohort

The Lifestyle and Health Study, consists of 16,210 men and women aged 45-70 years, who responded to the baseline questionnaire. For financial and efficiency reasons a case-cohort approach was applied, involving the selection of a random sample at baseline (36-39). The sample size was 20% of all respondents at both baseline measurements, with a proportional equal sample of both baseline responses and stratified to practice. Advantages of this approach were the ease of selection of the sample, the possibility of using one single sample for multiple outcomes and substantial reductions in time and costs of data collection and/or analyses with a minimal loss of efficiency compared to a full cohort study. On the other hand, the number of male never drinkers was low, and in chapter 7, life events were dichotomized into experienced no life event versus experienced one or more life events, due to the large number of missing data. This could have led to power problems in the analyses, implying that real associations were possibly missed, and that a possible effect of alcohol use on the relationship between life events and cardiovascular disease might be unnoticed.

Registries of general practitioners

Registries of general practitioners were used as the sampling frame. Coverage of target population was high, since as a result of health insurance regulations, nearly all inhabitants of the Netherlands are insured and registered with a GP. In addition, the GP has a function as gatekeeper in the Dutch health care system for admissions to a hospital or a specialist (40, 41). GPs have, in general, detailed information regarding health status of their patients (40). Health problems of the cohort members were derived from the computerized medical databases of the general practitioners only. However, in practice, general practitioners had most medical information still on paper at the start of the study, and at the end of the follow-up period, it turned out that it was not realistic to obtain the problem lists of all cohort members.

Nevertheless, problem lists were available for almost all persons included in the random sample. All available problem lists were checked for irrelevant items and incompleteness. Although it cannot be ruled out that some health problems were missed, there were no indications found for differences in chance of missed health problems between persons who experienced a cardiovascular disease during the follow-up period and those who did not.

Alcohol and cardiovascular disease

It is not possible to conduct experimental trials to investigate the effect of alcohol use on cardiovascular disease, because of ethical and practical problems. In order to gain insight in this relationship researchers need to rely on cohort studies to investigate possible explanations. One of the critiques is that a systematic error might be operating in these studies, referring to inclusion of people with pre-existing disease, and use of a merged group of never drinkers, former drinkers, and occasional drinkers as reference group, which appears to increase the difference in risk between non-drinkers and moderate drinkers on the risk of cardiovascular events (2, 3, 42-44). It is hypothesized that people stop drinking due to ill health, or likely never start drinking because of pre-existing disease, whereas healthy people do not change their drinking, indicating that non-drinkers could possibly differ from drinkers regarding their health risk profile from the beginning (42). In chapter 7, the numbers were too small to make a distinction between lifetime abstainers and ex-drinkers, and for practical reasons, they were categorized as non-drinkers. No effect was found of alcohol use on the relationship between life events and a cardiovascular event, so this possible overestimate of the effect is probably negligible. Friesema et al., (35) found, with data from the Lifestyle and Health Study, that risk of all-cause mortality and cardiovascular events is primarily based on current drinking at baseline and not on lifetime drinking habits and drinking in the distant past. This could imply that actual intake at baseline is stronger related to cardiovascular events, but it could also indicate that people might indeed adjust their drinking habits anticipating on the oncoming cardiovascular event, in line with the theory of Shaper (42).

Longitudinal design

One of the major advantages of the present study was its longitudinal design. However, the design and analysis of this study does not permit causal inferences between experiencing a life event and alcohol use. It cannot be ruled out that alcohol use had changed after experiencing a life event, since consumption and life events are measured at the same time, and share the same reference period. It would be necessary that subjects report their alcohol use both before and after experiencing a negative life event, in order to ensure information on temporal contingency of life events and consumption. This would imply recording on a continuous basis, with short time periods. Example of such a technique is the so-called Experience Sampling Method, a time-sampling technique, although practically difficult to implement in a population study.

Although life events and alcohol use were measured at the same time, the experienced life events were reported and documented before a subject experiences a cardiovascular event, which made it possible to investigate causality, and overcome recall bias. The question if persons recall more life events, because they searched for a possible cause for their heart attack, and attach a meaning to life events in the process, which could lead to selectively recall or interpret events as more upsetting, was tackled in this thesis.

Drop-out

Using a longitudinal study design -with five questionnaires- resulted in that some people dropped out at a certain follow-up, but could re-enter at a later follow-up. If a person dropped out at the required (follow-up) questionnaire, subjects were dropped from the analysis. Missing data on life events and/or alcohol use during follow-up due to attrition could potentially bias the observed association between life events, alcohol use and cardiovascular events. Attrition is not always preventable, and overall attrition in the Lifestyle and Health Study was comparable to other studies, with about 21% at follow-up 1997 and about 28% at the other follow-up questionnaires of the Lifestyle and Health Study. In chapter 7 it was found that women had a higher chance of missing data. And being an abstainer or drinking less than 1 glass per week at baseline had the highest chance of having missing data in the year previous to the cardiovascular event, compared with drinkers of ≥ 15 glasses per week at baseline, and drinkers of 1-14.9 glasses/week at baseline had the lowest chance. It can only be speculated what the impact of this could be on the results of the present study. Thygesen et al., (45) also found that people with high alcohol intake and abstainers had a higher chance of dropping out, but they found as well that it did not influence the observed relationship between alcohol intake and mortality.

As described, life events are considered to be a more objective and acute way of measuring stress. In this thesis, life events were measured annually over a period of 5 years; because too many in-between questionnaires were missing, it was not possible to conduct an analysis with all 5 measurements. Hollis et al., (46) conducted a 6-year prospective study, and found that annual accumulation of life events were not related to risk of subsequent coronary mortality or fatal/non-fatal myocardial infarction. Assuming that the effect of life events on cardiovascular disease is an acute effect, it was decided to investigate in this thesis the effect of life events experienced in the year previous to the cardiovascular event.

Recommendations

Operationalization of stress

From the review in chapter 2 it becomes apparent that when life events are operationalized or categorized separately they are not only related to an increased alcohol use but also to a decreased alcohol use. The hypothesis that the effect of specific negative life events may cancel each other out, when combined in a summarized measure could not be confirmed in chapter 6. When looking at the relationship between the scores on subscales of life events and alcohol use, one can observe only a significant effect for illness or bereavement events, who were experienced the most, and have a more than average contribution to the sum score in subjects aged 45 years and older. It should be kept in mind that if studying the effect of life events in a general population study with subjects aged 45 years and older, illness or bereavement events are the events experienced the most, and have a more than average contribution to the sum score in these subjects. It would be recommended to investigate in future studies if the risk of getting a cardiovascular disease increases if a person experiences more life events, and to investigate if type of life events experienced had a different effect on the risk of cardiovascular event.

Psychosocial stress can be operationalized in different ways. In this thesis, it is operationalized as experiences of negative life events. Life events have been found to be coronary heart disease triggers (47, 48). In case-control studies investigating this particular relationship, it was found that people who experienced a myocardial infarction reported more stressful life events in the preceding period than controls (49-51). Although life events were found to be related to coronary heart disease, in retrospect, life events might not be the best measure to test the stress buffering function of alcohol use on the relationship between stress and cardiovascular disease in an older population, mainly because most of the subjects sooner or later experience a life event. There are several other ways to operationalize psychosocial risk factors; it would be interesting to investigate the effect of alcohol use on, for example, the relationship between depression and cardiovascular disease, or chronic stress and cardiovascular disease, or daily hassles and cardiovascular disease.

Depression

From the literature it was found that moderate drinkers appeared to suffer less from stress than either abstainers or heavy drinkers (52, 53). In those studies, depression was used as outcome. In this thesis experiencing a cardiovascular event was used as the outcome. Maybe the effect of life events on depression manifests itself quicker than the effect on cardiovascular disease, which makes it indeed possible to find an acute effect of alcohol use on the relationship between life events and depression, but not on the relationship between life events and cardiovascular disease, which takes a longer time to develop and to become manifest. It would be interesting to investigate the relationship between alcohol use, life events and cardiovascular disease with depression in the model.

Coping style

It was found in chapter 6 that the direction of the connection between experiencing life events and alcohol use depended on the person's coping style; implying that people scoring high on emotion coping, characterized by a passive, resigned, indulgent and self-accusatory coping style, increase their alcohol use after experiencing a negative life event, and people scoring low on emotion coping decrease their alcohol use after experiencing a negative life event. However, it remains an open question as to why people with an emotion-oriented coping style increase their drinking when facing hardships. Emotion coping is often considered to be a relatively ineffective coping strategy, and it is thinkable that people scoring high on emotion coping, use alcohol as an alternative coping strategy. More qualitative studies, or data on drinking motives or expectancies, are needed to see whether alcohol is actually used as a means to relieve stress and feel better. It could be speculated that the relationship between alcohol use, life events and cardiovascular disease is even more complex and that coping is an important moderator in that relationship. Maybe there is an interaction effect at a higher level, between life events, coping and alcohol use. It would be interesting to investigate the effect of alcohol use on the relationship between life events and cardiovascular disease but than controlling for emotion coping.

Social support

The focus of this thesis was, as most research does, on social support as a stress moderating factor. Contrary to expectations, no proof was found that one of the indicators of social support modified the relationship between life events and alcohol use, or the relationship between life events and cardiovascular

disease. Social isolation and lack of quality social support are found in the literature to be independent risk factors for coronary heart disease (47, 48, 54). In this thesis, scoring high on **social contacts** was found to be associated with a lower alcohol use, and also to protect subjects from getting a cardiovascular disease. However, scoring high on **actual received social support** - refering to the degree of confidentiality in social relationships and the opportunities subjects have to be intimate with someone-, was found to be associated with a higher alcohol use, and appeared to be a risk factor for cardiovascular disease. This increase in alcohol use may explain why scoring high on actual support was found to be a risk factor for cardiovascular disease, but based on this thesis it can not be explained why among those receiving more actual support alcohol use increases. Actual received social support may be indicative of a higher emotional quality of the social relationships or a greater strength of the ties in the subject's social network. It may well be that the higher consumption among those receiving more actual support is the result of a functional use of drinking, as drinking is generally thought to facilitate social communication. This motivational explanation is, however, in contrast to Skog's sociological theory that social integration implies better regulation and control of drinking (55). More in line with this idea, assuming that fewer social calls are indicative of social isolation, is the result that the more isolated subjects in the current sample drink more heavily. In the same paper, however, Skog complicates matters by presenting evidence for a J-shaped relationship of social isolation and consumption, with abstainers and heavy drinkers sharing higher levels of social isolation. Other studies have come to similar conclusions (56, 57). The data in this thesis are insufficiently detailed for a decisive test for either a motivational or sociological explanation. It would be very interesting to investigate the relationship between alcohol use, social support and coronary heart disease, without life events.

Final remark

Before the start of the study, it had hardly been investigated if the impact of stress on cardiovascular disease was modified by lifestyle, such as alcohol consumption. Although, it cannot be concluded from this thesis that a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease, some interesting results were presented. One of the main findings was that the direction of the connection between experienced life events and alcohol use depended on the person's coping style. Another finding was that, scoring high on **social contacts** was found to be associated with a lower alcohol use, and also to protect subjects from getting a cardiovascular disease. However, scoring high on **actual received social support**, was found to be associated with a higher alcohol use, and appeared to be a risk factor for cardiovascular disease.

It can be concluded that the relationship between alcohol use, stress and cardiovascular disease involves several other factors, such as coping style and social support. Suggestions for further research would be to investigate the effect of alcohol use on the relationship between depression and cardiovascular disease, or chronic stress and cardiovascular disease, or daily hassles and cardiovascular disease. Similarly, the effect of alcohol use on the relationship between life events and cardiovascular disease but than controlling for emotion coping, would be worth exploring. Yet another topic, the relationship between alcohol use, social support and cardiovascular heart disease needs further scientific attention.

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Summary

Although many epidemiological studies have repeatedly described the relationship between alcohol use and cardiovascular disease as J-shaped or U-shaped with a higher risk for non-drinkers and heavy drinkers, and a lower risk for moderate drinkers, there is still scepticism about the potential beneficial effects of moderate alcohol use on cardiovascular disease. It has been shown that high alcohol intake can cause serious health problems, and before the message is given to people that alcohol indeed has protective effects for cardiovascular disease, it is important to investigate possible explanations. Several possible mechanisms that could explain the relationship between alcohol use and cardiovascular disease, have been investigated, but remain unclear, and are still open for debate. In addition to potential biological explanations, which do not enterily explain the relationship between alcohol and cardiovascular disease, there might be other explanations, such as psychological mechanisms or methodological pitfalls, relevant in explaining the J-shaped curve.

Psychological variables are often not taken into account in the relationship between alcohol use and cardiovascular disease or mortality. There are complex interactions between alcohol use, psychological variables (such as stress and/or social support), and health. The buffering hypothesis posits that impact of stress may differ if resources for dealing with stress (for example, social support or coping style) are available. Tension reduction is considered to be an important reason for people to consume alcohol. It was hypothesized, that alcohol has potent stress dampening or stress buffering effect, and might thus modify the negative effects of stress. Stress has found to be a risk factor for coronary heart disease.

As described in **chapter 1**, the aim of this thesis was to investigate whether a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease. Stress can be operationalized in different ways. Divisions can be made in objective stressors, and stress as perceived by a person, and between the acute or more chronic nature of stress. In this thesis, it is operationalized as experiences of negative life events, such as death of a spouse and loss of employment, being more objective and acute stressors.

The research questions described in chapter 1 are: 1) What is the relationship between negative life events and alcohol use in the general population, based on a literature review? 2) What is the relationship between response behaviour and health status at baseline and survival in a 5-year follow-up period in the Lifestyle and Health Study? 3) What are the test-retest reliability and the construct validity of the Lifetime Drinking History questionnaire? 4) What is the relationship between negative life events and alcohol use in a longitudinal cohort study, and is this relationship modified by gender, coping style, and/or social support? 5) What is the relationship between negative life events and cardiovascular disease, and is this relationship modified by alcohol use, coping style, and/or social support?

In **chapter 2** the findings of a critical review of research into the relationship between negative life events and alcohol use in the general population, published between 1990 and 2005 are presented. Focus was on general drinking behavior (excluding clinical studies focusing on heavy drinking and abuse or dependence),

and special attention was given to the study design (longitudinal or cross-sectional). This review found evidence that pointed towards a relationship between the occurrence of life events and alcohol use in the general population. The direction of the effect was, however, not unequivocal. It became apparent, that when life events were operationalized or categorized separately they were not only related to an increased alcohol use but also to a decreased alcohol use. Health-related life events and financial problems preceded a decrease in alcohol use, whereas life events related to spouse, friends and relatives, and retiring seemed to cause an increase in alcohol use. It was found that, for a correct estimation of the effect of negative life events, it was important to specificy the model to be tested, including buffering factors such as gender, social support, coping resources, as well as baseline consumption.

Chapter 3 describes the study population, the study design of, and the different methods used in the Lifestyle and Health Study, a prospective cohort study, aiming to investigate whether factors other than strictly biological, could be accountable for the observed lower risk of cardiovascular events for moderate drinkers. The Lifestyle and Health Study started in 1996 with a baseline questionnaire, followed by four annual follow-up questionnaires. The registries of 34 general practices were used as the sampling frame. General practitioners excluded terminally ill patients with life expectancies of less than three months, persons with severe dementia, mentally disabled persons, and institutionalized persons from the cohort. All other men and women aged 45-70 registered with the participating general practioners were included in the study and received a baseline questionnaire. A total of 31,349 men and women aged 45–70 years were approached at the start of the study of which 16,210 (51.7%) responded to the baseline questionnaire, 5,882 (18.8%) actively refused, and 9,257 (29.5%) did not respond.

Medical information was obtained through the GPs, who filed all relevant health problems of the past and during the follow-up period (from July 1996 to June 2001) on a so-called problem list, which is an essential part of the medical record. All myocardial infarctions and all deaths occurring in the follow-up period were reported by the general practitioners to the research team as soon as possible after presentation. The questionnaire included questions about health, lifestyle (e.g., alcohol consumption), life events, coping styles, and social support, among others.

In **chapter 4** the results of a nonresponse analysis were reported. If nonresponse is random, the threat to the generalizability of the results of the study is limited, but if it is not random, it may lead to bias in study outcomes. When nonrespondents differ from respondents on the exposure or target variable of the study, the likelihood of nonresponse bias increases. The association between response behavior and health status at baseline, and survival in a five-year follow-up period were assessed. Objective retrospective and prospective health information was available for both the respondents and the noncontacts. For the refusals only information about retrospective cardiovascular health problems (i.e. coronary heart disease, (defined as angina pectoris, acute myocardial infarction, or chronic ischemic heart disease), heart failure, nonfatal stroke, and other arterial obstructive or peripheral vascular disease), and about hypertension with involvement of target organs, diabetes mellitus, and hypercholesterolemia was available. Results in chapter 4, showed that among respondents coronary heart disease was more prevalent. Compared with respondents, noncontacts had a higher mortality risk during follow-up. And among nonrespondents,

the refusals were more likely than noncontacts to have hypercholesterolemia, and were less likely to have coronary heart disease and diabetes mellitus. The paradoxical results that respondents were less healthy at baseline but prospectively had a lower mortality risk may point to a selection effect indicating that the 'worried ill' are more inclined to participate. This effect could imply that observed relationships between risk factors or behaviors and outcomes in cohort studies may be attenuated.

The quality, construct validity, and test-retest reliability of a new self-administered questionnaire called the Lifetime Drinking History questionnaire (LDH-q) were tested in a sample of 3,255 men and women of the Lifestyle and Health Study and the results were reported in **chapter 5**. The LDH-q was developed for use in the Lifestyle and Health Study, because only interview-formats existed for asking for lifetime alcohol intake, and the Lifestyle and Health Study cohort was too large to interview all individuals. Test-retest reliability was assessed by means of the intraclass correlation coefficient and kappa scores. Correlations between lifetime and current intake scores were used to assess discriminant and convergent validity. Both reliability and validity appeared to be reasonably high compared with results obtained by using interview formats to measure lifetime alcohol intake. Reliability of the LDH-q was higher for men than for women, probably because of the more frequent and regular drinking of men. Indices of validity were similar for men (0.75) and women (0.70). Results show that the LDH-q can be a useful instrument in large-scale cohort studies.

In **chapter 6** the results from the analysis into the relationship between negative life events and alcohol use in a longitudinal design were described. As emerged from the review in chapter 2, it was emphasized that in order to make a correct estimation of the effect of negative life events, it was important to specify a model including buffering factors such as social support, and coping resources. An interaction effect was indeed found between experiencing a negative life event and emotion coping on alcohol use; implying a positive relationship between the occurrence of negative life events and alcohol use in subjects scoring high on emotion coping, and a negative one among subjects scoring low on emotion coping. Cognitive coping, action coping, actual support, social contacts and gender did not modify the relationship between life events and alcohol use. However, having a more cognitive coping style or more social contacts was associated with a lower level of alcohol use, whereas having an action coping style and receiving more actual social support was associated with a higher drinking level. It seems plausible that people scoring high on emotion coping, characterized by a passive, resigned, indulgent and self-accusatory coping style, increase their alcohol use after experiencing a negative life event.

In **chapter 7** the relationship between negative life events and non-fatal and fatal cardiovascular disease, and the modifying role of alcohol use on this relationship was investigated longitudinally. It was hypothesized, that if alcohol buffers the negative effects of stress, non-drinkers would lack this possibility to alleviate stress and therefore are more vulnerable for the negative effects of stress. Both alcohol use and social support have been put forward to modify the negative impact of stress on coronary heart disease. If so, these factors could offer an additional explanation for the J-shaped risk curve in studies on alcohol use and coronary risk. It appeared that women had a higher risk for a cardiovascular event within one year after experiencing one or more life events, while among men this association was reversed. Alcohol use,

coping style and social support did not modify the relationship between life events and cardiovascular disease. Scoring high on social contacts was found to be associated with a lower risk of getting a cardiovascular disease, whereas scoring high on actual received social support was found to be associated with a higher risk. Conclusion was that no evidence was found that a stress buffering effect of alcohol use could offer an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease.

In the final chapter of this thesis, **chapter 8**, the main results are discussed and placed in a broader perspective. Furthermore, the strenght and limitations of the different studies are described, and recommendations for future research were presented. Although, some interresting results were presented (for example, that the direction of the connection between experienced life events and alcohol use depended on the person's coping style), it cannot be concluded from this thesis that a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease. Suggestions for further research, would be to investigate the effect of alcohol use on, the relationship between depression and cardiovascular disease, or chronic stress and cardiovascular disease, or daily hassles and cardiovascular disease. Another suggestion would be to investigate the effect of alcohol use on the relationship between life events and cardiovascular disease but than controlling for emotion coping. Finally, it would be suggested to investigate the relationship between alcohol use, social support and cardiovascular heart disease, without life events.

Samenvatting

Ondanks het feit dat veel epidemiologische studies de relatie tussen alcoholgebruik en hart- en vaatziekten herhaaldelijk beschrijven als een J- of U-vormig verband met een verhoogd risico op hart- en vaatziekten voor niet-drinkers en zware drinkers en een verlaagd risico voor matige drinkers, bestaat er nog altijd discussie over een mogelijk positief effect van gemiddeld alcoholgebruik op hart- en vaatziekten. Het is aangetoond dat een hoge inname van alcohol ernstige gezondheidsproblemen kan veroorzaken. Voordat de boodschap wordt gecommuniceerd dat alcohol inderdaad een beschermend effect heeft op het krijgen van hart- en vaatziekten is het belangrijk om mogelijke alternatieve verklaringen te onderzoeken. Er zijn verschillende mogelijke mechanismen onderzocht die de relatie tussen alcoholgebruik en hart- en vaatziekten kunnen verklaren, maar deze staan nog steeds open voor discussie. Naast de mogelijke biologische verklaringen die het verband tussen alcohol en hart- en vaatziekten niet volledig verklaren, zijn er mogelijk andere verklaringen, zoals psychologische mechanismen of methodologische valkuilen, relevant om de J-vormige curve te verklaren.

Er wordt vaak geen rekening gehouden met psychologische variabelen in de relatie tussen alcoholgebruik en hart- en vaatziekten en / of sterfte. Er zijn complexe interacties tussen alcoholgebruik, psychologische variabelen (zoals stress en / of sociale steun) en gezondheid. De stress-buffering hypothese poneert dat het effect van stress anders kan zijn indien manieren om met stress om te gaan (bijvoorbeeld sociale steun of coping stijl) beschikbaar zijn. Het verlagen van spanning wordt beschouwd als een belangrijke reden voor mensen om alcohol te consumeren. De hypothese is dat alcohol een sterkte stress-dempende werking of stress-bufferende werking heeft en daardoor de negatieve gevolgen van stress kan wijzigen. Stress blijkt een risicofactor voor coronaire hartziekten.

Zoals beschreven in **hoofdstuk 1** is het doel van dit proefschrift om te onderzoeken of een stress-bufferende werking van alcoholgebruik een alternatieve manier is om de J-vormige curve te verklaren. Stress kan op verschillende manieren worden geoperationaliseerd. Er kan onderscheid worden gemaakt in objectieve stressoren of stress zoals waargenomen door een persoon, maar ook tussen het acute of meer chronische karakter van stress. In dit proefschrift wordt stress geoperationaliseerd als 'life events' (ook wel, het ervaren van negatieve ingrijpende levensgebeurtenissen), zoals de dood van een echtgenoot of verlies van werkgelegenheid. 'Life events' gelden als de meer objectieve en acute stressoren.

De onderzoeksvragen beschreven in hoofdstuk 1 zijn:

1) Wat is de relatie tussen 'life events' en alcoholgebruik in de algemene bevolking op basis van een literatuuronderzoek?
2) Wat is de relatie tussen responsgedrag en de gezondheidstoestand bij de start en overleving tijdens de follow-up periode van vijf jaar in de Leefwijze En Gezondheid Onderzoek (LEGO-studie)?
3) Wat zijn de test-hertest betrouwbaarheid en de constructvaliditeit van de Lifetime Drinking History questionnaire?
4) Wat is de relatie tussen 'life events' en alcoholgebruik in een longitudinaal cohortonderzoek en wordt deze relatie beïnvloed door geslacht, copingstijl en / of sociale steun?

5) Wat is de relatie tussen 'life events' en hart- en vaatziekten en wordt deze relatie beïnvloed door alcoholgebruik, copingstijl en / of sociale steun?

In **hoofdstuk 2** worden de resultaten beschreven van een literatuurstudie naar de relatie tussen 'life events' en alcoholgebruik in de algemene bevolking op basis van literatuur gepubliceerd tussen 1990 en 2005. De nadruk lag daarbij op het drinken van alcohol in het algemeen (met uitzondering van klinische studies gericht op zwaar drinken en alcohol misbruik of afhankelijkheid). Daarnaast werd er speciaal aandacht besteed aan het design van de studie (longitudinaal of crossectioneel).

Uit deze literatuurstudie kwam naar voren dat er een relatie is tussen 'life events' en alcoholgebruik in de algemene bevolking. De richting van het effect was echter niet eenduidig. Het werd duidelijk dat, als 'life events' in categorieën werden ingedeeld ze zowel een relatie hebben met een hoger alcoholgebruik als een lager alcoholgebruik. Het ervaren van gezondheidsgerelateerde 'life events' en financiële problemen zijn gerelateerd aan een lager alcoholgebruik, terwijl 'life events' die te maken hebben met de echtgenoot, vrienden en familieleden gerelateerd zijn aan een hoger alcoholgebruik. Een conclusie uit deze literatuur-studie was dat als je een correcte schatting van het effect van 'life events' op alcoholgebruik wilt maken, het belangrijk is om het model te specificeren waarin bufferende factoren, zoals geslacht, sociale steun, copingstijl en het alcoholgebruik bij de start van een studie zijn meegenomen.

Hoofdstuk 3 beschrijft de onderzoekspopulatie, het design van de studie en de verschillende methoden die worden gebruikt in de LEGO-studie. Dit is een prospectieve cohort studie, met als doel te onderzoeken of andere factoren dan strikt biologische een verklaring kunnen geven voor het gevonden verhoogde risico op hart- en vaatziekten voor niet-drinkers en zware drinkers en het verlaagde risico voor matige drinkers.

De LEGO-studie startte in 1996 toen een baseline vragenlijst werd opgestuurd welke werd gevolgd door vier jaarlijkse follow-up vragenlijsten. De registers van 34 huisartspraktijken werden gebruikt als steek-proefkader. Terminaal zieke patiënten met een levensverwachting van minder dan drie maanden, personen met ernstige dementie, mensen met verstandelijke beperkingen en personen die in een instelling woonden werden door de huisartsen uitgesloten van deelname aan het cohort. Alle andere mannen en vrouwen in de leeftijd van 45 tot en met 70 jaar, die bij de deelnemende huisartsen stonden ingeschreven, werden opgenomen in de studie en kregen een baseline vragenlijst toegestuurd. In totaal werden 31.349 mannen en vrouwen in de leeftijd van 45 tot en met 70 jaar benaderd bij het begin van de studie. Van deze 31.349, stuurden 16.210 (51,7%) de baseline vragenlijst terug, weigerden 5.882 (18,8%) hun deelname aan de studie en reageerden 9.257 (29,5%) helemaal niet.

Via de huisartsen werd de medische informatie verzameld. Deze registreerden alle voormalige en tijdens de follow-up periode (van juli 1996 tot juni 2001) voor een huisarts relevante optredende gezondheidspro-blemen op de zogenaamde probleemlijsten. Deze probleemlijst vormt een essentieel onderdeel van het medische dossier. Daarnaast rapporteerden de huisartsen alle hartinfarcten en alle sterfgevallen die tijdens de follow-up periode plaatsvonden direct aan de onderzoeksgroep. De vragenlijst bevatte onder andere vragen over gezondheid, leefstijl (bijvoorbeeld, alcoholgebruik), 'life events', copingstijlen en sociale steun.

In **hoofdstuk 4** werden de resultaten van een non-respons analyse gerapporteerd. Als non-respons willekeurig is, is de bedreiging voor de generaliseerbaarheid van de resultaten van de studie beperkt. Maar als het niet willekeurig is, kan het leiden tot vertekening in de studieresultaten. Als de non-respondenten verschillen van de respondenten op de risicofactoren of de uitkomsten van de studie dan neemt de kans op non-respons bias toe.

De relatie tussen responsgedrag en de gezondheidstoestand bij de start en overleving tijdens de follow-up periode van vijf jaar werd onderzocht. Objectieve retrospectieve en prospectieve gezondheidsgegevens waren voor zowel de respondenten als de 'noncontacts' beschikbaar. Voor de weigeraars was alleen retrospectieve informatie beschikbaar over hart- en vaatziekten (dwz. coronaire hartziekte (gedefinieerd als angina pectoris, acuut myocard infarct, of chronische ischemische hartziekte), hartfalen, niet-fatale beroerte en andere arteriële obstructie of perifeer vaatlijden) en over hypertensie met orgaanbeschadiging, diabetes mellitus en hypercholesterolemie.

De resultaten in hoofdstuk 4, laten zien dat coronaire hartziekten vaker voorkomen bij de respondenten, dan bij de non-respondenten. In vergelijking met respondenten hadden 'noncontacts' een hoger risico om te over-lijden tijdens de follow-up. Weigeraars hadden, in vergelijking met 'noncontacts', vaker hypercholesterolemie en minder kans op coronaire hartziekten en diabetes mellitus. De resultaten blijken paradoxaal aangezien de respondenten minder gezond waren bij de start van de LEGO-studie, maar daarentegen wel een lager risico hadden om te overlijden tijdens de follow-up periode. Dit zou kunnen wijzen op een selectie-effect, waarbij de "worried ill" sneller geneigd zijn om deel te nemen. Dit effect zou kunnen betekenen dat de gevonden relaties tussen risicofactoren of risicogedragingen en de uitkomsten van cohortstudies afgezwakt worden.

De kwaliteit, construct validiteit en test-hertest betrouwbaarheid van een nieuwe vragenlijst genaamd de Lifetime Drinking History questionnaire (LDH-q) worden getest in een steekproef van 3.255 mannen en vrouwen van de LEGO-studie. De resultaten worden gerapporteerd in **hoofdstuk 5**. De LDH-q is ontwikkeld voor de LEGO-studie, omdat alleen interview-vragenlijsten bestonden om alcoholgebruik gedurende het hele leven te meten. Daarnaast heeft de LEGO-studie een te hoog aantal respondenten om ze allemaal te interviewen. Test-hertest betrouwbaarheid is geschat door middel van de intraclass correlatie coëfficiënt en kappa scores. Correlaties tussen levenslange en de huidige consumptie werden gebruikt om de discriminante en convergente validiteit te bepalen. Zowel de betrouwbaarheid als de validiteit bleek redelijk hoog te zijn in vergelijking tot de resultaten uit studies die gebruik maakten van interview-vragenlijsten om alcoholgebruik gedurende het hele leven te meten. Betrouwbaarheid van de LDH-q was hoger voor mannen dan voor vrouwen, dit wordt waarschijnlijk veroorzaakt doordat mannen frequenter en regelmatiger alcohol gebruiken. Resultaten van indicatoren voor validiteit waren vergelijkbaar voor mannen (0,75) en vrouwen (0,70). Uit deze resultaten komt naar voren dat de LDH-q een bruikbaar instrument kan zijn in grote cohortstudies.

In **hoofdstuk 6** worden de resultaten van de analyse naar de relatie tussen 'life events' en alcoholgebruik in een longitudinale studie beschreven. Uit de literatuurstudie in hoofdstuk 2 kwam naar voren dat als je een goede schatting van het effect van 'life events' wilt maken, het belangrijk is dat er in een model rekening wordt gehouden met mogelijke bufferende factoren, zoals sociale steun en copingstijlen. Er werd

een interactie-effect gevonden tussen ‘life events’ en een emotiegerichte copingstijl op alcoholgebruik; er werd een positieve relatie gevonden tussen ‘life events’ en alcoholgebruik bij mensen die hoog scoorden op een emotiegerichte copingstijl en een negatieve bij mensen die laag scoorden op een emotiegerichte copingstijl. Een cognitief gerichte copingstijl, een actie gerichte copingstijl, het daadwerkelijk ervaren van sociale steun, sociale contacten en geslacht hadden geen effect op de relatie tussen ‘life events’ en alcoholgebruik. Echter, mensen met een meer cognitief gerichte copingstijl of meer sociale contacten werden geassocieerd met een lager alcoholgebruik, terwijl mensen met een meer actie gerichte copingstijl en mensen die hoger scoren op het daadwerkelijk ervaren van sociale steun werden geassocieerd met een hoger alcoholgebruik. Het lijkt aannemelijk dat mensen die hoog scoren op een emotiegerichte copingstijl, gekenmerkt door een passieve, berustende en zelfbeschuldigende copingstijl, meer gaan drinken na het doormaken van ‘life events’.

In **hoofdstuk 7** wordt longitudinaal de relatie tussen ‘life events’ en niet-fatale en fatale hart- en vaatziekten onderzocht en daarnaast wordt gekeken of deze relatie wordt beïnvloed door alcoholgebruik. De hypothese is dat, indien alcohol een stress-bufferende werking heeft, niet-drinkers kwetsbaarder zijn voor de negatieve gevolgen van stress, omdat ze alcohol niet kunnen gebruiken om eventuele spanning te verlagen. Zowel alcoholgebruik als sociale steun is naar voren gebracht als een factor die de negatieve gevolgen van stress op coronaire hartziekten kan veranderen. Als dat inderdaad klopt, dan kunnen deze factoren mogelijk relevant zijn om de J-vormige curve te verklaren die gevonden wordt in studies naar de relatie tussen alcoholgebruik en hart- en vaatziekten. Het bleek dat vrouwen een hoger risico hadden om hart- en vaatziekten te krijgen binnen een jaar na het ervaren van een of meer ‘life events’, terwijl mannen juist een lager risico bleken te hebben. Alcoholgebruik, copingstijl en sociale steun hadden geen invloed op de relatie tussen ‘life events’ en hart- en vaatziekten. Meer sociale contacten bleek te zijn geassocieerd met een lager risico op het krijgen van hart- en vaatziekten, terwijl hoog scoren op het daadwerkelijk ervaren van sociale steun geassocieerd bleek te zijn met een hoger risico. Er kan worden geconcludeerd dat er geen bewijs is gevonden dat alcohol een sterke stress-bufferende werking heeft. En er is dus geen andere verklaring voor de J-vormige relatie tussen alcoholgebruik en hart- en vaatziekten gevonden.

In het laatste hoofdstuk van dit proefschrift, **hoofdstuk 8**, worden de belangrijkste bevindingen besproken en in een breder perspectief geplaatst. Daarnaast worden de sterke en zwakke punten van de verschillende studies beschreven en aanbevelingen voor vervolgonderzoek gedaan. Er wordt een aantal interessante resultaten gepresenteerd, bijvoorbeeld dat de richting van het verband tussen ‘life events’ en alcoholgebruik afhankelijk was van de gehanteerde copingstijl van de persoon. Er kan alleen niet uit dit proefschrift worden geconcludeerd dat er een stress-bufferende werking van alcoholgebruik is gevonden en er is dus geen andere verklaring voor de J-vormige relatie tussen alcoholgebruik en hart- en vaatziekten gevonden. Suggesties voor verder onderzoek zouden zijn om het effect van alcoholgebruik te onderzoeken op de relatie tussen depressie en hart- en vaatziekten, of op de relatie tussen chronische stress en hart- en vaatziekten, of op de relatie tussen ‘daily hassles’ en hart- en vaatziekten. Een ander voorstel zou zijn om het effect van alcoholgebruik op de relatie tussen ‘life events’ en hart- en vaatziekten te onderzoeken, waarbij gecontroleerd wordt voor de emotie gerichte copingstijl. De laatste suggestie zou zijn om de relatie tussen alcoholgebruik, sociale steun en hart- en vaatziekten te onderzoeken waarbij ‘life events’ buiten beschouwing wordt gelaten.

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About the author

Marja Veenstra was born on December 31st, 1974 in Drachten, the Netherlands. She completed her secondary education at the Emelwerda College in Emmeloord, graduating in 1992. She then started her bachelor study in Nursing at the Noordelijke Hogeschool in Leeuwarden. After her graduation in 1996 she studied Health Sciences at Maastricht University specialising in Health Education and Health Promotion and Epidemiology. She completed her Masters in 1999.

In 2000 she started as a researcher for three months at the Comprehensive Cancer Centre Limburg (IKL) in Maastricht. She performed the effect evaluation of a health oriented rehabilitation programme for patients recovering from cancer called Recovery & Stability or in Dutch Herstel & Balans.

From September 2000 till August 2005, she worked as a PhD-student at the Addiction Research Institute (IVO), her place of work was at the Maastricht University. The aim of her PhD project, which is described in this thesis, was to investigate whether a stress buffering effect of alcohol use offers an additional explanation for the J-shaped risk relationship between alcohol use and cardiovascular disease. In 2003 she obtained her Masters of Science-degree in Health Services Research of the Netherlands Institute for Health Sciences (NIHES) at the Erasmus University Rotterdam.

From August 2005 till December 2008 she worked as a researcher at the Department of General Practice at Maastricht University on the Pomona 2 project. The over-arching aim of Pomona 2 was to promote the quality of life and health of people with intellectual disability in Europe through building health information and knowledge.

From September 2009 till December 2009 she worked as a teacher at Social Work at the Hogeschool Zuyd in Sittard.

Since January 2010 she works as an advisor at the "Huis voor de Zorg" an independent organisation dedicated to the interests of all (potential) health care consumers in Limburg. It provides information and in case of complaints assistance. It monitors and examines the quality of health care and aims to improve it. The effort is always focused on increasing "power" of health care consumers.

Marja lives together with Peter and together they have three children; Jesper (September 2006) and the twins Fenna and Sybren (December 2008).

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appendix A

Baseline questionnaire

Rijksuniversiteit Limburg | Maastricht

Vragenlijst leefwijze en gezondheid

VUL IN:

Wat is uw geslacht?

☐ **man** ☐ **vrouw**

Wat is uw geboortedatum?

☐☐ ☐☐ **19** ☐☐

dag **maand** **jaar**

BELANGRIJK!

Komen uw geslacht en geboortedatum overeen met de gegevens op het etiket bovenaan deze pagina?
Als dit niet het geval is, is de vragenlijst mogelijk per ongeluk verwisseld met die van uw echtgeno(o)t(e) of een andere huisgenoot.
Zorgt u dat u de juiste vragenlijst heeft, voor u verder gaat met invullen.

Deze vragenlijst gaat over onderwerpen zoals: gezondheid, ademhaling, vermoeidheid, voeding, drinkgewoonten, sociale omgeving, rookgewoonten, beweging, meningen.

Instructie voor het invullen van deze vragenlijst: zie volgende pagina

Dit onderzoek is mede mogelijk gemaakt door de Nederlandse Hart Stichting

INSTRUCTIE

Sommige vragen gaan over gezondheidsklachten. Het is mogelijk dat u niet alles precies meer weet. U hoeft in dat geval niet uw huisarts te bellen. Wat u zelf nog weet is voor ons voldoende.

Probeert u wel alle vragen volledig te beantwoorden. Als u de lijst erg lang vindt, kunt u deze ook in twee keer invullen. Er zijn geen 'goede' of 'foute' antwoorden. Elk antwoord is belangrijk voor dit onderzoek als het voor u van toepassing is.

Deze vragenlijst is voor UZELF bedoeld. Het is belangrijk dat u de lijst invult en niet iemand anders. Leest u voor u verder gaat, eerst rustig de aanwijzingen.

Als u per ongeluk het verkeerde hokje aankruist, maakt u het dan helemaal dicht en kruis dan het juiste hokje aan.

■ fout
☒ goed

Soms zijn één of meer vragen voor u niet van toepassing. Dit wordt zo aangegeven:

nee ➡ ga verder met vraag ❻

U kunt dan alle vragen tot het genoemde nummer overslaan.

Voor informatie over vragenlijst en onderzoek: 043-3882376

ALGEMENE GEZONDHEID

		erg goed	goed	matig	slecht	erg slecht
1	Hoe is over het algemeen uw gezondheid?	☐	☐	☐	☐	☐

2 Heeft u een of meer chronische aandoeningen of langdurige ziekten? ☐ ja ☐ nee, ➡ ga verder met vraag 4

		erg sterk	sterk	matig	niet of nauwelijks	helemaal niet
3	In welke mate is deze aandoening of ziekte van invloed op uw dagelijks leven?	☐	☐	☐	☐	☐

4 Heeft u ooit ernstige lichamelijke klachten gehad of heeft u ze nog, en wel op het vlak van:
Meer dan één antwoord mogelijk.

Kruis voor elke periode aan of u de betreffende klacht heeft of heeft gehad.

	0-18 jaar	19-27 jaar	28-45 jaar	46-60 jaar	61- ouder
hart of bloedsomloop ▸	☐	☐	☐	☐	☐
klachten in rug of ledematen ▸	☐	☐	☐	☐	☐
longen ▸	☐	☐	☐	☐	☐
mond, slokdarm, maag, buik, lever, gal, nieren ▸	☐	☐	☐	☐	☐
ongeluk of val ▸	☐	☐	○	☐	☐
andere lichamelijke klachten ▸	☐	☐	☐	☐	☐

5 Heeft u ooit ernstige psychische klachten gehad of heeft u ze nog, en wel op het vlak van:
Meer dan één antwoord mogelijk.

Kruis voor elke periode aan of u de betreffende klacht heeft of heeft gehad.

	0-18 jaar	19-27 jaar	28-45 jaar	46-60 jaar	61- ouder
moeheid ▸	☐	☐	☐	☐	☐
depressie ▸	☐	☐	☐	☐	☐
nerveus ▸	☐	☐	☐	☐	☐
angst ▸	☐	☐	☐	☐	☐
slapeloosheid ▸	☐	☐	☐	☐	☐
verwardheid ▸	☐	☐	☐	☐	☐
andere psychische klachten ▸	☐	☐	☐	☐	☐

6 Wat is uw lengte (zonder schoenen)? ☐☐☐ centimeter

7 Wat is uw gewicht (zonder kleren)? ☐☐☐ kilo

BORSTKLACHTEN: IN DE AFGELOPEN 6 MAANDEN

Als u het niet zeker weet, kruis dan het vraagteken aan

8 Heeft u pijn of een onaangenaam gevoel in de borst gehad? *(verkoudheid niet meetellen)* ☐ ja ☐ ? ☐ nee

9 Heeft u een drukkend of zwaar gevoel op de borst gehad? *(verkoudheid niet meetellen)* ☐ ja ☐ ? ☐ nee

10 Heeft u aanvallen van beklemmende pijn in de borst gehad? ☐ ja ☐ ? ☐ nee

Als u alle drie bovenstaande vragen met "nee" heeft beantwoord, kunt u doorgaan met vraag 22

11 Kreeg u deze druk of pijn als u een helling of trap opliep, zich voorthaastte of tegen de wind in liep of fietste? ☐ ja ☐ ? ☐ nee

12 Kreeg u deze druk of pijn als u gewoon op straat liep? ☐ ja ☐ ? ☐ nee

Als u de vragen 11 en 12 met "nee" heeft beantwoord, kunt u doorgaan met vraag 15

13 Wat deed u als u deze druk of pijn kreeg terwijl u liep of fietste?
- ☐ gewoon doorlopen of doorfietsen
- ☐ langzamer lopen of fietsen, of stilstaan
- ☐ tablet onder de tong nemen

14 De druk of pijn verdween dan...
- ☐ binnen tien minuten
- ☐ na langer dan tien minuten
- ☐ helemaal niet

15 Kreeg u deze druk of pijn...
- ☐ als u van de warmte in de kou kwam
- ☐ als u van de kou in de warmte kwam
- ☐ als u opgewonden of overstuur was
- ☐ binnen tien minuten na de maaltijd
- ☐ anders, nl. ____

16 Zijn de klachten van pijn of drukkend gevoel in de borst pas de laatste drie maanden opgetreden? ☐ ja ☐ ? ☐ nee

17 Kwamen de klachten van pijn of drukkend gevoel in de borst pas de laatste drie maanden veel vaker voor? ☐ ja ☐ ? ☐ nee

18 Werden deze klachten steeds erger? ☐ ja ☐ ? ☐ nee

19 Heeft u ooit een aanval gehad van ernstige pijn voor op de borst, die een half uur of langer duurde? ☐ ja ☐ ? ☐ nee

Als u vraag 19 met "nee" heeft beantwoord, kunt u doorgaan met vraag 22

20 Heeft u meer dan eens zo'n langdurige pijn gehad? ☐ ja ☐ ? ☐ nee

21 Hoe lang geleden had u de laatste aanval van pijn?
- ☐ korter dan een jaar geleden
- ☐ langer dan een jaar geleden

MEDICIJNGEBRUIK: IN DE AFGELOPEN 12 MAANDEN

22 Gebruikte u de afgelopen 12 maanden minstens één keer per week pijnstillers?
Kruis op elke regel één hokje aan.

		zowel op recept als op eigen initiatief	op recept van arts	op eigen initiatief
• Aspirine, Acetosal, Acetylsalicylzuur: Aspro, Alka-Seltzer, APC, Chefarine, Rhonal e.d. ☐ nee, ja ➡		☐	☐	☐
• Paracetamol: Finimal, Panadol, Hedex, Witte Kruis e.d. ☐ nee, ja ➡		☐	☐	☐
• Overige pijnstillers bijv. ibuprofen e.d. ☐ nee, ja ➡		☐	☐	☐

23 Gebruikte u de afgelopen 12 maanden minstens één keer per week de volgende medicijnen?
Kruis op elke regel één hokje aan.

			zowel op recept als op eigen initiatief	op recept van arts	op eigen initiatief
slaapmiddelen	☐ nee,	ja ➡	☐	☐	☐
kalmeringsmiddelen	☐ nee,	ja ➡	☐	☐	☐
overige medicijnen (geen pijnstillers)	☐ nee,	ja ➡	☐	☐	☐

24 Heeft u de afgelopen 12 maanden vitaminepillen, -druppels of andere preparaten geslikt?

☐ nee ☐ ja, nl. de volgende merken:

	welk merk?	aantal per dag?	alleen 's winters	het gehele jaar door
1			☐	☐
2			☐	☐
3			☐	☐

25 Bent u buiten adem wanneer u een heuveltje oploopt of wanneer u zich moet haasten, lopend op vlak terrein?
☐ ja ☐ nee

26 Raakt u sneller buiten adem dan andere mensen van uw leeftijd als u op vlak terrein loopt?
☐ ja ☐ nee

27 Moet u af en toe stoppen om op adem te komen als u in uw eigen tempo loopt op vlak terrein?
☐ ja ☐ nee

28 Raakt u buiten adem wanneer u zich wast of aankleedt?
☐ ja ☐ nee

29 Hoe vaak snurkt u?
☐ iedere nacht
☐ 2-5 keer per week
☐ 2-4 keer maandelijks
☐ minder dan eens per maand
☐ weet ik niet
☐ nooit ➡ ga verder met vraag 31

30 Wordt het snurken onderbroken door adempauzes?
☐ ja ☐ nee ☐ weet ik niet

31 Slaapt u doorgaans alleen of met iemand samen op één kamer?
☐ alleen ☐ met iemand samen

VERMOEIDHEID: IN DE AFGELOPEN 3 MAANDEN

Kruis op elke regel één hokje aan.

	ja	?	nee
32 • Voelt u zich vaak moe?	☐	☐	☐
• Heeft u vaak moeite om in te slapen?	☐	☐	☐
• Wordt u 's nachts vaak wakker?	☐	☐	☐
• Ik doe 's nachts vaak geen oog dicht	☐	☐	☐
• Voelt u zich vaak slap?	☐	☐	☐
• Heeft u het gevoel dat u de laatste tijd weinig presteert?	☐	☐	☐

Kruis op elke regel één hokje aan.

	ja	?	nee
• Heeft u weleens het gevoel dat het u allemaal wat te veel wordt?	☐	☐	☐
• Heeft u het gevoel dat u in het slop zit?	☐	☐	☐
• Voelt u zich de laatste tijd lustelozer dan vroeger?	☐	☐	☐
• Ik voel mij 's ochtends, nadat ik ben opgestaan, meestal goed uitgerust	☐	☐	☐
• Is uw plezier in het seksuele verminderd?	☐	☐	☐
• Heeft u de laatste tijd weleens een gevoel van hopeloosheid gehad?	☐	☐	☐
• Doet u er nu langer over om een moeilijk probleem te begrijpen dan een jaar geleden?	☐	☐	☐
• Ik ben vaak erg slaperig overdag	☐	☐	☐
• Is het zo dat allerlei kleine dingen u meer ergeren dan vroeger?	☐	☐	☐
• Heeft u de laatste tijd weleens het verlangen voelen opkomen om het bijltje erbij neer te gooien?	☐	☐	☐
• Ik voel me prima	☐	☐	☐
• Heeft u weleens het gevoel dat uw lichaam een batterij is, waarvan de kracht of het vermogen aan het opraken is?	☐	☐	☐
• Overdag val ik soms in slaap ook al wil ik dat niet	☐	☐	☐
• Zou u soms weleens dood willen zijn?	☐	☐	☐
• Heeft u de laatste tijd het gevoel dat u niet meer zoveel waard bent als vroeger?	☐	☐	☐
• Voelt u zich moedeloos?	☐	☐	☐
• Heeft u weleens huilbuien?	☐	☐	☐
• Ik word overdag vaak overmand door slaap	☐	☐	☐
• Wordt u wel eens wakker met een gevoel van uitputting en vermoeidheid?	☐	☐	☐
• Is het moeilijk voor u geworden om u lang op één ding te concentreren?	☐	☐	☐
• Kunt u de laatste tijd door kleine dingen soms erg geprikkeld raken?	☐	☐	☐
• Ik kan de laatste tijd soms erg opvliegend zijn	☐	☐	☐

VOEDING: IN DE AFGELOPEN 3 MAANDEN

De volgende vragen gaan over hoe vaak UZELF bepaalde voedingsmiddelen eet. Wat u eventueel voor anderen bereidt, telt dus niet mee.
Denkt u hierbij aan wat u de afgelopen DRIE MAANDEN gewoonlijk heeft gegeten. Laat een eventueel dieet buiten beschouwing als het korter duurde dan drie weken.

1 Hoeveel dagen per week drinkt of eet u meestal...
Kruis op elke regel één hokje aan.

	nooit of minder dan 1 keer per week	dagen per week 1-2	3-4	5-6	7
• gewone witte melk of karnemelk?	☐	☐	☐	☐	☐
• yoghurt, vruchten yoghurt of biogarde?	☐	☐	☐	☐	☐
• vla, pudding of pap?	☐	☐	☐	☐	☐

2 Hoeveel glazen of schaaltjes drinkt of eet u gewoonlijk op zo'n dag?
Kruis op elke regel één hokje aan.

	geen	per dag: 1	2	3	4	5 of meer
• glazen melk of karnemelk?	☐	☐	☐	☐	☐	☐
• schaaltjes yoghurt?	☐	☐	☐	☐	☐	☐
• schaaltjes vla, pudding of pap?	☐	☐	☐	☐	☐	☐

3 Wat voor soort melk gebruikt u meestal?

☐ volle ☐ magere ☐ karnemelk
☐ halfvolle ☐ wisselend ☐ niet van toepassing

4 Wat voor soort yoghurt, vruchtenyoghurt of biogarde gebruikt u meestal?

☐ volle ☐ magere
☐ halfvolle ☐ wisselend ☐ niet van toepassing

5 *Kruis op elke regel één hokje aan.*

	geen	1-2	3-4	5-6	7-8	9 of meer
• Hoeveel sneetjes brood, broodjes, crackers of beschuiten eet u meestal per dag?	☐	☐	☐	☐	☐	☐
• Hoeveel daarvan belegt u meestal met kaas?	☐	☐	☐	☐	☐	☐
• Hoeveel daarvan belegt u meestal met vleeswaren?	☐	☐	☐	☐	☐	☐

6 Kunt u drie soorten vleeswaren opschrijven die u gewoonlijk op uw brood eet?

1 _____
2 _____
3 _____

7 Wat voor soort boter smeert u MEESTAL op uw brood?

☐ margarine ☐ roomboter
☐ dieet-margarine ☐ wisselend
☐ halvarine of dieethalvarine ☐ geen boter

8 Hoe vaak eet u vleessoorten zoals rookworst, verse worst, of saucijsjes bij de warme maaltijd?

☐ nooit/minder dan 1 keer per maand ☐ 1 keer per twee weken
☐ 1 keer per week
☐ 1 keer per maand ☐ 2 keer per week
☐ 1 keer per drie weken ☐ 3 keer of vaker per week

9 Hoe vaak eet u half-om-half gehakt?

☐ nooit/minder dan 1 keer per maand ☐ 1 keer per twee weken
☐ 1 keer per week
☐ 1 keer per maand ☐ 2 keer per week
☐ 1 keer per drie weken ☐ 3 keer of vaker per week

10 Hoe vaak eet u speklappen of doorregen varkenslappen?

☐ nooit/minder dan 1 keer per maand ☐ 1 keer per twee weken
☐ 1 keer per week
☐ 1 keer per maand ☐ 2 keer per week
☐ 1 keer per drie weken ☐ 3 keer of vaker per week

11 Hoeveel dagen per week gebruikt u jus bij de warme maaltijd?

☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ elke dag

☐ nooit/minder dan 1 keer per week ➡ ga verder met vraag **14**

12 Hoeveel lepels jus gebruikt u dan gewoonlijk per maaltijd?

1	2	3	4	5	meer dan 5 lepels
☐	☐	☐	☐	☐	☐

13 Over wat voor soort lepel heeft u het dan?

☐ eetlepel ☐ juslepel van het lepelrek
☐ gewone juslepel ☐ niet van toepassing

14 Hoe vaak eet u naast de maaltijden nog TUSSENDOORTJES zoals snacks, patat, worst, kroketten, slaatjes, enz.?

☐ nooit/minder dan 1 keer per maand ☐ 1 keer per twee weken
☐ 1 keer per week
☐ 1 keer per maand ☐ 2 keer per week
☐ 1 keer per drie weken ☐ 3 keer of vaker per week

15 Hoe vaak eet u naast de maaltijden nog TUSSENDOORTJES zoals:
Kruis op elke regel één hokje aan.

	nooit of minder dan 1 keer per week	dagen per week: 1-2	3-4	5-6	7
• pinda's, nootjes, chips, blokjes kaas of worst?	☐	☐	☐	☐	☐
• gebak, cake, grote koeken en chocolade?	☐	☐	☐	☐	☐
• koekjes?	☐	☐	☐	☐	☐

16 Hoeveel koekjes eet u dan gemiddeld op zo'n dag?

Geen	1-2	3-4	5-6	7 of meer per dag
☐	☐	☐	☐	☐

17 Hoeveel dagen per week eet u gewoonlijk...
Kruis op elke regel één hokje aan.

	nooit of minder dan 1 keer per week	dagen per week: 1-2	3-4	5-6	7
• gekookte groente?	☐	☐	☐	☐	☐
• sla of andere rauwkost?	☐	☐	☐	☐	☐

18 Eet u gewoonlijk groente of sla?
Kruis op elke regel één hokje aan.

	ja	nee
• bij de warme maaltijd	☐	☐
• bij de broodmaaltijd	☐	☐
• tussendoor	☐	☐

19 Hoeveel dagen per week eet u gewoonlijk...
Kruis op elke regel één hokje aan

	nooit of minder dan 1 keer per week	dagen per week: 1-2	3-4	5-6	7
• uien	☐	☐	☐	☐	☐
• knoflook (teentje)	☐	☐	☐	☐	☐
• appels	☐	☐	☐	☐	☐
• citrusfruit (sinaasappels, grapefruit of mandarijnen)	☐	☐	☐	☐	☐
• ander fruit (bananen, peren, tropisch fruit, enz.)	☐	☐	☐	☐	☐

20 Hoeveel uien of teentjes knoflook eet u dan ZELF op zo'n dag? *(deel zonodig het aantal uien of teentjes in de maaltijd door het aantal personen)*

	geen	per dag: minder dan 1	1	2	3	4 of meer
• uien	☐	☐	☐	☐	☐	☐
• teentjes knoflook	☐	☐	☐	☐	☐	☐

21 Hoeveel stuks fruit eet u gewoonlijk op zo'n dag?
Kruis op elke regel één hokje aan.

	geen	per dag: minder dan 1	1	2	3	4 of meer
• appels	☐	☐	☐	☐	☐	☐
• citrusfruit (sinaasappels, grapefruit of mandarijnen)	☐	☐	☐	☐	☐	☐
• ander fruit (bananen, peren, tropisch fruit, enz.)	☐	☐	☐	☐	☐	☐

22 Bent u vegetariër?

☐ ja ☐ nee

23 Volgt u momenteel een dieet?

☐ ja ☐ nee

KOFFIE EN THEE:

IN DE AFGELOPEN 12 MAANDEN

24 Hoe vaak drinkt u koffie?

nooit of minder dan 1 keer per week ☐ | dagen per week: 1-2 ☐ 3-4 ☐ 5-6 ☐ 7 ☐

25 Hoeveel koppen zijn dat dan op zo'n dag? ☐☐ koppen

26 Gebruikt u cafeïne-vrije koffie? altijd ☐ meestal ☐ af en toe ☐ zelden ☐ nooit ☐

27 Hoe vaak per week drinkt u thee?

nooit of minder dan 1 keer per week ☐ | dagen per week: 1-2 ☐ 3-4 ☐ 5-6 ☐ 7 ☐

28 Hoeveel koppen zijn dat dan op zo'n dag? ☐☐ koppen

GEBRUIK VAN BIER, WIJN, STERKE DRANK

Het doel van deze vragen is om een indruk te krijgen van uw gebruik van bier, wijn en sterke drank vanaf uw jeugd tot nu.

We onderscheiden drie soorten drank, nl. bier, wijn en sterke drank (gedistilleerd).
We verstaan onder:

BIER:	alle biersoorten, behalve alcoholvrij bier
WIJN:	alle wijnsoorten, sherry, Martini, port en vruchtenwijnen
STERKE DRANK:	alle gedistilleerde dranken (jenever, whisky, cognac), mixen, cocktails en likeur (met een alcohol percentage hoger dan 20%).

1 Op welke leeftijd heeft u voor het eerst bier, wijn of sterke drank gedronken?
We bedoelen een heel glas en niet alleen proeven aan een glaasje van iemand anders.

Vul hier de leeftijd in: ☐☐

▶ **Ligt deze leeftijd tussen:**
Kruis de juiste periode aan

12-18 jaar?	☐ ➡ ga verder met vraag ●	**JEUGD op pagina 10**
19-27 jaar?	☐ ➡ ga verder met vraag ●	**JONGE VOLWASSENHEID op pagina 11**
28-44 jaar?	☐ ➡ ga verder met vraag ●	**VOLWASSENHEID op pagina 12**
45-60 jaar?	☐ ➡ ga verder met vraag ●	**MIDDELBARE LEEFTIJD op pagina 13**
61 jaar of ouder?	☐ ➡ ga verder met vraag ●	**OUDERE LEEFTIJD op pagina 14**

☐ **Ik heb nog nooit bier, wijn of sterke drank gedronken ➡ ga verder met EFFECTEN op pagina 18**

A JEUGD

U was toen tussen de 12 en 18 jaar

2 Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tijdens uw jeugd?
Reken vanaf de bij vraag 1 opgegeven leeftijd.

☐ iedere dag ☐ 1 - 3 dagen per maand
☐ 5 - 6 dagen per week ☐ 3 - 5 dagen per halfjaar
☐ 3 - 4 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 1 - 2 dagen per week ☐ nooit ➡ ga verder met vraag 12

3 Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

4 Dronk u meestal bier, wijn of sterke drank?
Kruis op elke regel één hokje aan.

	altijd	meestal	af en toe	zelden	nooit
bier ▶	☐	☐	☐	☐	☐
wijn ▶	☐	☐	☐	☐	☐
sterke drank ▶	☐	☐	☐	☐	☐

5 Waar dronk u tijdens uw jeugd?
Kruis op elke regel één hokje aan.

	altijd	meestal	af en toe	zelden	nooit
thuis of bij anderen thuis ▶	☐	☐	☐	☐	☐
buitenshuis, zoals café, dancing, restaurant ▶	☐	☐	☐	☐	☐

6 Dronk u meestal alleen?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

7 Hoe vaak dronk u tijdens uw jeugd 6 of meer glazen bier, wijn of sterke drank op één dag?

☐ iedere dag ☐ 1 - 3 dagen per maand
☐ 5 - 6 dagen per week ☐ 3 - 5 dagen per halfjaar
☐ 3 - 4 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 1 - 2 dagen per week ☐ nooit

8 Bent u ooit bewust gestopt met het drinken van alcohol in deze periode?

☐ ja ☐ nee ➡ ga verder met vraag 12

9 Indien gestopt tijdens uw jeugd, bent u toen voorgoed of tijdelijk gestopt?

tijdelijk ▶ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar
Hoe lang duurde het? ☐☐ maanden ☐☐ jaar

voorgoed ▶ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar

10 Bent u toen gestopt...
Meer dan één antwoord mogelijk.

☐ vanwege advies van een arts of specialist
☐ op aandringen van mijn partner
☐ mijn familie adviseerde me te stoppen
☐ collega's drongen aan te stoppen
☐ op advies van anderen, nl. ☐

11 Om welke reden bent u toen gestopt...
Meer dan één antwoord mogelijk.

☐ vanwege uw gezondheid
☐ vanwege te grote afhankelijkheid van de drank
☐ omdat het te duur was
☐ vanwege uw werk
☐ omdat u moeilijkheden kreeg met anderen
☐ andere reden nl. ☐

12 Heeft u na uw 18e levensjaar nog bier, wijn of sterke drank gedronken?
- ☐ ja ➡ ga verder met vraag 13
- ☐ nee ➡ ga verder met "EFFECTEN" op pag. 18

B JONGE VOLWASSENHEID — U was toen tussen de 19 en 27 jaar

13 Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 19e en 27e jaar?
- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 23

14 Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

15 Dronk u meestal bier, wijn of sterke drank? *Kruis op elke regel één hokje aan.*

	altijd	meestal	af en toe	zelden	nooit
bier ▸	☐	☐	☐	☐	☐
wijn ▸	☐	☐	☐	☐	☐
sterke drank ▸	☐	☐	☐	☐	☐

16 Waar dronk u tijdens uw jonge volwassenheid (19-27 jaar)? *Kruis op elke regel één hokje aan.*

	altijd	meestal	af en toe	zelden	nooit
thuis of bij anderen thuis ▸	☐	☐	☐	☐	☐
buitenshuis, zoals café, dancing, restaurant ▸	☐	☐	☐	☐	☐

17 Dronk u meestal alleen?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

18 Hoe vaak dronk u 6 of meer glazen bier, wijn of sterke drank op één dag tussen uw 19e en 27e jaar?
- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit

19 Bent u ooit bewust gestopt met het drinken van alcohol in deze periode?
- ☐ ja
- ☐ nee ➡ ga verder met vraag 23

20 Indien gestopt tussen uw 19e en 27e jaar, bent u toen voorgoed of tijdelijk gestopt?
- tijdelijk ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar
  Hoe lang duurde het? ☐☐ maanden ☐☐ jaar
- voorgoed ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar

21 Bent u toen gestopt...
Meer dan één antwoord mogelijk.
- ☐ vanwege advies van een arts of specialist
- ☐ op aandringen van mijn partner
- ☐ mijn familie adviseerde me te stoppen
- ☐ collega's drongen aan te stoppen
- ☐ op advies van anderen, nl. ____

22 Om welke reden bent u toen gestopt...
Meer dan één antwoord mogelijk.
- ☐ vanwege uw gezondheid
- ☐ vanwege te grote afhankelijkheid van de drank
- ☐ omdat het te duur was
- ☐ vanwege uw werk
- ☐ omdat u moeilijkheden kreeg met anderen
- ☐ andere reden, nl. ____

23 Heeft u na uw 27ste levensjaar nog bier, wijn of sterke drank gedronken?
- ☐ ja ➡ ga verder met vraag 24
- ☐ nee ➡ ga verder met "EFFECTEN" op pag. 18

C VOLWASSENHEID — U was toen tussen de 28 en 44 jaar

24 Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 28e en 44e jaar?
- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 34

25 Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

26 Dronk u meestal bier, wijn of sterke drank? *Kruis op elke regel één hokje aan.*

	altijd	meestal	af en toe	zelden	nooit
bier ▸	☐	☐	☐	☐	☐
wijn ▸	☐	☐	☐	☐	☐
sterke drank ▸	☐	☐	☐	☐	☐

27 Waar dronk u tijdens uw volwassenheid (28-44 jaar)? *Kruis op elke regel één hokje aan.*

	altijd	meestal	af en toe	zelden	nooit
thuis of bij anderen thuis ▸	☐	☐	☐	☐	☐
buitenshuis, zoals café, dancing, restaurant ▸	☐	☐	☐	☐	☐

28 Dronk u meestal alleen?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

29 Hoe vaak dronk u 6 of meer glazen bier, wijn of sterke drank op één dag tussen uw 28e en 44e jaar?
- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit

30 Bent u ooit bewust gestopt met het drinken van alcohol in deze periode?
- ☐ ja
- ☐ nee ➡ ga verder met vraag 34

31 Indien gestopt tussen uw 28e en 44e jaar, bent u toen voorgoed of tijdelijk gestopt?
- tijdelijk ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar
  Hoe lang duurde het? ☐☐ maanden ☐☐ jaar
- voorgoed ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar

32 Bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege advies van een arts of specialist
- ☐ op aandringen van mijn partner
- ☐ mijn familie adviseerde me te stoppen
- ☐ collega's drongen aan te stoppen
- ☐ op advies van anderen, nl. ____

33 Om welke reden bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege uw gezondheid
- ☐ vanwege tè grote afhankelijkheid van de drank
- ☐ omdat het te duur was
- ☐ vanwege uw werk
- ☐ omdat u moeilijkheden kreeg met anderen
- ☐ andere reden, nl. ____

34 Heeft u na uw 44ste levensjaar nog bier, wijn of sterke drank gedronken?

- ☐ ja ➡ ga verder met vraag 35
- ☐ nee ➡ ga verder met "EFFECTEN" op pag. 18

D MIDDELBARE LEEFTIJD

U was toen tussen de 45 tot 60 jaar

35 Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen 45e en 60e jaar?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 45

36 Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

37 Dronk u meestal bier, wijn of sterke drank?
Kruis op elke regel één hokje aan.

	altijd	meestal	af en toe	zelden	nooit
bier ▶	☐	☐	☐	☐	☐
wijn ▶	☐	☐	☐	☐	☐
sterke drank ▶	☐	☐	☐	☐	☐

38 Waar dronk u tijdens uw middelbare periode (45-60 jaar)? *Kruis op elke regel één hokje aan.*

	altijd	meestal	af en toe	zelden	nooit
thuis of bij anderen thuis ▶	☐	☐	☐	☐	☐
buitenshuis, zoals café, dancing, restaurant ▶	☐	☐	☐	☐	☐

Dronk u meestal alleen?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

Hoe vaak dronk u 6 of meer glazen bier, wijn of sterke drank op één dag tussen uw 45e en 60e jaar?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit

41 Bent u ooit bewust gestopt met het drinken van alcohol in deze periode?

☐ ja ☐ nee ➡ ga verder met vraag 45

42 Indien gestopt tussen uw 45e en 60e jaar, bent u toen voorgoed of tijdelijk gestopt?

tijdelijk ▶ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar
Hoe lang duurde het? ☐☐ maanden ☐☐ jaar

voorgoed ▶ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar

43 Bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege advies van een arts of specialist
- ☐ op aandringen van mijn partner
- ☐ mijn familie adviseerde me te stoppen
- ☐ collega's drongen aan te stoppen
- ☐ op advies van anderen, nl. ____

44 Om welke reden bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege uw gezondheid
- ☐ vanwege tè grote afhankelijkheid van de drank
- ☐ omdat het te duur was
- ☐ vanwege uw werk
- ☐ omdat u moeilijkheden kreeg met anderen
- ☐ andere reden, nl. ____

45 Bent u ouder dan 60 jaar?

- ☐ ja
- ☐ nee ➡ ga verder met vraag 57 op pagina 15

46 Heeft u na uw 60ste levensjaar nog bier, wijn of sterke drank gedronken?

- ☐ ja ➡ ga verder met vraag 47
- ☐ nee ➡ ga verder met "EFFECTEN" op pag. 18

E OUDERE LEEFTIJD

U bent 61 jaar of ouder

47 Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank vanaf uw 61e jaar?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 57

48 Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

49 Dronk u meestal bier, wijn of sterke drank?
Kruis op elke regel één hokje aan.

	altijd	meestal	af en toe	zelden	nooit
bier ▶	☐	☐	☐	☐	☐
wijn ▶	☐	☐	☐	☐	☐
sterke drank ▶	☐	☐	☐	☐	☐

50 Waar dronk u vanaf uw 61e jaar?
Kruis op elke regel één hokje aan.

	altijd	meestal	af en toe	zelden	nooit
thuis of bij anderen thuis ▶	☐	☐	☐	☐	☐
buitenshuis, zoals café, dancing, restaurant ▶	☐	☐	☐	☐	☐

51 Dronk u meestal alleen?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

52 Hoe vaak dronk u vanaf uw 61e jaar 6 of meer glazen bier, wijn of sterke drank op één dag?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit

53 Bent u ooit bewust gestopt met het drinken van alcohol in deze periode?

- ☐ ja
- ☐ nee ➡ ga verder met vraag 57

54 Indien gestopt vanaf uw 61e jaar, bent u toen voorgoed of tijdelijk gestopt?

tijdelijk ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar
Hoe lang duurde het? ☐☐ maanden ☐☐ jaar

voorgoed ▸ ☐ ➡ Hoe oud was u toen u stopte? ☐☐ jaar

55 Bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege advies van een arts of specialist
- ☐ op aandringen van mijn partner
- ☐ mijn familie adviseerde me te stoppen
- ☐ collega's drongen aan te stoppen
- ☐ op advies van anderen, nl. _____

56 Om welke reden bent u toen gestopt...
Meer dan één antwoord mogelijk.

- ☐ vanwege uw gezondheid
- ☐ vanwege tè grote afhankelijkheid van de drank
- ☐ omdat het te duur was
- ☐ vanwege uw werk
- ☐ omdat u moeilijkheden kreeg met anderen
- ☐ andere reden, nl. _____

57 Heeft u de afgelopen 12 maanden nog bier, wijn of sterke drank gedronken?

- ☐ ja ➡ ga verder met vraag 58
- ☐ nee ➡ ga verder met "EFFECTEN" op pag. 18

F IN DE AFGELOPEN 12 MAANDEN

58 Hoe vaak in de afgelopen 12 maanden heeft u WIJN (ook sherry, port, Martini e.d.) gedronken?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 61

59 De keren dat u WIJN dronk, hoeveel dronk u dan op zo'n dag?

☐☐ glazen.

60 Drinkt u vooral rode of vooral witte wijn?

- ☐ vooral rood
- ☐ vooral wit
- ☐ ongeveer evenveel

61 Hoe vaak in de afgelopen 12 maanden heeft u BIER gedronken?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 63

62 De keren dat u BIER dronk, hoeveel dronk u dan op zo'n dag?

☐☐ glazen

63 Hoe vaak in de afgelopen 12 maanden heeft u STERKE DRANK gedronken?

- ☐ iedere dag
- ☐ 5 - 6 dagen per week
- ☐ 3 - 4 dagen per week
- ☐ 1 - 2 dagen per week
- ☐ 1 - 3 dagen per maand
- ☐ 3 - 5 dagen per halfjaar
- ☐ 1 - 2 dagen per halfjaar
- ☐ nooit ➡ ga verder met vraag 65

64 De keren dat u STERKE DRANK dronk, hoeveel dronk u dan op zo'n dag?

☐☐ glazen

65 Als u terug kijkt op de afgelopen 12 maanden, wat is het GROOTSTE aantal glazen bier, wijn of sterke drank dat u op één dag gedronken heeft?

- ☐ meer dan 12 glazen
- ☐ 9 à 12 glazen
- ☐ 6 à 8 glazen
- ☐ 4 of 5 glazen
- ☐ 3 glazen
- ☐ 1 of 2 glazen
- ☐ weet ik niet

66 Drinkt u weleens wijn, bier of sterke drank vlak voor het naar bed gaan?

altijd	meestal	af en toe	zelden	nooit
☐	☐	☐	☐	☐

G IN DE AFGELOPEN WEEK

67 Kruis aan: welke dag het is vandaag?

Ma	Di	Wo	Do	Vrij	Za	Zon
☐	☐	☐	☐	☐	☐	☐

68 Geef in het schema aan hoeveel glazen bier, wijn en/of sterke drank u op elk van de afgelopen 7 dagen heeft gedronken. Begin bij gisteren.

	Bier	Wijn	Sterke drank
Gisteren ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
2 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
3 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
4 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
5 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
6 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen
7 dagen geleden ▸	☐☐ glazen	☐☐ glazen	☐☐ glazen

H REDENEN

Hieronder staan redenen waarom mensen weleens bier, wijn of sterke drank drinken. Geef aan hoe in hoeverre deze redenen voor u een rol spelen.

Kruis op elke regel één hokje aan.

12 Ik drink bier, wijn of sterke drank...	Dit is voor mij: volstrekt niet belangrijk	niet zo belangrijk	tamelijk belangrijk	heel erg belangrijk
• om speciale gebeurtenissen te vieren	☐	☐	☐	☐
• omdat het de druk van mijn dagelijkse problemen verlicht	☐	☐	☐	☐
• omdat het contact met anderen dan makkelijker gaat	☐	☐	☐	☐
• omdat dit mijn eetlust verhoogt	☐	☐	☐	☐
• omdat ik dan meer geniet van het contact met anderen	☐	☐	☐	☐
• tegen de stress en spanningen	☐	☐	☐	☐
• omdat anderen die ik ontmoet ook drinken	☐	☐	☐	☐
• omdat ik het lekker vind	☐	☐	☐	☐
• omdat ik niet durf te weigeren	☐	☐	☐	☐
• om mezelf op te beuren	☐	☐	☐	☐
• omdat het goed is voor mijn gezondheid	☐	☐	☐	☐
• omdat het lekker smaakt	☐	☐	☐	☐
• omdat ik me er lichamelijk beter bij voel	☐	☐	☐	☐
• omdat ik daarmee beter de dagelijkse beslommeringen van me af kan zetten	☐	☐	☐	☐
• omdat het een positief effect heeft op mijn hart en bloedvaten	☐	☐	☐	☐
• omdat ik het nodig heb als ik gespannen en nerveus ben	☐	☐	☐	☐
• omdat het mij meer energie geeft	☐	☐	☐	☐
• omdat me dat helpt mijn zorgen te vergeten	☐	☐	☐	☐
• omdat de arts het mij adviseerde	☐	☐	☐	☐
• omdat het me minder nerveus maakt	☐	☐	☐	☐
• omdat ik me dan beter kan concentreren	☐	☐	☐	☐
• om te ontspannen	☐	☐	☐	☐
• omdat ik er aan verslaafd ben	☐	☐	☐	☐
• omdat ik me verveel	☐	☐	☐	☐

EFFECTEN

Bier, wijn en sterke drank hebben verschillende effecten. Kruis voor elk effect aan of U denkt dat dit bij u al dan niet zal optreden als u drinkt of zou gaan drinken.

1	Dit is bij mij: zeer onwaarschijnlijk	onwaarschijnlijk	waarschijnlijk	zeer waarschijnlijk
• Ik amuseer me beter	☐	☐	☐	☐
• Ik krijg problemen met het rijden in het verkeer	☐	☐	☐	☐
• Ik ga me schuldig voelen	☐	☐	☐	☐
• Ik slaap sneller in	☐	☐	☐	☐
• Ik word door anderen beter geaccepteerd	☐	☐	☐	☐
• Ik word agressief	☐	☐	☐	☐
• Ik word minder alert	☐	☐	☐	☐
• Ik ga me voor mezelf schamen	☐	☐	☐	☐
• Ik krijg een licht gevoel in mijn hoofd	☐	☐	☐	☐
• Ik word onhandig en ongecoördineerd	☐	☐	☐	☐
• Ik ga me beter voelen	☐	☐	☐	☐
• Ik raak betrokken bij ruzies	☐	☐	☐	☐
• Ik kan me niet concentreren	☐	☐	☐	☐
• Ik krijg een kater	☐	☐	☐	☐
• Ik voel me gelukkiger	☐	☐	☐	☐
• Ik krijg meer zin in seks	☐	☐	☐	☐
• Ik ga gemakkelijker met anderen om	☐	☐	☐	☐
• Ik krijg hoofdpijn	☐	☐	☐	☐
• Ik durf meer op seksueel gebied	☐	☐	☐	☐
• Alles wordt leuker	☐	☐	☐	☐
• Ik ga gemeen doen	☐	☐	☐	☐
• Ik krijg problemen met mijn geheugen	☐	☐	☐	☐
• Ik kan me moeilijk concentreren	☐	☐	☐	☐
• De lichamelijke effecten zijn prettig	☐	☐	☐	☐
• Ik krijg minder schroom om er op uit te gaan	☐	☐	☐	☐
• Mijn stemming verbetert	☐	☐	☐	☐
• Ik raak sneller seksueel opgewonden	☐	☐	☐	☐
• Ik voel me beter in de omgang met anderen	☐	☐	☐	☐
• Ik word triest	☐	☐	☐	☐
• Ik word spraakzamer	☐	☐	☐	☐
• Ik word seksueel actiever	☐	☐	☐	☐
• Ik ga me ziek voelen	☐	☐	☐	☐
• Ik voel me minder gespannen	☐	☐	☐	☐
• Ik word vriendelijker	☐	☐	☐	☐
• De lichamelijke effecten zijn vervelend	☐	☐	☐	☐
• Ik ben in staat om aan iets anders dan mijn problemen te denken	☐	☐	☐	☐
• Ik ga me kalmer voelen	☐	☐	☐	☐
• Ik word slaperig	☐	☐	☐	☐

PERSOONSKENMERKEN

1 In welk land bent u geboren?
- ☐ Nederland
- ☐ anders, nl. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

2 Welke nationaliteit heeft u? *Als u een dubbele nationaliteit heeft, beide aankruisen en invullen.*
- ☐ Nederlandse
- ☐ anders, nl. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

3 Wat is uw burgerlijke staat?
- gehuwd ▸ ☐ ➡ sinds welk jaar? 19☐☐
- gescheiden ▸ ☐ ➡ sinds welk jaar? 19☐☐
  na hoeveel jaar huwelijk? ☐☐
- weduwe/weduwnaar ▸ ☐ ➡ sinds welk jaar? 19☐☐
  na hoeveel jaar huwelijk? ☐☐
- nooit gehuwd geweest ▸ ☐

4 Woont u samen met een vaste partner? *Hieronder verstaan we ook uw huwelijkspartner.*
- ☐ ja
- ☐ nee

5 Rekent u zichzelf tot een kerkgenootschap, een godsdienstige gemeente of een andere levensbeschouwelijke groepering?
- ☐ ja
- ☐ nee ➡ ga verder met vraag "ROKEN" op deze pag.

6 Tot welke kerk of levensbeschouwelijke groepering rekent u zich in de eerste plaats?
- ☐ rooms katholiek
- ☐ nederlands hervormd
- ☐ gereformeerd
- ☐ andere christelijke kerk
- ☐ islam
- ☐ humanistisch verbond
- ☐ ander kerkgenootschap/andere levensbeschouwing, nl. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

7 Hoe vaak gaat u in het algemeen naar de kerk of bezoekt u bijeenkomsten?
- ☐ 1 keer per week of vaker
- ☐ 2 tot 3 keer per maand
- ☐ 1 keer per maand
- ☐ een paar keer per jaar
- ☐ zeer zelden
- ☐ nooit

8 Hoe zou u zichzelf willen omschrijven wat betreft uw godsdienstige overtuiging?
- ☐ sterk overtuigd
- ☐ overtuigd
- ☐ enigszins overtuigd
- ☐ weinig overtuigd
- ☐ helemaal niet overtuigd

ROKEN

1 Rookt u sigaretten en/of shag?
- ☐ ja ➡ ga verder met vraag ❺
- ☐ nee

2 Heeft u in uw leven ten minste 100 sigaretten en/of shagjes gerookt?
- ☐ ja
- ☐ nee ➡ ga verder met "BEWEGEN" op pag. 20

3 Heeft u ooit dagelijks gerookt?
- ☐ ja
- ☐ nee

4 Op welke leeftijd bent u voorgoed gestopt met het roken van sigaretten of shag?
- ik was ☐☐ jaar ➡ ga verder met vraag ❻

5 Rookt u elke dag sigaretten of shag?
- ☐ ja
- ☐ nee

6 Op welke leeftijd bent u voor het eerst dagelijks sigaretten en/of shag gaan roken?
- ik was ☐☐ jaar

7 Hoeveel sigaretten en/of shagjes rookt u gemiddeld op een dag dat u rookt? *(ex-rokers: vóór u de laatste keer stopte)*
- ☐☐

8 Rookt u sigaren, cigarillo's en/of pijp?
- ☐ ja ➡ hoeveel gemiddeld per dag? ☐☐
- ☐ nee

9 Heeft u vroeger sigaren, cigarillo's of pijp gerookt?
- ☐ ja
- ☐ nee

BEWEGEN IN DE AFGELOPEN 12 MAANDEN

1 Hoeveel trappen loopt u per dag? *(één trap is ongeveer 12 treden; op en neer is 2 trappen)*
- ☐ 0
- ☐ 1-10
- ☐ 11-30
- ☐ 31-50
- ☐ 51-80
- ☐ meer dan 80

2 Hoeveel meter loopt u in totaal op een doorsnee dag? (binnen én buitenshuis)
- ☐ 0
- ☐ 1-500 meter
- ☐ 500-1000 meter
- ☐ 1000-2500 meter
- ☐ 2500-5000 meter
- ☐ 5000-10.000 meter
- ☐ meer dan 10.000 meter

3 Doet u regelmatig aan sport of aan een lichamelijke activiteit in uw vrije tijd?
- ☐ nee
- ☐ ja, ongeveer eens per week of vaker
- ☐ ja, maar minder vaak dan wekelijks

4 Hoeveel tijd heeft u in de afgelopen 12 maanden gemiddeld besteed aan een zware sport? *(zie de lijst met voorbeelden hieronder)*
- ☐ 0 uur
- ☐ 1 uur per week
- ☐ 2 uur per week
- ☐ 3 uur per week
- ☐ 4 uur per week
- ☐ 5 uur per week
- ☐ 6 uur per week
- ☐ 7 uur of langer per week

Voorbeelden van zware sporten:
voetbal en andere balsporten, hardlopen, trimmen, aerobics, joggen, zwemmen, wielrennen, tennis, badminton, squash, schaatsen en andere zware sporten

5 Hoeveel tijd heeft u in het laatste jaar besteed aan een lichtere sport? *(zie de lijst met voorbeelden hieronder)*
- ☐ 0 uur
- ☐ 1 uur per week
- ☐ 2 uur per week
- ☐ 3 uur per week
- ☐ 4 uur per week
- ☐ 5 uur per week
- ☐ 6 uur per week
- ☐ 7 uur of langer per week

Voorbeelden van lichte sporten:
fietsen, wandelen, bowlen, kegelen, zeilen, (volks)dansen, gymnastiek, golf, yoga, tuinieren, biljarten en andere lichte sporten

SOCIALE CONTACTEN 1: IN DE AFGELOPEN 12 MAANDEN

Het gaat bij deze vragen over contacten met mensen die u geregeld ziet.

Kruis op elke regel één hokje aan.

	bijna nooit	soms	nogal eens	vaak
• Ik praat vertrouwelijk met anderen	☐	☐	☐	☐
• Anderen komen bij mij voor steun of advies	☐	☐	☐	☐
• Vrienden en/of familie bezoeken mij	☐	☐	☐	☐
• Als ik me gespannen voel of onder druk sta, dan is er iemand die mij helpt	☐	☐	☐	☐
• Als ik iets leuks meemaak, dan is er iemand met wie ik dat kan delen	☐	☐	☐	☐
• Als ik pijn heb, dan is er iemand die me steunt	☐	☐	☐	☐
• Ik bespreek mijn persoonlijke problemen met anderen	☐	☐	☐	☐
• Ik bezoek familie en/of vrienden	☐	☐	☐	☐
• Anderen komen bij mij met hun persoonlijke problemen	☐	☐	☐	☐
• Als ik verdrietig ben, dan is er iemand met wie ik dat kan delen	☐	☐	☐	☐
• Als ik hulp nodig heb bij karweitjes die ik niet alleen kan uitvoeren, dan is er iemand die me daarbij helpt	☐	☐	☐	☐
• Als anderen iets leuks meemaken, sta ik er voor open om dat met ze te delen	☐	☐	☐	☐
• Als ik ziek ben, is er iemand die mij helpt	☐	☐	☐	☐
• Als anderen verdriet hebben, dan kunnen ze bij mij terecht	☐	☐	☐	☐
• Ik help anderen als ze hulp nodig hebben bij karweitjes die ze niet alleen af kunnen	☐	☐	☐	☐
• Ik steun anderen als ze pijn hebben	☐	☐	☐	☐
• Anderen praten vertrouwelijk met mij	☐	☐	☐	☐
• Ik help anderen als ze ziek zijn	☐	☐	☐	☐
• Ik ga naar anderen voor steun en advies	☐	☐	☐	☐
• Ik help anderen als ze zich gespannen voelen of onder druk staan.	☐	☐	☐	☐

SOCIALE CONTACTEN 2: NIET UW PARTNER, NIET UW HUISGENOTEN

Schrijft u in onderstaande hokjes de voornamen van de mensen met wie u het vaakst contact heeft. Schrijf maximaal vijf namen op, anderen dan partner of huisgenoot.

	pers. 1	pers. 2	pers. 3	pers. 4	pers. 5
3 In wat voor soort relatie staan deze mensen tot u?					
zoon of dochter ▸	☐	☐	☐	☐	☐
andere familie ▸	☐	☐	☐	☐	☐
vriend(in) of kennis ▸	☐	☐	☐	☐	☐
collega ▸	☐	☐	☐	☐	☐
buur ▸	☐	☐	☐	☐	☐
anders ▸	☐	☐	☐	☐	☐
4 Hoe vaak heeft u contact met elk van deze mensen?					
iedere dag ▸	☐	☐	☐	☐	☐
4-6 keer per week ▸	☐	☐	☐	☐	☐
1-3 keer per week ▸	☐	☐	☐	☐	☐
elke maand weleens ▸	☐	☐	☐	☐	☐
minder vaak ▸	☐	☐	☐	☐	☐
5 Wanneer u SAMEN bent met elk van deze mensen, hoe vaak drinkt u dan samen een of meer glazen bier, wijn of sterke drank? *Als u zelf geen alcohol gebruikt, vult u dan in hoe vaak u contact heeft gehad waarbij de ander wel dronk.*					
(bijna) iedere keer ▸	☐	☐	☐	☐	☐
meer dan de helft ▸	☐	☐	☐	☐	☐
minder dan de helft ▸	☐	☐	☐	☐	☐
(bijna) nooit ▸	☐	☐	☐	☐	☐

INGRIJPENDE GEBEURTENISSEN: IN DE AFGELOPEN 2 JAAR

Ga na of u zelf sinds april 1994 een van de volgende gebeurtenissen is overkomen. Indien u een vraag met "ja" beantwoordt, geef dan aan hoe erg u de gebeurtenis vond of nog steeds vindt.

Kruis op elke regel één hokje aan.			erg	niet erg	positief
• een ernstige ziekte of zwaar ongeval van uzelf	☐ nee	ja ➡	☐	☐	☐
• een ernstige ziekte of zwaar ongeval in de familie	☐ nee	ja ➡	☐	☐	☐
• dood van uw echtgeno(o)t(e), levenspartner, eigen kind, ouder, broer of zus	☐ nee	ja ➡	☐	☐	☐
• dood van een goede vriend of nauw verwant familielid	☐ nee	ja ➡	☐	☐	☐
• scheiding door huwelijksmoeilijkheden (van uzelf)	☐ nee	ja ➡	☐	☐	☐
• einde van een langdurige liefdesrelatie (van uzelf)	☐ nee	ja ➡	☐	☐	☐

Kruis op elke regel één hokje aan.			erg	niet erg	positief
• serieuze ruzie met een vriend, buur of familielid	☐ nee	ja ➡	☐	☐	☐
• werkloos of werkzoekend voor langer dan 1 maand van u of uw partner	☐ nee	ja ➡	☐	☐	☐
• verlies van baan van u of uw partner	☐ nee	ja ➡	☐	☐	☐
• serieuze financiële moeilijkheden	☐ nee	ja ➡	☐	☐	☐
• als verdachte in contact met politie of justitie (bijv. arrestatie, veroordeling)	☐ nee	ja ➡	☐	☐	☐
• verlies of diefstal van waardevol bezitting(en)	☐ nee	ja ➡	☐	☐	☐

STEMMING

Het gaat hier om hoe u zich de afgelopen week, met vandaag erbij, voelde.

Kruis op elke regel één hokje aan.	helemaal niet	een beetje	nogal	tamelijk veel	heel erg
• Verstrikt zijn of je gevangen voelen	☐	☐	☐	☐	☐
• Te veel over de dingen piekeren	☐	☐	☐	☐	☐
• Het gevoel in de put te zitten	☐	☐	☐	☐	☐
• De gedachte, dat je voor je zonden gestraft zou moeten worden	☐	☐	☐	☐	☐
• Huilbuien	☐	☐	☐	☐	☐
• Je eenzaam voelen	☐	☐	☐	☐	☐
• Denken om er maar een eind aan te maken	☐	☐	☐	☐	☐
• Een gevoel van leegte	☐	☐	☐	☐	☐
• Denken aan dood of sterven	☐	☐	☐	☐	☐
• Jezelf van allerlei dingen de schuld geven	☐	☐	☐	☐	☐
• Nare gedachten of ideeën niet kwijt kunnen raken	☐	☐	☐	☐	☐
• Je gauw gekwetst voelen	☐	☐	☐	☐	☐
• Gevoelens dat je niets waard bent	☐	☐	☐	☐	☐
• Je alleen voelen, zelfs bij andere mensen	☐	☐	☐	☐	☐

LICHAMELIJKE ERVARINGEN: IN DE AFGELOPEN 3 MAANDEN

De volgende vragen gaan over gebeurtenissen en omstandigheden die mensen soms meemaken. Per ervaring worden vier vragen gesteld.

1 Als ik voortdurend hoofdpijn zou hebben en houden, dan zou ik denken dat komt omdat:
Kruis op elke regel één hokje aan.

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• ik ben emotioneel van slag	☐	☐	☐	☐
• er is iets mis met mijn spieren, zenuwen of hersenen	☐	☐	☐	☐
• een harde knal, fel licht, of iets anders heeft me geïrriteerd	☐	☐	☐	☐

Heeft u in de laatste 3 maanden aanhoudende hoofdpijn gehad? ▶ ☐ ja ☐ nee

2 Als ik flink zou zweten, dan zou ik denken dat komt omdat:
Kruis op elke regel één hokje aan.

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• ik heb koorts of een infectie	☐	☐	☐	☐
• ik ben angstig en nerveus	☐	☐	☐	☐
• de kamer te warm is, ik ben te warm gekleed of ik werk te hard	☐	☐	☐	☐

Heeft u in de laatste 3 maanden gemerkt dat u sterk zweette? ▶ ☐ ja ☐ nee

3 Als ik plotseling duizelig zou worden, dan zou ik denken dat het komt omdat:
Kruis op elke regel één hokje aan.

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• er is iets mis met mijn hart	☐	☐	☐	☐
• ik heb niet gegeten of ik ben te snel opgestaan	☐	☐	☐	☐
• ik sta er onder druk en stress	☐	☐	☐	☐

Heeft u zich in de laatste 3 maanden duizelig gevoeld? ▶ ☐ ja ☐ nee

4 Als ik hartkloppingen zou voelen, dan zou ik denken dat komt omdat:
Kruis op elke regel één hokje aan.

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• ik heb me te zeer ingespannen of te veel koffie gedronken	☐	☐	☐	☐
• ik moet echt opgewonden zijn of angstig	☐	☐	☐	☐
• er is iets mis met mijn hart	☐	☐	☐	☐

Heeft u in de laatste 3 maanden hartkloppingen gehad? ▶ ☐ ja ☐ nee

5 Als ik me erg moe zou voelen, dan zou ik denken dat komt omdat:
Kruis op elke regel één hokje aan.

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• ik ben emotioneel op of futloos	☐	☐	☐	☐
• ik heb me te zeer ingespannen of ik heb niet genoeg gesport	☐	☐	☐	☐
• ik heb bloedarmoede of mijn bloed is niet in orde	☐	☐	☐	☐

Heeft u zich in de laatste 3 maanden moe gevoeld? ▶ ☐ ja ☐ nee

	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
6 Als ik mijn eetlust zou verliezen, dan zou ik denken dat komt omdat: *Kruis op elke regel één hokje aan.*				
• ik heb te veel gegeten de laatste tijd, of ik heb minder eten nodig	☐	☐	☐	☐
• ik heb me zoveel zorgen gemaakt dat het eten me niet smaakt	☐	☐	☐	☐
• ik heb een maag of darmprobleem	☐	☐	☐	☐
Heeft u in de laatste 3 maanden uw eetlust verloren? ▶	☐ ja	☐ nee		
7 Als ik sneller dan anders buiten adem zou raken, dan zou ik denken dat komt omdat: *Kruis op elke regel één hokje aan.*	daar denk ik: zeker niet aan	misschien aan	waarschijnlijk aan	zeker aan
• mijn longen zitten dicht door een infectie, irritatie of een probleem met mijn hart	☐	☐	☐	☐
• de kamer is te benauwd of de lucht is erg verontreinigd	☐	☐	☐	☐
• ik ben te zeer opgewonden of angstig	☐	☐	☐	☐
Bent u in de laatste 3 maanden snel buiten adem geraakt? ▶	☐ ja	☐ nee		

OPVATTINGEN

Kruis op elke regel één hokje aan.	sterk mee oneens	mee oneens	eens noch oneens	mee eens	sterk mee eens
• Als ik goed voor mijzelf zorg, kan ik ziektes voorkomen	☐	☐	☐	☐	☐
• Ik heb mijn gezondheid in eigen hand	☐	☐	☐	☐	☐
• Als ik iets wil doen om mijn gezondheid te verbeteren, dan lukt het me ook om dat te bereiken	☐	☐	☐	☐	☐
• Als ik ziek ben ligt het aan mijzelf hoe snel ik beter word	☐	☐	☐	☐	☐
• Ik heb het idee dat dingen die ik doe om mijn gezondheid te verbeteren geen effect hebben.	☐	☐	☐	☐	☐
• Mijn gezondheid wordt in de eerste plaats bepaald door wat ik zelf doe	☐	☐	☐	☐	☐
• Wat ik er ook voor doe, mijn gezondheid wordt niet zoals ik zou willen.	☐	☐	☐	☐	☐
• Als ik ziek word, is dat mijn eigen schuld	☐	☐	☐	☐	☐
• Ik ben even goed als anderen in staat om dingen te doen die goed zijn voor mijn gezondheid.	☐	☐	☐	☐	☐
• Het ligt vooral aan mijzelf hoe snel ik van een ziekte kan genezen	☐	☐	☐	☐	☐

OORZAKEN HARTAANVAL

Geef aan hoe belangrijk u elk van deze zaken vindt bij het ontstaan van een hartaanval

Kruis op elke regel één hokje aan.	heel belangrijk	draagt er enigszins toe bij	onbelangrijk	volstrekt niet belangrijk
roken ▶	☐	☐	☐	☐
luchtverontreiniging ▶	☐	☐	☐	☐
toeval ▶	☐	☐	☐	☐
giftige stoffen in de voeding ▶	☐	☐	☐	☐
te veel werk, te weinig vrije dagen ▶	☐	☐	☐	☐
ongezonde werkplek ▶	☐	☐	☐	☐
stressvolle baan ▶	☐	☐	☐	☐
noodlot ▶	☐	☐	☐	☐
God's wil ▶	☐	☐	☐	☐
slechte voeding ▶	☐	☐	☐	☐
nervositeit ▶	☐	☐	☐	☐
gebrek aan lichamelijke weerstand ▶	☐	☐	☐	☐
te hoge eisen aan jezelf stellen ▶	☐	☐	☐	☐
erfelijkheid, constitutie ▶	☐	☐	☐	☐
verlies van een geliefd persoon ▶	☐	☐	☐	☐
andere, eerdere ziektes ▶	☐	☐	☐	☐
spanningen in gezin of relaties ▶	☐	☐	☐	☐
een pessimistische kijk op de wereld ▶	☐	☐	☐	☐
uitputting ▶	☐	☐	☐	☐
moeilijke kindertijd ▶	☐	☐	☐	☐
gebrek aan erkenning op het werk ▶	☐	☐	☐	☐
drankgebruik ▶	☐	☐	☐	☐
onvoldoende lichaamsbeweging ▶	☐	☐	☐	☐
verdringen van gevoelens ▶	☐	☐	☐	☐
aardstralen en waterstromen ▶	☐	☐	☐	☐
innerlijke angsten ▶	☐	☐	☐	☐
infecties ▶	☐	☐	☐	☐
onvoldoende weerbaarheid in contacten met anderen ▶	☐	☐	☐	☐
straf voor een verkeerde leefwijze ▶	☐	☐	☐	☐
ongevallen of verwondingen ▶	☐	☐	☐	☐
onvoldoende macht om spanningen en crises de baas te kunnen ▶	☐	☐	☐	☐
soort werk ▶	☐	☐	☐	☐
medicijnen ▶	☐	☐	☐	☐

Kruis op elke regel één hokje aan.

	heel belangrijk		draagt er enigszins toe bij	onbelangrijk	volstrekt niet belangrijk
verontreinigd water	☐		☐	☐	☐
werkdruk	☐		☐	☐	☐
tijdsdruk, haasten	☐		☐	☐	☐
fouten van dokters	☐		☐	☐	☐
gering doorzettingsvermogen	☐		☐	☐	☐
zorgen	☐		☐	☐	☐
overgewicht (te zwaar)	☐		☐	☐	☐
hoge bloeddruk	☐		☐	☐	☐
suikerziekte	☐		☐	☐	☐
vet eten	☐		☐	☐	☐
persoonlijkheid	☐		☐	☐	☐
hoog zoutgebruik	☐		☐	☐	☐

OMGAAN MET PROBLEMEN

Als u iets overkomt (bijv. ziekte, scheiding, verlies van werk, e.d.), hoe gaat u daar dan mee om.

Kruis op elke regel één hokje aan.

	op mij van toepassing: helemaal niet	niet	neutraal	wel	heel sterk
• Ik vraag me af waarom zoiets juist mij moest overkomen	☐	☐	☐	☐	☐
• Lichaamsoefeningen ter ontspanning helpen mij goed door de moeilijke periode heen	☐	☐	☐	☐	☐
• Ik stort me op het werk (of mijn hobby); dat leidt me af van de moeilijkheden	☐	☐	☐	☐	☐
• Zoiets maakt me vaak woedend op anderen	☐	☐	☐	☐	☐
• Het is belangrijk voor me, mezelf te beheersen, me niet te laten gaan	☐	☐	☐	☐	☐
• Als ik de zaak met humor bekijk, kan ik zelfs om mezelf lachen	☐	☐	☐	☐	☐
• Ik denk, dat ik de ongemakken kan accepteren en ze met gelatenheid draag	☐	☐	☐	☐	☐
• Ter oplossing van mijn problemen stel ik mij zo bereidwillig mogelijk op	☐	☐	☐	☐	☐
• Ik raak het gevoel niet kwijt, dat ik zelf schuld heb aan de crisis	☐	☐	☐	☐	☐
• Mijn gedachten draaien steeds weer rond de problemen, zonder dat het resultaat oplevert	☐	☐	☐	☐	☐
• Ik maak meer tijd vrij om iets opbouwends te doen	☐	☐	☐	☐	☐
• Me om anderen bekommeren helpt me ook mijn problemen de baas te worden	☐	☐	☐	☐	☐
• Er zijn dingen die belangrijker voor me zijn en die me helpen, me af te leiden van mijn problemen	☐	☐	☐	☐	☐

Kruis op elke regel één hokje aan.

	op mij van toepassing: helemaal niet	niet	neutraal	wel	heel sterk
• Over een moeilijke levensfase kom ik net zo goed heen als over iets dat minder erg is; het lukt me eigenlijk goed om nieuwe problemen te beheersen	☐	☐	☐	☐	☐
• Ik zou niet weten waarom ik me zorgen zou moeten maken, het gaat eigenlijk best goed met me en het is lang niet zo erg als ze denken	☐	☐	☐	☐	☐
• Ik heb meer tijd en rust nodig, om alles beter aan te kunnen	☐	☐	☐	☐	☐
• Het komt voor, dat een woedeaanval, huilen of ook wel lachen me oplucht	☐	☐	☐	☐	☐
• Ik sta er zelf verbaasd van, hoe weinig me dergelijke problemen doen	☐	☐	☐	☐	☐
• Ik probeer mezelf duidelijk te maken, wat er met mij aan de hand is en wat deze problemen betekenen	☐	☐	☐	☐	☐
• Ik zoek steun en een goed gesprek bij mensen die dichtbij me staan	☐	☐	☐	☐	☐
• Als ik aan de mensen denk, die het nog moeilijker hebben, gaat het relatief goed met mij	☐	☐	☐	☐	☐
• Een probleemsituatie zie ik als een kans mijn leven te veranderen	☐	☐	☐	☐	☐
• Ik stel het uit me bij mijn problemen te laten helpen, of volg adviezen niet zo op als ik het eigenlijk zou moeten doen	☐	☐	☐	☐	☐
• Als het slecht met mij gaat, koop ik iets bijzonders voor mezelf (eten, kleding, boeken, etc.).	☐	☐	☐	☐	☐
• Iets eten, roken of drinken maakt een en ander draaglijker	☐	☐	☐	☐	☐
• Mijn geloof in God en in de Voorziening geeft me de nodige houvast.	☐	☐	☐	☐	☐
• Met een beetje geluk komt alles weer in orde. Ik ben en blijf een optimist	☐	☐	☐	☐	☐
• Ik kan doen wat ik wil: aan mijn problemen verandert dat toch niets	☐	☐	☐	☐	☐

PERSOONSKENMERKEN

1 Wat is de hoogste schoolopleiding die u VOLTOOID heeft?	☐ geen ☐ lagere school ☐ lager beroepsonderwijs (LTS, LEAO, huishoudschool, etc.) ☐ MULO, MAVO, ULO ☐ middelbaar beroepsonderwijs ☐ HAVO ☐ VWO, gymnasium, HBS, atheneum ☐ hoger beroepsonderwijs ☐ universitair/wetenschappelijk onderwijs

2 Heeft u betaald werk of heeft u eerder betaald werk gehad? *Hieronder verstaan we ook een baan (of werk als zelfstandige) van maar enkele uren per week.*

- ☐ heb nu betaald werk ▸
- ☐ vroeger betaald werk gehad ▸ ➡ sinds wanneer niet meer: 19☐☐
- ☐ nooit betaald werk gehad ▸ ➡ ga verder met vraag 9

3 Er zijn verschillende mogelijkheden met betrekking tot betaald werk. Kunt u aangeven welke van toepassing zijn op uw (vroegere) werk?
Meer dan één antwoord mogelijk.

- ☐ ik werk tegen loon of salaris (óók uitzendwerk)
- ☐ ik werk voor eigen rekening, als zelfstandige in eigen bedrijf of praktijk
- ☐ ik werk op free-lance basis (géén uitzendwerk)
- ☐ ik werk mee in gezins- of familie bedrijf, maar sta NIET op de loonlijst.

4 Hoeveel uur werkt (of werkte) u doorgaans per week?

- ☐ 16 uur of minder
- ☐ 16 tot 32 uur
- ☐ 32 tot 40 uur
- ☐ meer dan 40 uur

5 Welk beroep oefent u op dit moment uit of oefende u het laatste uit?
Het gaat om de precieze werkzaamheden. "Docent", "bouwvakker" etc. is niet voldoende; dat moet zijn: "lerares wiskunde aan de MAVO", "betonvlechter", e.d.

6 Geeft u (of gaf u), direct of via anderen, leiding aan personeel?

- ☐ geen leidinggevende functie
- ☐ 1-9 personen
- ☐ 10-49 personen
- ☐ meer dan 50 personen

7 Wie beslist(e) er over de indeling van uw werktijd, u zelf of anderen?

- ☐ ik beslis(te) zelf
- ☐ ik beslis(te) gedeeltelijk zelf
- ☐ anderen beslissen (-sten)

8 Bent u tevreden over uw situatie wat betreft werk?

- ☐ heel tevreden
- ☐ tamelijk tevreden
- ☐ niet zo tevreden
- ☐ erg ontevreden

9 Tot welke van de volgende groepen rekent u zichzelf op dit moment?
Kruis op elke regel één hokje aan.

	ja	nee
• Ik doe het huishouden	☐	☐
• Ik ben (gedeeltelijk) arbeidsongeschikt	☐	☐
• Ik ben gepensioneerd (VUT, AOW e.d.)	☐	☐
• Ik heb een betaalde werkkring	☐	☐
• Ik ben werkloos/werkzoekend	☐	☐
• Ik doe onbetaald werk met behoud van uitkering	☐	☐
• Ik doe vrijwilligerswerk (onbetaald werk dat ten goede komt aan bepaalde personen, groepen of de gemeenschap)	☐	☐
• Ik volg een opleiding	☐	☐
• Anders, nl. ➡	☐	☐

Ga door naar de laatste pagina ➡

10 Kunt u hiernaast aankruisen tot welke categorie het inkomen VAN UW HUISHOUDEN behoort?
Bedoeld wordt NETTO PER MAAND, zonder vakantiegeld, 13de maand e.d.

- ☐ minder dan 2000 gld.
- ☐ 2000 - 3200 gld.
- ☐ 3200 - 4600 gld.
- ☐ meer dan 4600 gld.
- ☐ kan ik niet zeggen

11 Wat is de hoogste schoolopleiding die uw partner VOLTOOID heeft?

- ☐ geen
- ☐ lagere school
- ☐ lager beroepsonderwijs (LTS, LEAO, huishoudschool, etc.)
- ☐ MULO, MAVO, ULO
- ☐ middelbaar beroepsonderwijs
- ☐ HAVO
- ☐ VWO, gymnasium, HBS, atheneum
- ☐ hoger beroepsonderwijs
- ☐ universitair/wetenschappelijk onderwijs

12 Heeft uw partner op dit moment een betaalde baan van minimaal 15 uur?

- ☐ ja
- ☐ nee

13 Welk beroep oefent uw partner op dit moment uit of oefende hij/zij het laatste uit?
Het gaat om de precieze werkzaamheden. 'Docent', 'bouwvakker' etc. is niet voldoende; dat moet zijn: 'lerares wiskunde aan de MAVO', 'betonvlechter', e.d.

Dit is het einde van de vragenlijst.
Hartelijk dank voor het invullen.

Stop de lijst in de antwoordenvelop en volg verder de instructies zoals vermeld in de bijgesloten brief.

appendix B

LDH-q (version follow-up 1997)

GEBRUIK VAN BIER, WIJN, STERKE DRANK

Het doel van deze vragen is om een indruk te krijgen van uw gebruik van bier, wijn en sterke drank vanaf uw jeugd tot nu.

We onderscheiden drie soorten drank, nl. bier, wijn en sterke drank (gedistilleerd):
BIER: alle biersoorten, behalve alcoholvrij bier
WIJN: alle wijnsoorten, sherry, Martini, port en vruchtenwijnen
STERKE DRANK: alle gedistilleerde dranken (jenever, whisky, cognac), mixen, cocktails en likeur (met een alcohol percentage hoger dan 20%)

1 Op welke leeftijd heeft u voor het eerst bier, wijn of sterke drank gedronken? *We bedoelen een heel glas en niet alleen proeven aan een glaasje van iemand anders.*

☐☐ Vul hier de leeftijd in

☐ Ik heb nog nooit bier, wijn of sterke drank gedronken ➡ ga verder met KOFFIE en THEE op pagina 11

2 Dronk u wel eens bier, wijn of sterke drank tussen uw 12e en 18e jaar?

☐ JA ➡
- Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 12e en 18e jaar?

☐ iedere dag ☐ 1 - 2 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 5 - 6 dagen per week ☐ 1 - 3 dagen per maand ☐ NOOIT ➡ ga verder met vraag 3
☐ 3 - 4 dagen per week ☐ 3 - 5 dagen per halfjaar

- Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen
- Heeft u na uw 18e levensjaar bier, wijn of sterke drank gedronken?

☐ ja ➡ ga verder met vraag 3 ☐ nee ➡ ga verder met KOFFIE en THEE op pagina 11

☐ NEE

3 Dronk u wel eens bier, wijn of sterke drank tussen uw 19e en 27e jaar?

☐ JA ➡
- Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 19e en 27e jaar?

☐ iedere dag ☐ 1 - 2 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 5 - 6 dagen per week ☐ 1 - 3 dagen per maand ☐ NOOIT ➡ ga verder met vraag 4
☐ 3 - 4 dagen per week ☐ 3 - 5 dagen per halfjaar

- Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen
- Heeft u na uw 27e levensjaar bier, wijn of sterke drank gedronken?

☐ ja ➡ ga verder met vraag 4 ☐ nee ➡ ga verder met KOFFIE en THEE op pagina 11

☐ NEE

GA DOOR MET VRAAG 4 OP DE VOLGENDE PAGINA

4 Dronk u wel eens bier, wijn of sterke drank tussen uw 28e en 44e jaar?

☐ JA ➡
- Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 28e en 44e jaar?

☐ iedere dag ☐ 1 - 2 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 5 - 6 dagen per week ☐ 1 - 3 dagen per maand ☐ NOOIT ➡ ga verder met vraag 5
☐ 3 - 4 dagen per week ☐ 3 - 5 dagen per halfjaar

- Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen
- Heeft u na uw 44e levensjaar bier, wijn of sterke drank gedronken?

☐ ja ➡ ga verder met vraag 5 ☐ nee ➡ ga verder met KOFFIE en THEE op pagina 11

☐ NEE

5 Dronk u wel eens bier, wijn of sterke drank tussen uw 45e en 60e jaar?

☐ JA ➡
- Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank tussen uw 45e en 60e jaar?

☐ iedere dag ☐ 1 - 2 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 5 - 6 dagen per week ☐ 1 - 3 dagen per maand ☐ NOOIT ➡ ga verder met vraag 6
☐ 3 - 4 dagen per week ☐ 3 - 5 dagen per halfjaar

- Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen
- Bent u ouder dan 60 jaar?

☐ ja ☐ nee ➡ ga verder met vraag 7 op pagina 10

- Heeft u na uw 60e levensjaar nog bier, wijn of sterke drank gedronken?

☐ ja ➡ ga verder met vraag 6 ☐ nee ➡ ga verder met vraag 7 op pagina 10

☐ NEE

6 Dronk u wel eens bier, wijn of sterke drank na uw 60e jaar?

☐ JA ➡
- Hoe vaak dronk u gewoonlijk bier, wijn of sterke drank vanaf uw 61e jaar?

☐ iedere dag ☐ 1 - 2 dagen per week ☐ 1 - 2 dagen per halfjaar
☐ 5 - 6 dagen per week ☐ 1 - 3 dagen per maand ☐ NOOIT ➡ ga verder met vraag 7
☐ 3 - 4 dagen per week ☐ 3 - 5 dagen per halfjaar

- Hoeveel glazen dronk u doorgaans op zo'n dag? ☐☐ glazen

☐ NEE

GA DOOR OP DE VOLGENDE PAGINA

7 **Heeft u de afgelopen 12 maanden bier, wijn of sterke drank gedronken?**

☐ NEE ➡

☐ JA

- **Bent u de afgelopen 12 maanden bewust gestopt met het drinken van bier, wijn of sterke drank?**

  ☐ ja
  ☐ nee, ik ben al eerder gestopt
  ☐ nee, ik dronk sowieso heel weinig

  ➡ ga verder met KOFFIE en THEE **op pagina 11**

- **Bent u gestopt...** *Meer dan één antwoord mogelijk.*

  ☐ vanwege advies van een arts of specialist
  ☐ op aandringen van mijn partner
  ☐ mijn familie adviseerde me te stoppen
  ☐ collega's drongen aan te stoppen
  ☐ op advies van anderen, nl. ☐☐☐☐☐☐☐☐☐☐

- **Om welke reden bent u gestopt...** *Meer dan één antwoord mogelijk.*

  ☐ vanwege uw gezondheid
  ☐ vanwege tè grote afhankelijkheid van de drank
  ☐ omdat het te duur was
  ☐ vanwege uw werk
  ☐ omdat u moeilijkheden kreeg met anderen
  ☐ andere reden, nl. ☐☐☐☐☐☐☐☐☐☐

GA VERDER MET **KOFFIE EN THEE** OP **PAGINA 11**

GEBRUIK VAN BIER, WIJN, STERKE DRANK IN DE AFGELOPEN 12 MAANDEN

8 Hoe vaak in de afgelopen 12 maanden heeft u WIJN (ook sherry, port, Martini e.d.) gedronken?

☐ iedere dag
☐ 5 - 6 dagen per week
☐ 3 - 4 dagen per week
☐ 1 - 2 dagen per week
☐ 1 - 3 dagen per maand
☐ 3 - 5 dagen per halfjaar
☐ 1 - 2 dagen per halfjaar
☐ NOOIT ➡ ga verder met vraag 11

9 De keren dat u WIJN dronk, hoeveel dronk u dan op zo'n dag?

☐☐ glazen

10 Drinkt u vooral rode of vooral witte wijn?

☐ vooral rood
☐ vooral wit
☐ ongeveer evenveel

11 Hoe vaak in de afgelopen 12 maanden heeft u BIER gedronken?

☐ iedere dag
☐ 5 - 6 dagen per week
☐ 3 - 4 dagen per week
☐ 1 - 2 dagen per week
☐ 1 - 3 dagen per maand
☐ 3 - 5 dagen per halfjaar
☐ 1 - 2 dagen per halfjaar
☐ NOOIT ➡ ga verder met vraag 13

12 De keren dat u BIER dronk, hoeveel dronk u dan op zo'n dag?

☐☐ glazen

13 Hoe vaak in de afgelopen 12 maanden heeft u STERKE DRANK gedronken?

☐ iedere dag
☐ 5 - 6 dagen per week
☐ 3 - 4 dagen per week
☐ 1 - 2 dagen per week
☐ 1 - 3 dagen per maand
☐ 3 - 5 dagen per halfjaar
☐ 1 - 2 dagen per halfjaar
☐ NOOIT ➡ ga verder met vraag 15

66 Alcohol and Cardiovascular Disease: Impact of Life Events and Social Support Marja Veenstra

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