

# **Associations between self-rated health, quality of life and symptoms of depression among Finnish inpatients with alcohol and substance use disorders**

Keywords: Self-rated health, perceived health status, quality of life, substance use disorder, alcohol use disorder

## **Introduction**

Alcohol and substance use disorders (referred to hereafter as SUDs) are known to be associated with various negative health outcomes including somatic health problems (e.g. Dela Cruz et al., 2016; Rehm et al., 2017), depression (e.g. Grant et al., 2004; Pirkola et al., 2005) and impaired Quality of Life (QoL) (Levola, Aalto, Holopainen, Cieza, & Pitkanen, 2014; e.g. Vederhus, Pripp, & Clausen, 2016). Somatic health problems related to SUDs may be the direct result of exposure to alcohol and other drugs or they may be the end result of high-risk behaviour commonly associated with SUDs. Individuals with SUDs may have problems with seeking adequate medical help for their somatic health problems and they are also more likely to have impaired treatment adherence (Catz, Heckman, Kochman, & DiMarco, 2001; Kunz, 1997; Levola et al., 2014).

Self-rated health has been shown to be a good predictor of future health and functioning as well as an important indicator of QoL (Becchetti, Bachelet, & Riccardini, 2017; Benyamini et al., 2014; Hillen, Davies, Rudd, Kieselbach, & Wolfe, 2003; Idler & Kasl, 1995). A strong association has been reported in several studies between self-rated health and mortality (Idler & Kasl, 1991; Sundquist & Johansson, 1997; Thong et al., 2008). Despite the multiple health problems that individuals with SUDs experience, not

much is known about how these individuals themselves view their own health.

Depression and symptoms thereof are extremely common among individuals with SUDs (Grant et al., 2004; Pirkola et al., 2005). Various explanations of co-occurring psychiatric and substance related disorders have been offered. Substance use can be the direct cause of psychiatric symptoms or it can exacerbate existing conditions. In some instances substance use may be the result of an ill-advised attempt to “self-medicate” psychiatric distress. According to recent research, substance use would appear to predispose to an increased risk of depression - at least in the case of alcohol - and the “self-medication hypothesis” has met criticism (Fergusson, Boden, & Horwood, 2009; Lembke, 2012).

Depression has been linked to worse self-rated health (Bustos-Vazquez, Fernandez-Nino, & Astudillo-Garcia, 2017; Mulsant, Ganguli, & Seaberg, 1997) and impaired QoL (Papakostas et al., 2004) in a number of studies. Previous research has shown that depression and somatic health concerns are common among individuals with SUDs, however, to the authors’ knowledge, few studies have utilized self-rated health in the context of SUDs and no studies to date that have analyzed the association between symptoms of depression and self-rated health among individuals with SUDs.

The aims of this study were 1) to assess self-rated health among individuals undergoing inpatient treatment for SUDs i.e. describe how they perceived their health status and 2) to analyze how having symptoms of depression affected perceptions of health status and QoL among these individuals.

## Methods

The data comprised a convenience sample of eighty inpatients at Järvenpää Addiction Hospital with a diagnosis of alcohol or substance dependence according to the International Classification of Diseases, 10th revision (ICD-10) (The World Health Organization, 2016). Data were collected within the scope of the PARADISE project in 2012 (Cieza et al., 2015). The study protocol and all documents were approved by the A-Clinic Foundation's ethical committee for treatment and research.

The study protocol included a clinical interview and validated questionnaires. Socio-demographic variables including age, gender, education, working status and main substance of use (alcohol vs. other), duration of dependence and smoking status were obtained via interview.

A general self-assessment of one's health (SAH) was obtained using a single-item scale ranging from very poor (1) to very good (5) that has been widely used as a measure of subjective health (Bailis, Segall, & Chipperfield, 2003; Smith & Goldman, 2011). Comorbidities were reported using the Self-Administered Comorbidities Questionnaire (SCQ), including a sum score of twelve common conditions (heart disease, high blood pressure, lung disease, diabetes, ulcer or stomach disease, kidney disease, liver disease, anaemia or another blood disease, cancer, depression, osteoarthritis or degenerative arthritis, back pain, rheumatoid arthritis, alcohol or other substance dependence) and the option of adding up to three conditions (Sangha, Stucki, Liang, Fossel, & Katz, 2003). Each condition in the SCQ is rated on the basis of severity from 0 to 3 based on whether the respondent has had the condition on the past year (Do

you have ..? yes 1 pt), has sought medical attention for it (Do you receive treatment for it? yes 2 pts) and whether it has affected their functioning (Does it limit your activities? yes 3 pts). These three questions were also analyzed independently of each other as dummy variables. Additionally, Quality of Life was assessed using the 8-item European Health Interview Survey - Quality of Life (EUROHIS-QOL-8) (Schmidt, Muhlan, & Power, 2006). All eight items are scored from one to five (range 8 to 40) with higher scores indicating better QoL.

The Beck Depression Inventory (BDI-II) was used to evaluate symptoms of depression. It consists of 21 questions with four response options each (0 to 3 pts per question, range 0 to 63 pts) with a higher score indicating more severe symptoms of depression (Beck, Steer, Ball, & Ranieri, 1996). For the purpose of this study and following the guidelines of Beck et al. (1996), participants were categorized into non-depressed if they received a BDI-II score of 0 to 19 pts and into depressed if they reported  $\geq 20$  pts. Information regarding diagnoses of major depression or bipolar disorder were also obtained.

### ***Statistical analyses***

Correlations between self-rated health (SAH), comorbidities (SCQ), QoL (EUROHIS-QoL-8) and severity of depression (BDI-II) as continuous variables were analyzed using Pearson's correlation coefficient. Age and duration of dependence were categorized with the cut-off of 40 years (age) and 10 years (duration of dependence). The rest of the socio-economic variables (male vs. female gender, higher vs. lower education, working vs. not working) and substance related variables (alcohol vs. other, daily smoking vs. no

daily smoking) were also categorical. The mean scores of the SAH, SCQ, EUROHIS-QoL-8 and BDI-II measures with 95% confidence interval were reported for each category of socio-economic and substance related variable and the differences in the mean scores were studied using one-way ANOVA (F-test).

Separate multivariate linear regression models (enter) were then calculated for self-rated health, comorbidities and QoL as the independent variables in order to allow for adjustment for potential confounders. The BDI-II score was used in the multivariate models as a continuous variable in order to ascertain whether symptoms of depression were linearly associated with the independent variables. Separate models were created due to the intercorrelation between self-rated health, comorbidities, QoL and depression symptom severity (Table 1).

Listwise deletion was applied due to the assumption that data was missing completely at random (MCAR). Listwise deletion resulted in 17.5% (n = 66/80) data loss. However, because the assumption of data MCAR is difficult to determine, the final analyses were also performed using multiple imputation to account for missing data in order to ascertain that listwise deletion did not bias the main results. After screening the data and determining that data were missing in an arbitrary pattern, multiple imputation was performed with the chained equation –method, specifically the iterative MCMC-algorithm which is the default for arbitrarily missing data in SPSS. The five imputed datasets with a maximum ten iterations were pooled for analyses. Imputation was performed if missing data were observed for socio-demographic and SUD-related variables, depression as well as the variables regarding self-rated health, comorbidities and QoL. Missing data were observed as follows: BDI-II 10.0%, EUROHIS-QoL-8 7.5%, SAH 0.0%, SCQ 0.0%, socio-demographic variables 0.0%, substance use related variables 0.0%.

Results were considered statistically significant at  $p < 0.05$ . All analyses were performed with SPSS version 22.

## **Results**

The mean age of the 80 participants was 39.6 (SD 13.2) and one third were women (Table 2). All participants had a diagnosis of alcohol or substance dependence, half were in treatment primarily due to alcohol use and the other half because of alcohol and/or other substance use. A third of the participants had no more than a primary school education. Being outside of the workforce due to disability or unemployment was common. Three out of four participants were smokers.

Morbidity according to the SCQ is displayed in Figure 1, where conditions reported by at least 10% ( $n=8$ ) of participants are included. Back pain, high blood pressure and liver disease were the most commonly reported somatic comorbidities. A little over half of participants with self-reported high-blood pressure reported having received treatment for it and quite a small number of participants reported having received treatment for back pain or liver disease.

### ***Alcohol vs. other dependence***

Participants with primary alcohol dependence were statistically significantly older than participants with other dependence (mean 46.8 yrs vs. 32.3 yrs;  $p < 0.001$ ), had more often completed secondary education (alc  $n = 30$  vs. other  $n = 19$ ;  $p < 0.05$ ) and had fewer comorbid dependences of other substances (mean 1.2 vs. 1.7;  $p < 0.001$ ). There was no statistically significant difference in gender (alc men  $n = 28$  vs. other  $n = 22$ ;  $p = 0.249$ ), unemployment (alc  $n = 32$  vs. other  $n = 30$ ;  $p = 0.790$ ), disease duration (mean

alc 11.9 yrs vs. other 12.45 yrs;  $p = 0.749$ ) or daily smoking (alc  $n = 28$  vs. other  $n = 34$ ;  $p = 0.180$ ) between primarily alcohol dependent participants and those with other dependence.

### ***Perceived health status and QoL***

Self-rated health was reported to be moderate (mean 3.2; SD 0.8). The mean SCQ-score for comorbidities was 8.8. (SD 4.8) and the mean EUROHIS-QoL-8 –score for quality of life was 25.3 (SD 6.2). The mean scores for symptoms of depression, self-rated health, comorbidities and QoL stratified by socio-demographic and SUD related variables are presented in Table 2. Self-rated health and QoL were poorer among men than among women. Higher age and longer duration of dependence were associated with more reported comorbidities. There were no statistically significant differences between participants with regard to other variables, e.g. educational level, employment status or primary alcohol dependence vs. other dependence.

### ***Symptoms of depression***

Of the 80 participants, 72 had filled out the BDI-II. A large proportion of the participants (72.2%) reported at least mild ( $>13$ ) depressive symptoms and mean BDI-II scores were quite high (22.5; SD 12.5). Every other participant had a BDI-II score of  $\geq 20$  i.e. were categorized as depressed for the purposes of our study. Of all participants, 15.0% ( $n=12$ ) had a diagnosis of unipolar major depression and an additional 12.5% ( $n=10$ ) a diagnosis of bipolar disorder. Those with a diagnosis of major depression or bipolar disorder reported more severe symptoms of depression symptoms (mean 30.8; SD 10.6) than other participants [mean 19.4; SD 11.8).

Older age, being more educated and longer duration of SUD were associated with being categorized as depressed according to BDI-II scores (Table 2). Depressed participants rated their health to be statistically significantly poorer and reported more comorbidities than non-depressed participants. Depressed participants also reported statistically significantly worse QoL than did non-depressed participants. Severity of depression (BDI-II) was correlated with worse self-rated health, more comorbidities (SCQ), and poorer QoL (Table 1).

### ***Multivariate analyses***

The variables entered in the multivariate linear regression analyses were age, gender, level of education, working status, type and duration of SUD, smoking status and severity of depressive symptoms. Of all the variables in the multivariate analyses, more severe symptoms of depression were associated with poorer self-rated health (Table 3). More severe symptoms of depression were also statistically significantly associated with more self-reported comorbidities, as was longer duration of SUD. More severe symptoms of depression and male gender were associated with impaired QoL in the multivariate analyses. Thus, the statistically significant bivariate correlations (Table 1) between symptoms of depression and self-rated health, comorbidities and QoL were present even after adjusting for cofounders in the multivariate models (Table 3).

### **Discussion**

The patients undergoing inpatient treatment for substance and alcohol dependence reported various somatic comorbidities and their self-rated health was moderate. Symptoms of depression were very common and half of the participants received a

score of 20 or more corresponding to moderate or severe symptoms of depression according to Beck et al. (1996). More severe symptoms of depression were associated with poorer self-rated health, more comorbidities and poorer QoL after adjusting for potential confounders such as age. Participants with alcohol dependence were older and more highly educated compared to participants with substance dependence, but did not differ with regard to perceived health status, QoL or symptoms of depression.

Multimorbidity is common in depression (Read, Sharpe, Modini, & Dear, 2017) and symptoms of depression have been reported to be associated with psychosocial difficulties (Pitkänen, Levola, de la Fuente, & Cabello, 2018). In this study, participants categorized as depressed had significantly poorer self-assessed health, more somatic comorbidities and poorer QoL than those categorized as non-depressed. The association of depressive symptoms and self-assessed health, somatic comorbidities and QoL persisted after adjusting for confounders. These findings are consistent with previous literature. While it is possible that somatic illness cumulates on those with comorbid depression, it is also possible that depression negatively affects an individual's perception of his or her health. Depression may also impair an individual's ability to care for oneself and seek adequate treatment for somatic complaints.

Symptoms of depression were extremely common among the participants in this study. While the BDI-II is not a diagnostic instrument, half of the participants reported moderate or severe symptoms of depression and were categorized into depressed for the purposes of this study. Both primary (i.e. independent) and secondary (i.e. substance induced) mood disorders are highly prevalent among individuals with SUDs (Hasin, Stinson, Ogburn, & Grant, 2007) which is reflected in the results of this study.

The multivariate regression models in this study showed that longer duration of

SUDs was associated with somatic comorbidities irrespective of age. This suggests that the longer the duration of substance use disorder, the more harm is afflicted on a person's health. Accordingly, it has been shown e.g. in the case of hepatitis C - a common complication of injecting drug use – that its prevalence rises with the duration of injecting drug use (Varjonen, 2015). Participants reported that their comorbidities were often undertreated. This finding is unfortunately in line with previous research, which has shown that persons with psychiatric illness and substance use disorders increased mortality (Lumme, Pirkola, Manderbacka, & Keskimaki, 2016). This increase in mortality may be explained by problems in treatment seeking and treatment adherence, but also inadequate treatment received for treatable somatic illness due to stigma (Levola et al., 2014; Sullivan et al., 2015).

Several studies have shown alcohol and substance use disorders to be associated with impaired QoL (e.g. Donovan, Mattson, Cisler, Longabaugh, & Zweben, 2005; Levola et al., 2014). In this study, the mean score for QoL was 25.3. According to previous research, mean QoL scores reported using the EUROHIS-QOL-8 among the general population in Europe were higher (mean 29.4) and higher still when analyzing Western European countries (mean 32.1) (Schmidt et al., 2006). The results of this study are thus in concordance with previous findings were SUDs have been associated with impaired QoL. Depression is also well known to be associated with impaired QoL (IsHak et al., 2011; Papakostas et al., 2004). According to the results of this study, depression was associated with impaired QoL after adjusting for socio-demographic variables, smoking status, as well as type and duration of SUDs.

The results of this study are to be interpreted with some limitations. The study population was a convenience sample of individuals in inpatient treatment for SUDs

and thus the characteristics of these participants most likely represent severe alcohol and substance use disorders. The generalizability of these results may thus be limited. The study sample was also limited in size. However, the instruments used are well validated and widely used which is a strength of this study. The use of data imputation for missing data can be considered a further strength.

This research contributes new knowledge as to the perceived health status of individuals with SUDs as well as to the impact of symptoms of depression on self-perceived health status and QoL. Individuals with SUDs have many health-related concerns and their QoL is impaired. Recognizing and adequately treating somatic complaints among individuals with SUDs should be emphasized. Symptoms of depression are associated with self-rated health and QoL in this population. Further research is needed to bridge the information gap on self-perceived and objective health status of individuals with SUDs as well as their interaction with depression.

### **Conflict of interest**

The authors declare that there is no conflict of interest.

Table 1. Intercorrelations (Pearson) of self-assessed health, comorbidities, quality of life and symptoms of depression.

Table 2. Mean scores and between group differences (one-way ANOVA) for self-rated health, comorbidities and QoL.

Table 3. Associations of variables with self-rated health, comorbidities and QoL in multivariate linear regression models.

Figure 1. Common comorbidities (reported by more than 10% of participants) of inpatients with SUDs according to the Self-reported Comorbidities Questionnaire (SCQ).

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**Table 1.** Intercorrelations (Pearson) of self-assessed health, comorbidities, quality of life and symptoms of depression.

	SAH <sup>1</sup> n=80	p	SCQ <sup>2</sup> n=80	p	EUROHIS-QoL-8 <sup>3</sup> n=74	p	BDI-II <sup>4</sup> n=72	p
SAH	--	--	--	--	--	--	--	--
SCQ	-0.381	<0.001	--	--	--	--	--	--
EUROHIS-QoL-8	0.596	<0.001	-0.360	<0.01	--	--	--	--
BDI-II	-0.478	<0.001	0.392	<0.01	-0.633	<0.001	--	--

<sup>1</sup> single-item scale of subjective health, range 1 (very poor) to 5 (very good)

<sup>2</sup> Self-Administered Comorbidities Questionnaire, range 0 to 36 with higher scores indicating more comorbidities

<sup>3</sup> 8-item quality of life scale, range 8 to 40 with higher scores indicating better QoL

<sup>4</sup> Beck Depression Inventory, range 0 to 63 with higher scores indicating more severe symptoms of depression

Table 2. Mean scores and between group differences (one-way ANOVA) for self-rated health, comorbidities and QoL.

	n=	SAH <sup>1</sup>	F	p	n=	SCQ <sup>2</sup>	F	p	n=	EUROHIS-	F	p	n=	BDI-II	F	p
	80	mean			80	mean			74	QoL-83 <sup>3</sup>			72	mean		
		(95% C.I.)				(95% C.I.)				mean				(95% C.I.)		
Gender																
Female	30	3.47			30	7.73			29	27.24			28	20.79		
		(3.21-3.72)	5.23	0.025*		(6.23-9.24)	2.63	0.109		(25.15-29.38)	4.89	0.030*		(16.12- 25.46)	0.89	0.349
Male	50	3.06			50	9.50			45	24.04			44	23.64		
		(2.83-3.29)				(8.06-10.94)				(22.14-25.95)				(19.74-27.53)		
Age, yrs																
<40	43	3.33			43	7.58			41	24.88			39	19.10		
		(3.10-3.56)	1.92	0.169		(6.51-8.65)	6.95	0.010*		(22.90-26.85)	0.41	0.522		(15.22-22.98)	6.91	0.011*
≥40	37	3.08			37	10.30			33	25.82			33	26.58		
		(2.80- 3.36)				(8.42-12.17)				(23.60-28.04)				(22.30- 30.86)		
Education																
Primary only	31	3.32			31	8.45			29	26.38			28	18.72		
		(3.03-3.61)	0.98	0.325		(6.80- 10.10)	0.33	0.568		(24.25-28.51)	1.45	0.233		(13.75-23.75)	1.12	0.040*
Secondary or higher	49	3.14			49	9.08			45	24.60			44	24.93		
		(2.92-3.37)				(7.66-10.51)				(22.62-26.58)				(21.35-28.51)		
Working status																
Yes <sup>4</sup>	18	3.50			18	7.39			18	27.67			18	19.83		
		(3.24-3.76)	3.16	0.080		(5.74-9.04)	2.18	0.144		(25.21-30.13)	3.56	0.063		(14.27-25.40)	1.12	0.295
No <sup>5</sup>	62	3.13			62	9.26			56	24.54			54	23.43		
		(2.92-3.34)				(7.97-10.54)				(22.81-26.26)				(19.91-26.94)		
Primary substance																
Alcohol	40	3.15			40	9.25			35	26.17			36	24.92		
		(2.88-3.42)	0.50	0.483		(7.66-10.84)	0.60	0.442		(24.18-28.17)	1.31	0.256		(21.05-28.78)	2.69	0.106
Other	40	3.28			40	8.43			39	24.51			36	20.14		
		(3.03-3.52)				(6.96-9.89)				(22.39-26.64)				(15.66-24.62)		
Duration of SUD,																
yrs																
<10	34	3.26			34	7.12			32	26.78			32	19.78		
		(3.00-3.53)	0.26	0.615		(5.86-8.38)	8.43	0.005**		(24.61-28.95)	3.30	0.073		(15.64-23.92)	2.85	0.096
≥10	46	3.17			46	10.11			42	24.17			40	24.73		
		(2.93-3.42)				(8.58-11.63)				(22.23-26.10)				(20.57-28.88)		
Smoking status																
Daily smoker	62	3.26			62	8.45			56	25.27			58	21.64		
		(3.07-3.44)	0.91	0.142		(7.21-9.70)	1.83	0.180		(23.60-26.93)	0.01	0.943		(18.46-24.82)	1.52	0.222
Non- / ex- /	18	3.06			18	10.17			18	25.39			14	26.21		
occasional smoker		(2.56-3.55)				(8.13-12.20)				(22.19-28.59)				(18.17-34.26)		

<sup>1</sup> single-item scale of subjective health, range 1 (very poor) to 5 (very good) <sup>2</sup> Self-Administered Comorbidities Questionnaire, range 0 to 36 with higher scores indicating more comorbidities <sup>3</sup> 8-item quality of life scale, range 8 to 40 with higher scores indicating better QoL <sup>4</sup> Employed / student / homemaker/ on temporary sick leave for under 3 months <sup>5</sup> Unemployed / on disability \* < 0.05 \*\* < 0.01 \*\*\* < 0.001

Table 3. Associations of variables with self-rated health, comorbidities and QoL in multivariate linear regression models.

	Original data n=66			Adjusted R <sup>2</sup>	Pooled data n=80		
	Unstandardized coefficient B	Std. Error	p		Unstandardized coefficient B	Std. Error	p
<b>SAH<sup>1</sup></b>							
Male gender	0.368	0.183	0.048*	0.227	0.297	0.776	0.093
Age	-0.004	0.009	0.698		-0.005	0.177	0.534
Secondary education or higher	-0.020	0.194	0.920		0.003	0.009	0.987
Employed	-0.185	0.202	0.363		-0.182	0.179	0.369
Alcohol as primary SUD	-0.199	0.206	0.338		-0.119	0.202	0.559
Longer duration of SUD	0.003	0.011	0.796		0.000	0.203	0.984
Current smoker	-0.189	0.229	0.414		-0.057	0.011	0.794
Severity of depressive symptoms	-0.028	0.007	<0.001***		-0.026	0.218	0.001**
<b>SCQ<sup>2</sup></b>							
Male gender	-0.916	1.049	0.674	0.223	-0.916	1.049	0.382
Age	0.064	0.052	0.161		0.064	0.052	0.212
Secondary education or higher	-0.653	1.062	0.480		-0.653	1.062	0.538
Employed	0.538	1.207	0.694		0.538	1.207	0.656
Alcohol as primary SUD	0.483	1.210	0.593		0.483	1.210	0.690
Longer duration of SUD	0.148	0.062	0.016*		0.148	0.062	0.017*
Current smoker	0.692	1.293	0.814		0.692	1.293	0.592
Severity of depressive symptoms	0.093	0.044	0.037*		0.093	0.044	0.032*
<b>EUROHIS-QoL-8<sup>3</sup></b>							
Male gender	2.483	1.215	0.046*	0.445	2.792	1.265	0.028*
Age	0.022	0.065	0.729		0.051	0.062	0.415
Secondary education or higher	-0.297	1.346	0.826		-0.581	1.359	0.670
Employed	-1.876	1.320	0.161		-1.874	1.378	0.174
Alcohol as primary SUD	-2.415	1.407	0.091		-1.998	1.438	0.165
Longer duration of SUD	-0.064	0.081	0.431		-0.048	0.076	0.527
Current smoker	0.299	1.546	0.847		0.605	1.467	0.680
Severity of depressive symptoms	-0.314	0.050	<0.001***		-0.294	0.060	<0.001***

<sup>1</sup> single-item scale of subjective health, range 1 (very poor) to 5 (very good)

<sup>2</sup> Self-Administered Comorbidities Questionnaire, range 0 to 36 with higher scores indicating more comorbidities

<sup>3</sup> 8-item quality of life scale, range 8 to 40 with higher scores indicating better QoL

\* < 0.05 \*\* < 0.01 \*\*\* < 0.001

**Figure 1.** Common comorbidities (reported by more than 10% of participants) of inpatients with SUDs according to the Self-reported Comorbidities Questionnaire (SCQ).

