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Students at risk of suicide: Identification, referral and prevention.

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Abstract

Background:

The Student Health Check can be used to identify multiple risk factors, and to improve identification of students at risk for suicide. Information on the experiences with, and needs of, prevention methods for students can be used to give recommendation on the improvement of prevention methods.

Method:

Quantitative analyses were done based on data from the Student Health Check. A prediction model of suicide risk (SBQ-R score >2) was made. Separate analyses were used to research the effect of the individual risk factors as measured by the CDS-5 (cigarette dependency), AUDIT (alcohol use disorders), EK-10 (depression/anxiety disorders), and RAND-36 (general health).

Data for the qualitative assessment of experience and need for preventive measures was gathered by a questionnaire under participants from the Student Health Check who were at risk for suicide.

Results:

N=7302 students filled out the Student Health Check. 27.5% (n=2398) have thought about suicide at least shortly and 8.6% of students is at risk for suicide (n=681). Females had a 1.311(1.080-1.593 95%BI) higher odds for suicide risk. In the prediction model the variables depression, anxiety, psychological problems and lifestyle were significantly correlated with suicide risk for both men and women. For women the variables smoking, general health and living situation were also significant. CDS-5-, AUDIT-, EK-10-, and RAND-36 score were all (partially) significantly correlated to suicide risk.

Qualitative analysis of the questionnaire responses (N=16) resulted in the several themes identifying the needs, knowledge and experiences with prevention such as experiences with prevention in general and at the educational institutions. Students talked about taboo, decreasing the threshold, Internet and student services.

Conclusion:

Several risk factors are significantly correlated with suicide risk. Risk factors differ for men and women, and the correlation of risk factors with suicide risk increases when scoring higher on the tests for individual variables. Feedback given to students by the Student Health Check can be improved based on this information. Students experience talking and help on the Internet as helpful, and there is need for the improvement of student services (student advisors/online resources) and a need for a decrease of the threshold to help.

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1. Introduction

Suicide is an issue that affects all layers of society, however especially in younger age groups it constitutes a very large part of the possible causes of death (Garssen & Hoogenboezem, 2007). From 1995 to 2006 suicide was cause of death in 24.8% of cases under men aged 20-29, compared to 1.6% in the general population. Under women this was 20.6%, compared to 0.7% in the general population. According to the WHO suicide is very much preventable and thus is a pressing burden in society (2004).

The Dutch government has established the goal of lowering the incidence of suicide with 1% a year (Schippers, 2013), however from 2008-2012 the incidence of suicide has continued to increase every year. In 2012 1753 people died by suicide in the Netherlands (Centraal Bureau voor de Statistiek, 2013). Several Dutch ministries have therefore cooperated to formulate a national agenda for suicide prevention (Schippers, 2014). Prevention and education institutions have been established as important domains for the implementation of this national agenda.

This article will study the identification, referral and prevention concerning students at risk of suicide. In this introduction information will be discussed from literature on suicide and suicidal ideation under students relevant to the analyses of data on this topic provided by the Student Health Check (SHC), and a theoretical model will be provided.

1.1 Characteristics of students at risk of suicide

The definition of suicide which has been used in this paper is:

Any action with a deadly result, taken by the diseased, in expectation of a deadly or potentially deadly result, with intent of executing wanted change (Kerkhof & van Luyn,

The definition of suicidal ideation used is:

The total of thoughts, wishes, fantasies, suicide attempts, and preparation actions with which a person is factually or mentally busy (Kerkhof & van Luyn, 2010).

Suicidal ideation is therefore a broader perspective of any temporary or more permanent issues revolving around the topic of suicide. These separate definitions leave room for the possibility to discuss both the act of (successfully) committing suicide and individuals who struggle with suicide and/or suicidal thoughts in general.

According to research by Roberts et al. (2010) found that 'school' and 'marihuana use' could significantly predict the incidence of first suicide attempts. Other factors that emerge from literature are: alcohol abuse, (Lamis, Malone, Langhinrichsen-Rohling, & Ellis, 2010; Lamis & Malone, 2011), smoking, (Li et al., 2012). The relationship between alcohol and risk of suicide is moderated by additional factors such as; perceived burdensomeness, thwarted belongingness, and depression (Lamis et al., 2010; Lamis & Malone, 2011). Religion can be a protective factor (Greening & Stoppelbein, 2002).

Nyer et al. (2013) found that a characteristic of depressed students that have suicidal ideation is an overall higher experienced disease burden. Suicidal behaviour also seems to be associated with genetic variations in neurobiological functioning of the neuroendocrine system (Zalsman, 2012). Gender differences are present both in prevalence of suicide and suicidal thought, execution of suicide attempts, and help seeking. Suicidal ideation and attempts are more prevalent under women, yet the

incidence of dying by suicide is higher under men, thus men have more lethal suicide attempts and often by harsher measures (Centraal Bureau voor de Statistiek, 2013; Garssen & Hoogenboezem, 2007; McGirr et al., 2006; Schrijvers, Bollen, & Sabbe, 2011). There are also differences in help seeking under men and women such as a higher reported lack of time for females (Czyz, Horwitz, Eisenberg, Kramer, & King, 2013).

More personal factors such as impairment, ethnic differences, personal history of suicide attempts and family history of suicide attempts are important factors in the increase in risk of incidence too (Mathew & Nanoo, 2013; Rew, Thomas, Horner, Resnick, & Beuhring, 2001; Roberts et al., 2010).

Because these personal characteristics and histories are difficult to target as they cannot be modified, they do not provide a handle for preventive measures. Roberts et al (2010) argued that due to the small amount of factors independently correlated with risk of first incidence, preventive measures targeted toward only one stressor may not yield much result. However, there is a cumulative effect of the separate risk factors: the odds¹ of attempt of suicide increases with an increase in amount of risk factors, such as caregiver attempt and marijuana use combined (Roberts et al., 2010). Research toward the clustering of health-related behaviour indicated that having multiple unhealthy behaviours, such as the cluster of behaviours indicated as 'risk-prone behaviour', is linked to poorer health outcomes as well as poorer psychosocial health (Busch, Van Stel, Schrijvers, & de Leeuw, 2013).

This indicated that a broader scope of health behaviours needs to be included in prevention.

Determining which risk factors are correlated to suicide risk for students in the Netherlands can help identify high risk students. The targeting of certain risk groups with an individual high risk history and cumulative sets of multiple behavioural risk factors, through for instance the SHC, may create a feasible strategy for preventive measures.

1.2 (Online) resources

Describing the population at risk, and determining multiple risk factors, may provide a target for new and existing preventive strategies. Yet the need for the improvement of current preventive strategies and better identification and referral of students at risk for suicide is best illustrated by the fact that a large part of this population is not known by professionals, or to quote a finding of Paul Joffe in his paper on the effectiveness of a suicide prevention program on students at the university of Illinois in the United States (2008):

“...the majority of individuals who carry out their suicidal careers, from initial intent to death, do so without ever entering a therapist's office.”

This is reflected in the preliminary results from the SHC: more than 40% of the students reported that they did not initially want help (C.M. Van der Heijde, Vonk, & Meijman, 2013).

This implicates that for preventive measures to yield the maximum result the entire population, including students that do not want help, should be reached. Coping strategies such as social support can significantly reduce risk of suicide (Mathew & Nanoo, 2013). Currently several prevention programs are focussed on suicide, some specifically for youth (RIVM, 2014). A recent meta-analysis by Kauer et al. (2014) indicated that online mental health services could possibly contribute to help-

¹ In statistics, odds represent the relative probability that an event will take place between a number of groups. An odds of 2 means that when randomly selecting samples from a test and a control group, the probability that you will find the outcome in the test group is 2 times the probability that you will find it in the control group.

seeking under certain groups of young people due to for example the accessibility of online resources and the anonymity of the medium, although they do not increase help-seeking overall. This could indicate that these online services reach a part of the population that is not reached by regular prevention strategies and measures although Kauer et al. indicate that more research toward help-seeking as a primary outcome is necessary. As e-health grows to become a part of modern healthcare, ICT could be a helpful tool in the improvement of the quality, efficacy, and cost-effectiveness of healthcare (College voor zorgverzekeringen, 2014).

For suicide specifically, resources such as the Internet can play a prominent positive as well as negative role, and due to this ambiguous nature should therefore be handled with care (Daine et al., 2013). More information on this topic is provided in Appendix 1. Research by Van Voorhees et al. (2009) showed that a web-based intervention can significantly reduce self-harm thoughts in patients suffering from depression. A recent randomized controlled trial by Van Spijker et al. (Van Spijker, Van Straten, & Kerkhof, 2014) indicated that online self-help for suicidal thought has proven to be effective.

In 2009 the website 113online.nl was launched in the Netherlands. It is currently one of the most complete sites on suicide prevention in the Netherlands (Mokkenstorm, Huisman, & Kerkhof, 2012). The site is incorporated as an important character in the execution of the national agenda for suicide prevention (Schippers, 2014). Online resources such as 113Online.nl can be used by people at risk for suicide to find information and help, and are thus currently included in the feedback from the SHC.

1.3 The Student Health Check (SHC)

The Student Health Check, an online tool to address health behaviours and to measure and prevent risk of suicide, is part of the project 'Stoplichten' by Bureau Studentenartsen, and aims to research the effect of self-regulation of motivation and health under students (C M Van der Heijde, Vonk, & Meijman, 2011). The test measures several health outcomes and based on certain cut-off points the test produces recommendations for behavioural changes, and links to web pages and organizations that are able to supply information and tools for this behavioural change. Depending on the answers given for the measures of depression and suicide, the test refers participants to visit 113online.nl. As it is imperative that student are well informed of the possibilities for help, more research is needed to be able to accurately consign the right information to each individual. Data analysis of the results of the SHC can present information on the population of students at risk for suicide, which may benefit the detection and referral of the general population of students in practice.

1.4 Needs and experiences of students at risk of suicide

Additionally to gain more descriptive information and a better picture of the population at risk, more research is needed towards the preferences and experiences of students with the preventive strategies discussed in this article.

Creating a clear picture of the risk factors that may be targeted by preventive strategies is only one part of the development of successful strategies for preventing suicide under students. Another is to incorporate experiences of patients to form better and more comprehensive programs that fit the need of the population better.

Research by Bennet et al. (2002) defined reconnecting with friends and family and help-seeking as categories for the rehabilitation of individuals after a suicide. In a large community-based study adolescents communication with friends and family was stated to be one of the most important factors

in preventing self-harm in general (Fortune, Sinclair, & Hawton, 2008). Creating a network of support through counsellors, family and peers was suggested as a direction for prevention.

Characteristics of the method of prevention itself may also influence the accessibility. Whiteside et al. (2014) indicated that the personalisation of preventive measures makes for these measures to appeal more to people. More research towards the needs of students and the experiences they have with the existing structure of prevention can be used to make recommendations to improve and individualise existing interventions.

1.5 Theoretical framework of prevention and suicide

A theoretical model that provides a basis for the general prevention of dangerous behaviour specifically for youth and young adults is the risk/protective theory for building prevention programs (Bogenschneider, 1996). This theoretical model, explaining how preventive measures can affect dangerous behaviour such as suicide under students, is based on both the targeting of risk factors as well as the development and strengthening of protective factors to result in healthier development for youth.

This theoretical model therefore can be used in the analysis of both the factors determining risk for suicide, and the needs and experiences with prevention of students at risk of suicide. The following figure illustrates the development and behaviour of youth as viewed by the risk/protective model from K. Bogenschneider (1996).

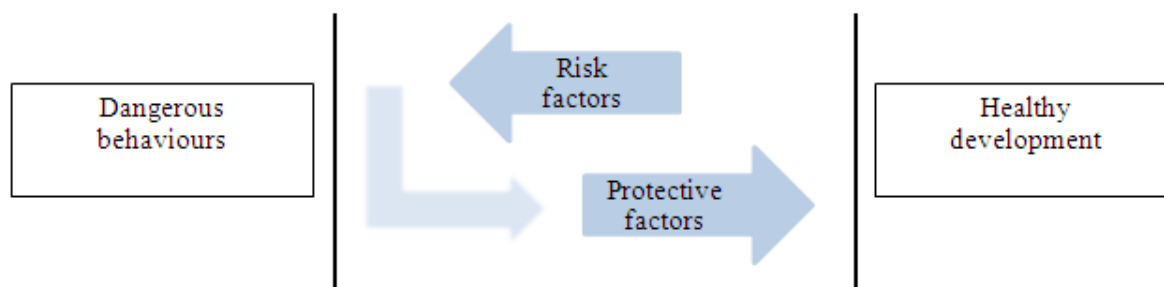


Figure 1 Promoting positive youth development through risk/protective-focused prevention. Adapted from: Bogenschneider, 1996.

A public health approach to suicide must take into account both the risk and protective factors to form a comprehensive prevention strategy that incorporates all elements of behavioural development (Coie et al., 1993). The identification of risk and protective factors, for instance by the SHC, can be employed in the stimulation of healthy development through protective factors and the elimination of dangerous behaviours and the accompanying risk factors. Research toward preventive interventions can yield insight in the developmental processes that contribute to risk or recovery. Qualitative information on the experiences of students as to how prevention programs decrease risk for suicide and support protective factors, and qualitative information on the needs for these programs students report, can benefit the development of suicide prevention programs and provides information that incorporates all elements of prevention through the risk/protective theory as such.

The framework within which the risk factors specific for suicide can be discussed is the diathesis-stress model of behaviour, sometimes also referred to as the vulnerability-stress model (Mann, Waternaux, Haas, & Malone, 1999). This theoretical model of psychopathology interprets psychological disorders as a combination of inherent vulnerability (diathesis) and stressors. It thus

focusses on the pathological effect that the risk factors, which have been mentioned in the risk/protective model, may have on students that have a predisposition for dangerous behaviours from a pathological perspective. This model will elucidate in greater detail the underlying relation of risk factors and unhealthy behaviour as described in the risk/protective model of prevention. The model, figure 2, is proposed by Mann et al. (1999) as a clinical model of suicidal behaviour in psychiatric patients.

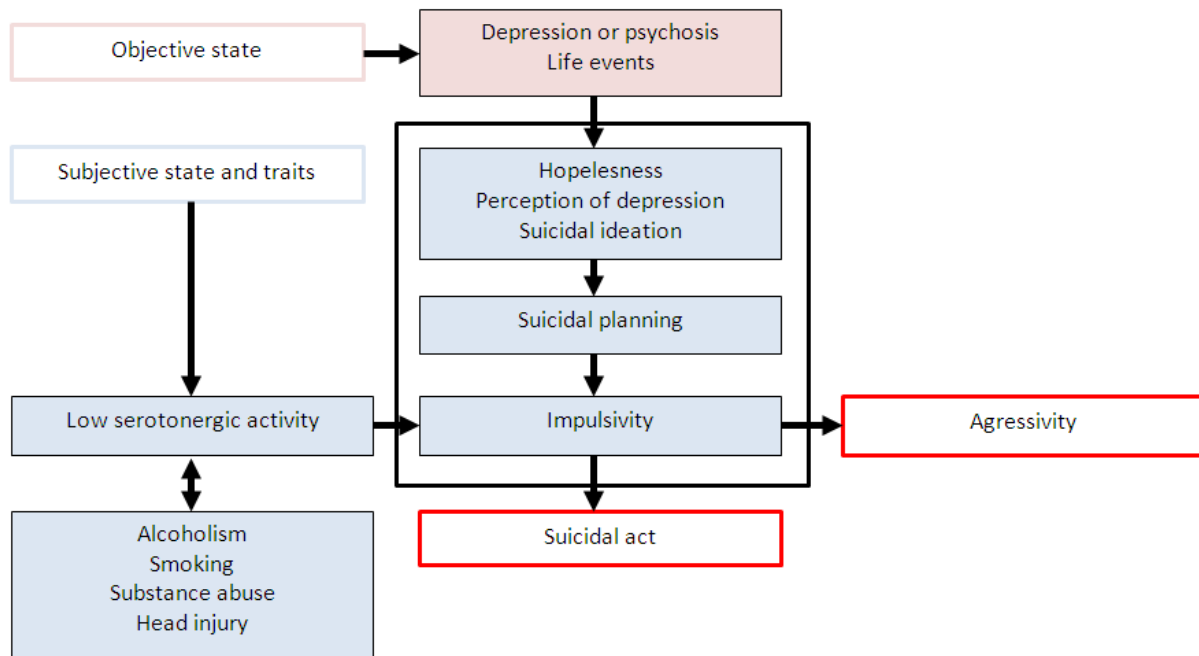


Figure 2 A model of suicidal behaviour. Adapted from Mann et al., 1999.

This model illustrates that diathesis (in this model referred to as objective states) and stressors (in this model referred to as subjective state and traits) in combination can contribute to the risk of a suicide attempt. Based on the theoretical diathesis-stress model there are two states that contribute to the eventual risk of suicide in an individual. Separately these two components of this model, the objective and subjective state, do not suffice to explain the onset of disease, however in combination they accurately describe the process that could result in a disorder (Hankin & Abela, 2005; Mann et al., 1999). The objective state is a state which is set (e.g. genetic predisposition/stressful life events) and cannot be altered, and the subjective state is a state influenced by multiple stressors. This subjective state can therefore be influenced by preventive measures targeting these stressors. Several stressors have been mentioned in this article that may influence the risk of suicide, however more research is needed to determine which combination of stressors are characteristic for students at risk for suicide specifically.

1.6 Research question

In this paper research questions will be considered through quantitative analysis of data provided by the test, and a qualitative analysis of the experiences with, and needs of, preventive measures for students at risk of suicide. The main topic of this article is the identification and referral of students with suicide risk and prevention of this risk. This will be discussed through two separate sub-questions.

The question address specific components of the theoretical models discussed in this paper by addressing both the risk factors as well as research the possibilities for preventive and protective measures. The purpose of this article is to form a better image of the group of students at risk for suicide in higher education, and to refine information and feedback (that can be provided to participants of the SHC), current (online) information, and preventive measures for students at risk of suicide.

Recommendations will be discussed to improve information and preventive measures available to students.

Within a scientific context, this paper will test and elaborate current (often inconclusive) knowledge of risk factors in a large Dutch population of students. This research may therefore lead to both more knowledge on suicide risk and prevention under students, as well as practical recommendations of the application this knowledge in practice. This supports better detection and referral of students at risk of suicide, which may ultimately decrease the risk of suicide for students in (Dutch) society.

Understanding which stressors may increase the risk of suicidal thoughts and suicide attempts in the research population could indicate where preventive action should be taken and how students with suicide risk may be identified.

The first and main sub-question or research question is therefore:

Which stressors or factors determine the risk of suicide under students?

A qualitative assessment of what the effect of the SHC on the behaviour of the research population, and of how current preventive measures have affected students at risk of suicide and how these may be improved and elaborated according to the research population, can contribute to referral and prevention of suicide risk. This will be evaluated through the following sub-question:

What are the experiences with, and needs of, preventive measures according to students?

2. Method

2.1 Sample

This research consisted of a combination of quantitative research and qualitative research. Participants were selected from students at the University of Amsterdam, the VU University, and the Amsterdam University of Applied Science, who participated in the SHC. The ethical commission of the department of psychology at the University of Amsterdam had granted permission for the SHC. Data collection by the SHC for the cohort used in this study took place during a period of almost 1 year (October 2013- March 2014) in collaboration with several departments at the aforementioned Universities.

Quantitative research through a cross-sectional study was based on data from all participants who participated in the SHC.

Qualitative research took place through an anonymous online questionnaire, which only included participants who scored positive for suicide risk (SBQ-R total score ≥ 8) (Linehan, 1981; Osman et al., 2001) on the SHC and who granted permission to be contacted for further research. These participants were recruited via an email containing a link to the questionnaire (the email can be viewed in appendix 2). In the questionnaire students were also informed of their right to stop their participation in the study at any moment and without reason, and that data they provided might be used in future research.

2.2 Literature

Literature was searched in Google Scholar and PubMed by the use of (different combinations of) MeSH terms and general terms. Terms such as 'suicide', 'suicidal', 'suicidal ideation' and 'suicide attempt' were used to specify for suicide. Population selection took place by the use of terms such as 'adolescents', 'young adults', 'students', 'college', and 'university'. For additional information on specific topics terms such as 'prevention', 'risk factor', and 'behaviour OR behavior' (to account for both British and American spelling) were used. Relevant articles, reports and books were selected based on the information provided in the abstract and/or summary. Further examination of the content took place to examine if the text provided information to be used in the paper.

2.3 Measures

In the quantitative cross-sectional study several outcome measures of the SHC have been taken into account. Many of the questions in the SHC were based on validated questionnaires, an overview of which can be seen in table 1. Additional measures were: psychological issues, living situation, nationality, and general information on student health and behaviour.

Table 1
Variables included in the prediction model

Variable	Validated questionnaire	source
Suicidal behaviour	Suicidal Behaviours Questionnaire-Revised (SBQ-R)	Linehan, 1981; Osman et al., 2001
Alcohol use	Alcohol Use Disorders Identification Test (AUDIT)	Saunders, Aasland, Babor, De la Fuente, & Grant, 1993
Smoking	the Cigarette Dependence Scale (CDS-5)	Etter, Le Houezec, & Perneger, 2003
Drug use	Drug Abuse Screening test (Dast-10)	Skinner, 1982a, 1982b
Internet use	CIUS	Meerkerk, 2007
Depression	Extended Kessler-10 psychological distress scale (EK-10)	Donker et al., 2010; Kessler et al., 2002, 2010
Anxiety	Extended Kessler-10 psychological distress scale (EK-10)	Donker et al., 2010; Kessler et al., 2002, 2010
General health	the RAND-36	Zee & Sanderman, 2012
Lifestyle	the RAND-36	Zee & Sanderman, 2012
Self-efficacy	CCCS	Kuo, Roysircar, & Newby-Clark, 2006

Note. A full explanation of the different validated questionnaires can be found in appendix 3.

The Questionnaire used for the qualitative data collection in this article was composed in consult with student counsellors, student psychologists, and professionals. Existing knowledge on suicide prevention has been taken into account so as to make sure all relevant topics would be addressed, yet caution was taken to make sure no suggestive questions were asked.

The questionnaire existed of 3 parts: an individual, general and an evaluation part. Open ended question were asked to allow students to report individual knowledge and experiences with prevention, their general opinion on prevention for all students, and on prevention and need for prevention, and a short evaluation of the questionnaire. All answers could be typed in to large text boxes with no limitation on the amount of words that could be entered, so as to stimulate participants to answer as little or as much as they felt like. The questionnaire can be viewed in appendix 2.

2.4 Analysis

Data collected by the SHC and the questionnaire was used for several analyses. First anomalies in the dataset such as doubles were taken out. Participants who had only filled out part of the test were included, but the specific questions that had not been filled out were excluded from the analyses by considering that data 'missing'. General analyses of the remaining data from the SHC took place to provide in depth information on suicide and other variables. Several variables were computed to allow for these analyses, such as a dichotomous variable for suicide risk (SBQ-R item 1 score ≥ 2).

Following this general analysis of the data, a logistic regression analysis was carried out. Variables to be included were selected based on literature research and data availability. The dichotomous independent variable was suicide risk and table 2 shows the dependent variables that were included in the model. Variables were checked for a non-linear or multiplicative association with the outcome measure, if so separate quartiles were used or a quadratic term was computed.

First the univariate influence of the separate variables was computed. Then a multivariate prediction model² of the correlation of determinants with the outcome was.

² A prediction model is a statistical term for an analysis for finding the best multivariate model for an outcome variable.

In the case of a logistics regression within a cross-sectional study no causal (or predictive) relation can be found, only a correlation between determinants and the dichotomous outcome. This is very important to keep in mind while interpreting the results in this research. The term 'prediction' model in this study therefor only refers to the statistical analysis, and will be interpreted as a model of correlations only.

Table 2
Description of variables included in the prediction model

Variable	type	description	Range
Alcohol use	Continuous	Likert scale of: Do you ever drink alcohol?	0 (never) – 5 (very often)
Smoking	Continuous	Likert scale of: Do you ever smoke?	0 (never) – 5 (very often)
Drug use	Continuous	Likert scale of: Do you ever use drugs?	0 (never) – 5 (very often)
Internet use	Continuous	Likert scale of: Do you use Internet 'more often than desirable'?	0 (never) – 5 (very often)
Depression	Continuous	Depression score on the Extended Kessler-10 psychological distress scale	6-30
Anxiety	Continuous	Anxiety score on the Extended Kessler-10 psychological distress scale	4-25
Psychological complaints	Dichotomous	Do or do not have psychological complaints	
General health	Continuous	General health score (based on a selection of questions from the RAND-36)	4-20
Lifestyle	Continuous	Lifestyle score	1-5
Living situation	Categorical	Current living situation	
Nationality	Dichotomous	Do or do not consider oneself of Dutch nationality	

A priori stratification for sex was applied for the differences in prevalence of suicide risk under men and women (Twisk, 2010). A manual backward selection procedure was used to exclude variables that did not significantly influence the independent factor with a cut-off point of $p=0.05$. In the case of variables that had been divided into quartiles, the lowest p-value was used to establish if a variable should remain in the model. The quality of the prediction model was presented by the pseudo-R Nagelkerke R-square, the Hosmer and Lemeshow goodness-of-fit, and the area under the ROC curve (AUC).

Qualitative analysis of responses to the online questionnaire took place by data coding. The data on individual experiences and needs was fragmented, labelled by open coding of the fragments, and underlying theme's and structures were explored through axial coding and assigning different themes and subthemes to the codes this provided. This method can be viewed as inductive or bottom-up analysis. Any relevant information in the evaluation part was placed with experience or need. Based on the themes and subthemes the codes and their fragments were divided into separate categories to form a hierarchical coding scheme. A similar procedure took place when analysing the knowledge of prevention methods, although in this case the themes and subthemes were divided over an existing structure of categories: the domains of suicide prevention as defined by the National agenda suicide prevention (Schippers, 2014). This method of coding was therefore of a more deductive nature, although initial coding was still done with a bottom-up procedure.

To improve the inter-rater reliability the first responses to the questionnaire were coded by two researches separately, yet by the same order of coding as explained above. Following the coding by these two researchers separately the resulting hierarchical coding schemes were discussed to establish concurrency on the best scheme to use for coding all the responses to the questionnaire. This increased the reliability of the results by standardizing the coding method used on all responses. An overview of themes resulting from coding has been provided in appendix 7

3. Results

The total population of the SHC were 7302 students with a median year of birth of 1992, who study at Dutch universities. The students were recruited at 3 universities in Amsterdam, thus the majority (5805, or 79.5%) studied at one of these universities. Overall, more women (68.4%) filled out the SHC than men (31.6%). Most of the respondents were in the bachelor stage of their university degree, followed by students in their first-year or ‘propaedeutic’ stage or master stage. Only very few respondents were in their medical internship phase, doctoral phase, or PhD phase.

In the qualitative questionnaire no personal data was collected, as the questionnaire was completely anonymous. A total of 16 respondents filled out the online questionnaire via the link provided in an e-mail.

3.1 General information on suicide

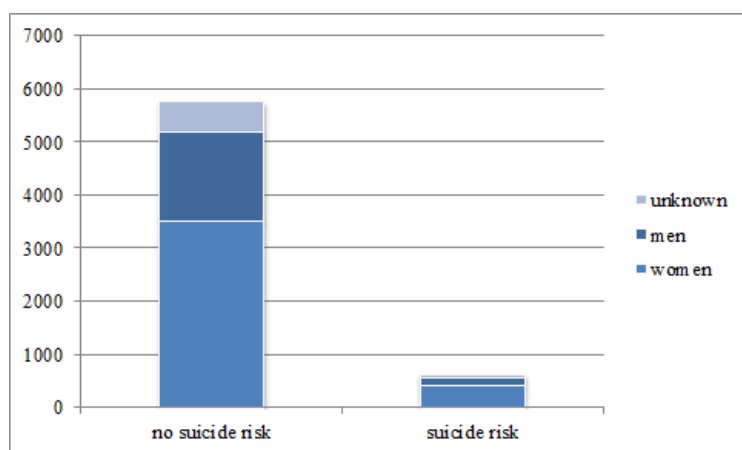


Figure 3 Suicide under men and women

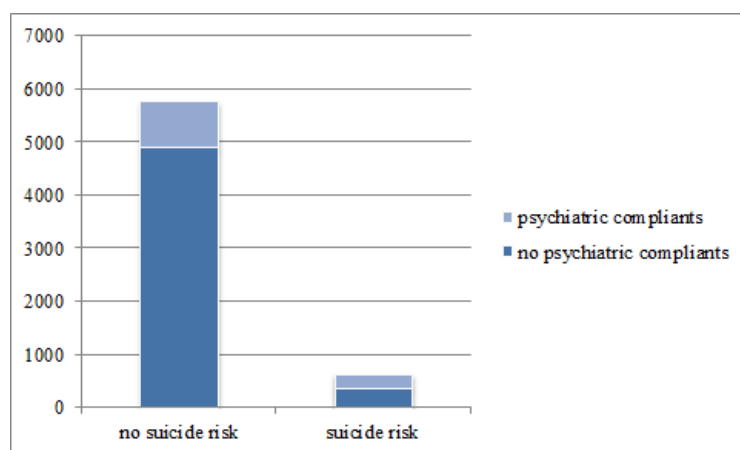


Figure 4 Suicide under student with and without psychiatric complaints

1.8% of students (118) have attempted to commit suicide. 631 students, or 8.6%, had a suicide risk. They had at least a plan or had attempted to commit suicide, aside from whether they had the intention of dying.

Of these students, more than 70% were women. This is reflected in a higher odds for female students for suicide risk: women had a 1.31(1.08-1.59 95% CI) higher odds at having suicide risk compared to men. Figure 3 illustrates this prevalence of suicide risk under students, and the difference in prevalence under women and men.

There is also a significant (Chi-square=309.918, p=0.00) correlation between having psychiatric complaints and having a suicide risk, with student with psychiatric complaints having a 4.31 higher odds at having suicide risk (3.63-5.13 95% CI). This can be seen in Figure 4: the prevalence of psychiatric complaints under students with suicide risk was much higher, namely 43.1% under students with suicide risk compared to 15% under students without suicide risk.

However, being ‘at risk’ requires you to have at least planned a suicide attempt. To fully understand the magnitude of the prevalence of suicidal thoughts under students one must also keep in mind that there are many students who have thought about suicide but have not planned any attempt. 27.5% of students, or 2398 students in total, have thought about suicide at least shortly. Of these students 53.3%, or 1276 students, have thought at least once about committing suicide in the past year and 11.6%, or 277 students, have thought about committing suicide often or very often.

Additionally, of these students 28.9% reported that it is improbable that they would ever commit suicide but there is a chance, and 2.9% reported that it was probable to very probable that they would ever commit suicide.

The odds that students report that they may one day commit suicide increases if students have reported that they have already attempted to commit suicide before. Students who have attempted to commit suicide once have a 19.31 ($p=0.00$, 9.07-41.11 95%CI) higher odds of answering 'probable' compared to students who have never attempted to commit suicide, a 133.27 ($p=0.00$, 29.46-507.37 95%CI) higher odds of answering 'very probable' compared to students who have never attempted to commit suicide, and a 52.40 ($p=0.00$, 12.23-224.46 95%CI) higher odds of answering 'extremely probable' compared to students who have never attempted to commit suicide. Although the odds at answering 'no chance', 'fairly improbable', and 'improbably' are also significantly higher for students with suicide risk this means that they still had a higher odds for reporting these less decisive answers than the very absolute 'no' compared to students who have never attempted to commit suicide.

Students with risk of suicide reported a need for help with the issues addressed in the SHC more often than students without risk of suicide. Even though 72.9% reported that the SHC did not help recognize new issues, as they already knew about them, a need for help from 'a professional or healthcare facility' was named 10% more often under students with suicide risk, followed by 'friends or partner' (5.4% more often).

3.2 In depth analysis of individual variables

3.2.1 Smoking

Smoking appeared to be a significant predictor of suicide risk. Students with suicide risk smoked more often (53.1%) than students who do not have a suicide risk (40.3%). Smoking also significantly (chi-square=38.25, $p=0.000$) increased the odds of having suicide risk by 1.68 (1.42-1.98 95% CI).

By means of the CDS-5 test for cigarette dependency the relation between smoking and suicide risk has been studied in greater detail for students who smoke.

The regression coefficient for suicide risk was 1.04 (1.02-1.06 95% CI), thus for every point scored on the CDS-5 the odds for suicide risk increased by 1.04. This means that smoking or not smoking increased odds for suicide risk but also the amount of cigarette dependency for those students who smoke explains the increased risk of suicide. Both the presence and the intensity of the variable smoking therefore influenced the outcome, although only slightly.

3.2.2 Drinking alcohol

Although there was only a small difference in the amount of students with and without suicide risk that drink alcohol (89.9% and 87.3% respectively), drinking or not drinking alcohol is significantly correlated to suicide risk (Chi-square=4.08, $p=0.04$). Students that drank had a 0.77(0.60-0.10 95%BI) higher odds for suicide risk than students who did not drink. Drinking alcohol in itself is therefore not a factor that contributes to suicide risk, but a 'positive' factor, as in that suicide risk is less frequent under students who drink compared to students who don't.

However, the relation between alcohol and suicide risk was not linear. When analysing the effect of a higher AUDIT score on suicide risk, it showed that, although the 2nd and 3rd quartile have an odds below 1 at suicide risk (0.901, 690-1.176 95%BI and 0.623, 0.486-0.799 95%BI), students who scored in the highest 25% of scores have a 1.064(0.845-1.340 95%BI) higher odds at suicide risk. This may illustrate that alcohol can seem to be positively correlated to suicide risk at first, but scoring very high on the AUDIT thus indicating alcohol dependency is negatively associated with suicide risk. As both the 95%BI of the 2nd and 4th quartile include 1, these results may be due to chance and do not have any further scientific significance in this instance.

3.2.3 Drugs

Drug use is a very interesting subtopic for suicide. There was a significant difference (Chi-square=8.81, $p=0.003$) between students with and without suicide risk for whether they used drugs or not. The odds of suicide risk was 1.29 (1.09-1.52 95%CI) higher for students who used drugs.

There was a significant association (Chi-square=22.83, $p=0.00$) between suicide risk and if an individual felt he or she has neglected their school or work due to their drug use. Students who felt they have neglected school or work due to their drug use had a 2.25 higher odds for suicide risk than students who used drugs but have never felt this way.

However it's the specific drug use patterns that are also interesting.

Although the use of hash (used by 52.9% of the total population, N=1047), XTC (used by 33.0% of the total population, N=653), cocaine (used by 13.0% of the total population, N=264), mushrooms,

amphetamines (used by 10.0% of the total population, N=203), and less frequently used drugs such as LSD and other drugs (generally designer drugs, N=195) was not significantly different, the odds of (ab-)use of prescription medication such as Ritalin (odds:1.80, 1.13-2.88 95%CI) and sleeping pills and tranquilizers (odds:2.70, 1.63-4.47 95%CI), and the use of more addictive drugs such as GHB (odds:2.14, 1.08-4.23 95%CI) and heroin (although there was only one case reported of the latter so this will not be taken as representative of the population), were significantly higher under students with suicide risk.

Table 3

Drug use variables significantly correlated to suicide risk

Drugs use	use under students (general)	Drugs use under students without suicide risk	Drug use under students with suicide risk	difference in drug use	Chi-square	p-value
Ritalin	6.4% (N=127)	5.9%	10.2%	4.3%	6.30	0.01
sleeping pills/ tranquilizers	4.3% (N=86)	3.7%	9.3%	5.6%	15.99	0.00
GHB	2.5% (N=50)	2.2%	4.7%	2.5%	4.97	0.03

Note. Heroin has been excluded from this table, as only one case was reported.

As can be seen in Table 3, the N for drugs that are significantly correlated to suicide risk are very low, therefore results should be taken as indicative but not representative for the entire population. The odds for suicide risk increases with a higher DAST score for drug abuse. Only the difference between the lowest quartile compared to the highest quartile is significant, with a 1.86 higher odds for suicide risk for the 25% of students who score the highest on the DAST ($p=0.015$, 1.13-3.06 95%CI).

3.2.4 Internet

In general a higher percentage of students with suicide risk compared to students who did not have a suicide risk reported being on the Internet 'more often than desirable' very often (8.6% compared to 5.3%) or often (18% compared to 14%). When analysing the statistical differences between these groups, it was found that all response categories ('sometimes', 'regularly', 'often', 'very often') apart from 'sometimes' had a higher odds for suicide risk. Students in the category 'often' had a 1.81 ($p=0.00$) higher odds for suicide risk and students in the category 'very often' had a 1.43 ($p=1.43$) higher odds.

For students who reported being on the Internet 'more often than desirable', the CIUS score showed that students who score in the highest 25% of total score had a 2.09 higher odds for suicide risk compared to students in the lowest 25% of total score. Compulsive Internet use is therefore a negative factor for suicide risk.

3.2.5 Depression

For depression, as measured by the EK-10, the odds of suicide risk dramatically increased per quartile. As shown in table 4 students in the 2nd quartile had a 1.87 higher odds for suicide risk compared to students in the 1st quartile, student in the 3rd quartile had a 3.30 higher odds, and students in the 4th quartile had a 9.14 higher odds.

Table 4
Logistic regression for suicide risk by depression

	odds	95% BI lower	upper
2 nd quartile compared to 1 st quartile	1.87***	1.31	2.66
3 rd quartile compared to 1 st quartile	3.30***	2.36	4.62
4 th quartile compared to 1 st quartile	9.14***	6.70	12.47

Significance indicated by: *p= ≤0.050, **p= ≤0.010, ***p= ≤0.001

3.2.6 Anxiety

Similar to the situation for depression, anxiety as measured by the EK-10 was also strongly correlated to suicide risk. Table 5 shows that students who scored in the highest 75% of the total score had a 4.15 higher odds for suicide risk.

Table 5
Logistic regression for suicide risk by anxiety

	odds	95% CI lower	upper
2 nd quartile compared to 1 st quartile	1.76***	1.32	2.34
3 rd quartile compared to 1 st quartile	2.37***	1.74	3.23
4 th quartile compared to 1 st quartile	5.28***	4.15	6.71

Significance indicated by: *p= ≤0.050, **p= ≤0.010, ***p= ≤0.001

3.2.7 General health

General health seems to be a very significant factor for suicide risk as shown in table 6. As the score on general health increased the odds for suicide risk decreased substantially from 0.56 for the 2nd quartile compared to the 1st, to 0.28 for the 4th quartile. Suicide risk is significantly less frequent under students who have a higher score on general health.

Table 6
Logistic regression for suicide risk by general health

	odds	95% CI lower	upper
2 nd quartile compared to 1 st quartile	0.56***	0.46	0.68
3 rd quartile compared to 1 st quartile	0.31***	0.24	0.40
4 th quartile compared to 1 st quartile	0.28***	0.22	0.36

Significance indicated by: *p= ≤0.050, **p= ≤0.010, ***p= ≤0.001

3.2.8 Lifestyle

Similarly to general health a higher score on lifestyle, which indicates a better lifestyle, was significantly correlated with a lower odds at suicide risk. Table 7 shows that this odds decreased from 0.67 for the 2nd quartile compared to the 1st, to 0.26 for the 4th quartile.

Table 7
Logistic regression for suicide risk by lifestyle

	odds	95% CI lower	upper
2 nd quartile compared to 1 st quartile	0.67***	0.54	0.83
3 rd quartile compared to 1 st quartile	0.42***	0.34	0.53
4 th quartile compared to 1 st quartile	0.26***	0.20	0.34

Significance indicated by: * $p \leq 0.050$, ** $p \leq 0.010$, *** $p \leq 0.001$

3.2.9 Living situation

As can be seen in Table 8, both living with peers, as well as living alone is significantly different from living at home (with parents or family). Living with peers has an odds of 0.70 for suicide risk compared to students who live at home, and living alone has a 1.53 higher odds for suicide risk compared to students who live at home.

Table 8
Logistic regression for suicide risk by living situation

	odds	95% CI lower	upper
2 nd quartile compared to 1 st quartile	0.70**	0.55	0.89
3 rd quartile compared to 1 st quartile	1.53***	1.23	1.90
4 th quartile compared to 1 st quartile	1.06	0.82	1.39

Significance indicated by: * $p \leq 0.050$, ** $p \leq 0.010$, *** $p \leq 0.001$

3.2.10 Nationality

For nationality the focus remains only on a differentiation between foreign and Dutch nationality as some nationalities had a very low frequency (N=35) and therefore an analysis of suicide risk for separate nationalities resulted in an invalid model. Having a foreign nationality compared to a Dutch does not appear to have a significant difference in suicide risk.

3.2.11 Additional factors:

The additional factors self-efficacy and coping have not been taken into account in the prediction model, as data for these questions were collected only when performance on other variables such as lifestyle were poor. Nonetheless they give interesting information on the resilience of students by measuring self-efficacy and coping strategies under students at risk. Coping strategies are correlated to a decreased odds of suicide risk. More information on these factors can be found in appendix 4.

3.3 Correlation model of predictors

Table 9
Logistic regression for suicide risk under women

variables	N=3948	Univariate associations			Multivariate prediction model		
		odds	95%CI		odds	95%CI	
			lower	upper		lower	upper
Smoking		1.32***	1.22	1.42	1.19***	1.09	1.29
Drinking alcohol		0.94	0.83	1.05			
Drugs		1.40***	1.20	1.62			
Internet use		0.85***	0.78	0.93			
Depression							
1 st quartile	833						
2 nd quartile (compared to 1 st)	1025	1.57	0.98	2.50	1.23	0.76	1.97
3 rd quartile (compared to 1 st)	980	2.73***	1.76	4.23	1.55	0.98	2.46
4 th quartile (compared to 1 st)	1110	8.58***	5.74	12.82	3.01***	1.90	4.76
Anxiety		1.01***	1.01	1.01	1.00*	1.00	1.00
Psychological complaints		4.78***	3.87	5.90	2.38***	1.86	3.04
General health							
1 st quartile	1195						
2 nd quartile (compared to 1 st)	1047	0.49***	0.38	0.63	0.79	0.60	1.03
3 rd quartile (compared to 1 st)	861	0.30***	0.22	0.41	0.64**	0.45	0.89
4 th quartile (compared to 1 st)	845	0.22***	0.15	0.31	0.63*	0.43	0.92
Lifestyle		0.29***	0.23	0.36	0.61***	0.47	0.80
Living situation							
with parents or family	1663						
with peers (compared to parents or family)	1001	0.69**	0.52	0.91	0.66**	0.49	0.90
alone (compared to parents or family)	684	1.53**	1.17	1.98	1.24	0.93	1.64
with partner (compared to parents or family)	595	1.06	0.79	1.43	1.03	0.75	1.42
		1.17	0.88	1.54			
Nationality							
Nagelkerke R-square							0.19
Hosmer and Lemeshow Goodness-of-fit							0.22
AUC							0.77***

Significance indicated by: *p= ≤0.050, **p= ≤0.010, ***p= ≤0.001

For the female prediction model, provided in table 9, the Hosmer and Lemeshow goodness-of-fit is not significant, indicating the model to fit the data better with than without variables. The Nagelkerke

R-square indicates a fit of 0.19. The area under the ROC curve (AUC) is 0.77, with $p=0.000$ meaning the model classifies the outcome better than chance.

Table 10
Logistic regression for suicide risk under men

variables	N=1822	Univariate associations			Multivariate prediction model		
		odds	95%CI		odds	95%CI	
			lower	upper		lower	upper
Smoking		1.22***	1.08	1.38			
Drinking alcohol		1.01	0.87	1.19			
Drugs		1.20	0.98	1.47			
Internet use		0.85*	0.75	0.98			
Depression							
1 st quartile	632						
2 nd quartile (compared to 1 st)	536	2.36**	1.28	4.37	2.08*	1.12	3.87
3 rd quartile (compared to 1 st)	357	4.59***	2.52	8.35	3.27***	1.74	6.12
4 th quartile (compared to 1 st)	297	11.22***	6.37	19.75	6.90***	3.71	12.81
Anxiety		1.01***	1.01	1.02			
Psychological complaints		3.86***	2.67	5.59	1.91**	1.27	2.87
General health							
1 st quartile	357						
2 nd quartile (compared to 1 st)	480	0.61*	0.40	0.93			
3 rd quartile (compared to 1 st)	511	0.33***	0.20	0.53			
4 th quartile (compared to 1 st)	474	0.37***	0.23	0.60			
Lifestyle		0.35***	0.24	0.49	0.61*	0.42	0.90
Living situation							
with parents or family with peers (compared to parents or family)	632						
alone (compared to parents or family)	536	0.70	0.43	1.11			
with partner (compared to parents or family)	357	1.51*	1.01	2.28			
Nationality	297	0.92	0.51	1.68			
Nagelkerke R-square							0.14
Hosmer and Lemeshow Goodness-of-fit							1.83
AUC							0.75***

Significance indicated by: * $p \leq 0.050$, ** $p \leq 0.010$, *** $p \leq 0.001$

For the male prediction model the Hosmer and Lemeshow goodness-of-fit is not significant, indicating the model to fit the data better with than without variables. The Nagelkerke R-square indicates a fit of 0.14. The area under the ROC curve (AUC) is 0.75, with $p=0.000$ meaning the model classifies the outcome better than chance.

The final prediction models for men and women differ by several variables. In the final model for men the variables depression, psychiatric complaints and lifestyle have been included. In the final model for women, these variables are supplemented by the variables smoking, anxiety, and living situation.

3.4 Qualitative analysis

Qualitative analysis of the questionnaire responses (N=16) resulted in several themes and sub-themes. The results will be discussed separately for experience and need.

3.4.1 Individual experience

Under the topic individual experience two separate issues were addressed: the knowledge of prevention and their experiences with prevention.

Knowledge

The question on knowledge of suicide prevention resulted in an average of 3 different prevention methods as an answer. Prevention methods were categorized by the domains of suicide prevention as defined by the national agenda suicide prevention namely 'health care', 'media', 'prevention', 'education', 'means restriction', and all other responses were collected under the domain 'other'. This can be seen in figure 5.

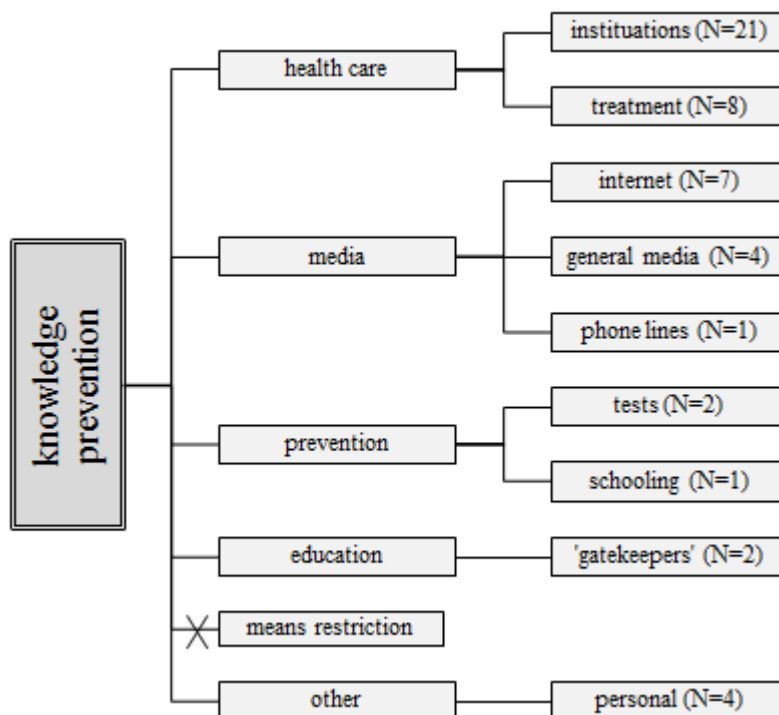


Figure 5 hierarchal coding scheme of knowledge of prevention

Under respondents knowledge on suicide prevention seemed to be focussed on professional mental health care and media. Participants mentioned different health care prevention methods the most frequent. Second most mentioned were media prevention methods. Notable is that methods of means restriction were not mentioned by any respondent. Under 'health care', General practitioners were only mentioned once, although these form an important barrier to professional help as they are a key character in referral within Dutch health care.

Experience

From the questions on the personal experience with prevention several themes emerged that will be discussed.

‘Suicide’

Respondents were very open in talking about their experiences surrounding suicide. They reported factors that had resulted in a decrease of suicidality, factors that had influenced their behaviour, and bad experiences surrounding their suicidality. Several respondents mentioned that they had encountered a taboo surrounding the topic of suicide. This taboo was elucidated as experiencing prejudice and disbelief by others, as can be seen in the following quotes³.

“...people think that when you go to a psychologist that you are ‘crazy’...” – respondent 6

““Why would you want to commit suicide, I didn’t think that something for you” comments [by others].” – Respondent 3

‘Talking’

Talking emerged in many forms, both with professionals, 113online, and friends and family. Talking let respondents think about their suicidality, reflect on their situation, and put things in perspective. Experiences with talking were not always positive, as some respondents had a harder time talking about their issues when there was no connection with the professional or they did not feel like talking freely. However, anonymity was often mentioned as pleasant, and 113online was mentioned as a resource that could at any time be contacted when someone wanted to talk. This is supported by a quote from a respondent:

“I have emailed a few times with 113online. This was nice because it was digital and anonymous. I.e. 24 hours a day accessible and without having to come out for who you are...” – Respondent 5

‘System and practice’

Many respondents talked about how they had experienced being identified, helped and referred to treatment (or the lack thereof). Educational institutions were mentioned to play a role in this for some respondents, through student psychologists and deans, yet others were completely unaware that this was even a possibility when asked. Identification happened through several channels, by professionals, online tests, and friends and family. Some students informed that they had never been recognized by their surroundings as suicidal. This is illustrated by the following quote:

“I have never been taken seriously. Everyone always thought it was nonsense. I have never received help, even when I asked for it” – Respondent 4

A taboo on suicide within educational institutions was also mentioned to exist. Some respondents reported experiencing a threshold to get help:

“The whole hassle around going to a psychiatrist [doesn’t help] ... It is already a big step to wanting help, and then you still have to overcome all those obstacles.” – Respondent 5

‘Internet’

The theme Internet encompassed several different aspects, both positive and negative. The ambiguous role of Internet was evident in the responses: Internet provided information on suicide methods but was also effective in providing identification, recognition and support. Not all respondents have made use of the Internet.

³ These and all following quotes in this chapter have been translated from Dutch to English.

3.4.2 Need

The questions on need also resulted in various themes.

‘Educational institution’

Students offered several suggestions for the improvement of prevention within an educational environment. Students discussed student counsellors, student psychologists, the dean, and peers:

“...I would have liked it if there had been a student psychologist at the location where I studied where I could have gotten my story of my chest and who could have given advice on where I could go with my issues.” – Respondent 1

An incorporation of prevention within the curriculum and at every location was deemed to be beneficial, although not all believed that suicide was something that should be disclosed to, or diagnosed by, someone from the institution. More promotion of existing prevention and services was needed to create awareness of resources and increase awareness under students.

‘General characteristics’

This theme incorporated all characteristics and goals for suicide prevention that respondents deemed important. Talking, lowering the threshold and general characteristics such as anonymity were sub-themes to this topic. A respondent mentioned that support in finding help is necessary for suicidal students:

“A larger offer and pressure of help [helps decrease suicide risk]. The thought “I can solve it by myself” or “Fuck it” is to present the accept help yourself” – Respondent 12

Students wanted suicide prevention to focus on the prevention of suicide attempts, but also on knowledge on suicide by their surroundings and more openness on the topic of suicide. Additionally some wanted prevention to have an anonymous character, to provide information and help, and to remain easily accessible and voluntary.

‘Internet’

Many online resources were suggested to support identification, referral and prevention of students with suicide risk. For identification tests were mentioned, but also interactive resources such as forums and online chats could help talk about issues and provide mental support for suicidal students. Professional prevention could also take place online, by providing (contact) information for help or by chatting with a psychologist.

“There is a lot of information on medication and other methods online. On the other hand there are many helplines and forums where people can share their story” – Respondent 7

As can be seen in the previous quote still many students warned about the negative information that could be found online as well.

4. Discussion

4.1 Key points of the results

The incidence of suicide attempts in the research population compared to the general Dutch population is higher, with an estimated 1% of suicide attempts in the Netherlands compared to a reported 1,8% suicide attempts under students (Hoevmans & Schoemaker, 2010). Results from the SHC in 2012 (Van der Heijde, Vonk, & Meijman, 2013) show that 1.4% of students participating in the test have attempted to commit suicide and an additional 7.1% had planned to commit suicide (compared to 8.6% in this article).

Students with suicide risk showed intent to change and a higher need for help from professionals or friends. This is also reflected in earlier research (Stringer et al., 2013).

More women than men filled out the SHC (approximately 70%). The skewed percentage is only a slightly in-accurate reflection of the student population. More females attend the University of Amsterdam ($\pm 60\%$) and the VU University Amsterdam ($\pm 55\%$) (Dienst Uitvoering Onderwijs & Ministerie van Onderwijs Cultuur en Wetenschap, 2013b; Van der Waals, 2013). On the VU University Amsterdam and the Amsterdam University of Applied Sciences this ratio was not skewed toward females ($\pm 51\%$) (Dienst Uitvoering Onderwijs & Ministerie van Onderwijs Cultuur en Wetenschap, 2013a).

The prediction model for men and women resulted in two distinctly separate models of variables correlated with suicide risk. It determined which of the known risk factors from literature are relevant to this large cohort of Dutch students.

For men variables that were initially deemed significant were no longer significant when combined in a model with (and thus corrected for) multiple variables. For women the prediction model resulted in a much more complex picture of multiple variables that were correlated to the outcome including both the variables significant for men as well as smoking, general health and living situation. Smoking appeared to have a different effect on men and women and is found to affect adolescent women more than man in other research as well (Epstein & Spirito, 2010). Although alcohol was expected to be significantly correlated to suicide risk in the prediction model this was not the case. This may be because alcohol can have a positive relation with moderate use, and a negative relation with alcohol problems.

The risk factors identified can influence the dangerous behaviour, in this case risk of suicide, as presented by the theoretical model presented in this article. Literature also supports the finding that people with suicidal ideation have a perceived unmet need for help (Stringer et al., 2013) as found in the qualitative analyses. The value of the information in this article is the applicability of the information on the institution at hand. The reported need for improvement can be applied through identification of risk behaviours as well as support of protective factors to stimulate healthy development.

4.2 Recommendations

Based on the information provided by the quantitative analysis recommendations can be made to adapt or individualize the feedback from the SHC for each student, and possibly to provide better information on the site from Bureau Studentenartsen.

There are very characteristic differences between men and women in the outcome of the prediction models. This is reflected in literature, where women tend to display different behaviours and trends

compared to men. A recommendation to better the feedback given to an individual is therefore to at least establish different feedback formats for men and women. Additionally to an orange or red 'traffic light' (indicating warnings, $SBQ-R \geq 8$ = orange, $SBQ-R > 11$ = red). This feedback provided can differentiate between the different behavioural patterns, as well as between the fairly straightforward issues under men compared to the more complex correlation of issues under women. The simultaneous delivery of feedback by the SHC has proven to be effective in initiating behavioural change in research in a similar setting and geographical location (Schulz et al., 2014).

Based on qualitative analysis the role of student advisors is important in lowering the threshold to professional help for student with suicide risk is an important aspect of prevention. Promotion of services for suicidal students could stimulate awareness of resources and talking among peers and students services.

In research under a cohort of Dutch individuals a higher amount of suicide patients was in contact with general practitioner compared to international research (Stringer et al., 2013). It is argued that this may be because of the low financial barriers in Dutch health care. If this is the case then the current changes in the Dutch health care system, including a higher 'eigen bijdrage' (personal contribution) to health care costs, may decrease this difference by an increase in the financial threshold to professional care. Student services and online resources are an example of how the threshold to professional care be lowered. Gatekeeper training (e.g. for student counsellors and student psychologists, both in real life as well as through e-learning modules) has proven to be effective in training individuals to interact with suicidal students (Ghoncheh, Kerkhof, & Koot, 2014; Tompkins, Witt, & Abraibesh, 2009). Further research is needed into the effectiveness of different web-based interventions (Luxton, June, & Kinn, 2010).

A more elaborate account of the recommendations can be found in appendix 5.

4.3 Strengths and imitations

Although an extensive amount of students from the institutions involved in this study have filled out the SHC, not all students have done so. The considerations of students that ground their choice for (not) filling out the SHC are unknown. More women than men filled out the SHC, therefore the large amount of females who have filled in the SHC may influenced the applicability of the results of this research on the entire student population by selection bias. By stratification of the results by sex this effect is partially corrected for.

Selection bias may also have played a role in the anonymous questionnaire on experiences and needs. The participants were selected through the SHC and encouragement to participate was based on the engagement strategy for communication, which has been proven to be the most effective method in engaging participants to partake in online suicide prevention methods (Whiteside et al., 2014). Only 16 (14.7%) of the 109 students contacted filled out the online questionnaire. This may be due to unwillingness, but also due to students not recognizing themselves as suicidal although the SBQ-R score indicated this. The method of an anonymous questionnaire was preferred over personal interviews, because this may have yielded an even smaller response. A-selective collection of participants in qualitative data results in indicative but not representative information.

Specific limitations concerning the data and method of data collection are often rooted in the cross-sectional nature of the study. Data collected in a cross-sectional study is information of an individual at a specific point in time. No causality or fluctuations of factors over time can be or have been taken

into account. Therefore all results from the analyses in this article are indicative of correlations between variables, yet the origin of the underlying relation between these variables remains unknown in this instance. A future longitudinal study through the SHC may provide more information on causality.

The division of the population in students with and students without suicide risk, or suicidal and non-suicidal, took place based on the first question of the SBQ-R. The SBQ-R is self-reported, which can bring up issues on reliability of the data: however the format may also encourage answering truthfully as someone may feel more comfortable with reporting suicidal behaviour than with having to talk about it in an interview. The SBQ-R has proved internal validity in multiple studies (Cotton, Peters, & Range, 2007; Osman et al., 2001). A limitation in the division is that it is based on the assumption that all students who are at risk for suicide, are also suicidal. Impulse suicides are found to be by less depressive students yet also less lethal. Suicide risk may also fluctuate over time (ten Have et al., 2009) which is not taken into account in a cross-sectional study. More research towards the specificity of the SBQ-R under Dutch students is needed to establish if all cases of suicide under student could have been predicted.

Additional boundaries were that the great amount of participants was decreased by the selection of questions presented to students based on answers on previous questions. Also, in this study only one cohort from the SHC was taken into account. To check for trends and continuity of the effects found further research could compare the analyses done in this article with similar analyses in the other cohorts.

There were many strong points to the article as well. The use of validated questionnaires ensured internal validity of the results found, and the stratification for sex corrected the difference in suicide risk for men and women. Web-based interventions have proved to significantly initiate behavioural change (Wantland, 2004) and as mentioned earlier an engagement strategy have proven to be effective in engaging participants to take part in online suicide prevention methods (Whiteside et al., 2014).

The SHC provided a large data set. All variables included in the prediction model had at least 10 occurrences in the population, and the amount of variables included was less than the square root of the total amount of observations. This ensured a valid model. Due to the large amount of variable that could be added, no pre-selection had to be made and all variables that may have seemed of interest in literature could be included. Using a prediction model to establish relevant variables decreases the standard error of the resulting model as much as possible by including all variables in one test (Twisk, 2010). Stratification for sex did not only correct for the possible selection bias but also for the possible confounding or effect modification by sex. As discussed in the introductory paragraph on the characteristics of students with suicide risk, sex influences suicide and suicidal risk in several ways. Hence presenting the results for men and women separately gives the opportunity to discuss results pertaining one specific gender and the underlying differences.

The quality of the prediction model was indicated with the Nagelkerke pseudo-R for goodness-of-fit and supported by the Hosmer and Lemeshow goodness-of-fit test. The outcome showed that this prediction model had a sufficient goodness-of-fit. For questionnaires a goodness-of-fit of only 10-15 can be sufficient, because explained variance within a model is not the main purpose of this prediction model (Twisk, 2010).

5. Conclusion

Several risk factors are significantly correlated with suicide risk. These factors differ for men and women, with women having several additional factors that prove significant. The correlation of the determinants with suicide risk increases when scoring higher on the validated questionnaires used for the individual variables. Based on this information gender, and/or the presence of several risk factors, could be taken into account when providing feedback to students. Students with a suicide risk experience talking and help on the Internet as helpful and there is need for the improvement of student services such as student advisors, online resources, and a decrease of the threshold to get help.

6. References

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7. Reflection

Personal reflection – Persoonlijke reflectie (Dutch)

Voor aanvang van mijn stage heb ik de afweging gemaakt of ik gewoon een ‘makkelijke’ stage wilde volgen, of dat ik mijn grenzen wilde verleggen en mezelf wilde uitdagen. Ik heb voor dit laatste gekozen en daarom gesolliciteerd naar de stageplaats over het onderwerp zelfmoord onder studenten, en ben nog steeds heel blij dat ik die keuze heb gemaakt.

De stage heeft in bepaalde opzichten heel positief aan mijn verwachtingen voldaan, en in sommige opzichten vond ik het toch wel echt een andere manier van werken dan dat ik gewend was tijdens mijn opleiding.

Hoewel ik de stage als zeer intensief heb ervaren (het zou blijken dat mijn verwachting van dagelijks 9-5 zeker een onderschatting zou zijn van het werkelijke aantal uren wat ik per dag met stage bezig was) zou ik graag nog veel langer aan het onderwerp doorgewerkt hebben. Tijdens het schrijven van het verslag kwamen veel interessante dingen naar boven, maar ook weer verschrikkelijk veel dingen die ik een tijdsperiode van 3 maanden niet verder zou kunnen onderzoeken. Hoewel dit natuurlijk heel leuk is, is het daarom soms ook lastig een grens aan te geven waarop je je conclusies trekt en waar je verder onderzoek aanbeveelt of zelf uitvoert.

Maar in dit aspect lagen ook een aantal van de positieve ervaringen: het was een onderwerp waar ik niet mee kon ophouden over te schrijven, en ik heb het tijdens geen enkele dag van de 3 maanden als een last ervaren om hiermee aan de slag te moeten gaan. Er is nog zoveel te bereiken op het gebied van zelfmoord, en het geeft een enorme voldoening om bij te dragen aan een klein stukje kennis wat mogelijk kan helpen zoiets verschrikkelijks als zelfmoord onder studenten te voorkomen. De praktische waarde van het verslag maakte ook dat je het idee had ergens voor te werken en een doel had om te bereiken.

Wat deze hele ervaring me geleerd heeft is dat ik het enorm interessant vind om met mijn kennis en vaardigheden bij te kunnen dragen aan het in kaart brengen en mogelijk voorkomen van een maatschappelijk probleem. Ik vond het heel leuk om mijn resultaten niet alleen tijdens het stagecongres te presenteren maar ook tijdens de professionaliseringsmodule zelfmoord voor studentendecanen en studieadviseurs gegeven door de GGZ. Voor mij was het een leerzame ervaring om alles wat ik tijdens de bachelor in theorie geleerd heb voor het eerst serieus in de praktijk te kunnen brengen. In gezelschap van 3 gezellige medestudenten op mijn locatie (Ingrid Bunck, Joyce Molenaar en Pascal Collard) ben ik elke dag weer gemotiveerd en met plezier naar stage gekomen. Daarnaast heeft ook Xanne Visser mij geholpen om mijn verslag verder vorm te geven.

Onder leiding van mijn dagelijkse- en VU-begeleiders heb ik gewerkt aan een verslag waar ik zeer tevreden mee ben. Mijn begeleiders (Frans Meijman, Peter Vonk en Claudia van der Heijde) hebben allen veel tijd en energie gestoken in het ondersteunen van mijn werk, en me geholpen om te bepalen wat voor lijn mijn verslag zou moeten hebben. Hierdoor heb ik het idee dat mijn eindproduct meer is dan dat ik voor aanvang van mijn stage had verwacht dat ik neer zou kunnen zetten.

Als laatste wil ik ook de respondenten bedanken voor hun openhartige houding tijdens het vertellen over wat zij zelf mee hebben gemaakt en hoe zij de toekomst graag zouden zien.

Na 3 maanden hard werken, ben ik zelf heel blij met mijn resultaat.

8. Appendix

Appendix 1 Internet as a resource

As discussed in the introductory paragraph of this article, online resources can contribute to providing help for individuals that possibly may not be reached by current methods. Kauer et al. (2014) indicated that online mental health services could possibly contribute to help-seeking under certain groups of young people due to for example the accessibility of online resources and the anonymity of the medium, although they do not increase help-seeking overall. This could indicate that these online services reach a part of the population that is not reached by regular prevention strategies and measures although Kauer et al. indicate that more research toward help-seeking as a primary outcome is necessary. . Coping strategies such as social support can significantly reduce risk of suicide (Mathew & Nanoo, 2013). Currently there are several prevention programs focussing on suicide, some specifically for youth (RIVM, 2014). As e-health grows to become a part of modern healthcare, ICT could be a helpful tool in the improvement of the quality, efficacy, and cost-effectiveness of healthcare. (College voor zorgverzekeringen, 2014)

For suicide specifically, resources such as the Internet can play a prominent positive as well as negative role, and due to this ambiguous nature should therefore be handled with care. (Daine et al., 2013)

The Internet can play a role in sustaining and escalating suicidal thought, as well as in the prevention of suicide under students. Although most pages available on the Internet are suicide neutral or anti-suicide (Recupero, Harms, & Noble, 2008), there is a large amount of sites available that facilitate or encourage suicide for distressed individuals (Biddle, Donovan, Hawton, Kapur, & Gunnell, 2008), and access to online information on suicide methods seems to have contributed to a few yet significant amount of cases of suicide (1.5%, 95%CI 0.7% to 2.9%), for instance by providing information on highly lethal methods thus increasing the chance at a successful attempt (Gunnell et al., 2012).

In a reaction on the article by Biddle et al. J.M. Grohol (2008) argues however that generic queries such as 'suicide' do not lead to pro-suicide sites in the top-10 results. Online interventions, preventive measures, and support can have a positive effect on suicide too:

research by Van Voorhees et al. (2009) showed that a web-based intervention can significantly reduce self-harm thoughts in patients suffering from depression. Coping strategies such as social support can also significantly reduce risk of suicide (Mathew & Nanoo, 2013). A recent randomized controlled trial by Van Spijker et al. (Van Spijker et al., 2014) indicated that online self-help for suicidal thought has proven to be effective.

Though the Internet may provide students with resources and information regarding suicide prevention it is still a developing environment. In 2009 Van Ballegooijen et al. determined that the quality of information available online may not always be optimal. The quality of online suicide prevention in the Netherlands and Flanders (selection of sites is based on the use of Dutch language) could be called sufficient in only 6 of a total of 23 sites directed towards suicide prevention (Van ballegooijen, Van spijker, & Kerkhof, 2009). This grading was based on 17 different quality characteristics, and indicates a need for improvement of the provision of e-health and suicide prevention. In 2009, psychiatrist J. Mokkenstorm launched the website 113online.nl in the Netherlands. This organization is subsidized by the ministry of health, welfare and sport, and is anti-suicide without religious or ideological motives. The website aims to provide therapy, self-help, and acute assistance through a platform of online suicide prevention. In an article published in 2012

Mokkenstorm et al. pose that, based on the quality characteristics defined by Ballegooijen et al., 113online.nl is currently one of the most complete sites on suicide prevention in the Netherlands (Mokkenstorm et al., 2012). The site is incorporated as an important character in the execution of the national agenda for suicide prevention (Schippers, 2014). Online resources such as 113Online.nl can be used by people at risk for suicide to find information and help, and are thus currently included in the feedback from the SHC.

Appendix 2 *Email contact and Questionnaire (Dutch)*

Mail vragenlijst

Beste student,

Momenteel voer ik namens Bureau Studentenartsen onderzoek uit naar het identificeren en doorverwijzen van studenten met risico op suïcide. In het verleden heb jij deelgenomen aan de Studentengezondheidstest van Bureau Studentenartsen. Hierin heb jij aangegeven dat je weer benaderd mocht worden vervolgonderzoek.

De Studentengezondheidstest heeft naar aanleiding van jouw testresultaat feedback gegeven over je gezondheid en manieren om je gezondheid te verbeteren (de resultaten hiervan zijn door ‘Studentengezondheidszorg UvA/HvA’ naar je gemaïld). Hierin kwam naar voren dat jij mogelijk een verhoogd risico op suïcide of suïcidale gedachtes hebt. De Studentengezondheidstest geeft uiteraard alleen een indicatie van welk gedrag mogelijk risico’s kan hebben voor je gezondheid, dus het kan zijn dat je hier niet in herkent.

Maar heb jij inderdaad in het verleden een periode gehad waarin je suïcidale gedachtes had of wel eens over suïcide hebt nagedacht, dan wil je wellicht vertellen over je ervaringen met, behoeftes aan, of mogelijk gebrek aan preventie. In dat geval zou ik je willen vragen om deel te nemen aan mijn onderzoek, en wil ik je graag uitnodigen om een korte vragenlijst over je ervaringen in te vullen.

De vragenlijst bestaat uit open vragen waarin je zelf kunt vertellen over jouw ervaringen met preventieve maatregelen (of de afwezigheid hiervan) en hoe jij denkt dat dit voor andere studenten verbeterd kan worden.

Het invullen van de vragenlijst zal ongeveer 10 minuten in beslag nemen, en de resultaten van de vragenlijst zal ik gebruiken om aanbevelingen te doen om het opsporen en verwijzen van studenten die mogelijk een verhoogd risico op suïcide hebben te verbeteren.

Via de volgende link kun je de vragenlijst invullen:

[LINK]

Voor eventuele vragen of reacties voor of tijdens het invullen kun je me bereiken via d.mazurel@uva.nl. Ik ben elke werkdag bereikbaar via dit e-mailadres. Daarnaast kun je ook bellen naar (020) 5252954.

Vanzelfsprekend behandelen mijn begeleiders en ik jouw informatie als medisch geheim.

Met vriendelijke groet,

Danuta Mazurel

Bachelorstudent gezondheidswetenschappen

Vragenlijst

Dankjewel dat je geïnteresseerd bent in het invullen van deze vragenlijst.

De vragenlijst bestaat uit open vragen naar jouw ervaringen met en behoeftes aan preventie bij risico op suïcide.

Met preventie bedoel ik alles waarmee geprobeerd wordt het risico op suïcide voor studenten te verminderen. Denk hierbij bijvoorbeeld aan screeningprogramma’s, maar ook aan praten met andere mensen over je problemen of gedachten. Ook als je juist geen of weinig ervaring met preventie hebt

gehad kan je dit aangeven. Voel je niet bezwaard om soms nee te moeten antwoorden, dit kun je gewoon toelichten.

De open vragen kun je uitgebreid invullen. Het is juist van belang dat ik zoveel mogelijk te weten kom over jouw ervaringen en over een aanpak waar jij behoefte aan zou hebben gehad. Er zit daarom ook geen limiet aan de hoeveelheid tekst in de tekstvakken.

Na afloop van de vragen kun je in een korte evaluatie aangeven wat je van de vragenlijst vindt.

Individueel – Ervaring met preventie

De eerste vragen gaan over jouw persoonlijke ervaringen met preventie.

1] Welke vormen van preventie van suicidaliteit ken je in het algemeen?

Subtekst → Dit mag alles zijn, en is niet beperkt tot alleen preventie waar je ervaring mee hebt.

2] Wellicht ben je ooit op de universiteit of onderwijsinstelling in contact gekomen met personen, regelgeving, en dergelijke omtrent suicide die de universiteit beschikbaar stelde voor mensen met een risico op suicide. Zo ja; welke, zo nee wat heb je gemist?

3] Wellicht ben je ooit naar aanleiding van een vorm van preventie herkend als iemand met risico op suicide. Zo ja; hoe is dat toen verlopen en ben je doorverwezen voor hulp?

4] Hoe heeft een eventuele vorm van preventie je suicidale gedachten of risico op suicide beïnvloed of geholpen hier verandering in te brengen?

Subtekst → Licht toe op wat voor manier preventie je heeft beïnvloed of geholpen te veranderen. Bij verschillende vormen van preventie graag apart toelichten.

5] Waarom heeft die vorm van preventie jouw suicidale gedachten of risico op suicide wel/niet beïnvloed of geholpen hier verandering in te brengen?

Subtekst → Licht toe om wat voor reden deze vorm van preventie je wel/niet heeft kunnen beïnvloeden of helpen te veranderen. Bij verschillende vormen van preventie graag apart toelichten.

6] Wat heeft het meest geholpen toen je probeerde je suicidale gedachten of risico op suicide te verminderen?

7] Wat heeft het minst geholpen toen je probeerde je suicidale gedachten of risico op suicide te verminderen?

8] Heb jij gebruik gemaakt van het internet omtrent suicide? Zo nee; waarom niet, en zo ja; op wat voor manier dan, en heeft dit geholpen je risico op suicide te verminderen?

Algemeen – Behoeftes preventie

De volgende vragen gaan over jouw behoeftes met betrekking tot preventie.

9] Hoe (en door wie of wat) zou jij willen dat jij of andere studenten met een risico op suicide geïdentificeerd zouden worden?

10] Hoe zou jij willen dat jij of andere studenten met een risico op suïcide zouden worden geholpen hier verandering in te brengen, en waarom?

11] Hoe zou jij willen dat jij of andere studenten met een risico op suïcide (wanneer nodig) zouden worden verwezen naar hulp?

12] Wat vind jij de belangrijkste karakteristieken van preventie, en waarom?
Subtekst → Hiermee worden goede/positieve/gunstige karakteristieken bedoelt.

13] Hoe denk jij dat het internet jou of andere studenten met een risico op suïcide kan beïnvloeden?

14] Wat voor online informatie of elektronische middelen vind jij dat beschikbaar moet(en) zijn voor jou of andere studenten om suïcidale gedachten of risico op suïcide te verminderen?

15] Wat vind jij dat jouw universiteit of onderwijsinstelling goed doet om studenten met een risico op suïcide te identificeren en verwijzen?

Subtekst → Leg ook uit of je vindt dat dit voortgezet moet worden zoals het is of verder verbeterd moet worden.

16] Wat vind jij dat jouw universiteit of onderwijsinstelling zou moeten veranderen om studenten met een risico op suïcide te identificeren en verwijzen?

Evaluatie

De volgende vragen gaan over het invullen van deze vragenlijst.

17] Wat vind je in het algemeen van deze vragenlijst?

18] Waren er vragen die je te persoonlijk vond? Zo ja; welke en wil je dit toelichten?
Subtekst → (bijv. Dat je het onprettig vond om hierop antwoord te moeten geven.)

19] Op welke vragen kon je niet volledig antwoord geven? Wil je dit toelichten?

20] Als je graag een email met informatie ontvangt over de resultaten van dit onderzoek zodra deze bekend zijn, laat dan in het onderstaande tekstvak je e-mailadres achter.

Subtekst → (Je e-mailadres zal onmiddellijk verwijderd worden uit de administratie zodra deze informatie je toegezonden is, en niet voor enig ander doeleinde gebruikt worden)

Bevestiging

Dankjewel voor het invullen van de vragenlijst en daarmee aan het bijdragen aan mijn onderzoek.

Als je bij de evaluatie aangegeven hebt dat je graag een e-mail met informatie over de resultaten van dit onderzoek ontvangt, zal ik je over enkele maanden nog eenmalig een e-mail sturen.

Appendix 3 *Questionnaires used in the Student Health Check*

Alcohol Use Disorders Identification Test (AUDIT)

(Saunders et al., 1993)

The Alcohol Use Disorders Identification Test, or AUDIT, is a questionnaire to assess specifically the hazardous or harmful alcohol consumption of an individual. It is focussed on the less severe drinkers rather than individuals with diagnosed disorders, and incorporates both experiences in the past year as well as over a lifetime. This test, developed through a cross-national collaborative project by the WHO, constitutes of 10 questions.

The following 10 questions are used in the AUDIT:

Alcohol consumption

1. How often do you have a drink containing alcohol?
2. How many drinks containing alcohol do you have on a typical day when you are drinking?
3. How often do you have six or more drinks on one occasion?

Drinking behaviour

4. How often during the last year have you found that you were not able to stop drinking once you had started?
5. How often during the last year have you failed to do what was normally expected from you because of drinking?
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

Adverse psychological reactions

7. How often during the last year have you had a feeling of guilt or remorse after drinking?
8. How often during the last year have you been unable to remember what happened the night before because of drinking?

Alcohol-related problems

9. Has a relative or friend, or a doctor or other health worker, been concerned about your drinking and suggested you to cut down?
10. Have you or someone else been hurt because of your drinking?

Each question is scored from 0 to 4, resulting in possible end score from 0 to 40, where 0 is no hazardous and harmful alcohol consumption and 40 is complete hazardous and harmful alcohol consumption.

Two cut-off points (8/10) of hazardous and harmful alcohol use result in maximum sensitivity and specificity.

At a cut-off point of 8, the overall sensitivity for hazardous and harmful alcohol use was 87% - 96% (average 92%), and an average specificity of 94%. At a cut-off point of 10, the overall sensitivity for hazardous and harmful alcohol use was on average 80%, and specificity 95-100% (average 98%).

Suicidal Behaviours Questionnaire-Revised (SBQ-R)

(Linehan & Nielsen, 1981; Osman et al., 2001)(Linehan, 1981; Osman et al., 2001)

The Suicidal Behaviours Questionnaire-Revised, or SBQ-R, tests the self-reported severe past suicidal thoughts and attempts of individuals. The original SBQ by Lineham contained multiple questions on suicidal ideation and attempt, however in this paper the more recent revised edition by Osman et al. has been used. This revised edition of the SBQ-test incorporates previous research of the original and

modified versions of the SBQ-test with systematic research to establish a single short modified version.

The following 4 questions are used in the SBQ-R:

Item 1: Lifetime suicide ideation and suicide attempt

11. Have you ever thought about, or attempted to kill yourself?

➤ Answer: 1 = never, to 4 = attempted

Item 2: The frequency of suicidal ideation over the past twelve months

12. How often have you thought about killing yourself in the past year?

➤ Answer: 1 = never, to 5 = very often

Item 3: Threat of suicidal behaviour

13. Have you ever told someone that you were going to commit suicide, or that you might do it?

➤ Answer: 1 = never, to 3 = yes, more than once

Item 4: Self-reported likelihood of suicidal behaviour

14. How likely is it that you will commit suicide one day?

➤ Answer: 0 = never, to 6 = very likely

In some research, only item one is used to determine if an individual is suicidal or non-suicidal.

The cut-off point of item 1 is 2, with answer 1 and 2 (never, brief) indicating non-suicidal and answer 3 and 4 (had a plan, attempted) indicating suicidal. This cut-off point had a sensitivity of 100% and a specificity of 96%.

The cut-off point for total score is 7 (sensitivity 93%, specificity 95%) for undergraduate students and 8 (sensitivity 87%, specificity 93%) for adolescents and psychiatric inpatients.

The cut-off point for total score is 8, with <8 indicating no risk for suicide and ≥ 8 indicating a risk for suicide.

Cigarette Dependence Scale (CDS-5)

(Etter et al., 2003)

The Cigarette Dependence Scale, or CDS, is a tool to measure the dependence of participants on cigarettes. The CDS-5 is a short 5-item version of the full 12-item questionnaire.

Table 11 shows the questions used. The questions pertaining the CDS-5 are marked with an asterisk (*), see Table 11 no. 1 -5.

Table 11

The Cigarette Dependence Scale, English-language version

Questions	Response options	Recoding
* 1. Please rate your addiction to cigarettes on a scale of 0–100 I am NOT addicted to cigarettes at all = 0 I am extremely addicted to cigarettes = 100	Addiction	0–20 = 1 21–40 = 2 41–60 = 3 61–80 = 4 81–100 = 5
* 2. On average, how many cigarettes do you smoke per day?	Cigarette/day	0–5 = 1 6–10 = 2 11–20 = 3 21–29 = 4 30+ = 5
* 3. Usually, how soon after waking up do you smoke your first cigarette?	Minutes	0–5 = 5 6–15 = 4 16–30 = 3 31–60 = 2 61+ = 1
* 4. For you, quitting smoking for good would be:	Impossible = 5 Very difficult = 4 Fairly difficult = 3 Fairly easy = 2 Very easy = 1	No recoding
<i>Please indicate whether you agree with each of the following statements:</i>		
* 5. After a few hours without smoking, I feel an irresistible urge to smoke	Totally disagree = 1 Somewhat disagree = 2 Neither agree nor disagree = 3 Somewhat agree = 4 Fully agree = 5	
6. The idea of not having any cigarettes causes me stress	As item no. 5	
7. Before going out, I always make sure that I have cigarettes with me	As item no. 5	
8. I am a prisoner of cigarettes	As item no. 5	
9. I smoke too much	As item no. 5	
10. Sometimes I drop everything to go out and buy cigarettes	As item no. 5	
11. I smoke all the time	As item no. 5	
12. I smoke despite the risks to my health	As item no. 5	
CDS-12		Sum of items 1–12
CDS-5 (items marked *)		Sum of items 1–5

Note. As seen in Etter et al., 2003

The outcomes of the questionnaire are recoded into variables ranging from 1 to 5, with a total of 25 points where 5 is no dependence on cigarettes and 25 is complete dependence on cigarettes.

RAND-36

(Zee & Sanderman, 2012)

The RAND-36 is based on the RAND Health Insurance Questionnaire. The RAND Health Insurance Questionnaire is a multi-dimensional measure of health status. The RAND-36 used in this paper is a revised and translated version of the English MOS SF-36, which in turn is the original English-language shortened version of the RAND Health Insurance Questionnaire.

The RAND-36 includes 9 scales for measuring health, namely: physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain, general health, and health change.

In the SHC only question 11 of the RAND-36 has been used. The question tests energy/fatigue, emotional well-being, and general health:

11 Wilt u het antwoord kiezen dat het beste weergeeft hoe juist of onjuist u elk van de volgende uitspraken voor uzelf vindt.		volkomen juist	grotendeels juist	weet ik niet	grotendeels onjuist	volkomen onjuist
a	Ik lijk gemakkelijker ziek te worden dan andere mensen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Ik ben net zo gezond als andere mensen die ik ken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Ik verwacht dat mijn gezondheid achteruit zal gaan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Mijn gezondheid is uitstekend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 6 Question 11 of the RAND-36 (Zee & Sanderman, 2012)

The outcomes of the questionnaire are weighted and recoded into variables with different ranges, with the total sum of variables ranging from 0 to 100, where 0 is total absence of health issues and 100 is the maximum amount of health issues.

Extended Kessler-10 psychological distress scale (EK-10)

(Donker et al., 2010; Kessler et al., 2002)

The extended Kessler-10 psychological distress scale, or EK-10, is a Dutch-language expanded version of the original Kessler-10 psychological distress scale.

The K10 tests the psychological distress of participants by combining several scales: depressed mood, motor agitation, fatigue, worthless guilt, and anxiety. The EK-10, which encompasses 5 additional questions compared to the K-10, places an additional focus on core anxiety problems and use of medication besides the original focus on depression to increase the detection of anxiety disorders. In the SHC the first questions are used to measure depression. The additional 5 questions, 11 to 15, are used for anxiety.

The following 15 questions encompass the EK-10:

The following questions are about your feelings in <u>the past 4 weeks.</u>		All of the time	Most of the time	Some of the time	A little of the time	None of the time
1	About how often did you feel tired out for no good reason?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	About how often did you feel nervous?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	About how often did you feel so nervous that nothing could calm you down?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	About how often did you feel hopeless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	About how often did you feel restless or fidgety?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6	About how often did you feel so restless you could not sit still?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	About how often did you feel depressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	About how often did you feel that everything was an effort?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	About how often did you feel so sad that nothing could cheer you up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	About how often did you feel worthless?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					yes	no
11	In the past month, did you have a spell or attack when all of a sudden you felt frightened, anxious or very uneasy, or all of a sudden experienced physical symptoms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	In the past month, did you have an unreasonably strong fear of being in a crowd, leaving home alone, standing in a queue or traveling on buses, cars and trains?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	In the past month, did you have a strong fear of doing things in front of others, like speaking in public, eating in public, writing while someone watches?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	In the past month, have you felt most of the time worried and anxious?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Do you use medication for anxiety, depression, tension or stress at this moment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 7 *Questions of the EK-10* (Donker et al., 2010)

Answers are recoded into variables ranging from 1 to 5, with the total sum of variables of the full test ranging from 5 to 50, where 5 is total absence of psychological distress and 50 is the maximum presence psychological distress. The cut-off point used is 20 and/or at least 1 positive answer to one of the five additional questions.

In the date from the SHC the scale had been scored 1-5, therefor the total score varies from 10-50. For anxiety in the SHC the 15th question has been excluded, as it did not prove valid within smaller pilot studies of the test. The scale has also been changed to a likert scale, and therefor anxiety is measures on a scale from 4-20 (every question is scored 1-5)

The Drug Abuse Screening test (Dast-10)
(Skinner, 1982a, 1982b)

The Drug Abuse Screening Test, or DAST, tests for drug (ab-)use by individuals in the past year, excluding alcohol consumption. The full DAST is composed of 28 questions, however a 20-question (DAST-20) and 10-question (DAST-10) version have been derived from the full test.

In the SHC, all 10 questions of the DAST-10 are taken into account.

The following questions are used in the DAST-10:

<u>These questions refer to the past 12 months.</u>	<u>Circle Your Response</u>	
1. Have you used drugs other than those required for medical reasons?	Yes	No
2. Do you abuse more than one drug at a time?	Yes	No
3. Are you always able to stop using drugs when you want to?	Yes	No
4. Have you had "blackouts" or "flashbacks" as a result of drug use?	Yes	No
5. Do you every feel bad or guilty about your drug use?	Yes	No
6. Does your spouse (or parents) ever complain about your involvement with drugs?	Yes	No
7. Have you neglected your family because of your use of drugs?	Yes	No
8. Have you engaged in illegal activities in order to obtain drugs?	Yes	No
9. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?	Yes	No
10. Have you had medical problems as a result of your drug use (e.g. memory loss, hepatitis, convulsions, bleeding, etc.)?	Yes	No

Figure 8 *Questions of the DAST screening test* (Skinner, 1982a)

The Compulsive Internet Use Scale (CIUS)
(Meerkerk, 2007)

The Compulsive Internet Use Scale, or CIUS, is an instrument that measures the severity of compulsive Internet use. The scale has been tested both under heavy Internet users as well as a large population of convenience users. The CIUS exists of 14 questions, however in the SHC only the following (adapted) questions have been used:

- How often do you find it difficult to stop using the internet when you are online?
- How often do you continue to use the internet despite your intention to stop?
- How often do others (e.g. partner, children, parents, friends) say you should use the internet less?
- How often do you prefer to use the internet instead of spending time with others (e.g. partner, children, parents, friends)?
- How often are you short of sleep because of the internet?
- How often do you think about the internet, even when not online?
- How often do you look forward to your next internet session?
- How often do you think you should use the internet less often?
- How often have you unsuccessfully tried to spend less time on the internet?
- How often do you rush through your study work in order to go on the internet? (adapted from ‘(home) work’ to ‘(study) work’)

The questions “How often do you use the internet to escape from your sorrows or get relief from negative feelings?” and “How often do you feel restless, frustrated, or irritated when you cannot use the internet?” have not been included

Answers can be given on a likert scale from 1 (‘never’) to 5 (‘very often’) with a total score ranging from 10-50, with 10 indicating no compulsive internet use and 50 indicating full compulsive internet use.

The Cross-Cultural Coping Scale (CCCS)
(Kuo et al., 2006)

The Cross-Cultural Coping Scale, or CCCS, is a scale to measure the coping differences of students of a different nationality or heritage than where they live now. It encompasses 20 questions, which will not be presented in this appendix (but which can be found in the literature provided as reference) as the results have only been discussed in more detail in appendix 4.

Appendix 4 *Additional factors*

As discussed in the results paragraph of this article, the following factors have not been taken into account in the prediction model as data for these questions were collected only when performance on variables such as lifestyle were poor. Nonetheless they give interesting information on the resilience of students by measuring self-efficacy and coping strategies under students at risk.

Self-efficacy

Self-efficacy, as measured by the SHC, measures the resilience of student for peer pressure on several different risk behaviours. Although the odds for suicide risk increases with an overall higher score on the questions of self-efficacy (indicating a lower overall self-efficacy) this correlation is not significant. A possible trend is visible though in the odds of the 3rd quartile compared to the 1st (odds 0.76, 0.58-1.00 95%CI), which is close to significant with a p-value of 0.05.

Several interesting questions to measure self-efficacy such as “can you withstand peer pressure to smoke” (chi-square=19.36, p=0.04) and “can you withstand peer pressure to use any form of medication” (chi-square=20.02, p=0.029) are significantly correlated to suicide risk.

Coping (CCCS)

The SHC measured several coping methods: Collective-, avoidance-, and engagement coping (as measured by the CCCS). The odds of suicide risk is lower for higher scores on the respective coping methods. For avoidance coping student in the 3 highest quartiles have a 0.72-0.78 odds of suicide risk. For collective coping students in the 2nd quartile have 0.51 odds, and students in the 4th quartile a 0.29 odds, of suicide risk compared to students in the 1st quartile. For engagement coping this was 0.56 and 0.36 respectively.

Appendix 5 Recommendations

Based on the information provided by the qualitative analysis recommendations can be made to adapt the feedback from the SHC to the individual, and possibly to provide better information on the site from Bureau Studentenartsen. This is shortly discussed in the discussion paragraph of the article, yet in this appendix recommendations will be elaborated on more.

There are very characteristic differences between men and women in the outcome of the prediction models. This is reflected in literature, where women tend to display different behaviours and trends compared to men. A recommendation to better the feedback given to an individual is therefore to at least establish different feedback formats for men and women. This feedback provided can differentiate between the different behavioural patterns, as well as between the fairly straightforward issues under men compared to the more complex correlation of issues under women, additionally to the orange or red ‘traffic lights’ (indicating warningsings, $SBQ-R \geq 8$ = orange, $SBQ-R > 11$ = red) currently only provided based on the SBQ-R scores. The simultaneous delivery of feedback by the SHC has proven to be effective in initiating behavioural change in research in a similar setting and geographical location (Schulz et al., 2014).

Based on the quantitative analysis for risk factors the following changes could thus be made

- ❖ Separate feedback for men and women
- ❖ The presence of risk behaviours should signal that feedback on prevention of suicide and suicide risk should be provided

Examples of risk behaviours are:

- Depression (men and women)
- Anxiety (women)
- Psychological complaints (men and women)
- Poor general health (women) or lifestyle (men and women)
- Smoking (women)

Based on qualitative analysis the role of student advisors is important in lowering the threshold to professional help for student with suicide risk is an important aspect of prevention. Promotion of services for suicidal students could stimulate awareness of resources and talking among peers and students services.

Universities could provide

- ❖ Self-diagnose test. Both online as well as incorporated in the curriculum or as part of student counselling.
- ❖ Information on resources online such as 113online.nl.
- ❖ Information of resources within the institution (student counsellors, student psychologists, student doctors).

In research under a cohort of Dutch individuals a higher amount of suicide patients was in contact with general practitioner compared to international research (Stringer et al., 2013). It is argued that this may be because of the low financial barriers in Dutch health care. If this is the case then the current changes in the Dutch health care system, including a higher ‘eigen bijdrage’ (personal contribution) to health care costs, may decrease this difference by an increase in the financial threshold to professional care. Student services and online resources are an example of how the threshold to professional care be lowered, however the consults with student psychologists, student counsellors and deans indicated that there is often a shortage of knowledge, ability, and time (sometimes due to budget cuts) to handle students with suicide risk or suicidal ideation. Gatekeeper training (e.g. for student counsellors and student psychologists, both in real life as well as through e-

learning modules) has proven to be effective in training individuals to interact with suicidal students (Ghoncheh et al., 2014; Tompkins et al., 2009).

There are also no protocols establish for suicide within the educational institutions for teachers or student psychologists. The Dutch association of mental health and addiction care (GGZ) has developed a multidisciplinary diagnostic guideline for the treatment of suicide and suicidal behaviour (Hemert et al., 2012). Although initially focussed on professional healthcare workers they indicate that the recognition of suicidal behaviour should be a primary skill of any healthcare worker.

Orientating research toward the severity of suicidality may be a relevant skill for staff at a university institution that may come into contact with suicidal students as well.

Additional recommendations may therefore be:

- ❖ Provide staff with Gatekeeper-training.
- ❖ Establish protocol(s) on how to deal with a suicide and suicidal students.

Appendix 6 *Press release (Dutch)*

Kort persbericht

Bureau Studentenartsen

Door: Danuta Mazurel

Studenten met suïciderisico: identificatie, verwijzing en preventie.

Bijna 10% van studenten heeft wel eens aan suïcide gedacht. Suïcide, een van de belangrijkste doodsoorzaken onder jongeren, is een ernstig maar voorkombaar probleem.

Verbeteren van de herkenning van risicostudenten en huidige preventiemaatregelen kan bijdragen aan het verminderen van suïcide.

In een onderzoek namens Bureau Studentenartsen is op basis van een gezondheidstest onderzoek gedaan naar risicofactoren voor suïcide onder studenten. Hieruit kwam naar voren dat voor zowel mannelijke als vrouwelijke studenten depressie, psychische klachten, en leefstijl significant verband hielden met suïciderisico. Daarnaast waren voor vrouwen ook roken en angstproblemen hiermee verbonden. Daarnaast zijn door middel van een vragenlijst een aantal verbeterpunten opgesteld om de huidige preventiemaatregelen beter te kunnen laten aansluiten op de behoeftes van studenten. Vooral praten, met medestudenten maar ook met studentenpsychologen of studieadviseurs, bleek belangrijk. Er bestaat nog steeds een taboe rondom suïcide en suïcidale gedachten. De drempel naar professionele zorg moet verlaagd worden, en via internet zouden studenten die misschien anders geen zorg zouden hebben ontvangen toch bereikt kunnen worden.

De aanbevelingen uit het onderzoek zullen worden aangeboden aan de universiteiten die deel hebben genomen aan de gezondheidstest, namelijk de UvA, HvA en de VU.

Geïnteresseerd? Voor verdere informatie kunt u contact opnemen met Bureau Studentenartsen.

Appendix 7 Hierarchical coding scheme (Dutch)

The following hierarchical coding scheme display the themes and subthemes that have emerged from the fragments and the codes appointed to these fragments. This hierarchical scheme provides an overview of the relevant topics that have emerged from the data. The schemes are in Dutch.

