NovoSund

a snapshot of the health status at Novo Nordisk in Denmark

novo nordisk®

The NovoSund project, an important part of Novo Nordisk's social responsibility

Via targeted health activities, Novo Nordisk wishes to contribute to a healthy lifestyle among its employees. The core message is that a healthy lifestyle is an effective weapon in the fight against diabetes and other chronic diseases.

In order to offer relevant and targeted health activities to Novo Nordisk employees in Denmark, it is important to obtain information about the employees' health status. It was therefore decided to conduct three extensive questionnaire surveys about health, morbidity and lifestyle among all employees in Denmark.

Selected results from the first survey are presented in this report.

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preface

The NovoSund project was launched on 1 December 2003 as a multi-annual health project comprising all Novo Nordisk employees. Via targeted health activities, Novo Nordisk wishes to contribute to a healthy lifestyle among its employees. The core message is that a healthy lifestyle is an effective weapon in the fight against diabetes and other chronic diseases. Chronic diseases and morbidity are not only a result of the individual's choice of lifestyle. Workplace conditions, including workrelated stress and the lifestyle that is characteristic of the individual workplace, also play a role. Consequently, the NovoSund project is an important element of Novo Nordisk's social responsibility towards its employees and their families.

In order to offer relevant and targeted activities to Novo Nordisk employees in Denmark, it is important to obtain information about the employees' health status. It was therefore decided to conduct three extensive questionnaire surveys about health, morbidity and lifestyle among all employees in Denmark. In 2004, Novo Nordisk distributed the first questionnaire in cooperation with the Danish Research Center for Prevention and Health (RCPH). The remaining two surveys will take place at a later date.

The questionnaires are part of an ongoing assessment of the health status of all employees, and form the basis for action to combat health-related problems, particularly those that the employees themselves view as significant. This interaction between ongoing adjustment of health initiatives and regular analyses of their impact is what makes the project unique. All preventive and health-promoting activities will be targeted at the specific needs and wishes of the employees. Consequently, the project is expected to be both sustainable and effective.

In this report, Novo Nordisk – in cooperation with RCPH – presents relevant results of the first questionnaire survey, which was conducted in the autumn of 2004. The report illustrates and analyses the results, focusing on stress, physical activity, smoking, alcohol, diet and overweight.

The report was written by Mr Niss Skov Nielsen, *PhD*, RCPH. Ms Anne Helms Andreassen, leading statistician, RCPH, and Mr Niss Skov Nielsen have performed the *statistical analyses. Mr Rasmus Stig, computer scientist*, RCPH, has processed the data material and tables in the report. In addition, an appraisal group has provided current input for the form and content of the report. The appraisal group comprised:

- Mr Torben Jørgensen, Director, Health Services Research, RCPH.
- Professor Torsten Lauritzen, MD, Århus.
- Mr Knut Borch-Johnsen, Hospital Medical Director, Steno Diabetes Center.
- Ms Elin Schmidt, Vice President, Corporate Responsibility Management, Novo Nordisk A/S.
- Ms Marie Wahlers Nielsen, Project Manager, Corporate Responsibility Management, Novo Nordisk A/S.
- Mr Lars K. Müller, Advisor, Corporate Responsibility Management, Novo Nordisk A/S.

The results of the first questionnaire survey will be communicated to Novo Nordisk employees at the beginning of 2006. On the basis of the results, a number of relevant health-promoting initiatives will be initiated in close cooperation with employees and local management.

Lise Kingo
Executive Vice President, Novo Nordisk A/S
November 2005

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1 introduction

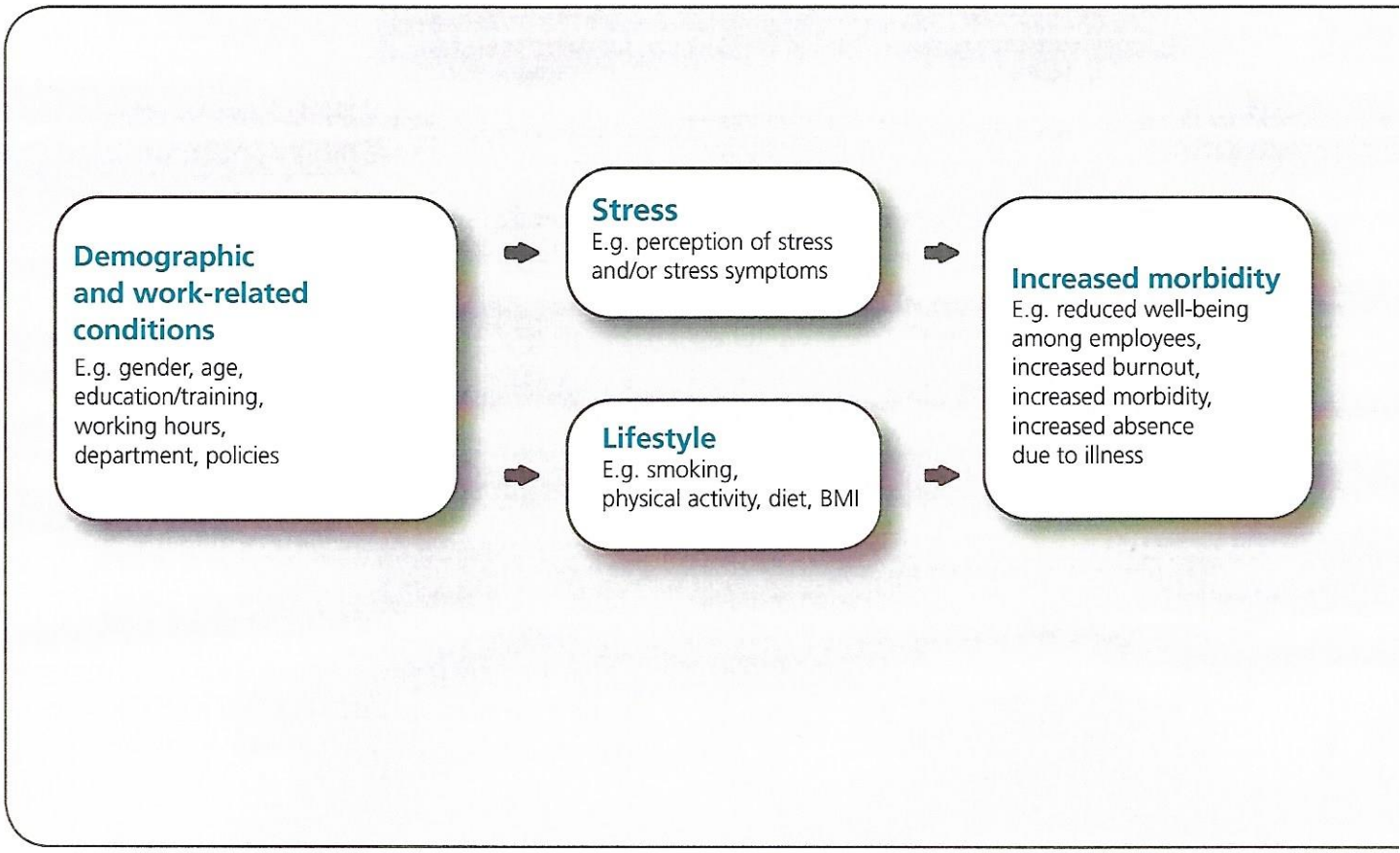
1.1. Purpose of the report

The purpose of the report is to present the results of a questionnaire survey of health and morbidity among Novo Nordisk employees – conducted in the period from October 2004 to January 2005.

1.2. Background

For the individual Novo Nordisk employee, the Novo-Sund project comprises a number of health-promoting initiatives that he or she may participate in on a voluntary basis. So far, the activities have primarily comprised 'stop smoking' courses sponsored by the employer, as well as general encouragement to participate in various activities such as the DHL relay (5x5 km jogging in Fælledparken in Copenhagen), the Novo Nordisk run around Lake Bagsværd and the 'Arbejdspladsen motioner' (workout at work) and 'Tæl dine skridt' (count your steps) campaigns. The questionnaire survey provides Novo Nordisk with a 'snapshot' of its employees' health status. This will be used as input for general health-promoting initiatives, but also for initiatives tailored to smaller groups of employees. >>

Figure 1: Overall model of the NovoSund survey



More specifically, focus will be on disclosing and whenever possible changing unhealthy lifestyles and stress among employees, which is expected to contribute to increasing their general health status and thus also to reducing burnout and morbidity among employees.

Figure 1 (page 7) is the basic model for the NovoSund project. Activities supporting the individual employees, shared standards for a healthy lifestyle and measures to reduce stressful working conditions form the theoretical basis for the initiatives. Via a positive impact on the employees' lifestyles and by focusing on stress at the workplace, Novo Nordisk seeks to create a platform for improving health among its employees.

As an integral part of the project, Novo Nordisk also wishes to document the impact of the various health-promoting initiatives offered to employees.

A core element of the documentation comprises three planned questionnaire surveys: an initial baseline survey with standardised and validated questions, and two follow-up surveys that are to take place at intervals of approx. 2 years.

Selected results from the first questionnaire survey are presented in this report.

summary of results

Compared with the population at large, Novo Nordisk has a high ratio of employees with long-cycle and medium-cycle educations (Statistics Denmark, 2004).

There is also a higher ratio of Novo Nordisk employees with sedentary work than in comparable populations (Kjøller and Rasmussen, ed., 2002/National Institute of Occupational Health, 2002). Compared with these reference populations there is also a lower incidence of long-term illness, but on the other hand there is a higher frequency of 2-week symptoms, stress and stress symptoms among Novo Nordisk employees. More frequent use of over-the-counter drug (OTC) drugs, as well as a higher frequency of absence due to illness within a 2-week period, can also be registered among the company's employees.

In the social area, there are fewer among the Novo Nordisk employees who discuss their problems with colleagues than among the reference populations.

As regards lifestyle, a higher ratio of Novo Nordisk employees find that they have influence on their own health, and Novo Nordisk employees generally lead more active and healthier lives than the reference populations (except when it comes to sleep and to some extent diet). Many Novo Nordisk employees already make an effort in the following areas: diet, smoking, alcohol and stress, as well as getting sufficient sleep and maintaining personal networks. When employees are asked what they would like to do to further boost their health, the following areas stand out: exercising more, avoiding stress, losing weight, improving their diet, and to some extent quitting smoking. These responses are consistent across all Novo Nordisk Sites and also constitute the areas with the greatest immediate scope for improvement of preventive measures.

Further analysis shows substantial differences between the various Sites and VP groups in terms of smoking, physical activity and stress. These variations are statistical significant even when controlled for other explanatory factors such as the employees' social backgrounds, lifestyles and well-being. This is a good starting point for introducing preventive measures since it is possible to select specific factors (stress or lifestyle) for relevant Sites and VP groups.
The analyses also show that:

- An unhealthy lifestyle and stress are associated with a perception of having little influence on one's own health, lack of sleep and lack of a personal network.
- An unhealthy lifestyle is associated with 'not doing anything for one's health' and with a low (mental) SF-12 score for well-being, as well as stress (SF-12: see Chapter 7, Appendix 3, Definitions).
- Unhealthy lifestyle factors are 'positively' interrelated.
- Exercising is inversely associated with an unhealthy lifestyle (smoking, alcohol, an unhealthy diet).

Since this is a cross-section study, it is not initially possible to say which way the associations go. Consequently, it is not known whether those who exercise do not feel stressed and have high SF-12 scores for well-being because of their physical activity – or whether those who are in good mental shape have the opportunity to (and do) exercise in their spare time.

More light will be shed on this issue when targeted initiatives have been launched at relevant Sites and in relevant VP groups as part of the project. >>

Further analyses of four selected illness parameters and of absence due to illness show that background factors and well-being, as well as stress and lifestyle factors, contribute substantially to explaining morbidity/absence assessed on the basis of the R^2 value of logistic regression analyses (13-51%). The degree of explanation is highest in relation to self-rated health (51%) and mental symptoms within a 2-week period (35%) and lowest for 2-week symptoms in general (22%), long-term illness (16%) and absence due to illness within a 2-week period (13%). The explanatory factors characterising the various illness parameters have several common denominators. Virtually all illness parameters can be related to low physical and mental well-being, assessed on the basis of the SF-12 score. Moreover, most parameters can be related to women, short education/training and stress, as well as overweight, lack of sleep and a perception of not having much influence on one's own health.

3 discussion

It is evident that background factors play a large role in relation to many of the variations seen between Sites and VP groups, respectively. For instance, the variation between overweight ratios at the different Sites can be explained by background factors alone. The question is then whether this is an 'excuse' for accepting such differences. In other words, should action (intervention) be omitted because differences in the BMI values of employee groups can be explained by their genders, ages and education/training? Another aspect is whether to seek to intervene in the employee groups with high ratios of overweight people, smokers, etc. The alternative would be to apply the same yardstick to everybody.

In any event – what is the realistic outcome of targeted campaigns and measures to reduce overweight and other aspects of an unhealthy lifestyle, as well as stress, among employees? The Danish government's health-policy statement from 2001 (Healthy throughout Life) can be taken as an indication. According to this statement, an unhealthy lifestyle can and should generally be reduced by approx. 1/3 for the population at large over a 10-year period (stress is not mentioned). If this objective is seen as a realistic target for preventive measures at Novo Nordisk, this means that 1/3 of the unhealthy lifestyle can realistically be eliminated, e.g. via campaigns and overall measures such as those applied by the Danish National Board of Health. It is not known whether stress can be reduced correspondingly.

Generally, results are likely to be individual, and it will be decisive which mechanisms are applied in order to achieve the most efficient reduction in unhealthy living and stress among employees. In some cases a general decree (e.g. a general ban on smoking?) is most likely to be effective, while other issues are best addressed via targeted efforts at relevant Sites/within relevant VP groups (e.g. overweight). Behaviour and incidence (e.g. perception of stress) may also be of a very personal nature, in which case individual advice and support should be offered. At any rate, the findings of the report give an indication of the strategies that might work – in combination with general ethical, business-related and other aspects that should be taken into account when focusing on health promotion and prevention of illness among employees.

4 materials and methods

At the beginning of October 2004, a questionnaire was posted to the 11,630 persons who were permanently employed by Novo Nordisk as at 1 September 2004. A total of 7,753 employees responded to the questionnaire within the period October 2004 to January 2005. This gives a response rate of 67 percent.

The questionnaire contained standardised and validated questions relating to the employees' lifestyles (smoking habits, physical activity, eating habits and alcohol consumption), attitudes to changing their lifestyles, self-rated health, use of pharmaceuticals, symptoms, morbidity and stress-related issues. The questionnaire included a total of 63 questions with 153 variables.

All 11,630 potential participants in the survey are attached to both a place of work (Site) and a Vice President (VP) at Novo Nordisk. The total number of Novo Nordisk Sites in Denmark is 41. In this report, the number of Sites has been reduced to 13 by grouping sites that are geographically close to each other (same town). This means that e.g. employees of NN, NNE, NNIT, NNS and NNSS at Bagsværd are regarded as one Site Bagsværd in this report.

Chapter 6 of the report includes a section on the overall response trends and a section on the distribution of selected lifestyle and stress parameters. The individual sections initially contain brief descriptions and statements of the content of the questions (variables) included, broken down as follows:

- Gender (2 subcategories).
- Age (5 subcategories).
- Education/training (6 subcategories).
- Site (13 subcategories).

In addition, figures have been prepared showing the intervention potential for the selected parameters, broken down by VP level.

Logistic regression analyses have been performed on the selected questions in dichotomised form for each of the above categories with a view to identifying subcategories that vary statistically significantly (95% probability) from the reference base.

Logistic regression analyses have also been performed on the variations between the different Sites and VP groups, respectively, with controls for background factors (gender, age, education/training and marital status). These analyses have been performed in order to clarify whether variations between Sites and VP groups are larger that random factors would suggest, and also to clarify whether any such variations could be explained by the backgrounds of the employees (gender, age, education/training and marital status).

Further logistic regression analyses have been performed to assess whether there is a scope – and if so which – for preventing morbidity and absence due to illness among employees.

The following analyses have been performed with a view to meeting the above objectives:

1) Analyses of the factors that relate to stress and lifestyle.
2) Analyses of the background and well-being factors, as well as the stress and lifestyle factors, that influence morbidity and absence due to illness.

Re 1. Analyses of the factors that relate to stress and lifestyle

Selected lifestyle and stress parameters are included in these analyses as outcomes (parameters). Background factors as well as different lifestyle, stress and well-being are included as explanatory factors. This means that a selected lifestyle parameter such as smoking is tested for background factors and correlation with other lifestyle factors, as well as stress and well-being factors.

The following selected lifestyle and stress parameters are included as binary (yes/no) outcomes in the analyses:

- stress (2 parameters: frequent perception of stress/ frequent stress symptoms)
- smoking (daily + occasional smokers)
- physical activity (less than the recommended 4 hours/ week)
- diet (unhealthy dietary score)
- alcohol (recommended weekly consumption limits frequently exceeded).

The following explanatory factors are included in the analyses:

- background factors (gender, age, education/training)
- other background factors (marital status, working hours, Site, VP group)
- lifestyle (smoking, alcohol, diet, physical activity (2 variables), BMI, sufficient sleep, physical strain in spare time, physical strain at work, self-rated influence on own health, active health behaviour, discussion of problems with others (network), self-rated social status)
- stress (frequent perception of stress, frequent stress symptoms)
- well-being (SF-12 mental and physical scores).

Re 2. Analyses of morbidity and absence resulting from an unhealthy lifestyle, stress, lack of well-being and background factors

The analyses are performed with backwards elimination of non-significant explanatory factors.

The following morbidity/absence parameters are included as binary (yes/no) outcomes in the analyses:

- long-term illness
- symptoms within the last 2 weeks
- mental symptoms within the last 2 weeks
- poor self-rated health
- absence due to illness (the percentages who have been absent for at least one day) within the last 2 weeks.

The following explanatory factors are included in the analyses:

- background factors (gender, age, education/training)
- other background factors (marital status, working hours)
- lifestyle (smoking, alcohol, diet, physical activity (2 variables), BMI, sufficient sleep, physical strain in spare time, physical strain at work, self-rated influence on own health, active health behaviour, discussion of problems with others (network), self-rated social status)
- stress (frequent perception of stress, frequent stress symptoms)
- well-being (SF-12 mental and physical scores).

overview of response rate and demographics

Response rate by gender, age, Site and VP level

The overall response rate is 67% (see Chapter 7, Appendix 2). Fewer men (62%) than women (71%) answered the questionnaire.

Fewer among the very young (25 years or younger) responded (56%), while the response rates for the other age groups are relatively uniform and close to the overall response rate.

The response rate is highest among employees at Steno Diabetes Center (75%) and lowest among employees at Værløse/Ganløse (55%).

The tables below show the distribution of all responses by Sites.

Table 1: Gender distribution of employees at the various Novo Nordisk Sites, per cent

	Total	Gender	
	Number of responses	Males, per cent	Females, per cent
SITE			
Bagsværd	2467	47,3	52,7
Kalundborg	1392	49,1	50,9
Hillerød	768	56,5	43,5
Måløv	702	37,5	62,5
Steno Diabetes Center	135	**13,3**	**86,7**
Gentofte	1070	34,7	65,3
Søborg	453	54,3	45,7
Lyngby	213	54,9	45,1
Sorgenfri	204	39,2	60,8
Hjørring	112	45,5	54,5
Køge/Hvidøre/Avedøre	66	50,0	50,0
Fuglebakken	94	17,0	83,0
Værløse/Ganløse	77	**71,4**	**28,6**
Total	7753	45,58	54,41

Table 2: Age distribution of employees at the various Novo Nordisk Sites, per cent

	Total	Age				
	All responses	≤25 years, per cent	26-34 years, per cent	35-44 years, per cent	45-54 years, per cent	55+ years, per cent
SITE						
Bagsværd	2467	1,9	26,5	40,4	19,6	11,6
Kalundborg	1392	**2,4**	27,6	41,0	22,3	6,6
Hillerød	768	1,0	26,8	46,7	18,9	6,5
Måløv	702	1,6	23,1	41,7	24,5	9,1
Steno Diabetes Center	135	1,5	24,4	28,1	**25,9**	20,0
Gentofte	1070	1,8	26,9	41,3	19,7	10,3
Søborg	453	1,1	23,4	41,7	25,2	8,6
Lyngby	213	**0,5**	47,9	37,6	**10,3**	3,8
Sorgenfri	204	4,4	33,8	37,3	17,6	6,9
Hjørring	112	1,8	17,0	**50,9**	25,0	5,4
Køge/Hvidøre/Avedøre	66	1,5	18,2	43,9	21,2	15,2
Fuglebakken	94	1,1	**50,0**	**24,5**	21,3	**3,2**
Værløse/Ganløse	77	1,3	**14,3**	35,1	23,4	**26,0**
Total	7753	1,8	27,0	41,0	20,8	9,4

Table 3: Distribution of employees at the various Novo Nordisk Sites by education/training, per cent

	Total	Education/training					
	All responses	No education/ training, per cent	Semi-skilled/ short-cycle training <1 year, per cent	Apprentice ship/ vocational training, per cent	Short-cycle education <3 years, per cent	Medium-cycle education 3-4 years, per cent	Long-cycle education >4 years, per cent
SITE							
Bagsværd	2467	7,6	4,1	14,9	21,4	19,0	33,1
Kalundborg	1392	9,8	7,0	30,0	21,6	17,1	14,5
Hillerød	768	11,8	4,9	21,7	15,0	20,8	25,7
Måløv	702	6,7	3,0	10,8	32,6	14,5	32,3
Steno Diabetes Center	135	3,0	1,5	**0,7**	17,0	**46,7**	31,1
Gentofte	1070	5,1	2,6	11,0	26,6	21,2	33,4
Søborg	453	**1,5**	1,8	4,9	22,7	28,0	41,1
Lyngby	213	3,3	**0,0**	5,2	14,6	18,8	**58,2**
Sorgenfri	204	3,4	1,0	6,9	13,2	19,1	56,4
Hjørring	112	17,9	8,0	39,3	15,2	11,6	8,0
Køge/Hvidøre/Avedøre	66	12,1	3,0	16,7	37,9	13,6	16,7
Fuglebakken	94	3,2	1,1	4,3	**54,3**	**10,6**	26,6
Værløse/Ganløse	77	**18,2**	**9,1**	**36,4**	**11,7**	19,5	**5,2**
Total	7753	7,6	4,1	16,5	22,5	19,5	29,9

6 results

6.1. Which descriptive trends are observed in the results of the survey?

6.1.1. Gender:

A higher percentage of women than men:

- have sedentary work
- feel stressed in their daily lives
- make an effort to stay healthy
- do not exercise as much as recommended
- eat a healthier diet
- talk to colleagues when they have problems
- have low physical, mental and overall well-being scores (SF-12)
- have suffered from mental and physical 2-week symptoms
- have suffered from mental symptoms within the last year
- have at some point had a health consultation/check-up
- have been absent due to illness within the last 2 weeks and within the last year
- have been treated by a doctor, dentist or other health care professional within a 2-week period and within the last year
- have used prescription or OTC drugs or herbal remedies within 2 weeks
- rate their eating habits as sensible
- are prepared to eat a healthier diet
- rate their exercise habits as poor
- find it very important to change their exercise habits.

Besides the opposite of the above, a higher percentage of men than women:

- are overweight (BMI>25)
- find it necessary to change their alcohol habits
- consider quitting smoking.

6.1.2. Age:

There is a negative correlation between age and:

- stress-related symptoms
- assessment of lack of sleep
- sedentary work
- an unhealthy diet (score)
- low mental (SF-12) score
- 2-week symptoms
- absence due to illness within the last year
- self-rated poor eating habits
- necessity of and attitude to a healthier diet.

On the other hand, there is a positive correlation between age and:

- regularly exceeding the recommended weekly alcohol limit
- obesity and overweight
- poor self-rated health
- low physical (SF-12) score
- long-term illness
- health check-ups
- contact with dentist within the last year
- use of prescription or OTC drugs or herbal remedies within 2 weeks
- necessity of changing alcohol habits.

6.1.3. Education/training:

There is a positive correlation between length of education/training and:

- sedentary work
- making an effort to remain healthy (active health behaviour)
- exercising
- frequent perception of stress
- necessity of and attitude to changing alcohol habits.

On the other hand, there is a negative correlation between length of education/training and:

- percentage of smokers
- unhealthy eating habits (score)
- obesity and overweight
- poor self-rated health
- low mental, physical and well-being scores (SP-12)
- 2-week symptoms
- absence due to illness within the last 2 weeks
- contact with a doctor within the last 2 weeks
- use of prescription drugs within the last 2 weeks
- self-rated unsound eating habits
- necessity of and attitude to a healthier diet
- poor self-rated alcohol habits.

6.1.4. Sites:

The following breakdown by Sites is viewed in relation to the overall average at Novo Nordisk.

Bagsværd

is characterised by a high percentage of employees who:

- have sedentary work
- are frequently stressed
- have sedentary hobbies
- smoke
- have a low physical SF-12 score
- have used prescription drugs within 2 weeks
- have used herbal remedies within 2 weeks
- find it necessary to change their eating habits
- find it necessary to change their exercise habits.

Moreover, there is a low percentage of employees who:

- have suffered from symptoms within the last year
- have seen a dentist within the last year.

Kalundborg

is characterised by a high percentage of employees who:

- make no effort to remain healthy (health behaviour)
- smoke
- have an unhealthy dietary score
- have a BMI>30
- have poor self-rated health
- have unsound self-rated eating habits.

Moreover, there is a low percentage of employees who:

- have sedentary work
- have seen a doctor within the last year
- have used OTC drugs within 2 weeks
- are prepared to change their exercise habits
- find it necessary to change their alcohol habits
- are prepared to drink less.

Hillerød

is characterised by a high percentage of employees who:

- make no effort to remain healthy (health behaviour)
- do not do exercise or participate in sports
- smoke
- have an unhealthy dietary score
- have a low physical SF-12 score
- have never had a health consultation/check-up
- have been absent due to illness within the last 2 weeks and within the last year
- have poor self-rated eating habits
- find it necessary to change their eating habits
- have poor self-rated exercise habits.

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Måløv

is characterised by a high percentage of employees who:

- have been diagnosed with long-term illness
- have seen a dentist within the last year.

Moreover, there is a low percentage of employees who:

- have sedentary work
- have had stress-related symptoms within the last 4 weeks
- find that they have little or no influence on their own health
- never or seldom get sufficient sleep to feel refreshed
- have a low mental SF-12 score
- have a low overall SF-12 well-being score
- find it necessary to change their eating habits.

Steno Diabetes Center

is characterised by a high percentage of employees who:

- have seen a doctor within the last 2 weeks
- have seen a dentist within the last 2 weeks
- have used prescription drugs within 2 weeks.

Moreover, there is a low percentage of employees who:

- smoke
- have poor self-rated eating habits
- find it necessary to change their eating habits
- have poor self-rated exercise habits.

Gentofte

is characterised by a high percentage of employees who:

- have sedentary work
- suffer from 2-week symptoms
- have received other treatment (than from doctor/ dentist) within the last 2 weeks.

Moreover, there is a low percentage of employees who:

- exercise for less than 3.5 hours per week.

Søborg

is characterised by a high percentage of employees who:

- have sedentary work
- exercise for less than 3.5 hours per week
- find it important to change their exercise habits
- find it necessary to change their alcohol habits
- are prepared to drink less alcohol.

Moreover, there is a low percentage of employees who:

- have a long-term illness
- have been absent within the last 2 weeks.

Lyngby

is characterised by a high percentage of employees who:

- have sedentary work
- have had stress-related symptoms within the last 4 weeks
- never or seldom get sufficient sleep to feel refreshed
- have sedentary hobbies
- have a low mental SF-12 score
- are prepared to eat a healthier diet
- have poor self-rated exercise habits
- find it important to change their exercise habits
- are prepared to change their exercise habits.

Sorgenfri

is characterised by a high percentage of employees who:

- have sedentary work
- frequently feel stressed in their daily lives
- have sedentary hobbies
- regularly exceed the weekly alcohol limit
- find it important to change their exercise habits.

Moreover, there is a low percentage of employees who:

- find that they have no influence on their own health
- have an unhealthy dietary score
- have a BMI>30
- have a low physical SF-12 score
- have been absent due to illness within the last year
- have used prescription drugs within 2 weeks
- have poor self-rated eating habits.

Hjørring

is characterised by a high percentage of employees who:

- find that they have no influence on their own health
- make no effort to remain healthy (health behaviour)
- do not do exercise or sports
- have a low dietary score
- have a BMI>30
- have unsound self-rated eating habits
- find it necessary to change their eating habits.

Moreover, there is a low percentage of employees who:

- suffer from 2-week symptoms
- are prepared to change their exercise habits
- find it necessary to change their alcohol habits.

Køge/Hvidøre/Avedøre

is characterised by a low percentage of employees who:

- have sedentary hobbies
- do not talk to anyone when they have problems
- have poor self-rated exercise habits.

Fuglebakken

is characterised by a high percentage of employees who:

- have sedentary hobbies
- have used OTC drugs within 2 weeks.

Moreover, there is a low percentage of employees who:

- do not talk to anyone when they have problems
- have seen a dentist within the last year.

Værløse/Ganløse

is characterised by a high percentage of employees who:

- do not talk to anyone when they have problems
- make no effort to remain healthy (health behaviour)
- do not do exercise or participate in sports
- smoke
- have an unhealthy dietary score
- have a BMI>30
- have poor self-rated health
- have a low mental SF-12 score
- have suffered from mental symptoms within the last 2 weeks.

Moreover, there is a low percentage of employees who:

- have sedentary work
- have seen a doctor within the last year.
- have seen a dentist within the last year
- have seen other health care providers within the last year.

6.2. Selected analysis results

Descriptive results from stress and lifestyle parameters are presented and analysed with a view to demonstrating whether there is a preventive potential in working with the factors selected, and if so in which direction.

6.2.1. Stress

- everyday stress (focus on: frequent perception of stress)
- stress-related symptoms - score based on frequency of 11 stress-related symptoms (focus on: perception of at least one stress-related symptom all the time/ much of the time within the last 4 weeks).

Stress is attributed to stimulus situations connected with discomfort and avoidance, and to a specific physiological or psychological reaction pattern, and to some extent to special interaction between a person and his/her surroundings (Elsas, 1993). Thus, stress comprises stressful events caused by so-called stressors or triggered by the stressful situation (response). >>

The response situation can be further defined as an individual condition that is psychophysiologically characterised by a combination of tension and disinclination (Søndergård-Kristensen, 1994). In general, the stress response is experienced in three fundamentally different ways:

1) A perception of being stressed (afraid/nervous).
2) Special reactions in stressful situations (fight/flight).
3) Various physiological reactions triggered by stress.

According to stress theories, stress occurs e.g. in work situations as a result of an imbalance between the job demands and the ability to meet these demands. Other results have shown that high job demands, little influence and lack of control in work situations are related to the development of stress in work situations (Karasek, 1979/Theorell & Karasek, 1996).

Stress is likely to make the individual ill, indirectly and directly. Long-term stress (chronic strain) often leads to a – sometimes unhealthy – change in behaviour (smoking, alcohol consumption, too little sleep, etc.), which frequently results in increased morbidity. The change in behaviour is often a reaction to or strategy against stress (Søndergård-Kristensen, 1994), and consequently it is natural to link perception of stress to lifestyle. Other studies have shown that job-related stress is often associated with high blood pressure, an increased cholesterol level and other symptoms of deteriorating health (Netterstrøm, 2002).

Percentages who are frequently stressed in their daily lives

Overall trends: 12.7% of Novo Nordisk employees frequently feel stressed in their daily lives, while 65.9% sometimes feel stressed. Finally, 21.5% of the employees seldom or never feel stressed. This distribution differs from the overall Danish population of working age in that a higher percentage of Novo Nordisk employees frequently or sometimes feel stressed (SUSY, 2000). As Figure 2 shows, there are substantial variations between the VP groups, with percentages ranging from 16 to 59.

Gender: Slightly more women than men state that they are frequently or sometimes stressed.

Age: A perception of frequently being stressed is particularly prevalent in the age groups 35-44 years and 45-54 years.

Education/training: Employees with long-cycle educations are overrepresented among those who frequently feel stressed. Among employees with short-cycle, medium-cycle or long-cycle educations there is also a relatively higher percentage who sometimes feel stressed.

Sites: Compared with the Novo Nordisk average, there are relatively more employees at Bagsværd and Sorgenfri who frequently feel stressed.

Analyses of variations between Sites and VP groups: The variation between VP groups ($p<0.0001$) is statistical significant, while no equivalent statistical significance is seen between the various Sites (0.0759). Gender ($p=0.0012$), age ($p<0.0001$) and education/training ($p<0.0001$) have an impact on the variation between the VP groups, but it is not sufficient to explain the entire variation between the VP groups ($p=0.0012$).

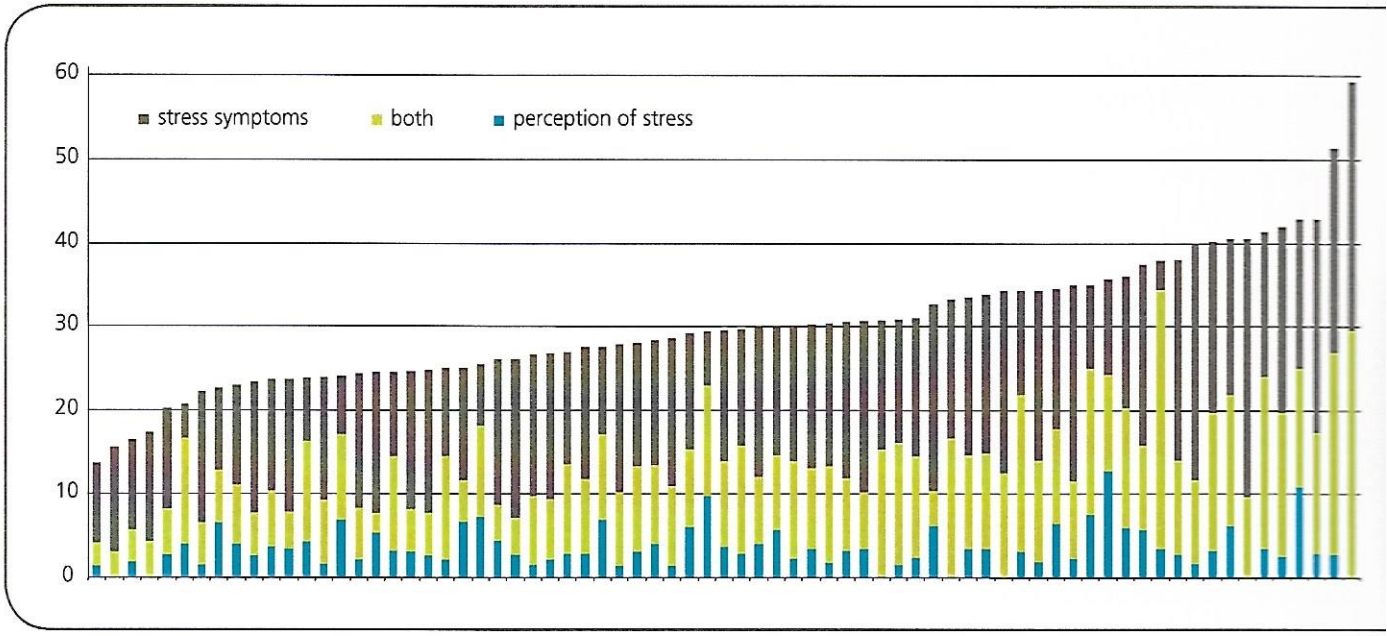
Percentages with at least one stress-related symptom all the time/much of the time

Overall trends: 26% of Novo Nordisk employees have had at least one stress-related symptom all the time – or much of the time – within the last 4 weeks.

Gender: Slightly more men than women state that they have had at least one stress-related symptom much of the time or more frequently within the last 4 weeks.

Age: A negative correlation is seen between age and stress-related symptoms since the percentage of employees who have had stress-related symptoms much of the time or more frequently within the last 4 weeks gradually declines with the increase in age.

Figure 2: Percentage of Novo Nordisk employees who frequently have a perception of stress/frequently have stress symptoms, broken down by VP groups



Education/training: Employees with long-cycle educations are overrepresented among employees with stress-related symptoms much of the time.

Sites: Compared with the Novo Nordisk average, there is a higher ratio of employees at Lyngby who have had stress-related symptoms much of the time or more frequently within the last 4 weeks, while there is a lower ratio at Måløv.

Analyses of variations between Sites and VP groups: Variations between Sites ($p=0.0007$) and VP groups ($p<0.0001$) are both statistical significant. Age ($p=0.0007/ 0.0007$) and marital status ($p=0.0012/0.0027$) have an impact, but this is not sufficient to explain the entire variation between Sites ($p=0.0045$) and VP groups ($p<0.0001$), respectively.

6.2.2. Lifestyle

- hours of physical activity per week (focus on: less than 3.5 hours' physical activity outside working hours)
- exceeding the recommended weekly limits for alcohol consumption (focus on: those who regularly exceed the recommended weekly limits for alcohol consumption)
- smoking habits (focus on: daily/occasional smokers)
- dietary score – based on frequency of consumption of cooked vegetables, salads, fruit, fish, use of fats in cooking and use of fats on bread (focus on: unhealthy score)
- BMI– Kg/height*height (focus on: BMI>30).

The literature often defines lifestyle as an expression of the individual's choice of behaviour. However, it cannot be isolated from the conditions of life and social relations under which the individual has been brought up and lives (Mean Life Expectancy Reports, 1994). Lifestyle can thus be perceived as the way in which the individual administers and interprets his/her opportunities and choices in his/her daily life. The lifestyle elements that are of importance to the health of the individual are often referred to as health behaviour. In epidemiological terms, the various types of health behaviour (such as smoking and physical activity) can to a greater or lesser extent be classified as risk factors that must be taken into account. In other words, to which extent does the individual display health-promoting or health-preserving behaviour (e.g. exercise) or incur health risks (e.g. smoking) that increase the risk of illness. >

It can often be difficult to distinguish behaviour that influences the individual's health from behaviour that does not. Lifestyle is therefore used in an overall sense in this section.

Percentages who are physically active for less than 3.5 hours per week

Overall trends: 46% of Novo Nordisk employees state that they are not physically active for at least 3.5 hours per week, while the remaining 54% state that they are physically active for 3.5 hours per week – corresponding to the Danish government's recommendation of ½ hour's daily physical activity. As shown in Figure 3 below, the total percentage of employees who are physically active varies among the different VP groups by approximately a factor 2, from 55% to 94%. The Figure also shows that most of those who are active belong to a club (25%) or prefer unorganised physical activity (37%), while only a total of 8% exercise at the workplace.

Gender: Slightly more women than men state that they do not fulfil the recommendations of 3.5 hours' of physical exercise a week.

Age: The age group 35-44 years is overrepresented among the employees who are not physically active for at least 3.5 hours per week.

Education/training: There are no statistical significant differences between the various education/training groups in relation to not being physically active for 3.5 hours per week as recommended.

Sites: Compared with the Novo Nordisk average, there is a higher ratio of employees at Søborg who are not physically active for at least 3.5 hours per week. In contrast, there is a lower ratio at Gentofte.

Analyses of variations between Sites and VP groups: Variations between Sites ($p=0.0046$) and VP groups ($p<0.0025$) are both statistical significant. Gender ($p<0.0001$/ <0.0001), age ($p=0.0001$/0.0003) and marital status ($p=0.0072$/0.0103) have an impact on these variations, but are not sufficient to explain the entire variation between Sites ($p=0.0011$) and VP groups ($p=0.0023$), respectively.

Figure 3: Percentages of Novo Nordisk employees who are physically active, broken down by VP groups

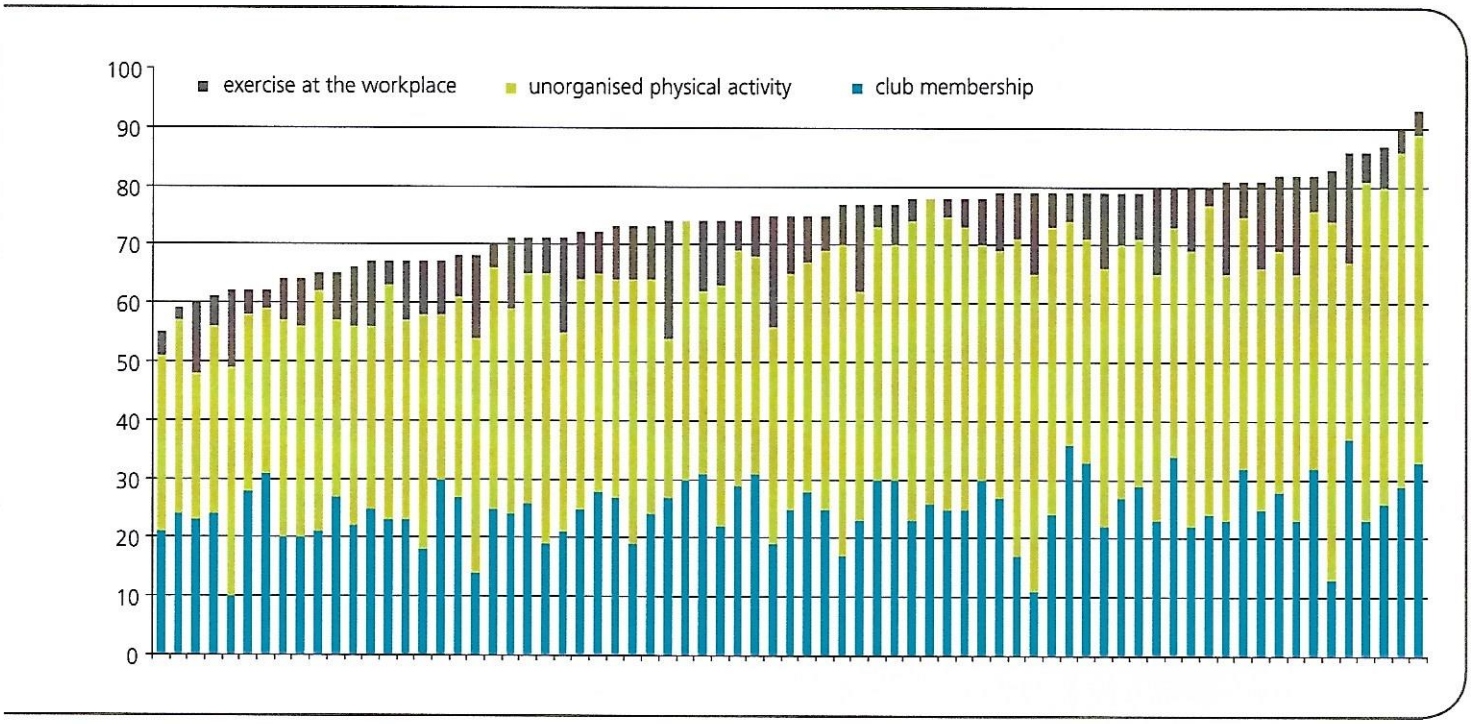
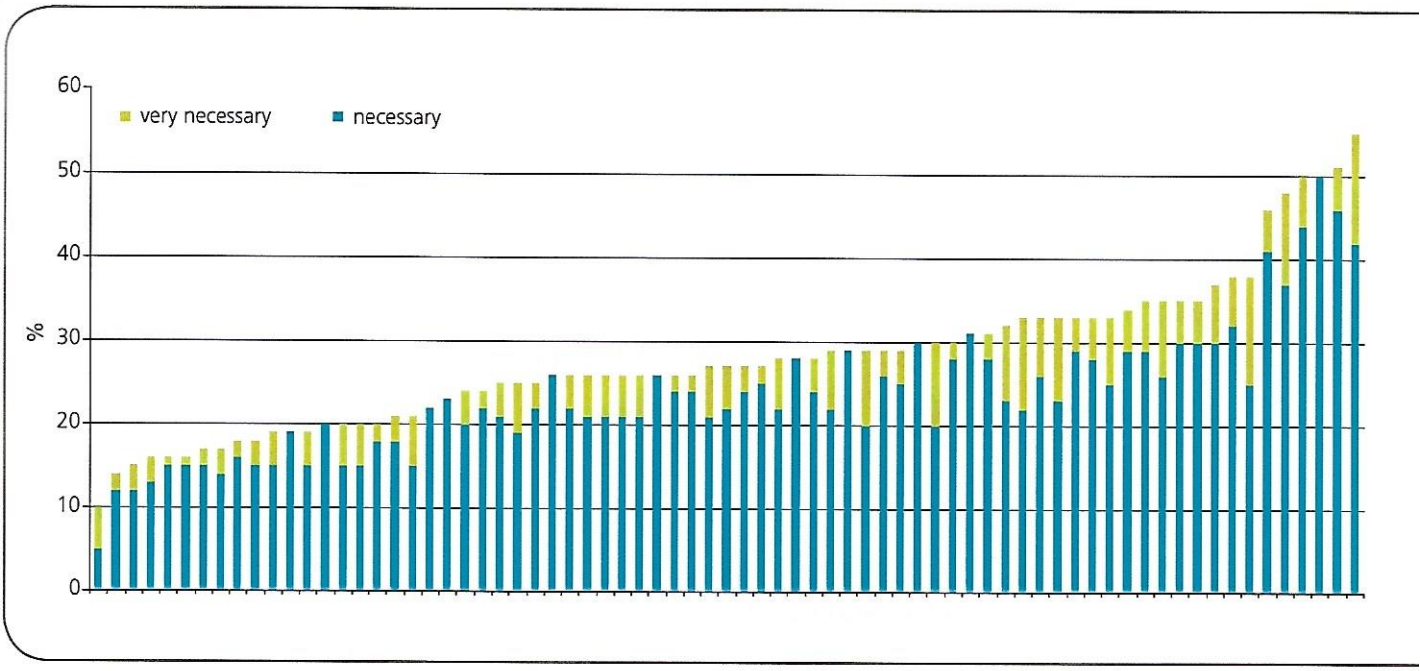


Figure 4: Percentages of Novo Nordisk employees who find it necessary or very necessary to change their alcohol habits, broken down by VP groups



Percentages who regularly exceed the weekly maximum limits for alcohol consumption

Overall trends: 6% of Novo Nordisk employees state that they regularly exceed the recommended limits for alcohol consumption of maximum 21 units/week for men and 14 units/week for women. The remaining 94% of employees state that they do not regularly exceed the recommendations. It is worth noting that only 6% of employees state that they regularly exceed the maximum weekly alcohol limit, while a total of 4% find it very necessary and 22% find it necessary to change their personal alcohol habits. As Figure 4 above also shows, there are substantial variations between the VP groups in this respect. From as few as 10% to as many as 55% within the various VP groups find it necessary, to a greater or lesser extent, to change their alcohol habits.

Gender: Slightly more men than women state that they regularly exceed the recommended alcohol limit.

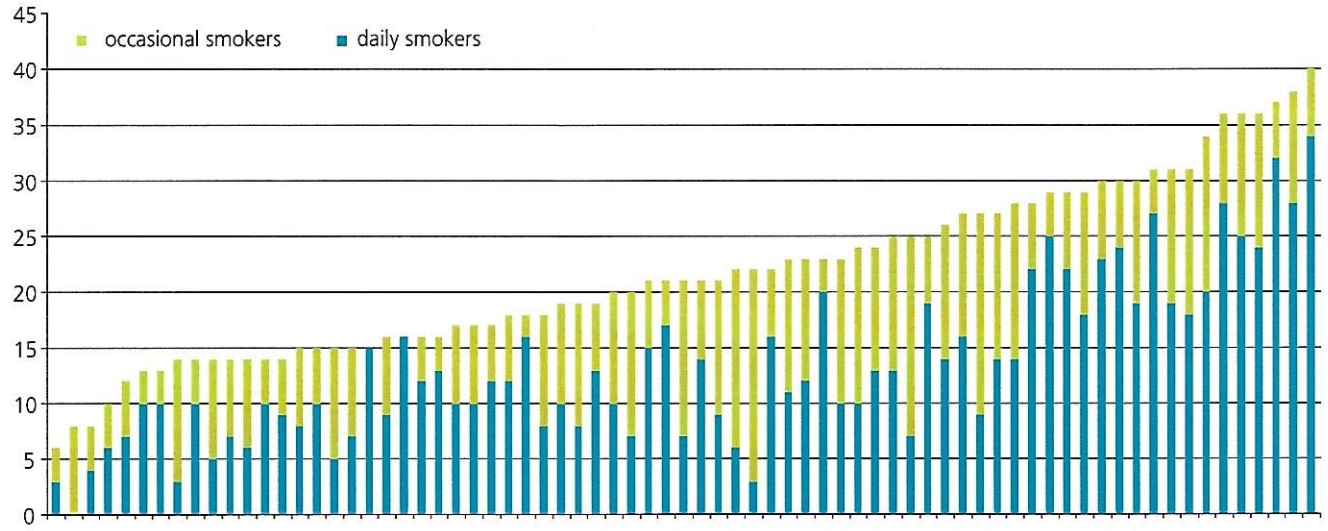
Age: An age-related increase is seen in the percentages of Novo Nordisk employees who regularly exceed the recommended alcohol limits of maximum 21 units/week for men and 14 units/week for women.

Education/training: Employees with less than1 year's education/training are overrepresented among those who regularly exceed the recommended weekly alcohol limits.

Sites: Compared with the Novo Nordisk average, there is a higher ratio of employees at Sorgenfri who regularly exceed the recommended weekly alcohol limits.

Analyses of variations between Sites and VP groups: Variations between Sites ($p=0.2434$) and VP groups ($p=0.6656$) are not statistical significant. >>

Figure 5: Percentages of daily smokers and occasional smokers among Novo Nordisk employees, broken down by VP groups



Percentages who smoke daily or occasionally

Overall trends: 25% of Novo Nordisk employees smoke daily or occasionally, while 21% have quitted smoking and 53% state that they have never smoked. For comparison, the ratio of daily smokers and occasional smokers is substantially higher in the Danish population overall (39%) than among Novo Nordisk employees. As Figure 5 above shows, the percentage of smokers varies by a factor 5 between the different VP groups. The lowest ratio is 7% smokers, while one VP group has 40% smokers. The Figure also shows that most smokers smoke daily, since a total of 18% of employees smoke daily, while 7% smoke occasionally. However, there are a few VP groups where all or nearly all smokers only smoke occasionally, which indicates that smoking patterns may be culturally/locally determined within the VP groups.

Gender: Slightly more men than women state that they smoke daily or occasionally.

Age: Among those aged 25 or younger there is a statistical significant large percentage of smokers. Among the other groups there is an age-related increase in the percentage of smokers.

Education/training: A negative relationship is observed between length of education/training and smoking.

Sites: Compared with the Novo Nordisk average, there is a higher ratio of smokers among employees at Værløse/Ganløse, Bagsværd, Kalundborg and Hillerød. In contrast, there is a lower ratio at Steno Diabetes Center.

Analyses of variations between Sites and VP groups: Variations between Sites ($p<0.0001$) and VP groups ($p<0.0001$) are both statistical significant. In all cases age ($p=0.0311/0.0190$), marital status ($p<0.0001/<0.0001$) and education/training ($p<0.0001/<0.0001$) have an impact, but it is not sufficient to explain the entire variation between Sites ($p=0.0319$) and VP groups ($p=0.0002$), respectively.

Percentages who have unhealthy eating habits (assessed on the basis of dietary score for consumption of fat, fish, fruit and vegetables)

Overall trends: 10% of Novo Nordisk employees eat unhealthy, while 79% eat average healthy food and 11% eat healthy, assessed on the basis of dietary scores. Dietary scores include the use of fat in cooking and the frequency of meals including fish, vegetables and fruit. As Figure 6 below shows, the ratios who eat unhealthy within the VP groups vary from 2% to 30%, while unhealthy eaters vary from 0 to 22%. There is a certain contradictive tendency within the VP groups in relation to healthy and unhealthy eating, although this tendency is not consistent. There are thus examples of VP groups where relatively high percentages eat healthy and unhealthy diets, respectively, and there are also VP groups where virtually none fall within these categories.

Gender: A substantially higher percentage of men than women have unhealthy eating habits, assessed on the basis of dietary scores.

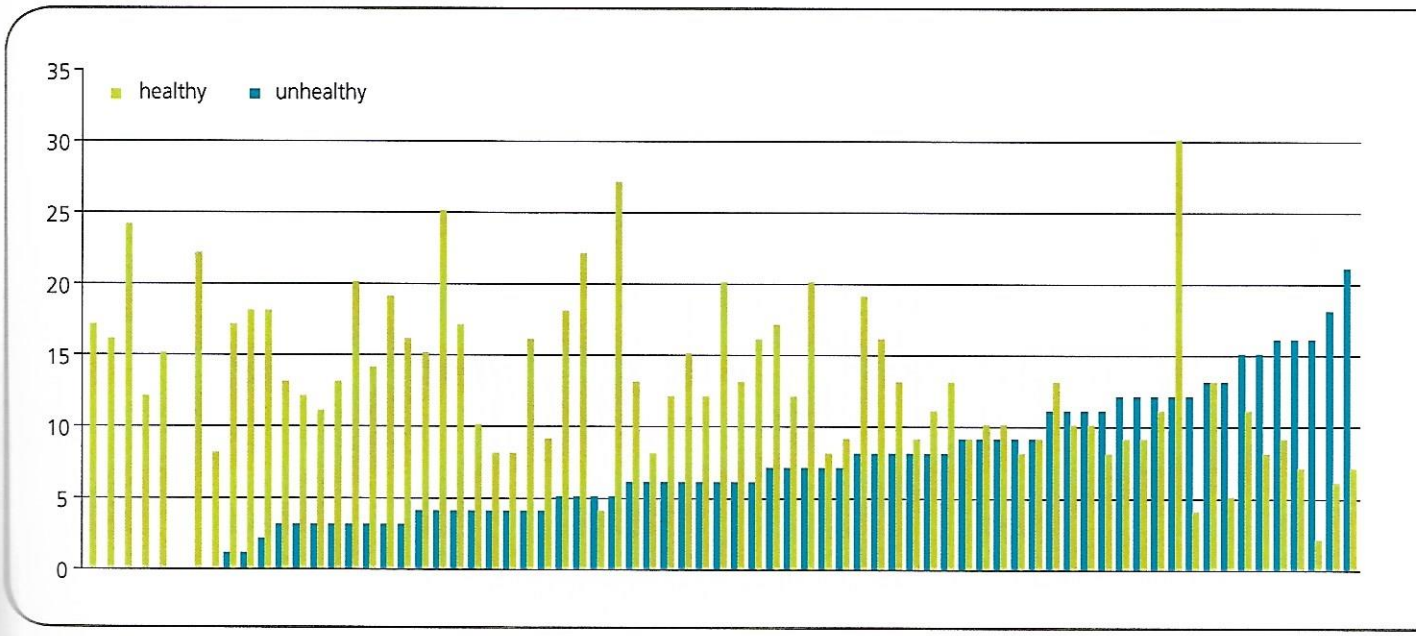
Age: A negative correlation is seen between age and unhealthy eating.

Education/training: There is a negative correlation between length of education/training and unhealthy eating, since a higher ratio of employees with no education/training have unhealthy dietary habits, while fewest among those with long-cycle educations have unhealthy dietary habits.

Sites: Compared with the Novo Nordisk average, the highest percentages of employees at Hjørring, Værløse/Ganløse, Kalundborg and Hillerød eat unhealthy. In contrast, there is a statistical significantly lower ratio at Sorgenfri.

Analyses of variations between Sites and VP groups: Variations between Sites ($p<0.0001$) and VP groups ($p<0.0001$) are both statistical significant. For all these variations, gender ($p<0.0001/<0.0001$), age ($p<0.0001/<0.0001$) and education/training ($p<0.0001/<0.0001$) have an impact, but it is not sufficient to explain the entire variation between Sites ($p=0.0034$). However, the employees' genders, ages and professions may explain the variation between the different VP groups when these background factors are taken into account – VP groups ($p=0.5988$). >>

Figure 6: Percentages of Novo Nordisk employees who are healthy and unhealthy eaters, broken down by VP groups – ranked by percentages of healthy eaters



Percentages who exceed the obesity threshold (BMI>30)

Overall trends: 7% of Novo Nordisk employees weigh so much that they exceed the obesity threshold (BMI>30), assessed on the basis of Body Mass Index (weight/height*height). A further 30% can be characterised as overweight (25<BMI<30), while the remaining 62% can be characterised as normal or underweight (BMI<25). For comparison, 10% of the overall Danish population are obese, while 42% are overweight. As Figure 7 below shows, the percentage of overweight (and obese) employees fluctuates by up to a factor 5 between the various VP groups. It is also seen that the percentage of obese employees (BMI>30) varies from 0 and 13% in the VP groups.

Gender: Slightly more men than women can be characterised as obese (BMI>30).

Age: There are no major age-related differences in the obesity percentages. Only the age group 26-34 years stands out in that there are fewer obese employees in this age group than in the rest.

Education/training: A negative correlation is seen between length of education/training and obesity, since the ratio of obese employees is highest among those with short education/training, while a lower ratio of those with long-cycle or medium-cycle educations can be characterised as obese.

Sites: Compared with the Novo Nordisk average, Hjørring, Kalundborg and Værløse/Ganløse have higher ratios of obese employees. In contrast, there is a lower ratio at Sorgenfri.

Analyses of variations between Sites and VP groups: Variations between Sites ($p<0.0001$) and VP groups ($p=0.0067$) are both statistical significant. Education/training ($p<0.0001/<0.0001$) has an impact, but it is not sufficient to explain the entire variation between the Sites ($p=0.0021$). However, the employees' professions may explain the variation between the different VP groups, which is no longer statistical significant when background factors are taken into account – VP groups ($p=0.7202$).

Figure 7: Percentages of overweight and obese Novo Nordisk employees, broken down by VP groups

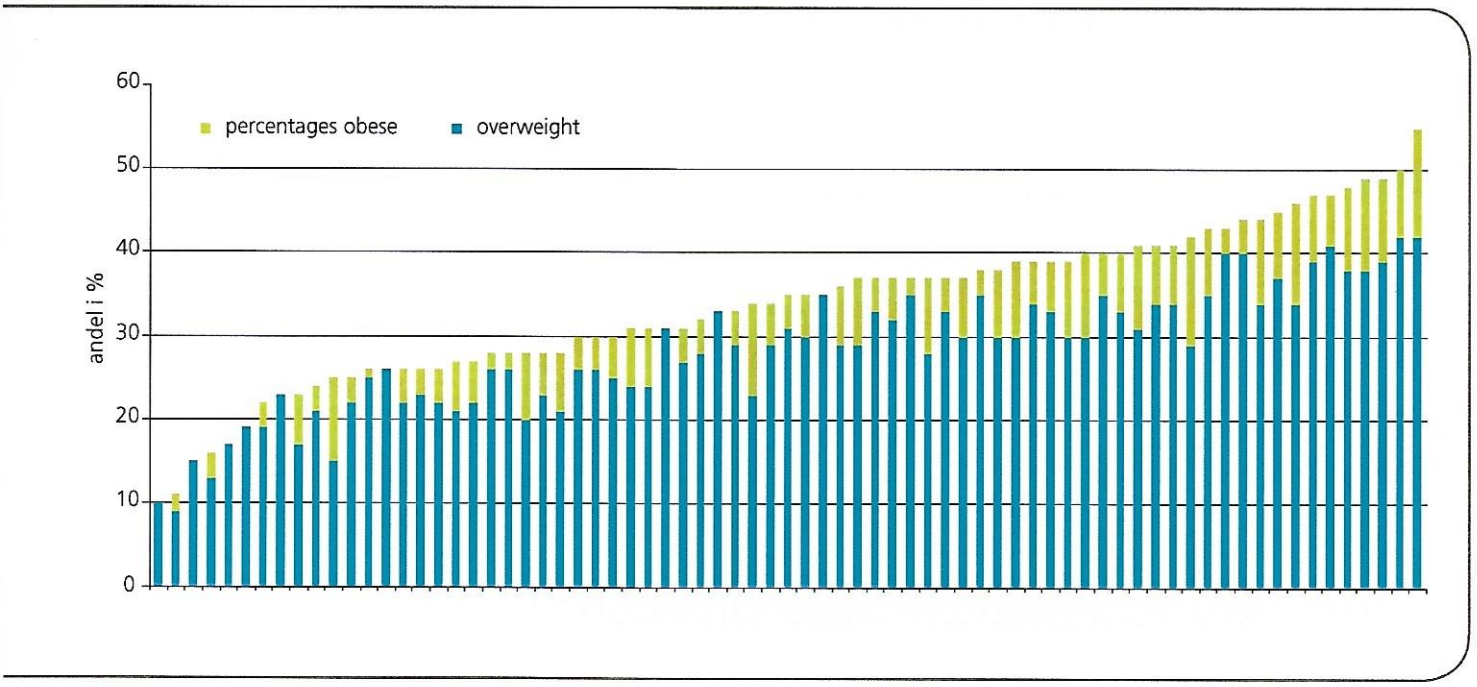
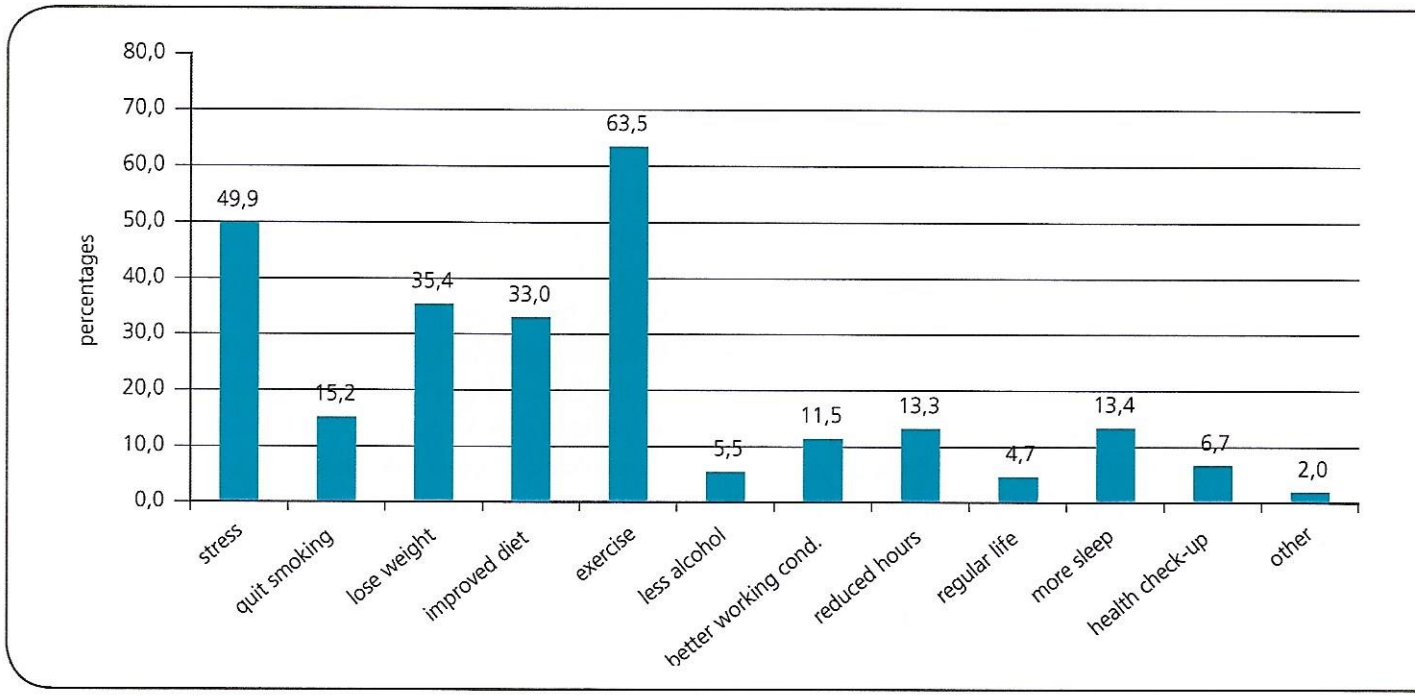


Figure 8: Distribution: 'If you were to do more for your health than you do now, what would you do?'



6.3. What is the scope for intervention?

The need for intervention among employees can be viewed from several angles. As Figure 8 above shows, employees are prepared to do more for their health in the following areas:

64% would like to exercise more, 50% would like to reduce stress, 35% would like to lose weight, and 33% would like to improve their diet.

These responses are consistent across all Sites – i.e. employees at all Sites would prefer to do something in these four areas rather than in other areas if they were to make an extra effort to boost their health.

Another option is to look at the employees who have evident needs as 'risk groups' within the above areas. In other words, 'How many employees have evident needs within the areas selected?':

46% do not fulfil the recommended ½ hour's physical activity per day.

37% are overweight (BMI>25) – of which 7% are obese (BMI>30).

29% have frequent stress symptoms or frequently feel stressed.

25% smoke daily or occasionally.

13% are unhealthy eaters, cf. dietary scores (consumption of fish, fat, vegetables and fruit).

11% uffer from poor well-being (physically or mentally), cf. SF-12 well-being score.

8% never or seldom get sufficient sleep to feel refreshed.

8% have never had or do not remember ever having had a health consultation/check-up.

6% regularly exceed the maximum weekly limit for alcohol consumption (21 units for men, 14 for women).

>>

In recent years, many research findings have demonstrated that the success rate for intervention increases if the individual is prepared to change his/her behaviour (see e.g. Connor & Normann, 1996).

A combination of the above compilations gives an indication of this. In other words: how many in the above 'risk groups' would genuinely want to make an effort in the relevant risk area if they were to boost their own health?

The highest success rates are potentially found if the following measures are initiated in the various risk groups:

- Physical activity among those who do not observe the recommended 3.5 hours/week (78%).
- Weight reduction among those who are overweight (69%).
- Stress reduction among those who are stressed (68%).
- Help for smokers to quit smoking (60%).
- Dietary improvements among those who are unhealthy eaters (46%).

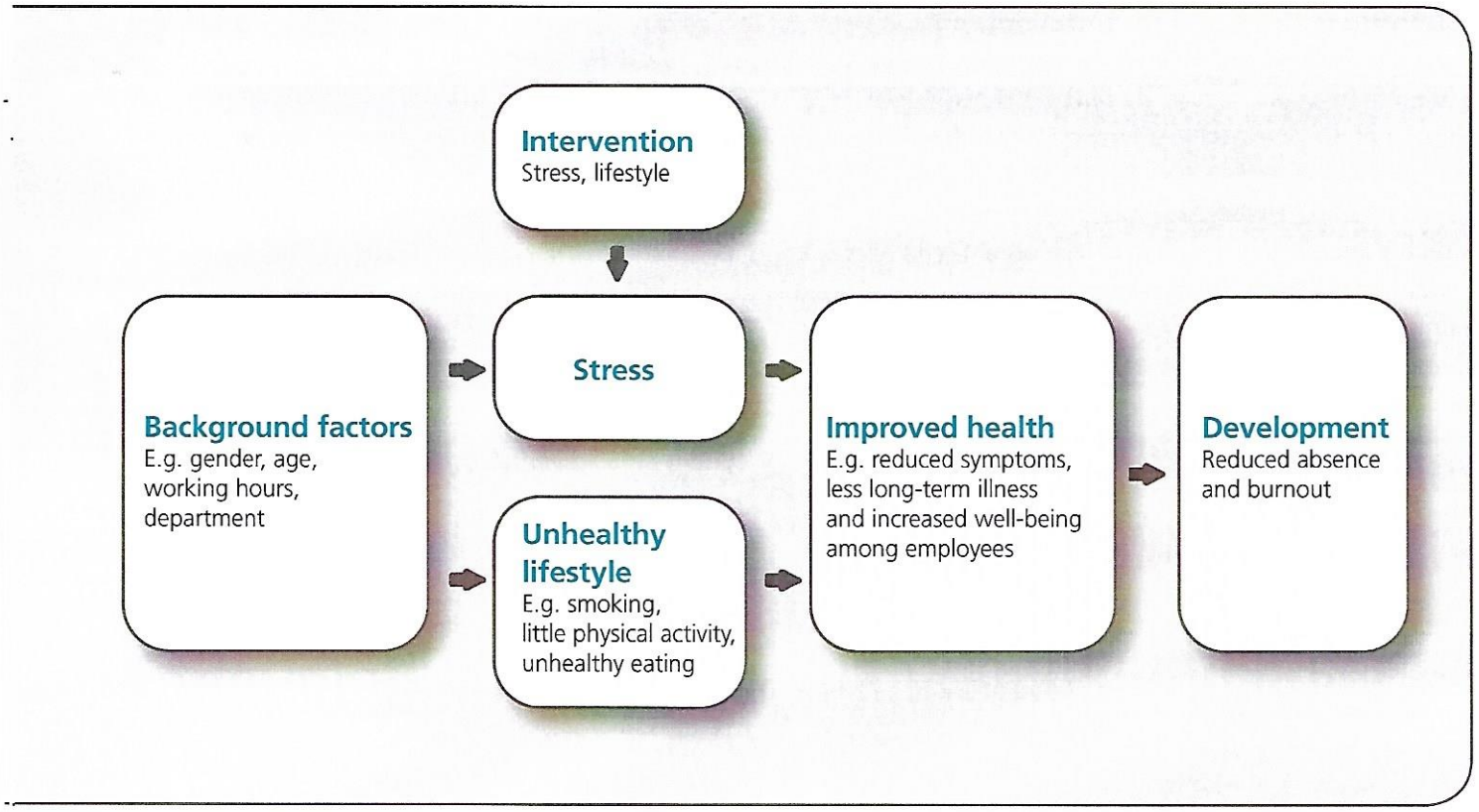
6.4. Further analyses

6.4.1. Prevention of morbidity and absence due to illness

The starting point of the analysis plan is the NovoSund project model (see Figure 1). The model assumes that the individual's background and his/her social relations – including at work – influence the individual's choice of lifestyle and his/her perception of stress. As the intervention model below (Figure 9) shows, stress and lifestyle are the key factors that Novo Nordisk has chosen to focus in its attempts to prevent morbidity and health problems and resulting absence and burnout among employees.

The analyses below seek to assess whether there is a potential – and if so which potential – for preventing morbidity and absence due to illness among Novo Nordisk employees by regulating, primarily, unhealthy lifestyles and stress factors.

Figure 9: Intervention model – NovoSund



The following analyses have been performed with a view to meeting the above objectives:

1) Analyses of the factors that have an impact on stress and lifestyle – with a view to identifying relevant factors and relevant employee groups for targeted intervention.
2) Analyses of the factors that have an impact on morbidity and absence due to illness – with a view to demonstrating that morbidity and absence are likely to be linked to unhealthy lifestyle and stress.

6.4.2. Factors that relate to stress and lifestyle

Stress: A total of 13% of employees often feel stressed (R^2: 27%). Stress is frequently observed among women, employees over 35 years, and employees with medium-cycle or long-cycle educations. Other characteristics include low mental and physical SF-12 scores (well-being), lack of sleep, lack of exercise, little influence on own health and lack of personal network.
In general, no statistical significant differences are observed between the Sites – however, a couple of Sites (Sorgenfri and Lyngby) deviate from the rest in that they have an overrepresentation of frequently stressed employees. Very large variations are seen between the different VP groups, where the percentages of employees who frequently feel stressed vary by a factor 5-10. This variation cannot be explained by the other explanatory factors included, nor by characteristics of the various Sites where the VP groups are located.

26% of employees have at least one stress symptom all the time or much of the time (R^2: 30%). Stress symptoms are most frequent among men, employees aged 25 or younger, and employees with day work. Other characteristics include low mental and physical SF-12 scores (well-being), lack of sleep, lack of exercise, less than 4 hours' physical activity/week, little influence on own health, and lack of a personal network.

A variation is seen between the different Sites; however, this can be explained by the other explanatory factors. Nevertheless, there is an overrepresentation of employees with stress symptoms at Site Lyngby. Very large variations are seen between the different VP groups, where the percentages of employees who have stress symptoms vary by up to a factor 10. This variation cannot be explained by the other explanatory factors included, nor by characteristics of the various Sites where the VP groups are located.

Physical activity: 54% of the employees are physically active for the recommended 3.5 hours/week (R^2: 31%). Physical activity for at least 3.5 hours/week is most frequently observed among men, employees aged 25 or younger, and unmarried singles. Other characteristics include BMI < 25, substantial influence on own health, heavy/some physical activity at work, competitive sports/medium-level physical activity outside work, healthy dietary score, active efforts to maintain or improve their health. Statistical significant variations are seen between the different Sites; the percentages of employees who fulfil the recommendations for weekly physical activity vary by up to a factor 3. The ratio of active employees is particularly high at Gentofte, and to some extent Værløse, Steno Diabetes Center and Fuglebakken. Substantial variations are also seen between the different VP groups; the percentages of employees who are physically active for at least 3.5 hours per week vary by up to a factor 20. This variation cannot be explained by the other explanatory factors included, nor by characteristics of the various Sites where the VP groups are located.

In contrast, 46% of the employees are not physically active for the recommended 3.5 hours/week (R^2: 31%). This group most frequently includes women, employees aged 26-54, and married employees. Other characteristics include BMI > 25, some influence on own health, sedentary work, sedentary hobbies, unhealthy dietary score, no active efforts to maintain or improve their health, and a mean SF-12 physical score. Statistical significant variations are seen between the different Sites; the percentages of employees who do not observe the recommendations for weekly physical activity vary by up to a factor 3. Particularly Hjørring and Søborg, and to some extent Hillerød and Sorgenfri, have low ratios of active employees. Substantial variations are also seen between the different VP groups; the percentages of employees who are not physically active for at least 3.5 hours per week vary by up to a factor 20. This variation cannot be explained by the other explanatory factors included, nor by characteristics of the various Sites where the VP groups are located. >>

Smoking: 25% of employees smoke daily or occasionally (R^2: 16%). Smoking is most frequent among young employees, those with little or no education/training, employees doing shift/night work, and unmarried employees. Other characteristics include low or normal BMI, lack of sleep, heavy physical work, no exercise in their spare time, unhealthy eating, weekly alcohol limits regularly exceeded, no efforts to improve their own health, and employees who can only discuss their problems with colleagues. Finally, low SF-12 scores are seen (particularly physical scores). It is also characteristic that the SF-12 score is almost synonymous with a frequent perception of stress/stress symptoms among smokers.

The ratio of smokers varies considerably from Site to Site; however, this can be explained by the other explanatory factors. Smokers are overrepresented at Bagsværd, Kalundborg, Hillerød, Hjørring and Værløse/Ganløse. Major variations are seen between the different VP groups, where the percentages of smokers vary by up to a factor 5. This variation cannot be explained by the other explanatory factors included, nor by characteristics of the various Sites where the VP groups are located.

Alcohol: 6% of the employees regularly exceed the recommended weekly alcohol limit (R^2: 13%). The limit is most frequently exceeded by employees over 45 years. Other characteristics include lack of sleep, smoking, low SF-12 (mental) and 'self-rated' very high or low social status. Again there is a considerable overlap between the employees' mental SF-12 score and their perception of stress/symptoms.

No statistical significant differences are observed between the various Sties – although there is an overrepresentation of employees at Sorgenfri and to some extent Fuglebakken and Steno Diabetes Center. No statistical significant differences are observed between the various VP groups overall – partly due to the relatively low number of employees who state that the alcohol limits are regularly exceeded.

Diet: 10% of the employees are generally unhealthy eaters (R^2: 20%). Unhealthy eating is most frequent among men, young employees, apprentices, employees with little/no education or training, and employees with shift/night work. Other characteristics include little influence on own health, lack of sleep, sedentary work, no spare-time exercise, smoking and low physical SF-12 score. There is an overlap between these employees' SF-12 scores and their perception of stress/symptoms. A variation is seen between the different Sites; however, this can be explained by the explanatory factors included. Unhealthy eaters are overrepresented at Kalundborg, Hillerød, Hjørring and Værløse/Ganløse. Variations are also observed between the different VP groups, which are, however, explained by the other explanatory factors.

What does the data show?

A relatively large share of the stress perceived and the unhealthy lifestyle can be explained by the explanatory factors included (background factors, other lifestyle/stress and well-being factors).

A statistical significant variation is seen between the different Sites in relation to physical activity. This variation is statistical significant even when controlled for all other explanatory factors.

Likewise, there are statistical significant variations between the different VP groups in relation to frequent stress, stress symptoms, smoking and physical activity.

An unhealthy lifestyle and stress are associated with little influence on one's own health, lack of sleep and lack of a personal network. An unhealthy lifestyle is also associated with 'not doing anything for one's health' and with low (mental) SF-12 score, as well as stress. To a large extent the unhealthy lifestyle factors also have 'positive' mutual associations, while physical activity is negatively associated with an unhealthy lifestyle (smoking, alcohol, unhealthy eating).

6.4.3. Morbidity and absence as a result of unhealthy lifestyle, stress and background factors

20% of the employees suffer from a long-term illness, and 16% of these long-term conditions can be related to background, lifestyle, stress and well-being factors. Long-term illness is mainly prevalent among elderly employees and those with little education/training. In addition, long-term illness can be related to frequent stress symptoms, obesity (BMI>30), lack of sleep, hard and medium physical activity in the employees' spare time, and employees who do something for their health (active health behaviour). Finally, good mental well-being and poor physical well-being are characteristic of employees with long-term illnesses.

78% of the employees have had symptoms within a 2-week period, and 22% of these symptoms can be related to background, lifestyle, stress and well-being factors. Symptoms are mainly seen among women, young employees, employees with short-cycle or medium-cycle education/training, and married employees. Symptoms can also be related to a frequent perception of stress, stress-related symptoms, obesity, a perception of having little influence on one's own health, lack of sleep, and both sedentary work and hard physical strain at work. Moreover, symptoms can be related to non-smoking and to low mental and physical well-being scores.

17% of the employees have had mental symptoms within a 2-week period, and 35% of these symptoms can be related to background, lifestyle, stress and well-being factors. Mental symptoms are particularly prevalent among women, singles, employees who do not talk with anyone when they have problems, and employees with a frequent perception of stress and stress-related symptoms. Finally, mental symptoms can be related to a perception of having little influence on one's own health and to low mental and physical well-being.

6% of the employees have poor self-rated health, and 51% of these health problems can be related to background, lifestyle, stress and well-being factors. Poor self-rated health is mainly seen among men, employees with frequent stress symptoms, obese employees, and employees who feel that they have little influence on their own health. Moreover, health problems are frequently seen among obese and overweight employees, those who lack sleep, and those with sedentary work. Finally, there are employees who do not make an active effort to boost their health, and employees with poor mental and physical well-being.

A consequence of illness is absence from work. A total of 16% of the employees have been absent within a 2-week period, and 13% of this absence can be related to background, lifestyle, stress and well-being factors. Absence is most frequent among women, young and middle-aged employees, and employees with little or no education/training. Other factors are lack of sleep and a perception of having little influence on one's own health. Moreover, absence can be attributed to unhealthy eating habits, but on the other hand also to active health behaviour. And finally to low mental and physical well-being scores.

What does the data show?

Background and well-being factors, as well as stress and lifestyle factors, are relatively important explanatory factors in relation to morbidity/absence, assessed on the basis of the R^2 value of logistic regression analyses (13-51%). Virtually all illness parameters can be related to low physical and mental well-being, assessed on the basis of the SF-12 score. In addition, most parameters can be related to women, little or no education/training and stress, besides overweight, lack of sleep and a perception of not having much influence on one's own health (Locus of Control).

7 appendices

Appendix 1 – Demographics and response rate

Description of the various Sites

Bagsværd: Administration, production, analysis and research. Large geographical dispersion, many different departments and many VPs.

Kalundborg: Large production site for bulk insulin. Many local VPs and many large departments.

Gentofte: Administration, production, analysis and development. The Site comprises a limited number of small and large departments, most of them with their own VPs.

Hillerød: Filling, production, development and product assembly. Several local VPs.

Måløv: Research, development, production and analysis. Several local VPs.

Lyngby: Primarily administration and IT. Several local VPs.

Sorgenfri: Sales and marketing, several local VPs.

Steno Diabetes Center: Novo Nordisk's own diabetes hospital. Only one local VP.

Søborg: Primarily analyses. There is no VP at Søborg.

Hjørring: Production site. The Site has its own VP.

Fuglebakken: Two large departments, mainly engaged in analysis. There is no VP at Fuglebakken. One department reports to VPs at Kalundborg, the other to VPs at Bagsværd.

Køge/Hvidøre/Avedøre Holme: Køge is primarily a production site. It is a small, isolated enterprise that is owned by Novo Nordisk but has a high degree of autonomy and its own VP. Hvidøre is Novo Nordisk's own course venue. There is no VP for Hvidøre, the local manager reports directly to the Executive Management.

Værløse/Ganløse: Værløse is a production-only area. There is no local VP. Staff at Ganløse work closely with researchers at Måløv and Bagsværd; there is no local VP at Ganløse.

Demographic breakdown at the various Sites

The overall gender distribution is more or less equal, although there is some variation between the different Sites. The largest ratio of women is seen at Site Steno Diabetes Center (86.7%), while the largest ratio of men is seen at Site Værløse/Ganløse (71.4%).
Almost 9 out of 10 (89%) of all Novo Nordisk employees are in the age range 26-54 years. Again, there is considerable variation between the Sites, from 74% (Værløse/Ganløse) to 97% (Fuglebakken).

A total of 49% of salaried Novo Nordisk employees have long-cycle or medium-cycle educations, while the percentage with little (less than one year) or no education/training is 27%. Depending on the functions of the individual Sites, these distributions naturally vary. The highest ratio with medium-cycle or long-cycle educations is seen at Steno Diabetes Center (78%), while there are fewest in these categories at Hjørring (20%). The highest ratio with little or no education/ training is seen at Site Værløse/Ganløse, while the lowest ratios are seen at Søborg and Lyngby (approx. 3%).

Appendix 2 – Response statistics

	Invited	Respondents	Response rate
All	11630	7753	66,66
Gender			
Mand	5718	3534	61,80
Kvinde	5912	4219	71,36
Age			
≤25 år	255	142	**55,69**
26-34 år	3144	2092	66,54
35-44 år	4749	3180	66,96
45-54 år	2370	1610	**67,93**
55+ år	1111	729	65,62
SITE			
Bagsværd	3622	2467	68,11
Kalundborg	2369	1392	58,76
Hillerød	1230	768	62,44
Måløv	953	702	73,66
Steno Diabetes Center	180	135	**75,00**
Gentofte	1530	1070	69,93
Søborg	635	453	71,34
Lyngby	298	213	71,48
Sorgenfri	291	204	70,10
Hjørring	162	112	69,14
Køge/Hvidøre/Avedøre	90	66	73,33
Fuglebakken	145	94	64,83
Værløse/Ganløse	140	77	**55,00**

Appendix 3 – Definitions

SF-12

The SF-12 score is an expression of the employee's physical and mental well-being. On the basis of the responses to a number of questions it is possible to analyse the employees' well-being.

The physical SF-12 score is based on the responses to the following questions/statements:

1) Does your health limit your ability to perform light activities such as moving a table, hoovering or cycling?
2) Does your health limit your ability to walk several storeys up a flight of stairs?
3) I have achieved less than I would have liked to within the last 4 weeks – due to my physical health.
4) I have been limited in my ability to perform various types of work or other activity within the last 4 weeks – due to my physical health.
5) How much has physical pain impeded your daily work (both at the workplace and in and outside your home) within the last 4 weeks?
6) How do you generally rate your health?

The mental SF-12 score is based on the responses to the following questions/statements:

1) Have you been full of energy?
2) Have you felt calm and relaxed?
3) Have you felt sad?
4) I have achieved less than I would have liked to due to emotional problems.
5) I have performed my work or other activities with less diligence than usual due to emotional problems.

In both cases points are given for each response, and a low score is equal to poor physical/mental well-being, while a high score is related to good physical/mental well-being.

Appendix 4 – Overview of Tables and Figures

Tables:

Figures:

Appendix 5 – References

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