

# Extensive Medical Absenteeism among Secondary School Students: An Observational Study on Their Health Condition from a Biopsychosocial Perspective

Yvonne T. M. Vanneste<sup>1,2,3</sup>, Jolanda J. P. Mathijssen<sup>2</sup>, Ien L. A. M. van de Goor<sup>2</sup>,  
Carin M. C. Rots-de Vries<sup>1,2</sup>, Frans J. M. Feron<sup>3</sup>

<sup>1</sup>Regional Public Health Service West Brabant, Tilburg, The Netherlands

<sup>2</sup>Faculty of Social and Behavioural Sciences, Tranzo, Tilburg University, Tilburg, The Netherlands

<sup>3</sup>Faculty of Health, Medicine and Life Sciences (FHML), CAPHRI, Department of Social Medicine, Maastricht University, Maastricht, The Netherlands

Email: [y.vanneste@ggdwestbrabant.nl](mailto:y.vanneste@ggdwestbrabant.nl)

Received 28 January 2015; accepted 15 March 2015; published 18 March 2015

Copyright © 2015 by authors and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

An adequate approach to reducing school absenteeism should focus on medical absenteeism as this is the most prevalent form of school absenteeism. The objective of this study is to explore the health condition of pre-vocational secondary students with extensive medical absenteeism from a biopsychosocial perspective. Data were obtained from medical assessments and Strengths and Difficulties Questionnaires (SDQs) of students with medical absence above threshold criteria (*i.e.* reported sick four times in 12 school weeks or more than six consecutive school days) who were referred to a youth health care physician. The results showed that the students had a mean absence rate of 14% in 12 school weeks. Of all students, 43.5% had a diagnosed disease and 81.5% had problems such as physical complaints not yet diagnosed, psychosocial problems, lifestyle problems and sleeping difficulties. Four groups could be distinguished: 13.4% with a diagnosed disease and no problem, 30.1% with a diagnosed disease and a problem, 51.5% with a problem and no diagnosed disease and 5.1% without a diagnosed disease or problem. Significantly higher scores of the Total difficulties-scale on the SDQ were found (mean 10.5; SD 5.8) in the study group, compared to a reference group (mean 9.1; SD 4.9). In conclusion, this study shows that when using the aforementioned criteria for extensive medical absenteeism to intervene with the absence, students with a mean absence rate of 14% in 12 school weeks are identified. If there was a diag-

**How to cite this paper:** Vanneste, Y.T.M., Mathijssen, J.J.P., Goor, L.A.M. van de, Rots-de Vries, M.C. and Feron, F.J.M. (2015) Extensive Medical Absenteeism among Secondary School Students: An Observational Study on Their Health Condition from a Biopsychosocial Perspective. *Open Journal of Preventive Medicine*, 5, 111-121.  
<http://dx.doi.org/10.4236/ojpm.2015.53013>

nosed disease, it was accompanied by problems about twice as often. More than half of the students' absence was caused by problems rather than a disease. The great diversity of these problems calls for a personalized approach. A broad perspective, including medical expertise, is needed to distinguish between emerging mental and physical diseases, psychosocial and lifestyle problems.

## Keywords

Adolescent Health, Preventive Pediatric Primary Care, School Absenteeism, Public Health, Psychosocial Problems

---

## 1. Introduction

School absenteeism can lead to a lower level of education or even to school dropout [1]-[4]. Low educational level and school dropout are both strongly associated with extensive risk behaviour (e.g. alcohol consumption, smoking, lack of exercise) [5] [6], a higher prevalence of mental problems and chronic health issues [7]-[10], and higher mortality rates [11]-[16]. Health outcomes, therefore, can be improved by optimizing educational opportunities [17]. Recently, Hawkrigg and Payne [18] proposed an approach to tackle prolonged school absenteeism. As they pointed out, the risk of associated long-term adverse health outcomes can be lowered by diagnosis and management of specific physical and mental health problems and facilitation of school attendance.

Often, a distinction is made between unexcused (truancy) and excused school absenteeism. The latter is mainly due to sickness reporting, so called medical absenteeism, and may be related to chronic somatic and psychiatric diseases. When these diseases are present, absenteeism appears to be commonly due to physical complaints and stress. It may also be caused by a low threshold for reporting sick, or by more complex causes such as psychological, family or social problems [4]. Moreover, medical absenteeism is associated with risk behaviours [19]. An absence rate of >20% of the school year is strongly associated with psychiatric diseases, especially depression and anxiety [20]. Considering these research outcomes, a broad perspective on medical absence is needed.

In the Netherlands, the approach to reducing school absences centers primarily on truancy. Although at least half of school absenteeism is related to medical absenteeism [21], an approach for addressing medical absenteeism is not yet available. Medical absenteeism is not an area of responsibility of Compulsory Education. The attendance officer has no legal duty to enforce the law in case of excused absenteeism and lacks medical expertise to interpret medical absenteeism correctly. It is the school's authority to decide how to deal with it. In some countries schools decide that sick reports must be verified by an appropriately licensed medical professional in order to be accepted, regardless of the length of absence. However, in the Netherlands, medical professionals are not allowed to make statements about medical conditions or learning abilities. Medical absenteeism from school thus results solely from parental sick reporting. Therefore, the Youth Health Care department [22] [23] of the Regional Public Health Service West Brabant has developed the intervention "Medical Advice for Sick-reported Students", abbreviated as MASS (see **Box 1**) [24], in collaboration with secondary schools. Schools actively identify students with medical absence above well-defined threshold criteria: reported sick four times in 12 school weeks or more than six consecutive school days (the MASS-criteria). As there are no standards for such criteria, these criteria are based on the results of a preliminary study [24] and expert agreement. After referral, youth health care physicians (YHCPs; the Dutch specialism for preventive paediatric primary care) look for factors that contribute to the students' medical absenteeism, using a biopsychosocial perspective [25] [26]. The biopsychosocial perspective is based on a conceptual model that assumes that psychological and social factors must also be included along with the biologic in understanding a person's physical complaint, medical illness or disorder. A management plan is then designed together with student, parents and school, and with curative professionals, if applicable, aimed to optimize students' health and maximize students' participation in school activities.

Implementation of MASS started at pre-vocational secondary schools, for two reasons. First, in the Nether-

**Box 1.** Description of the Dutch intervention “Medical Advice for Sick-Reported Students”, abbreviated as MASS.

The MASS intervention consists of an integrated approach in a public health setting. MASS provides a clear framework in which schools, in direct collaboration with YHCPs, are able to reach students and their parents, discuss aspects of the student’s medical absence, and design and monitor a management plan that aims to optimize students’ health and maximize students’ participation in school activities. In summary, the aim of the MASS intervention is to limit the absenteeism by arranging appropriate care, educational adjustments and adequate support for students and parents. A systematic routine is followed.

*Step 1 School’s policy:*

The school communicates with students and parents about the new policy in case of absenteeism because of medical reasons.

*Step 2 Referral to the YHCP:*

Students with extensive medical absence are identified by school by using well-defined threshold criteria: reported sick four times in 12 school weeks or more than six consecutive school days (the MASS-criteria). Meeting the criteria always leads to a referral to the YHCP for student and parents.

*Step 3 Consultation of student and parents with the YHCP:*

During the interview and medical assessment YHCPs look for biological, psychological and social factors that contribute to the students’ medical absenteeism. The YHCP identifies whether there is a specific somatic or psychiatric diagnosis to account for the absence. If the diagnosis is clear the focus will be on optimising the (adherence to) treatment. In cases of frequent physical complaints and psychosocial problems with no clear medical diagnosis (yet), the YHCP considers diagnostics, and looks for family and school related factors, as well as health risk behaviours and lifestyle aspects that contribute to the physical complaints and psychosocial problems. If needed, the YHCP refers to a medical specialist or a psychosocial support network. A management plan is then designed together with student, parents and school, and with curative professionals, if applicable. This plan includes agreements on cure, care and school attendance.

*Step 4 Monitoring the management plan:*

School and YHCP monitor the execution of the management plan.

lands, medical absenteeism is more prevalent at this educational level [21]. Secondly, school dropout occurs more frequently at this educational level because pre-vocational secondary students cannot fall back on a lower level of education. As they often demonstrate behavioural problems [27] and problems with planning [28], which prevent their catching up when fallen behind, school absenteeism therefore has serious consequences for them. The objective of this study is to explore the health condition and socio-demographic characteristics of those students who met the MASS-criteria, from the biopsychosocial perspective of youth health care.

## 2. Methods

### 2.1. Setting

Since 2010, MASS has been implemented in Dutch mainstream secondary schools in the region West Brabant, in the Netherlands. This study is part of the research project on the MASS intervention.

### 2.2. Study Group

The students were selected from 7 pre-vocational secondary schools which had applied the MASS intervention and consisted of 493 students who met the MASS-criteria and had been referred to the YHCP over the course of school year 2011-2012. If any student received two or more separate referrals over the data collection period, only data associated with the first referral were included. Of all students referred to the YHCPs 336 gave permission to use the information about their health condition and 256 students filled in the Strengths and Difficulties Questionnaire (SDQ).

### 2.3. Data Collection Procedure

Data were obtained from the medical assessments. The YHCPs filled out a registration form about the student’s health condition. At the end of the consultation written informed consent was obtained from students and parents to participate in the study. Additionally, students were asked to complete the Strengths and Difficulties Questionnaire [29] [30] (SDQ) at home. Data from YHCP files and school files were used to identify socio-demographic characteristics and to determine the absence rate.

## 2.4. Description of the Measurements

**Health condition:** By means of diagnostic interview and medical examination, the YHCPs identified and registered all determinants of medical absenteeism, both diseases and problems. Based on this procedure, a student could receive more than one classification in the domain of diseases and/or problems. Diseases were registered in open fields and categorized by expert agreement afterwards. Physical complaints, sleeping difficulties, lifestyle problems, and psychosocial problems, all categorized by protocol in child-related, family-related or school-related problems, were registered by checking the boxes on the registration form. The YHCPs were trained in using the registration form. Peer evaluation took place monthly to standardize the scoring method. The categorization and description of the health condition are presented in **Table 1**.

Psychosocial problems were also identified using the student's version of the SDQ. The SDQ is a standardized measure covering the most important domains of psychopathology in children and adolescents (4 - 16 year old), and is used as a valid instrument for early identification of psychosocial problems [31]-[33]. The questionnaire is divided in five subscales (5 items per scale): emotional problems, conduct problems, hyperactivity-inattention, peer problems and prosocial behaviour. On the basis of the four problem scales a total difficulty score can be calculated.

**Socio-demographic characteristics:** Students' ethnicity was determined and categorized on the basis of the country of birth of both parents and student. The level of social deprivation in the neighbourhood was assessed by postal code, using the classification in seven groups by the Dutch Institute for Social Research [34], 1 indicating highest level of deprivation and 7 the lowest. Three categories were used: high deprivation (1 through 3), medium deprivation (4) and low deprivation (5 through 7).

**Table 1.** Categorization and description of the health condition from a biopsychosocial perspective.

Health condition	Description
<b>Diseases:</b>	
1) Chronic physical disease	Including migraine, cervicogenic headache, asthma, allergies, eczema, urticarial, Osgood Schlatter, low blood pressure, hypermobility syndrome, mastocytosis, Diabetes Mellitus, obesity, thyroid problems, benign skin tumour, Irritable Bowel Syndrome, lactose intolerance, hearing problems, congenital abnormality.
2) Temporary physical disease	Including Pfeiffer, pneumonia, urinary tract infections, appendicitis, anaemia, upper respiratory infection, acute otitis, sinusitis, abscess, inflamed lymph node, laryngitis, cystitis, flu(-like illness), chickenpox, whooping cough, shingles.
3) Injury	Including concussion, elbow fracture, tendon rupture, ankle injury, spinal fracture.
4) Mental disease	Including Obsessive Compulsive Disorder (OCD), Attention Deficit (Hyperactivity) Disorder (AD(H)D), Pervasive Developmental Disorder—Not Otherwise Specified (PDD-NOS), anxiety, depression, dysthymia, mood disorders, conduct disorder, sexual abuse, addiction, eating disorder.
<b>Problems:</b>	
5) Physical complaints (not related to the present disease)	Including constipation, tired, headache, abdominal pain, musculoskeletal complaints, menstrual problems, pregnancy, and unexplained physical complaints.
6) Sleeping difficulties	Including problems with falling asleep or sleeping through the night.
7) Lifestyle problems	Including poor diet, going to bed too late, much computing, poor personal care, lack of exercise or relaxation, substance use.
8) Child-related psychosocial problem <sup>a</sup>	Including past experiences or traumas (such as the death of a loved one, the child or a relative have been sick or have had an accident), personality (such as less strength of character, anxiety).
9) Family-related psychosocial problem <sup>a</sup>	Including (threatening) divorce, poverty, unemployment, addiction, serious and/or chronic illness of a relative, substance abuse, neglect, or child kept at home to take care of a relative.
10) School-related psychosocial problem <sup>a</sup>	Including bullying, learning or motivation problems, trouble some relationship with a teacher or fellow-students.

<sup>a</sup>Emotional and behavioural problems. The categorization followed the origin of the problem, as indicated by the YHCP.

Medical absenteeism: Medical absenteeism was calculated as the total number of absence days per 12 school weeks, which is equivalent to 60 school days, prior to consultation date. For this purpose, routinely collected school attendance data were used.

## 2.5. Ethical Approval

The research protocol was approved by the Medical Ethics Committee of the University Hospital Maastricht and Maastricht University (Dossier number 11-4-070.6/ivb).

## 2.6. Statistical Analysis

Descriptive statistics were used to analyse the health condition and socio-demographic characteristics of the students. Pearson's chi-squared tests and Student's t-test were used to study the difference in SDQ scores between the study group and a reference population.

## 3. Results

### 3.1. Socio-Demographic Characteristics and Absence Rate

The school population consisted of 4159 students, 2078 (50%) of those male students and 2080 (50%) female students. The number of students was evenly distributed over the 4 school years. Nearly 12% (493 students) of the school population participated in the study. The study group consisted of 218 (44.2%) male and 275 (55.8%) female students. Of the study group, 152 (31.2%) students were in the second school year, 124 (25.3%) were non-Western immigrants, and 89 (18.3%) students lived in a highly deprived neighbourhood. The mean age of the students was 15.05 years (SD1.26). The mean number of absence days was 8.4 (SD6.60; range 1 - 45), which is equivalent to a rate of 14%. The results are presented in **Table 2**.

### 3.2. The Health Condition

Diseases and problems: Of all students referred to the YHCPs 336 gave permission to use the information about their health condition. The YHCPs indicated that 146 (43.5%) of these students had one or more diagnosed diseases, and 274 (81.5%) had one of more problems. **Table 3** shows how often the YHCPs noted diseases and problems. The percentages do not add to 43.5% (for disease) and 81.5% (for problem) since several diseases or problems may relate to the same student. According to whether or not the student had a disease and/or problem, four groups could be distinguished: 13.4% of the students had a disease and no problem, 30.1% had a disease

**Table 2.** Socio-demographic characteristics and size of medical absenteeism.

Characteristic	Students (n <sup>a</sup> = 493)	
Gender, n (%)	Male	218 (44.2)
	Female	275 <sup>b</sup> (55.8)
School year, n (%)	First	103 (21.1)
	Second	152 <sup>b</sup> (31.2)
	Third	113 (23.2)
	Fourth	119 (24.4)
Ethnicity, n (%)	Native	334 (68.2)
	Western	32 (6.5)
	Non-Western	124 (25.3)
Status score, n (%)	Low	89 (18.3)
	Medium	339 (69.6)
	High	59 (12.1)
Age, mean (SD), range	In years	15.05 (1.26) 12.3 - 18.5
Medical absenteeism, mean (SD), range	In total number of days	8.4 (6.60) 1 - 45

<sup>a</sup>The numbers do not always add up to 493 because of missing data from YHC files and registration forms; <sup>b</sup>Over-represented in the study group, compared to the school population.

**Table 3.** Results of the health condition.

Health condition	Students (n = 336)
Disease, n (%):	146 (43.5)
1) Chronic physical disease	92 (24.0)
2) Temporary physical disease	50 (13.0)
3) Injury	15 (3.9)
4) Mental disease	32 (8.3)
Problem, n (%):	274 (81.5)
5) Child-related psychosocial problem	134 (34.9)
6) Family-related psychosocial problem	130 (33.9)
7) School-related psychosocial problem	72 (18.8)
8) Physical complaint	228 (40.4)
9) Sleeping difficulty	28 (7.3)
10) Lifestyle problem	93 (16.5)

and a problem, 51.5% had a problem and no disease and 5.1% had neither a disease nor a problem. The various groups are shown in [Figure 1](#).

Psychosocial problems as measured by the Strengths and Difficulties Questionnaire (SDQ): Of all students referred to the YHCPs 256 students filled in the Strengths and Difficulties Questionnaire (SDQ). The results of the SDQ are presented in [Table 4](#). For the SDQ, there is no gold standard for the Dutch adolescent population yet. Therefore, the findings were compared to those of the Dutch National Youth Monitor in the region of West Brabant 2011 [35]. Student's t-tests revealed significant differences between the study group and the reference population, with higher means for the students with medical absenteeism on total difficulties, and on two subscales, emotional symptoms and prosocial behaviour. In relation to peer problems, significant difference appears only with the female students. With reference to the SDQ-scale Total difficulties, the results of the Chi-square tests (Male:  $\chi^2 = 6.78$ ,  $df = 2$ ,  $p \leq 0.05$ ; Female:  $\chi^2 = 48.4$ ,  $df = 2$ ,  $p \leq 0.01$ ) show that there are significant differences between the study group and the reference population, indicating that the study group more often has a border range (10.5% versus 8.0%) and an elevated score (9.8% versus 2.9%).

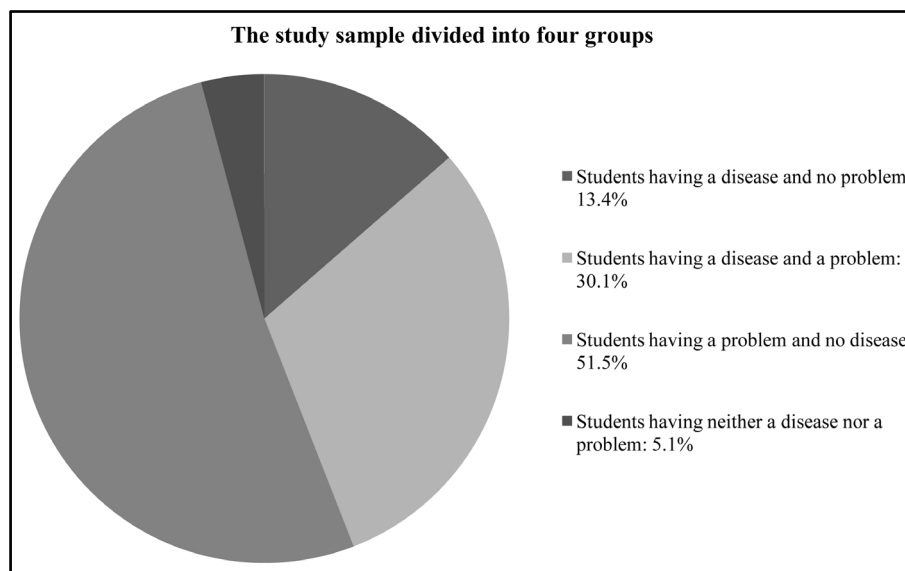
## 4. Discussion

This study explores the health condition, from a biopsychosocial perspective, and the socio-demographic characteristics of Dutch pre-vocational secondary students who were referred to a youth health care physician (YHCP) because of extensive medical absenteeism: reported sick four times in 12 school weeks or more than six consecutive school days.

Regarding health condition, the study showed that 43.5% of the students had a disease, and 81.5% had problems such as physical complaints not yet diagnosed, psychosocial problems, lifestyle problems and sleeping difficulties that caused clinically significant functional impairment as they resulted in absenteeism.

Of all students in our study group, about a third (24% chronic physical and 8.3% mental diseases) suffered a chronic disease. Since our study group was comprised of 12% of the school population, this means that about 4% of the school population had a chronic disease and met the MASS-criteria. Given that in the Netherlands, in regular education about 12% of all children has a chronic disease [36] [37], it can be assumed that most of the students with a chronic disease did not meet our criteria of extensive absence. This suggests that having a chronic disease does not mean that you are absent from school that much necessarily. Maybe they do receive optimal care, and therefore they are able to participate in school. It is known from research that having a chronic disease does not mean that it is necessarily to be absent from school more than average [4].

However, 40.4% of the students in our study had physical complaints, and 34.9% of the students had child-related, 33.9% family-related and 18.8% school-related psychosocial problems. Physical complaints and psy-



**Figure 1.** Visual presentation, according to whether or not having a disease or problem.

**Table 4.** Means and reference means of the SDQ, referred to norms of SDQ-scale total difficulties.

	Study group (n = 256) Mean age: 15.05 (1.26)			Dutch Youth Monitor West Brabant (n = 1821) Mean age: 13.97 (1.34)		
	Total (n = 256)	Male (n = 119)	Female (n = 137)	Total (n = 1821)	Male (n = 826)	Female (n = 995)
SDQ scores scales	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Total difficulties	10.5** (5.8)	10.0** (5.5)	11.0** (5.9)	9.1 (4.9)	8.5 (4.8)	9.6 (4.9)
Emotional symptoms	3.4** (2.5)	2.9** (2.2)	3.73** (2.6)	2.2 (2.1)	1.5 (1.6)	2.7 (2.2)
Conduct problems	1.6 (1.4)	1.6 (1.4)	1.6 (1.5)	1.5 (1.3)	1.6 (1.4)	1.4 (1.2)
Hyperactivity-inattention	4.1 (2.7)	4.1 (2.7)	4.1 (2.7)	4.1 (2.5)	4.2 (2.5)	4.1 (2.5)
Peer problems	1.4 (1.5)	1.3 (1.5)	1.6* (1.5)	1.3 (1.5)	1.3 (1.5)	1.3 (1.5)
Prosocial behaviour	8.6** (1.4)	8.3** (1.4)	8.8** (1.4)	8.0 (1.7)	7.6 (1.8)	8.3 (1.5)
SDQ-scale total difficulties***	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Normal rating	204** (79.7%)	102** (85.7%)	102** (74.5%)	1623 (89.2%)	754 (91.3%)	870 (87.4%)
Border range	27** (10.5%)	10** (8.4%)	17** (12.4%)	145 (8.0%)	51 (6.2%)	94 (9.4%)
Elevated score	25** (9.8%)	7** (5.9%)	18** (13.1%)	53 (2.9%)	21 (2.5%)	31 (3.1%)

\* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* Cut-off values: normal rating = 0 - 15; border range = 16 - 19; elevated score = 20 - 40 points.

chosoical problems may be related to a disease not yet diagnosed, the preclinical stage [38]. It often takes some time to break through (“growing into deficit”). Given that most of mental diseases emerge during adolescence and early adulthood and the median age of onset of all mental diseases is approximately 14 years [39], it is likely that some of our students go through psychological problems that do not yet cluster into a psychiatric diagnosis. Unmet need for treatment of mental problems is a major issue [40], possibly because most adolescents do not visit a physician when experiencing complaints or psychosocial problems [41]. In a previous study, Jones found that 45% of the students with an absence rate of more than 20% over three consecutive school terms had psychiatric disorders [20]. In our study, students with a mean absence rate of 14% over one school term were included. When using the MASS-criteria for intervening in medical absence, at least some of these students can be

identified in an early stage, which may prevent severe mental disease later.

Four groups could be distinguished according to whether or not the student had a disease and/or problem. In case of extensive medical absence, a disease will primarily be put forward as a cause. Therefore the groups are presented in the following order:

The first group (13.4%) consisted of students who had a diagnosed disease without problems. In cases of chronic diseases, school absenteeism may indicate that the disease is not being managed appropriately [4] [18]. More proper treatment and care can contribute to reducing medical absenteeism [4]. In cases of an injury or a temporary disease such as flu, absenteeism may be inevitable.

The second group of students (30.1%) had a diagnosed disease and problems. Kearney already found that in cases of having a disease, medical absenteeism is often due to psychological, family or social problems [4]. Having a chronic disease can be stressful for children, their parents, and their environment [42]. Issues such as experiencing the disease, feeling different from their school friends, lacking confidence to deal with their complaints at school and lagging behind in school work, may put up barriers for going to school.

In the third group (51.5%) the YHCPs indicated that medical absenteeism was most often caused by problems rather than diseases. The presence of psychosocial problems was confirmed by the significantly higher mean scores of SDQ total difficulties scales in the study group. Lenzen already demonstrated that medical absenteeism is positively associated with emotional and behavioural problems [43]. The nature of the problems appears to be diverse, when looked at from a biopsychosocial perspective: psychosocial problems, physical complaints, sleeping difficulties and lifestyle problems can be the underlying reasons for medical absenteeism. Medical expertise is needed in order to make diagnostic considerations for the early detection of developing physical and mental diseases as they usually progress over a period of time and have a pre-clinical phase and first symptoms [38]. This specific medical expertise is the additional value of YHC, because it is not available directly at Dutch schools.

The fourth group (5.1%) consisted of students who according to the YHCPs suffered neither disease nor problem. A conflict between student and parents sometimes precedes reporting sick. Moreover, the medical absenteeism may be due to a low threshold for reporting sick, although this may occur in all four groups [4].

Regarding socio-demographic characteristics, students visiting the second school year and female students were over-represented in the study group. In the Netherlands, medical absenteeism is the highest in the lowest school years [21]. It is known from research that there is a higher prevalence of medical absenteeism among female students [19].

Regarding the size of the absence, this study showed that the students had a mean absence rate of 8.4 days in 12 school weeks, which is equivalent to 14%. Jones *et al.* [20] stated that a school absence rate of over 20% cumulatively over several school terms is problematic for a child's development. The criteria chosen beforehand in our study seem to identify students with a "not-yet-problematic" absence rate. The MASS intervention offers potential to approach them more adequately at this early stage and thereby possibly prevent future problematic medical absenteeism. Future research is recommended to further study whether even better criteria can be developed and whether for these students, problematic medical absenteeism may be predicted or prevented.

This study knows some limitations. First, inclusion in this study was linked to the application of an intervention. This requires serious commitment of school personnel who is involved in identifying and referral of the students who meet the criteria. It is therefore quite conceivable that not all students have been identified, and that referral to the YHCP may be influenced by the personal vision of the school personnel. Second, the study took place in Dutch schools for pre-vocational secondary education in West Brabant, the Netherlands. Consequently, the findings may not be fully generalizable. Third, since only the results of YHCPs' first consultations are included, there may be underreporting of more personal factors contributing to the absence. Practice has taught that, in particular, issues of lifestyle and family are not easy to address in one consultation.

## 5. Conclusion

This study shows that when using the MASS-criteria to intervene with medical absence, students with a mean absence rate of 14% are identified. Looking at their health condition from a biopsychosocial perspective, it shows that in 43.5% of the cases there is a diagnosed disease, and if this is the case, two-third of the students also experienced additional problems. In 81.5% of the cases, the medical absenteeism presents students with problems. The largest group consists of students who have problems without a diagnosed disease. The great di-



versity of problems calls for a personalized approach from a biopsychosocial perspective, including medical expertise. This will allow emerging mental and physical diseases, social and lifestyle problems to be distinguished.

### What Is Already Known on This Topic?

- School absence due to sickness reports, so called medical absenteeism, is related to diseases, psychosocial problems, risk behaviour and a low threshold for reporting sick.
- A “problematic” medical absence rate of >20% of the school year is frequently associated with psychiatric illness, especially depression and anxiety.

### What This Study Adds?

- In this group of pre-vocational secondary students with a mean medical absence rate of 14% in 12 school weeks, 43.5% of them has a disease and 81.5% has problems such as physical complaints not yet diagnosed, psychosocial problems, lifestyle problems and sleeping difficulties.
- If a diagnosed disease was found, two-third of the students in the study group also experienced additional problems.
- In cases of problems, a broad perspective including medical expertise should be applied to distinguish between emerging mental and physical diseases, psychosocial and lifestyle problems.

### Acknowledgements

The authors would like to thank all students and youth health care physicians who participated in this study, and Ike Kroesbergen and Monique de Beer who supported the analysis of this study.

### Funding

Zon Mw, the Dutch Organization for Health Research and Development.

### Competing Interests

None.

### Ethics Approval

Medical Ethics Committee of the University Hospital Maastricht and Maastricht University (Dossier number 11-4-070.6/ivb).

### References

- [1] Eckstein, Z. and Wolpin, K.I. (1999) Why Youths Drop Out of High School: The Impact of Preferences, Opportunities, and Abilities. *Econometrica*, **67**, 1295-1339. <http://doi:10.1111/1468-0262.00081>
- [2] Rumberger, R.W. (2001) Why Students Drop Out of School and What Can Be Done. Dropouts in America: How Severe is the Problem? What Do We Know about Intervention and Prevention? Harvard University. <http://civilrightsproject.ucla.edu/research/k-12-education/school-dropouts/why-students-drop-out-of-school-and-what-can-be-done/rumberger-why-students-dropout-2001.pdf>
- [3] Christenson, S.L. and Thurlow, M.L. (2004) School Dropouts: Prevention Considerations, Interventions, and Challenges. *Current Directions In Psychological Science*, **13**, 36-39. <http://doi:10.1111/j.0963-7214.2004.01301010.x>
- [4] Kearney, C.A. (2008) School Absenteeism and School Refusal Behavior in Youth: A Contemporary Review. *Clinical Psychology Review*, **28**, 451-471. <http://doi:10.1016/j.cpr.2007.07.012>
- [5] Droomers, M., Schrijvers, C.T.M., van de Mheen, H. and Mackenbach, J.P. (1998) Educational Differences in Leisure-Time Physical Inactivity: A Descriptive and Explanatory Study. *Social Science & Medicine*, **47**, 1665-1676. [http://doi:10.1016/S0277-9536\(98\)00272-X](http://doi:10.1016/S0277-9536(98)00272-X)
- [6] Droomers, M., Schrijvers, C.T.M., Stronks, K., van de Mheen, D. and Mackenbach, J.P. (1999) Educational Differences in Excessive Alcohol Consumption: The Role of Psychosocial and material stressors. *Preventive Medicine*, **29**, 1-10. <http://doi:10.1006/pmed.1999.0496>
- [7] Havas, J., Bosma, H., Spreeuwenberg, C. and Feron, F.J. (2010) Mental Health Problems of Dutch Adolescents: The

- Association with Adolescents' and Their Parents' Educational Level. *European Journal of Public Health*, **20**, 3, 258-264. <http://doi:10.1093/eurpub/ckp172>
- [8] Dahlgren, G. and Whitehead, M. (2006) European Strategies for Tackling Social Inequities in Health: Levelling up Part 2. World Health Organization Regional Office for Europe. [http://www.euro.who.int/\\_data/assets/pdf\\_file/0018/103824/E89384.pdf?ua=1](http://www.euro.who.int/_data/assets/pdf_file/0018/103824/E89384.pdf?ua=1)
- [9] Mackenbach, J.P. (2006) Health Inequalities: Europe in Profile. Rotterdam: Erasmus MC. [http://www.who.int/social\\_determinants/resources](http://www.who.int/social_determinants/resources)
- [10] Thrane, C. (2006) Explaining Educational-Related Inequalities in Health: Mediation and Moderator Models. *Social Science & Medicine*, **62**, 467-478. <http://doi:10.1016/j.socscimed.2005.06.010>
- [11] Bosma, H., van de Mheen, H.D., Borsboom, G.J.J.M. and Mackenbach, J.P. (2001) Neighborhood Socioeconomic Status and All-Cause Mortality. *American Journal of Epidemiology*, **153**, 363-371. <http://dx.doi.org/10.1093/aje/153.4.363>
- [12] Huisman, M., Kunst, A.E., Bopp, M., Borgan, J.K., Borrell, C., Costa, G., Deboosere, P., Gadeyne, S., Glickman, M., Marinacci, C., Minder, C., Regidor, E., Valkonen, T. and Mackenbach, J.P. (2005) Educational Inequalities in Cause-Specific Mortality in Middle-Aged and Older Men and Women in Eight Western European Populations. *The Lancet*, **365**, 493-500. [http://dx.doi.org/10.1016/S0140-6736\(05\)17867-2](http://dx.doi.org/10.1016/S0140-6736(05)17867-2)
- [13] Mackenbach, J.P., Stirbu, I., Roskam, A.R., Schaap, M.M., Menvielle, G., Leinsalu, M. and Kunst, A.E. (2008) Socioeconomic Inequalities in Health in 22 European Countries. *The New England Journal of Medicine*, **358**, 2468-2481. <http://dx.doi.org/10.1056/NEJMsa0707519>
- [14] Lager, A.C. and Torssander, J. (2012) Causal Effect of Education on Mortality in a Quasi-Experiment on 1.2 Million Swedes. *Proceedings of the National Academy of Sciences of the United States of America*, **109**, 8461-8466. <http://dx.doi.org/10.1073/pnas.1105839109>
- [15] Gathmann, C., Jurges, H. and Reinhold, S. (2014) Compulsory Schooling Reforms, Education and Mortality in Twentieth Century Europe. *Social Science & Medicine*, **127**, 74-82. <http://dx.doi.org/10.1016/j.socscimed.2014.01.037>
- [16] Kulhánová, I., Hoffmann, R., Eikemo, T.A., Menvielle, G. and Mackenbach, J.P. (2014) Educational Inequalities in Mortality by Cause of Death: First National Data for the Netherlands. *International Journal of Public Health*, **59**, 687-696. <http://dx.doi.org/10.1007/s00038-014-0576-4>
- [17] WHO, World Health Organisation (2014) Health for the World's Adolescents. [http://www.who.int/maternal\\_child\\_adolescent/topics/adolescence/second-decade/en](http://www.who.int/maternal_child_adolescent/topics/adolescence/second-decade/en)
- [18] Hawkrigg, S. and Payne, D.N. (2014) Prolonged School Non-Attendance in Adolescence: A Practical Approach. *Archives of Disease in Childhood*, **99**, 954-957. <http://dx.doi.org/10.1136/archdischild-2013-304595>
- [19] Eaton, D.K., Brener, N. and Kann, L.K. (2008) Associations of Health Risk Behaviors with School Absenteeism. Does Having Permission for the Absence Make a Difference? *Journal of School Health*, **78**, 223-229. <http://dx.doi.org/10.1111/j.1746-1561.2008.00290.x>
- [20] Jones, R., Hoare, P., Elton, R., Dunhill, Z. and Sharpe, M. (2009) Frequent Medical Absences in Secondary School Students: Survey and Case-Control Study. *Archives of Disease in Childhood*, **94**, 763-767. <http://dx.doi.org/10.1136/adc.2008.140962>
- [21] NIPO het marktonderzoeksinstituut (2002) Report on School Absenteeism in Secondary School (Rapport: Schoolverzuim in het Voortgezet Onderwijs). Amsterdam. <http://www.tns-nipo.com/pages/persvannipo/pdf/schoolverzuim03.pdf>
- [22] Wieske, R.C.N., Nijhuis, M.G., Carmiggelt, B.C., Wagenaar-Fischer, M.M. and Boere-Boonekamp, M.M. (2012). Preventive Youth Health Care in 11 European Countries: An Exploratory Analysis. *International Journal of Public Health*, **57**, 637-641. <http://dx.doi.org/10.1007/s00038-011-0305-1>
- [23] Kuo, A.A., Inkelas, M., Lotstein, D.S., Samson, K.M., Schoret, E.L. and Halfon, N. (2006) Rethinking Well-Child Care in the United States: An International Comparison. *Pediatrics*, **118**, 1692-1702. <http://dx.doi.org/10.1542/peds.2006-0620>
- [24] Vanneste, Y.T.M., Rots-de Vries, M.C., Goor, L.A.M. van de and Feron, F.J.M. (2012) Medical Advice for Sick-Reported Students (MASS); Development of Anintervention (Medische Advisering Ziekgemelde leerling door de jeugdarts (M@ZL); ontwikkeling van een interventie). *Tijdschrift voor Gezondheidswetenschappen*, **90**, 412-419. [www.tsg.bsl.nl](http://www.tsg.bsl.nl) <http://dx.doi.org/10.1007/s12508-012-0145-2>
- [25] Engel, G.L. (1977) The Need for a New Medical Model: A Challenge for Biomedicine. *Science*, **196**, 129-136. <http://dx.doi.org/10.1126/science.847460>
- [26] Engel, G.L. (1992) The Need for a New Medical Model: A Challenge for Biomedicine. *Family Systems Medicine*, **10**, 317-331. <http://dx.doi.org/10.1037/h0089260>

- [27] Groeneveld, M.J., Benschop, M. and Olvers, D. (2008) Typically Pre-Vocational Secondary Education: A Comparative Study of the Characteristics of Pre-Vocational Secondary Students and the Generation of Einstein (Kenmerkend vmbo: Een vergelijkende studie van de eigenschappen van de lagere vmbo-leerlingen en de generatie van Einstein). Hiteq, Hilversum.  
<http://www.hiteq.org/Hiteq/Downloads/Publicaties%20geheel/Kenmerkend%20vmbo%20mbo%20havo%20en%20vwo.pdf>
- [28] van der Neut, I., Teurlings, C. and Kools, Q. (2005) To Respond to Learning Behaviour of Pre-Vocational Secondary Students (Inspelen op leergedrag van vmbo-leerlingen). IVA, Tilburg.  
<http://www.iva-onderwijs.nl/publicaties>
- [29] Goodman, R., Ford, T., Simmons, H., Gatward, R. and Meltzer, H. (2000) Using the Strengths and Difficulties Questionnaire (SDQ) to Screen for Child Psychiatric Disorders in a Community Sample. *The British Journal of Psychiatry*, **177**, 534-539. <http://dx.doi.org/10.1192/bjp.177.6.534>
- [30] Goodman, R. (1997 and 2006) The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry*, **38**, 581-586. <http://dx.doi.org/10.1111/j.1469-7610.1997.tb01545.x>
- [31] Muris, P., Meesters, C. and van den Berg, F. (2003) The Strengths and Difficulties Questionnaire (SDQ)—Further Evidence for Its Reliability and Validity in a Community Sample of Dutch Children and Adolescents. *European Child & Adolescent Psychiatry*, **12**, 1-8. <http://dx.doi.org/10.1007/s00787-003-0298-2>
- [32] van Widenfelt, B.M., Goedhart, A.W., Treffers, P.D.A. and Goodman, R. (2003) Dutch Version of the Strengths and Difficulties Questionnaire (SDQ). *European Child & Adolescent Psychiatry*, **12**, 281-289.  
<http://dx.doi.org/10.1007/s00787-003-0341-3>
- [33] Vogels, A.C.M., Hoekstra, F. and Reijneveld, S.A. (2005) Three Questionnaires for the Detection of Psychosocial Problems in Children from Seven to Twelve Years (Drie vragenlijsten voor het opsporen van psychosociale problemen bij kinderen van zeven tot twaalf jaar). TNO Quality of Life, Leiden.  
<http://www.ggd Kennisnet.nl/?file=2114&m=1310999371&action=file.download>
- [34] SCP Dutch Institute for Social Research. <http://www.scp.nl/>
- [35] CBS Dutch National Youth Monitor (2012) [www.jeugdmonitor.cbs.nl/](http://www.jeugdmonitor.cbs.nl/)
- [36] Mokkink, L.B., van der Lee, J.H., Grootenhuis, M.A., Offringa, M., van Praag, B.M.S. and Heymans, H.S.A. (2007) Scale and Impact of Chronic Diseases in Children (Omvang en gevolgen van chronische aandoeningen bij kinderen). *Tijdschrift Kindergeneeskunde*, **75**, 154-158. <http://dx.doi.org/10.1007/BF03061684>
- [37] Dutch Ministry of Education (2012) Disability-Specific Special Schools (Speciaal onderwijs).  
<http://www.rijksoverheid.nl/ministeries/ocw>
- [38] Snyderman, R. and Langheier, J. (2006) Prospective Health Care: The Second Transformation of Medicine. *Genome Biology*, **7**, 104. <http://dx.doi.org/10.1186/gb-2006-7-2-104>
- [39] Kessler, R., Amminger, G.P., Aguilar-Gaxiola, S., Alonso, J., Lee, S. and Ustin, T.B. (2007) Age of Onset of Mental Disorders: A Review of Recent Literature. *Current Opinion in Psychiatry*, **20**, 359-364.  
<http://dx.doi.org/10.1097/YCO.0b013e32816ebc8c>
- [40] Demyttenaere, K., Bruffaerts, R., Posada-Villa, J., Gasquet, I., Kovess, V., Lepine, J.P., *et al.* (2004) Prevalence, Severity, and Unmet Need for Treatment of Mental Disorders in the World Health Organization World Mental Health Surveys. The WHO World Mental Health Survey Consortium. *JAMA*, **291**, 2581-2590.  
<http://dx.doi.org/10.1001/jama.291.21.2581>
- [41] Theil, A., Verkerk, P.H. and Buiting, E. (2007) Quickly Back to School (Snel terug naar school). *Medisch Contact*, **62**, 31-32.
- [42] Eiser, C. (1993) Growing up with a Chronic Disease: The Impact on Children and Their Families. Jessica Kingsley Publishers, London.
- [43] Lenzen, C., Fischer, G., Jentzsch, A., Kaess, M., Parzer, P., Carli, V., Wasserman, D., Resch, F. and Brunner, R. (2013) School Absenteeism in Germany: Prevalence of Excused and Unexcused Absenteeism and Its Correlation with Emotional and Behavioural Problems (Schulabsentismus in Deutschland—Die Prävalenz von entschuldigten und unentschuldigten Fehlzeiten und ihre Korrelation mit emotionalen und Verhaltensauffälligkeiten). *Praxis der Kinderpsychologie und Kinderpsychiatrie*, **62**, 570-582. <http://dx.doi.org/10.13109/prkk.2013.62.8.570>