

## Working-aged population's mental symptoms and the use of the Internet

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### Abstract

The aim was to study how the working-age population's mental symptoms had a relation to the using of the Internet. In addition, the aim was to analyze how the mental symptoms had a relation to background information. The study was carried out as a cross-sectional study by posting a questionnaire to 15,000 working-age (18-65) Finns. Mental symptoms of responses (6121) were analysed using the model factors age, gender and use of the Internet. Only 0.06% mentioned that they were somehow addicted to the Internet. Based on statistical analyses, age and marital status had an influence on many mental symptoms. The use of the Internet at leisure had an influence on substance addiction and fear situations. The importance of the Internet only had an influence on the fear situations. In the future it will be essential to take into account that the use of the internet can affect mental symptoms.

### Introduction

When the use of the Internet increases, the potential for problematic use of the Internet also increases. It has been suggested that problematic use may lead to significant physical, social, professional, and mental problems including depression, anxiety, repetitive stress injuries, financial difficulties, declining grades and professional performance, social withdrawal, disturbed sleep patterns, and declined health status.<sup>1-7</sup> According to Widyanto's and Griffiths's review article<sup>8</sup> the empirical research into *internet addiction* can be roughly divided into five areas: a) survey studies that compare excessive Internet users with non-excessive users, b) survey studies that have examined vulnerable groups of excessive Internet use, most notably students, c) studies that examine the psychometric properties of excessive Internet use, d) case studies of excessive Internet users and treatment case studies, and e) correlational studies examining the relationship of excessive Internet use

with other behaviour (e.g., psychiatric problems, depression, self-esteem, etc.). Widyanto and Griffiths<sup>8</sup> concluded, that if *internet addiction* does indeed exist, it affects a relatively small percentage of the online population. In addition, what it is on the Internet that they are addicted to still remain unclear.<sup>8</sup>

*Internet addiction* is currently not included as a diagnosis in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM IV)<sup>9</sup> However, according to Block (2008),<sup>10</sup> *internet addiction* appears to be a common disorder that would merit inclusion in DSM-V. Based on Block's article<sup>10</sup> the diagnosis *internet addiction* is a compulsive-impulsive spectrum disorder that involves online and/or offline computer usage<sup>11,12</sup> and consists of at least three subtypes: excessive gaming, sexual preoccupations, and e-mail/text messaging.<sup>13</sup> Different subtypes can share the following components: excessive use, withdrawal, tolerance, and negative repercussions.<sup>13,14</sup>

According to earlier studies<sup>15-18</sup> the 12-month prevalence of depressive and anxiety disorders in the general populations varies between 4% and 11%, and 4% and 19%, respectively. In the Finnish Health 2000 Study depressive, alcohol use and anxiety disorders were found in 6.5%, 4.5% and 4.1% of the subjects, respectively.<sup>16</sup> Men had alcohol use disorders 7.3% and women 1.4%. Women had depressive disorders 8.3% and men 4.6%. Sex, age, marital, and employment status are distributed unevenly for mental disorders and their comorbidities. The study showed no association between educational level and mental disorders. According to Pirkola *et al.*<sup>16</sup> there appears to be no single population subgroup at high risk for all mental disorders, but rather several different subgroups at risk for particular disorders or comorbidity patterns.

The main aim of our work was to study how the working-age population's mental symptoms had a relation to the using of the Internet with answers from a questionnaire, which included questions about the possible influence of new technical equipment on the ergonomic health aspects, mental symptoms and accidents. In addition, the aim was to analyze how the mental symptoms had a relation to background information such as age, gender, and marital status.

### Materials and Methods

#### Study population and questionnaire

The questionnaire was posted to 15,000 Finns (working ages, 18-65) in October 2002. Names and addresses were obtained as a random sample from the Finnish population

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Register Centre. All the answers were handled anonymously and the study design was approved by the Ethical Committee (Pirkanmaa Health District, Finland, decision R02099).

The questionnaire was divided into six sections. The first section dealt with background information, and in section two the familiarity and use of given technical devices were mapped. People were also asked how important these devices were to them at work and leisure. If a respondent didn't have a job at the moment, he or she only answered questions about leisure. In the third section the focus was on physical loading and ergonomics. The fourth section concerned mental welfare. Respondents were asked if they had suffered sleeping disorders/disturbances, depression, exhaustion at work, substance addiction, anxiety or fear situations during the last 12 months. They were also queried if they somehow connected these symptoms to an increase in information-retrieval or informing through different electronic sources such as email, Internet, or digital television. The choices for the questions of section three and four were: cannot say, not at all, sometimes, pretty often, often, very often, and missing. Accidents were handled in the fifth section. The last part was an open-ended question *other observations concerning technology and health*. The details of the questionnaire have been reported earlier.<sup>19</sup>

#### Statistical analysis

The statistical analyses were done using the SPSS software, and consisted of General Linear Models with the symptoms assigned as

target variables. Also certain procedures were made to the explanatory variables. In the analyses for question #16) Have you suffered a) sleeping disorders/disturbances, b) depression, c) exhaustion at work, d) substance addiction, e) anxiety or f) fear situations during the last 12 months?, in the model, the factors were: age, gender, importance of Internet at leisure (Q9c), marital status (Mar), using the Internet at leisure (Q8c); and two-way interactions age x gender, age x Q9c, age x Mar, age x Q8c, gender x Q9c, gender x Mar, gender x Q8c, Q9c x Mar, Q9c x Q8c, Mar x Q8c. Age groups were classified (less than 20, 21-30, 31-40, 41-50, 51-60 and over 60).

(desktop computer, Internet, electric commerce, portable computer or mini-computer), 9) How important is the following equipment or services for your leisure? (desktop computer, Internet, electronic commerce, portable computer or mini-computer), and 16) Have you suffered a) sleeping disorders/disturbances, b) depression, c) exhaustion at work, d) substance addiction, e) anxiety or f) fear situations during the last 12 months? According to the question Q8 (Table 1) 4496 respondents (74.0%) used internet at leisure. In addition 77.3% of women at work, 69.3% of women outside working life, 79.0% of men at work and 57.4% of men outside working life used internet at leisure. For 67.1% of all respondents the internet was importance service and to 26.4% of all respondents the electric commerce was importance (Table 1, question Q9).

and 113 (19.0%) of men outside working life had sometimes or more suffered substance addiction.

### Result from statistic analyses

Table 2 shows the results of statistical analyses for the question #16) Have you suffered a) sleeping disorders/ disturbances, b) depression, c) exhaustion at work, d) substance addiction, e) anxiety or f) fear situations during the last 12 months? The significance is shown  $P < 0.05$  (\*\*=significant). In all data, age and marital status had an influence on the sleeping disorders/disturbances, depression, substance addiction and anxiety; the use of Internet at leisure (Q8c) had also an influence on the substance addiction; age, gender, marital status, the use of Internet at leisure and importance of Internet (Q9c) had an influence on the fear situations. In addition, some influence can also be seen together with two-way interactions in Table 2.

## Results

### Background information

During the winter 2002-2003 a total of 6121 responses arrived (41%). The mean age  $\pm$  standard deviation (SD) was  $41.3 \pm 13.1$  years. There were 3486 women and 2625 men. Respondents were relatively well distributed around Finland, so it can be assumed that they correspond to the entire working-age population. At the time of questionnaire 71% of the respondents were employed.

A summary of background information is shown in Table 1. Table 1 also includes answers to questions: 8) How often do you use the following equipment or services for leisure?

From all respondents 3581 (59.0%) of persons had sometimes or more suffered sleeping disorders/disturbances, 2618 (43.3%) had sometimes or more suffered depression, 3767 (62.5%) had sometimes or more suffered exhaustion at work, 582 (9.6%) had sometimes or more suffered substance addiction, 2079 (34.4%) had sometimes or more suffered anxiety and 965 (16.0%) had sometimes or more suffered fear situations during the last 12 months. From the women's respondents 126 (5.4%) of women at work and 59 (6.0%) of women outside working life had sometimes or more suffered substance addiction. From the men's respondents 266 (13.9%) of men at work

### Other observations concerning mental health and new technology

In total 1300 respondents (about 21%) answered the open-ended question *other observations concerning technology and health*. There was estimated to be 2508 comments (possibly responses to more than one aspect). On mental loading people have commented with 790 opinions concerning some quite different themes. The answers included comments on following topics: mental loading at

**Table 1. A summary of background information and the use of the technical devices at leisure, importance of devices or services at leisure and mental symptoms of all persons, women/men at work, women/men outside working life.**

Topics of questions and choices	All	%	Women at work	%	Women outside working life	%	Men at work	%	Men outside working life	%
<b>Q3 Marital status</b>										
Single	1343	22.0	432	17.9	302	30.6	335	17.2	244	40.2
Married or live-in	4219	69.0	1715	71.2	582	59.0	1498	77.0	312	51.4
Divorced	449	7.3	223	9.3	65	6.6	105	5.4	42	6.9
Widow or widower	101	1.7	39	1.6	37	3.8	8	0.4	9	1.5
<b>Q8 Use at leisure</b>										
b) use of desktop computer	4665	77.0	1901	79.3	704	72.3	1597	82.2	369	61.9
c) use of internet	4496	74.0	1858	77.3	674	69.3	1533	79.0	342	57.4
d) use of electric commerce	1556	25.8	589	24.5	222	22.8	588	30.4	129	21.6
e) use of portable computer or mini-computer	1432	23.6	505	21.2	142	14.7	650	33.6	107	17.9
<b>Q9 Importance of device or service at leisure</b>										
b) desktop computer	4117	67.9	1656	68.9	646	66.5	1398	71.9	341	57.0
c) internet	4071	67.1	1656	68.9	642	66.0	1373	70.6	326	54.5
d) electric commerce	1598	26.4	593	24.6	239	24.6	603	31.0	138	23.1
e) usage of portable computer	1377	22.8	490	20.4	140	14.5	608	31.4	121	20.3
<b>Q16 Mental symptoms</b>										
a) sleeping disorders/ disturbances	3581	59.0	1509	62.8	591	60.6	1060	54.8	329	55.0
b) depression	2618	43.3	1070	44.8	480	49.5	728	37.6	273	45.8
c) exhaustion at work	3767	62.5	1735	72.4	438	45.7	1315	67.9	199	33.6
d) substance addiction	582	9.6	126	5.4	59	6.0	266	13.9	113	19.0
e) anxiety	2079	34.4	838	35.0	406	41.9	574	29.7	211	35.5
f) fear situations	965	16.0	375	15.6	204	21.2	235	12.1	123	20.6

Q8 Use at leisure; the amount of positive answers included answers; less than monthly, monthly, weekly or daily; Q9 Importance of device or service at leisure: the amount of yes included answers little, moderately, pretty important, and very important. Q16 Mental symptoms; the amount of yes included answers sometimes, pretty often, often, and very often.

work (322 comments), mental loading at leisure time (235 comments), social activities (49 comments), addiction (71 comments), technology and the mental development of children and juveniles (42 comments), rest (41 comments) and other topics of mental loading (30 comments). The comments on the addiction included mobile phones (21), internet (13), computer (7) and others (30). Only four persons (0.06%) mentioned that they were somehow addicted to the Internet. Two of them mentioned that if they started discussions in the chat room, it was difficult to end them. Two mentioned that they stayed close to a computer to be able to browse web pages. In addition, one person mentioned that she becomes anxious if she cannot check her e-mails daily.

## Discussion

### Evaluation of methods

Our study included a total of 15 000 Finns, and 6121 responses arrived during the winter 2002-2003. The use of the internet has increased every year. According the Finnish statistical office<sup>20</sup> in 2003 the percentage of 15 to 74-year-olds using the Internet was 66%, and in 2007 the percentage was 79%.<sup>14</sup> Our results are based on a time when the Internet was not as popular as it is nowadays. It is good to consider this when analyzing the results.

In this data, only four persons mentioned that they were somehow addicted to the Internet, which is quite a small amount, only 0.06% of all responses. For example, in all the data 9.6% of respondents had substance addiction symptoms sometimes or often. Certainly the situations are different in the questionnaire we have a question about substance addiction, but no question about *internet addiction*. In addition, if a person had some symptoms sometimes it is not very often. If we take the sometimes results away, in all the data only 3.1% of respondents had substance addiction. Maybe nowadays a few more Finns have *internet addiction*, because the use has increased. In addition, now Internet games are quite popular and in some cases a person can have both *internet addiction* and game addiction. It is difficult to know precisely what kind of addiction a person has. He or she can be addicted to the Internet or a service of the Internet (e.g., games). In our material two people described that they were addicted to discussions in the chat room and two were addicted to browsing web pages. In the statistical analyses the use of the Internet included alternatives *less than monthly*, *monthly*, *weekly* and *daily*. The choice *less than monthly* means that a person uses Internet very little. Therefore, many are users

**Table 2. The results (Type III Sum of Squares and significance (Sig.)) of statistical analyses for question 16 (Q16a=sleeping disorders/disturbances, Q16b=depression, Q16c=exhaustion at work, Q16d=substance addiction, Q16e= anxiety, Q16f=fear situations, Mar= marital status, Q8c=use of Internet at leisure, Q9c=importance of Internet at leisure).**

Source of variation	Q16a Sig.	Q16b Sig.	Q16c Sig.	Q16d Sig.	Q16e Sig.	Q16f Sig.
Age	0.005**	<0.001**	0.110	<0.001**	0.010**	0.003**
Gender	0.212	0.398	0.356	0.221	0.055	0.002**
Q9c	0.191	0.294	0.526	0.493	0.488	0.039**
Mar	0.042**	0.030**	0.514	<0.001**	0.010**	0.020**
Q8c	0.430	0.319	0.124	<0.001**	0.247	0.002**
Age×gender	0.432	0.009**	0.383	0.807	0.001**	0.012**
Age×Q9c	0.448	0.829	0.309	0.541	0.459	0.783
Age×Mar	0.001**	<0.001**	0.002**	<0.001**	0.034**	<0.001**
Age×Q8c	0.926	0.963	0.432	0.379	0.913	0.553
Gender×Q9c	0.833	0.852	0.426	0.667	0.469	0.905
Gender×Mar	0.970	0.559	0.150	0.294	0.116	0.002**
Gender×Q8c	0.415	0.276	0.243	0.021**	0.168	0.218
Q9c×Mar	0.359	0.105	0.543	0.980	0.242	0.659
Q9c×Q8c	0.471	0.261	0.078	<0.001**	0.092	0.024**
Mar×Q8c	0.400	0.599	0.838	0.933	0.421	0.246

\*\*Significant at P<0.05.

of the Internet and new technical equipment.

The use of internet has increased since our data was collected in 2002-2003. In addition, the use of internet differs in countries. However, our results indicate that *internet addiction* definitely has an influence on some of the internet users. The use of internet is still increasing in many countries with economic opportunities and the easy use of internet. Then, this kind of questionnaire should be repeated in near future in developed country in Europe, Asia or in USA.

In Finland Internet cafes are not as popular as in South Korea, but there is a high level of Internet access at home,<sup>14</sup> and if we compare our results to the amount of *internet addiction* in South Korea, we can note that when the use of the Internet increases the amount of *internet addiction* cases also increases. According to Kim (2007) the average South Korean high school student spends about 23 hours each week gaming,<sup>21</sup> another 1.2 million are believed to be at risk for addiction and to require basic counselling. In addition, the South Korean government estimated that about 210,000 South Korean children (2.1%; ages 6-19) are afflicted and require treatment to *internet addiction*.<sup>22</sup> When we try to generalize our data for today's population, it is possible that more than 1% of working-aged population have addiction to Internet.

Different types of biases also occurred in the study. The questionnaire and questions can influence participants and only the active ones sent back the questionnaire. Furthermore, opinions can change quite quickly, as the technology develops. All participants do not

understand the questions and symptoms in the same way. For example, we got quite a few comments on addiction (71), but only four people mentioned that they were addicted to the Internet. Maybe it was easier to mention that others had an addiction than that he or she personally had one.

### Evaluation of symptoms

In our study (Table 1) women at work had more sleeping disorders/disturbances and exhaustion at work than women outside working life. The differences between the women's groups are quite small, except in exhaustion at work. Certainly only persons at work had the symptom exhaustion at work. In Table 1, men at work had only more exhaustion at work than men outside working life. The differences between the men's groups are a little higher than the differences between the women's groups. Men outside working life had 8.2% more depression, 8.5% more fear situations and 5.8% more anxiety than men at work. The differences between the men's group and women's group are in some cases higher than between women's groups or men's groups. For example, 19.0% of men outside working life had sometimes or more substance addiction and only 6.0% of women outside working life had the same symptom. According to other studies<sup>9-12</sup> the prevalence of depressive and anxiety disorders in the general population varies between 4% and 11%, and 4% and 19%, respectively and in the Finnish Health 2000 Study depressive-, alcohol use- and anxiety disorders were found in 6.5%, 4.5% and 4.1% of the subjects, respectively.<sup>10</sup> Our results are higher than in other stud-

ies. However, our results (Table 1) were based on people's own answers about their symptoms, and it is not the same as if they had mental diseases and diagnosis.

### Statistical analyses from all data

In statistical analyses age and marital status had an influence on many mental symptoms (sleeping disorders/disturbances, depression, substance addiction, anxiety and fear situations). The marital status described, e.g., how social the respondent was. In some cases the mental symptoms may decrease the person's social activity and she or he cannot find a partner as easily as other people. Only in two cases did the use of the Internet at leisure have an influence on the mental symptoms, substance addiction, and fear situations, and the importance of the Internet (Q9c) had an influence on the fear situations. Maybe those who had fear situations use the internet so that they can decrease the normal social contacts. Based on that, it is easy to understand these relations. In addition, maybe some of the respondents, when they had substance addiction, also had *internet addiction* or they were heavy users, and therefore we found a relation between the use of the internet and substance addiction. However, using the Internet had an influence on the working-age population's substance addiction and fear situation.

### Conclusions

In conclusion, it can be stated that in the Finnish working-age population a quite small amount, only 0.06%, stated that they were somehow addicted to the Internet. Based on statistical analyses, age and marital status had an influence on many mental symptoms. The use of the Internet at leisure had an influence on two mental symptoms (substance addiction and fear situation). The importance of the Internet only had an influence on the fear situations. In the future it will be essential to take into account that the use of the internet can affect a worker's mental symptoms, and it is important to observe a worker's mental health.

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# The influence of episodic mood disorders on length of stay among patients admitted to private and non-profit hospitals with alcohol dependence syndrome

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## Abstract

Episodic mood disorders are often associated with alcohol dependence. Few studies have explored the contribution of episodic mood disorders to length of stay among those hospitalized with alcohol dependence syndrome. Filling this research gap could improve care for patients while minimizing hospital utilization costs. This study was a cross-sectional analysis of the National Hospital Discharge Survey. ICD-9-CM diagnosis codes were used to identify those admitted to a private or non-profit hospital with alcohol dependence syndrome, and a co-morbid diagnosis of an episodic mood disorder (n=358). Descriptive statistics were used to highlight differences in key demographic and hospital variables between those with and without episodic mood disorders. Negative binomial regression was used to associate episodic mood disorders with hospital length of stay. Incidence rate ratios were calculated. Co-morbid episodic mood disorders ( $\beta=0.31$ ,  $P=0.001$ ), referral to a hospital by a physician ( $\beta=0.35$ ,  $P=0.014$ ), and increasing age ( $\beta=0.01$ ,  $P=0.001$ ) were associated with longer hospital stays. Hospital patients with an admitting diagnosis of alcohol dependence syndrome were 36% more likely to have a longer hospital stay if they also had a co-morbid diagnosis of an episodic mood disorder (IRR=1.36, CI=1.14-1.62). Patients admitted to a hospital with alcohol dependence syndrome should be routinely screened for episodic mood disorders. Opportunities exist for enhanced transitional care between acute, ambulatory, and community-based care settings to lower hospital utilization.

## Introduction

Alcohol dependence has substantial consequences for individual and public health. According to the American Psychiatric

Association,<sup>1</sup> alcohol dependence exists when individuals continue to engage in excessive alcohol consumption despite severe personal consequences such as damage to health, relationships, career, and many other aspects of daily life. Such excessive alcohol consumption can lead to several physical ailments such as stroke, heart disease, hypertension, and even brain damage.<sup>2</sup> Damage to internal organs such as the liver is also reported by those who practice excessive alcohol consumption.<sup>3</sup> In addition to physical ailments, alcohol dependence is linked to a multitude of psychiatric disorders such as major depression, mania, panic disorders, schizophrenia, and even suicide.<sup>2</sup> A sub-set of these psychiatric disorders is identified by the ICD-9-CM<sup>4</sup> as episodic mood disorders. These include bipolar I disorder, manic affective disorder, and major depressive affective disorder. For those diagnosed with both alcohol dependence and co-morbid psychiatric disorders, quality of life can be substantially diminished.<sup>5</sup> Alcohol dependence also has a serious effect on public health through the strain it places on the healthcare system and the risks associated with injuries. Alcohol related admissions represent 7.9% of all emergency department visits.<sup>6</sup> There is also a positive relationship between alcohol dependence and the likelihood of being admitted to an emergency department.<sup>7</sup> Some of this relationship could be due to the detrimental role alcohol plays in cases of both unintentional and intentional injury.<sup>8</sup> As a result of alcohol related healthcare utilization, healthcare costs of alcohol dependency were estimated at nearly \$30 billion in 2007.<sup>8</sup>

Alcohol dependence and psychiatric disorders such as depression are often related.<sup>9</sup> The relationship between alcohol dependence and psychiatric disorders has been described as bidirectional.<sup>10</sup> It is often difficult to know whether the alcohol dependence arose from the psychiatric disorder, or vice versa. Flensburg-Madsen and colleagues<sup>11</sup> recently addressed this question as one of temporal ordering. They found alcohol dependence was more likely to precede psychiatric disorders. Despite the temporal order, Schatzberg<sup>10</sup> reminds us of the complicated nature of alcohol dependence and psychiatric disorders. It is often a set of relationships that are difficult to identify and require a delicate balance of intervention from the acute, ambulatory, and community-based care settings. Unfortunately, hospitals are often not prepared to address mood disorders in patients presenting with non-psychiatric symptoms.<sup>12</sup>

The purpose of this study is to examine the association of episodic mood disorders with length of stay among patients admitting to a private or non-profit hospital with a diagnosis of alcohol dependence syndrome. This study is important because little is known about what

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Key words: episodic mood disorder, alcohol dependence syndrome, hospitalization

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mediates the length of stay for these patients. Ding and colleagues<sup>13</sup> conducted one of the only studies in this area and found a positive relationship between psychiatric disorders and length of stay among a population of substance abuse and alcohol users. However, their study was based on a wider range of patients that included a myriad of alcohol users and substance abuse users, and a myriad of psychiatric disorders in addition to episodic mood disorders. Further, their study was conducted using 2003-2007 data, and did not report likelihood statistics such as incidence rate ratios. This study adds to the work of Ding and colleagues<sup>13</sup> by examining more recent data and by incorporating likelihood statistics for use by policymakers and practitioners. Further, as opposed to the work of Ding and colleagues, this study examines a very specific population of alcohol users and psychiatric disorders: alcohol dependence syndrome and episodic mood disorders respectively. The narrower focus of this study is meant to yield more actionable data for practitioners by discussing the results in the context of a common patient profile that might be seen in everyday clinical practice.

## Materials and Methods

### Instrument and design

The 2008 National Hospital Discharge Survey (NHDS) was used to design a cross-