Could SF-36 be used as a screening instrument for depression in a Swedish youth population?

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Objective: Depression among youth is a condition associated with serious long-term morbidity and suicide. The aim of this study was to investigate whether a HRQoL instrument, the short form 36 version 1.0 (SF-36), could be used to screen for depression in a clinical Youth Centre (YC). A second purpose was to describe self-reported health and depression.
Setting: A clinical YC at a University hospital.
Design: A sample of 660 youths, 14–20 years old was assessed with SF-36 and Montgomery Åsberg Depression Rating Scale, self-screening version (MADRS-S). Answers to all the questions in both instruments were given by 79% (519/660; 453 women and 66 men). Mean age in the sample was 17.5 ± 1.6 years.
Results: Strong correlations were found between all the SF-36 subscales and the depression ratio scale MADRS-S.

Receiver operating characteristic (ROC) curve analysis confirmed that the SF-36 subscales mental health (MH) and vitality (VT) could correctly predict depression on the individual level with Area Under the ROC Curve values 0.87 and 0.84 in ROC curves. Individuals scoring 48 or lower on MH and 40 or lower on VT should be followed up with a clinical interview concerning possible depressive disorder. Mild to moderate depression was common (35.5%), especially among women (37.5%). Men scored higher than women on all SF-36 subscales except for physical functioning.
Conclusions: The SF-36 can be used to screen for suspect depression in a youth population followed by interview. This gives an opportunity to detect and treat emerging depressive symptoms early.

Keywords: adolescence, depression, health services research, mental health, quality of life, screening.

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Introduction

Mental disorders account for a large proportion of the burden of disease in young people in all societies, and most mental disorders begin during youth (12–24 years) (1). We know that affective disorders are associated with an increased risk of death by suicide, suicide attempts and recurrence of major depression by young adulthood (2). These disorders are also associated with early pregnancy, poor academic performance and impaired work, social and family functioning during youth. The psychiatric and psychosocial prognosis is poor, which highlights the importance of early identification and intervention (3, 4).

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In studies of adolescents, 10–20% have had at least one major depressive episode (MDD) by the age of 18 (3, 5).

Among Swedish high school students in Uppsala in the early nineties, 6% of the boys and 18% of the girls were screened as having symptoms of depression (6). In a recently published study of an adolescent population in a Swedish city (Västerås), 11.5% of the boys and 24.8% of the girls were screened as depressed according to DSM IV (Diagnostic and Statistical Manual of Mental Disorders, 4th edition A-criterion) by using The Depression Self-Rating Scale (DSRS) (7). Further during a Depression Screening Day in Uppsala, Sweden, in 2002, 47.1% (33/70) of adolescent patients at the Youth Centre (YC) fulfilled the criteria for depression assessed by MADRS-S (8). Thus, evaluation of depression ought to be a standard routine among adolescents visiting an YC to increase the proportion of depressed adolescents who initiate appropriate treatment early in the course of disease.

The context of this study was an YC in Uppsala, a Swedish city with 190 000 inhabitants. The YC is a part of the Department for Obstetrics and Gynaecology, Uppsala University hospital. It is an easily accessible public service, free of charge, for youth up to 20 years of age. The service provides prevention of unwanted pregnancies, prevention and treatment of sexually transmitted infections as well as guidance to young people in sexual and lifestyle issues. The service also includes prevention and treatment of psychological and social problems and complies with the policy programme of The Swedish Society of Youth Centres (FSUM) (9). The Uppsala YC is one of about 200 members of FSUM. According to the FSUM policy program, an YC is required to have at least one midwife, a gynaecologist or general physician and a psychologist and/or social worker. The YCs play an important role in health promotion because of their close contact with a large proportion of the teenage local population. The main reason for visiting the studied YC is prevention of unwanted pregnancies, prevention and treatment of sexually transmitted infections as well as guidance in sexual and lifestyle issues.

One of the most important health care developments made during the past decades has been an increasing consensus regarding the centrality of the patient's point of view in monitoring health care outcomes. Clinically based global rating scale which content extended beyond organ function to encompass human function was developed. Today, somatic as well as mental health research emphasizes the need for standardized measures for self-assessment of health, quality of life and disability (10). One of the widely used instruments for Health Related Quality of Life (HRQoL) assessment is SF-36 (the short form, 36 items) developed for the Medical Outcomes Study (MOS) in the United States to reflect WHO's definition of health: 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (11). It is designed to be used from the age of 14 and can be completed in 5–10 minutes.

A study using SF-36 was completed at the Uppsala YC in 2006 (12). The mean scores for the subscales, vitality (VT) and mental health (MH) were found to be low, and a clinical suspicion emerged that these findings could correlate with depression. Further, in the clinical setting, it seemed to be urgent to find an instrument by which the personnel easily could get a holistic picture of the help-seeking individuals' health. SF-36 seemed to be a suitable instrument for this purpose.

The purpose of this study was to investigate whether SF-36, an (HRQoL) instrument, correlates to MADRS-S (Montgomery Åsberg Depression Rating Scale Self rating version) (13). The second purpose was to describe the self-reported health perception and depression in a Swedish Youth Centre population. According to our knowledge, there are no currently published studies on the correlation between SF-36 and MADRS-S in this age group.

Methods

Study population and procedure

The study was performed at an YC at the Uppsala University hospital, Sweden.

The total number of individuals ages 13–20 registered in Uppsala municipality during 2006 were approximately 20 000 and about 20% of that age group visits this YC every year. Two per cent of the registered visits were appointments to the YC psychologist and the rest to midwives and doctors. The weekly access to a psychologist was 17 hours compared to 160 to a midwife and 24 to a doctor.

The information in this study was collected from January until the end of July 2006 to lessen the impact of seasonal variations. The total number of individuals visiting the YC during this period was 2651; 2372 women (90%) and 279 men (10%). All youth who visited the YC at the selected time were asked to fill out the Swedish version of SF-36 (14) and MADRS-S (13). The collection of the questionnaires took place at different days of the week and different times of the day, morning and afternoon to equalize the representation of the population.

HRQoL questionnaire: the short form 36 (SF-36), version 1,0

The SF-36 is a self-administered, short-form health survey with 36 questions. It yields an 8-scale profile of functional health and well-being scores. It can be used for screening, evaluation of treatment and measuring burden of disease in general and specific populations. Four scales relate primarily to physical health: general health perceptions (GH), physical functioning (PF), bodily pain (BP) and role limitations because of physical problems. Four of the eight subscales consisting of 14 items are related primarily to mental health: general MH, role limitations due to emotional problems (RE), VT and social functioning (SF). These subscales measure the distress and disability associated with psychological disorder and are not specific for a disease – or treatment. A high score indicates better health (range 0–100) (see Appendix S1) (15).

The reliability of these scales has been extensively studied in different adult populations (16, 17). They have a high degree of validity and have been replicated across different patient groups and diagnoses as well as various socio-economic situations (11, 18, 19). Overall, the scales are sensitive to both medical and psychiatric disorders (11, 20).

Validation and norming of the Swedish SF-36 were completed during 1991–1992 (14). In the Swedish SF-36, the PF was the most sensitive to the manifestation of physical health, and MH, RE and SF were the most sensitive to mental health (21).

Montgomery – Åsberg Depression Rating Scale self rating version – (MADRS-S)

The MADRS-S focuses on core depressive symptoms, grading the severity of each symptom and is less influenced by maladaptive personality traits compared to Beck's Depression Inventory (13). The items closely follow the definition of Major Depression Disorder (MDD) in DSM-IV. Nine items are asked for mood, feelings of unease, sleep, appetite, ability to concentrate, initiative, emotional involvement, pessimism and zest for life. The internal consistency reliability of MADRS-S has been shown to be good in several recently published studies or Cronbach alpha 0.84 and 0.85 (22, 23). Each item has 0–6 points on a Likert scale. The results are interpreted as follows: 0–11 points = no symptoms of depression, 12–20 points = mild depression, >20 points = moderate depression, >40 points = severe major depression (24, 25). The reason for choosing this instrument was the results from the Depression screening day in 2002, performed at the studied YC, where MADRS-S was used for this age group (8). The result showed that when the adolescents with MDD were compared to adults with MDD rated by MADRS-S, depressions among adolescents and adults had similar symptomatology.

The human ethics committee, Faculty of Medicine, Uppsala University, Sweden, approved the study.

Statistical analysis

Data on SF-36 subscales are presented as mean ± SD. A gender comparison was made by independent t-test. Chi-square test was used when the numbers in the sample were small. Pearson correlation test was used for comparison between SF-36 subscales and MADRS-S. Cronbach's alpha coefficients were calculated to estimate the internal consistency reliability of each SF-36 subscale. According to the generally accepted standard, the alpha coefficient should not fall below 0.7 (26). To estimate SF-36 cut-off scores to separate moderate depression from mild depression, sensitivity/specificity and receiver operating characteristic (ROC) curves were calculated for different SF-36 and MADRS-S scores. p-Values <0.05 were considered statistically significant.

Results

Study population

Of 660 respondents, or 25% of the studied population, 519 individuals 453 women and 66 men answered all the questions in SF-36 and MADRS-S. The 141 (22%) individuals, who only answered SF-36 but not MADRS-S, did no differ significantly in SF-36 rating from those answering both instruments. It was mainly the MADRS-S that the individuals asked to participate, were reluctant to answer. The gender distribution of the studied population did not differ from the total population visiting the YC during the period studied. Mean age was 17.5 ± 1.6 , 17.4 ± 1.5 for women and 17.8 ± 1.6 for men. Most of the participants or 432 (83%) were students, 53 (10%) were working, 22 (4%) were unemployed, three were sick-listed and for nine the occupation was unknown.

SF-36 results

Results for SF-36 are presented in Table 1. The Cronbach's alpha for the eight subscales was 0.83, range 0.78–0.83. Men scored higher than women, significantly so for all the subscales except for PF. The mean scoring on the subscales GH, VT, RE and MH was low compared to the other subscales, i.e. mean level of scoring being <70.

MADRS-S results

The depression severity and frequencies by gender are presented in Table 2. In this sample, 35.5% fulfilled the criteria for depression. The gender differences were significant in the groups of no depression and mild depression but not in moderate and severe depression. Men had lower frequency than women on no depression and women had higher frequency than men on mild depression. There was no difference in mean age between severity levels of depression.

Table 1 SF-36 results on subscales, mean scores by gender, median (Md) for 14- to 20- years-old visitors to the Uppsala Youth Centre n = 519

	PF M ± SD (Md)	RP M ± SD (Md)	BP M ± SD (Md)	GH M ± SD (Md)	VT M ± SD (Md)	SF M ± SD (Md)	RE M ± SD (Md)	MH M ± SD (Md)
n = 519 (Median)	90.0 ± 15.4 (95)	75.9 ± 32.5 (100)	71.3 ± 23.2 (74)	67.1 ± 22.6 (67)	52.7 ± 20.6 (55)	76.6 ± 22.4 (75)	58.5 ± 42.4 (66)	64.0 ± 20.6 (68)
Females = 453	89.6 ± 15.5	74.5 ± 33.1**	70.5 ± 22.9*	66.0 ± 2.8***	51.1 ± 20.5***	75.6 ± 22.5**	55.3 ± 42.6***	62.4 ± 20.6***
Males = 66	92.5 ± 14.5	85.6 ± 26.3	77.1 ± 24.5	74.8 ± 19.4	63.9 ± 17.9	83.5 ± 20.5	80.3 ± 20.6	74.5 ± 17.0

BP, bodily pain; GH, general health; MH, mental health; PF, physical functioning; RE, role limitations due to emotional problems; RP, role limitations due to physical problems; SF, social functioning; VT, vitality.
Significant differences between genders according to t-test *p < 0.05, **p < 0.01, ***p < 0.001.

MADRS-S score and severity	Females n = 453 (%)	Males n = 66 (%)	Total n = 519 (%)
No depression 0–11 p	283 (62.5)*	52 (78.8)	335 (64.5)
Mild depression 12–20 p	117 (25.8)*	7 (10.6)	124 (23.9)
Moderate depression 21–39	51 (11.3)	7 (10.6)	58 (11.2)
Severe depression ≥40	2 (0.4%)	0 (0)	2 (0.4)

Table 2 MADRS-S score by severity and gender in a Youth Centre sample in Uppsala 14–20 years (n = 519)

Significant difference between gender according to chi-square test *p < 0.05.

Correlation between SF-36 subscales and MADRS-S score

All SF-36 subscales correlated on a significant level (p < 0.01) with the depression rating scale MADRS-S. The strongest correlations were found for the subscales MH (−0.74), VT (−0.64), GH (−0.61) and SF (−0.59) (Table 3). Similarly, the SF-36 subscales described a clear gradient between the different depression severity groups (Table 4).

Receiver operating curves

ROC curves were plotted for all the subscales of SF-36 related to MADRS-S ≥ 21. The ROC cut-off scores for the best subscales according to the curves were as follows: MH ≤ 48 (sensitivity 82%; specificity 80%), VT ≤ 40 (sensitivity 81%; specificity 77%) and GH ≤ 50 (sensitivity 66%; specificity 82%) (see Fig. 1). This means that an individual scoring lower than these cut-off scores statistically is more likely to be within the depressed population, because the cut-off score was related to moderate depression MADRS-S ≥ 20. Corresponding results for the best subscales of SF-36 to MADRS-S ≥ 11 were MH ≤ 48 (sensitivity 83%; specificity 79%), VT ≤ 50 (sensitivity 75%; specificity 75%) and GH ≤ 66 (sensitivity 75%; specificity 73%).

Discussion

A clinical health service with limited resources, in our study an YC working with sexual and psychosocial health, needs a screening instrument for general health as well as for depression. It would be an advantage if a screening instrument for general health also could detect symptoms of depression, a prevalent and devastating disorder in adolescence. Our results indicate that SF-36 may be a useful instrument to screen for and detect depression in this group.

MADRS-S did not seem to be as well-accepted instrument as SF-36 because about 21% did not complete or care to answer the questions. We reasoned that this was because of the SF-36 being the first and MADRS-S the second questionnaire and that the youth did not have the time to do or finish it. Another reason could be that the questions in MADRS-S were considered difficult, focused on bad feelings that the respondent did not want to be confronted with. When we compared the way those who did not finish or answer MADRS-S rated their health using SF-36, with those who did finish the MADRS-S, there was no significant difference between the groups. This could mean that the main reason for not filling out the MADRS-S principally was that they did not think they had time or cared to do it.
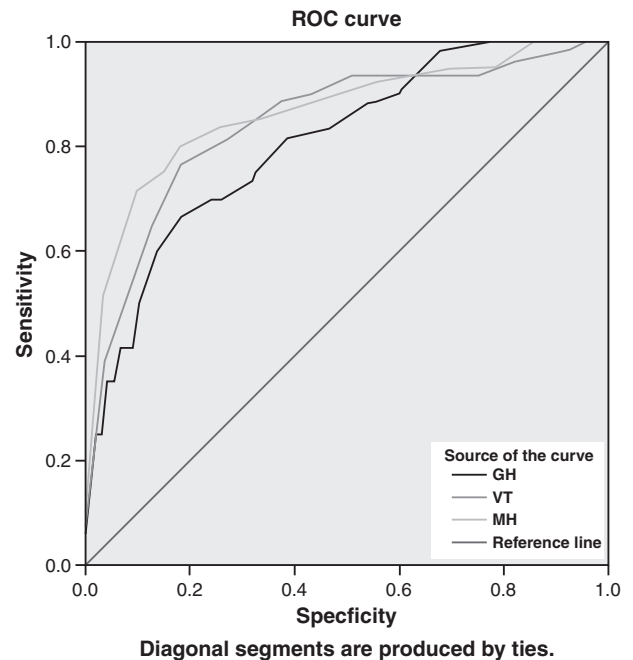
Strong correlations were found between all the SF-36 subscales and MADRS-S for both genders. The subscales MH and VT yielded Area Under the ROC Curve values 0.87 and 0.84 in ROC curves for moderate depression, and thus indicted that they might be used to detect depression in a clinical setting (Fig. 1) to give early treatment as well as rendering a general health rating from the youth.

Adolescents themselves rate their general health with relative stability over time. This stability will become negatively influenced by physical and mental disorders and health-compromising lifestyle, common in this group of adolescents with early debut of sexual activity (27). This implicates that adolescents visiting an YC can be expected to have a poorer general health and a higher prevalence of depression. In this YC sample, 35.5% (mild depression 24% and moderate or severe depression 11%) fulfilled the criterion for depression according to MADRS-S in comparison with 47.1% in the previously mentioned Depression Screening Day study at the same studied centre (8). The young people in our sample seemed to have an increased risk for self-reported depression that indicates a risk for clinically diagnosable depressive disorders.

Table 3 Correlation between MADRS-S and SF-36 subscales (n = 519)

	MADRS-S	PF	RP	BP	GH	VT	SF	RE	MH
MADRS-S Pearson correlation Sig (2-tailed) n = 519	1	−0.31**	−0.28**	−0.38**	−0.61**	−0.64**	−0.59**	−0.51**	−0.74**

BP, bodily pain; GH, general health; MH, mental health; PF, physical functioning; RE, role limitations due to emotional problems; RP, role limitations due to physical problems; SF, social functioning; VT, vitality.
**Correlation is significant at the 0.01 level (2-tailed)

Table 4 Sf-36 subscale mean results according to MADRS-S depression level in 14- to 20- year-old visitors to the Uppsala Youth Centre (n = 519)

SF-36 Scale Total (519) Mean	MADRS-S score	SF-36 Mean ± SD
Physical function (PF) 90.0 ± 15.4	0–11	93.0 ± 12.7
	12–20	85.6 ± 17.4
	21–39	82.9 ± 19.2
	40–	67.5 ± 31.8
Role Physical (RP) 75.9 ± 32.5	0–11	82.2 ± 28.0
	12–20	65.7 ± 36.3
	21–39	62.1 ± 37.2
	40–	50.0 ± 70.7
Bodily Pain (BP) 71.3 ± 23.2	0–11	76.4 ± 21.6
	12–20	64.7 ± 21.0
	21–39	56.6 ± 25.7
	40–	42.0 ± 42.4
General health (GH) 67.1 ± 22.5	0–11	75.7 ± 19.2
	12–20	55.1 ± 17.6
	21–39	44.7 ± 21.1
	40–	17.5 ± 10.6
Vitality (VT) 52.7 ± 20.6	0–11	61.0 ± 17.1
	12–20	41.8 ± 16.0
	21–39	29.6 ± 18.2
	40–	17.5 ± 3.5
Social Functioning (SF) 76.6 ± 22.4	0–11	85.1 ± 17.6
	12–20	64.4 ± 19.8
	21–39	54.3 ± 24.1
	40–	37.5 ± 17.7
Role Emotional (RE) 58.5 ± 42.2	0–11	72.4 ± 37.7
	12–20	36.6 ± 37.6
	21–39	26.4 ± 39.4
	40–	0.0 ± 0.0
Mental Health (MH) 63.9 ± 20.6	0–11	73.9 ± 14.7
	12–20	50.0 ± 14.4
	21–39	38.0 ± 19.5
	40–	20.0 ± 17.0

Figure 1 Receiver operating curve for the SF-36 subscales General Health, Mental Health and Vitality in relation to MADRS-S rating <20, 14–20 year olds at a Youth Centre (n = 519).

Also mild depressions need to be detected and treated because they are associated with a diminished psychosocial functioning and tend to grow deeper (28). Untreated a depression will last 7–9 months, and the educational as well as social development during most of one school year will be compromised. Depressions in adolescents have a recurring course in half of the cases and some develop to manic-depressive disorder (29, 30). Suicide attempts will appear when the depression is lasting for a longer time and growing deeper with more feelings of hopelessness. In Sweden, the frequency of reported suicide attempts in women 15–24 years of age has increased 40% between the years 1998 and 2003, which is quite alarming (31). Because we know that the cost of depression has doubled during the past 8 years (32), it is an important task for professionals working with young people to find a suitable

way of screening and detecting youth depression, and SF-36 could be suitable for this purpose.

For both genders, strong correlations were found between all the SF-36 subscales and MADRS-S, especially the two subscales MH and VT. In relation to MADRS-S scores for moderate depression, the subscale MH had the highest sensitivity and specificity and a cut-off level of ≤48. This means that individuals scoring 48 or lower should be followed up with a clinical interview for depression. This is also true for VT scores ≤40 and lower.

Interestingly, studies of quite different populations have rendered similar results for cut-off scores in screening for depression. In adult psychiatric patients, cut-off scores for MH and VT were 55 and 45 related to Depression Anxiety Stress Scale (DASS-21) (33). In older Swedish women using MADRS-S in comparison with SF-36, the cut-off score for MH was 53 (34).

In our study, there was also a significant difference between genders in prevalence of depression, women 37.5% and men 21.2%, or similar to other studies where a gender ratio in adulthood has been reported close to two (3). The rates of prepubertal depression are similar for boys and girls. After puberty, the rates in girls double and are closely related to menarche (3, 35). It has been suggested that the key to understanding the higher rates of depression among women lies in the joint effects of biological (genetic, pubertal hormones, pubertal timing and development) vulnerabilities, cognitive factors (cognitive style, objectified body consciousness, rumination) and environmental provoking experiences (36, 37). A considerable gender differ-

ence in prevalence of depressive symptoms has recently been reported in two studies; among 15- year-olds (31% vs. 22%) (38) and for 15- to 17- year-olds (24.8% vs. 11.5%) (7). In our sample, the difference between genders rating on level moderate depression was not significant. Further, there was a significant gender difference on all SF-36 sub-scales except PF, men scoring higher than women, as previously reported in other studies (12).

Only about 2% of the registered visits at the YC during the year the study was performed were appointments with the psychologist. This study has contributed to the knowledge of imminent need of greater access to a psychologist, and the workforce since the study was performed has been increased by two fulltime working psychologists.

Limitations

The SF-36 should ideally have been validated by a diagnostic interview. This procedure is very time-consuming, costly as well as beyond our resources, and we therefore chose to use the MADRS-S, a well-validated instrument. The SF-36 instrument seemed to be sensitive in detecting depression among young women; but due to power problems, the results for men are not conclusive.

A second limitation is that we studied a specific population of young people seeking help at the YC (approximately 20% of the whole population group 13–20 years of age). They actively seek help for different reasons, i.e. being in some ways risk-taking, but in other ways taking high responsibility for their well-being in different aspects of life and by seeking help at the YC. Even though they may not be representative for the whole population, they are at the same time important to study with the special interest in depression so this might not be a limitation.

A third limitation is that we did not register the reason for visiting the YC: ordinary preventive advice, sex problems, Sexually Transmitted Disease, psychological or psychosocial problems. This would have been of interest especially for the prevalence of depression in different groups of visitors.

Conclusion

SF-36, a HRQoL self-assessment instrument, could according to this study be used to screen for depression in adolescent young women visiting a clinical YC. This is a group with a high prevalence of depression, and screening of this group is important.

Mild to moderate depression was common (35.5%) in this sample, and men scored more frequently on no depression level and women on mild depression. Men scored higher than women on all SF-36 subscales except for PF. Further research is needed concerning the prevalence of main problems when seeking help at the centre as well as secondary problems. Depression prevalence should be further investigated. This study shows that adolescence health-care services could be perceived as an important place to screen for depression and treat emerging problems and disease early as well as prevent ill-health by education.

Acknowledgements

Conflict of interest

None. All authors declare that the answer to the questions on your competing interest form are all No and therefore have nothing to declare.

Author contributions

Corresponding author Jóna Kristjánsdóttir is responsible for collection, analysis and writing of the submitted manuscript. Tord Naessen, Claes Sundelin and Gunilla I. Olsson have contributed by supervision of the analysis, scientific advice and discussion and writing of the results.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Summary of information about SF-36 scores and subscales.

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