

Secular Trends in Self-Assessed Health Over 24 Years Among 38-, 50-, 70- and 75-Year-Old Women: Observations from the Prospective Population Study of Women in Gothenburg

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Background: Throughout the world, women report poorer self-assessed health than men. In Sweden, women's life circumstances have changed on many levels during the past decades. While cognition and bodily health have improved, mental health has deteriorated. During the 1980s and 1990s, Swedish women's self-rated health was deteriorating with an increase of psychosomatic diseases. Common mental disorders have increased most rapidly and contributed to an increase in sick leaves.

Purpose: The aim of this study was to study secular trends in self-assessed health in SF-36, in three different cohorts of women examined in 1992–1993, 2000–2001, 2004–2006 and 2016–2017.

Participants and Methods: Data from the Population Study of Women in Gothenburg were used where 38-, 50-, 70- and 75-year-old women had responded to SF-36 over a period of 24 years. SF-36 is a questionnaire concerning self-assessed health that consists of eight different subcategories, ie, four about physical health and four about mental health. This study made a comparison between the different results in SF-36 during 24 years.

Results: Results showed that today's 38-year-old women had poorer self-rated health in four subcategories, social functioning (SF), mental health (MH), vitality (VT) and general health (GH), compared to 24 years ago. Fifty-year-old women rated their health better in one subcategory, physical functioning (PF), and worse in another subcategory, VT. Seventy-year-old women rated their health better in two subcategories, physical role (RP) and emotional role (RE).

Conclusion: This study indicates that poor mental health is increasing among middle-aged women and that increased mental stress levels can be an underlying factor.

Keywords: mental stress, population study, self-assessed health, SF-36, women's health

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Introduction

Worldwide, women report poorer self-assessed health than men, as indicated by international comparisons between countries based on data from the World Health Organization's (WHO) surveys.¹ During the 1980s and 1990s, Swedish women's self-assessed health deteriorated with an increase in psychosomatic disorders.² A combination of social factors and biological factors is believed to underlie the major gender differences observed in all regions of the world.^{3,4} Physical health has improved, and the expected life span has increased, but the same positive trend in mental health has

not been demonstrated. While morbidity and mortality are higher in men, self-assessed health is reported to be lower in women.⁵ In Sweden, the life circumstances of women have changed in many ways in recent decades due to societal developments. A larger proportion of today's women have higher education and are to a greater extent full-time employee. During the economic crisis of the 1990s, women born in the early 1970s began to study at universities and colleges to a much greater extent than before. Approximately 200,000 students were enrolled in Swedish universities and colleges in the 1990s; today the figure is over 400,000 and more than 50% of these are women.⁶ In 2016, 19% of women in Sweden between 16 and 84 years reported reduced mental well-being compared with 13% of all men.⁷ Anxiety and stress-related mental disorder belong to the group of diagnoses that are most pronounced and are responsible for an increasing sickness absence among women. The number of women on sick leave in 2016 was almost double compared with the number of men.⁸ Since the mid-1990s, the amount of long-term sick leave has increased in women, and in Sweden, Common Mental Disorders (CMD) are responsible for the majority of all sick leave.⁹ Earlier studies have shown that patients on long-term sick leave report poorer self-assessed health compared to patients on short-term sick leave.¹⁰

By following women over time and identifying trends in self-assessed health, it is possible facilitate future planning and design of healthcare and care, it is relevant to know in which areas women experience both improved and impaired health.

The aim of this study was to study secular trends in self-assessed health by SF-36 in three different cohorts of women examined in 1992–93, 2000–01, 2004–06 and 2016–17 from the prospective Population Study of Women in Gothenburg, Sweden (PSWG). As prevalence of mental health problems have increased worldwide, the hypothesis was that the self-assessed mental health is worse among women who participated in the study 2016–17 compared to the women who participated in 1992–93.

Participants and Methods

The Population Study of Women in Gothenburg

In 1968–69, 1462 women aged 38, 46, 50, 54 and 60 in Gothenburg, Sweden, participated in PSWG. After that follow-up examinations have been executed in 1974–74, 1980–81, 1992–93, 2000–01, 2004–05, 2005–06 and in

2016–2017. In the two latest examinations, new cohorts of 38- and 50-year-old women participated. The participant rate has been high through all the years, ie, around 90% at the three first examinations and around 70% in the later examinations (see Table 1). Details of the sampling procedure and participation rates at earlier examinations have been presented elsewhere.^{11–14}

Data in this study were collected from 1992 (when the SF-36 began to be used in the population study) and at all later examinations. Table 1 shows year of the study, year of birth, ages, number of participants at each follow up as well as number of SF-36 survey completed at each follow up, from 1992–1993 to 2016–2017. In the study 2000–01 only 70- year-old women participated. In the studies 2004–06 the women were 38-, 50-, and 75-years-old.

Self-Assessed Health and SF-36

The health survey, Medical Outcomes Study Questionnaire Short Form 36 Health (SF-36) originates from the New England Medical Center in Boston and Rand Corporation in Santa Monica.¹⁵ The idea was that health would not only be based on morbidity and mortality but also on the patient's own view of quality of life. The survey measures how well-functioning the patient is in everyday life. The 36 questions that constitute the survey take an average of 10 minutes to answer. The SF-36 is suitable for group-level analysis for a general population. Since the form is not specified for any disease group, the SF-36 is also suitable for comparisons between disease groups. It can also be a useful instrument in the clinic for following a patient's development over time.^{15,16} Most of the studies that examined the reliability of the SF-36 have exceeded 0.80.¹⁷ Estimates of reliability in the physical and mental health sections are above 0.90. The SF-36 is well validated,¹⁷ also for Swedish conditions during the 1990s.^{18–20} The 36 questions are divided into eight different sections: physical functioning (PF = opportunity to perform daily activities), physical role (RP = limitation in activities due to bodily health), bodily pain (BP = the amount of pain and its influence in everyday life), general health (GH), vitality (VT = energy level, sense of fatigue and depression), social functioning (SF = affecting social activities due to bodily health or emotional problems), emotional role (RE = limitation in activities due to emotion or emotional problems), and mental health (MH = emotional well-being). SF-36 gives a total score for each of the included subscales. The sections contain 2–10 questions with 2–6 response options. The scales are scored so

Table 1 Year of the Study, Year of Birth, Ages, Participant Rates as Well as Number of SF-36 Survey Completed at Each Follow-Up, from 1992–1993 to 2016–2017

Year of Study	Ages	Invited Women n	Non-Participants/ Unreachable and Language Difficulties n	SF 36 Form Completed n (%)
1992–1993	70	473	183	290 (61)
	50	127	28	99 (78)
	38	92	24	68 (74)
Total		692	235	457 (66)
2000–2001	70	423	171	252 (60)
Total		423	171	252 (60)
2004–2005	50	505	216	289 (57)
	38	343	139	204 (60)
2005–2006	75	423	185	238 (56)
Total		1271	540	731 (58)
2016–2017	50	523	216	307 (59)
	38	515	253	262 (51)
Total		1038	469	569 (55)
Total 1992–2017		3424		2009 (59)

that a higher score always indicates better health status. The scoring takes place in several steps and requires the use of tables in the manual.²¹ The original points and the points for each sub-scale are summed. Then the scores on all subscales are converted to 0–100, higher scores indicate less disability; i.e., a score of zero is equivalent to maximum disability and a score of 100 is equivalent to no disability. All calculations were done in a computer program using the algorithms for calculating points based on the manual's instructions.

The eight subcategories that make up SF-36 can be summarized in the Mental Component Summary (MCS) and Physical Component Summary (PCS) groups. MCS includes VT, SF, RE and MH while PCS includes PF, RP, BP and GH.^{21,22}

The questionnaire also includes a question concerning change of health in the past 12 months. Thirty-eight- and fifty-year-old women completed SF-36 in 1992, 2004 and 2016. Seventy-year women completed it in 1992 and 2000 while women born in 1930 completed SF-36 in 2000 and 2005, when 70- and 75-years-old.

Socio-Economic Status

Information about marital status, children, total income status and education was obtained by means of a

questionnaire and transformed into a measure of socio-economic status (SES). SES was defined according to a five-point scale.^{23,24} For the purpose of this study, high SES was defined as large-scale employers and officials of high or intermediate rank, intermediate SES was defined as small-scale employers, officials of lower rank, and foremen, while low SES was defined as skilled and unskilled workers. Education was divided into three categories; elementary school (usually six or seven years), upper secondary school and university.

Physical Activity

On the basis of the physician's interview with the women, they were classified as being physically active during leisure time, if they reported usually, during the last 12 months, spending more than four hours a week gardening, running, dancing, playing golf, tennis, or similar activities.

Alcohol Habits

Information regarding alcohol habits was obtained at every examination using the same standardized structured interview conducted by a physician. All participants were asked to report their intake frequency (not in grams/day or drinks/week) of three different types of alcoholic drinks, namely, beer, wine, and spirits. Women were asked to

report the frequency of alcohol intake according to the following answer alternatives:

1. Never.
2. Earlier, but not during the last 10 years.
3. Earlier, but not during the last year.
4. Monthly.
5. Weekly.
6. Several times a week.
7. Daily.

For the purpose of this study we derived three separate categories of consumption of alcohol, based on the various levels (frequency) where:

- (i) “Never” included levels 0, 1 and 2.
- (ii) “Sometimes” included levels 3 and 4.
- (iii) “Regularly” included levels 5 and 6.

Mental Stress

Prevalence of mental stress was based on a question describing the extent to which the women had experienced mental stress previously or presently. The mental stress question was asked in exactly the same way at all examinations: Have you experienced any period of mental stress (one month or more), and with mental stress we mean that you have been irritable, tense, nervous, anxious, afraid, anguished or sleepless connected with concern for your work, health, family or conflict with the people around you (at home, at work).

1. Never experienced mental stress
2. Experienced mental stress, but not during the last 5 years
3. Occasionally experienced mental stress during the last 5 years
4. Experienced mental stress several times during the last 5 years
5. Experienced mental stress constantly during the last year
6. Experienced mental stress constantly during the last 5 years

For the purpose of this study we derived three separate categories of mental stress, based on the various levels (frequency) where:

- i) “Never” included levels 0 and 1
- ii) “Sometimes” included level 2

- iii) “Regularly” included levels 3, 4 and 5

Statistical Methods

For 38- and 50-year olds, ANOVA analyses were conducted to test differences between mean values for each subcategory. The 70-year olds were made up of two groups, born in 1922 and 1930; therefore, independent samples were used to test differences. The 75-year olds who responded to the SF-36 in 2005–06 were made up of the same participants who were 70 years in 2000–01; therefore, paired T-tests were used to investigate whether their self-assessed health was better or worse after five years. MANOVA analyses were then performed for each category to see if any independent variable affected the result. The Chi-square test was used to compare prevalence between groups. P-values <0.05 were considered significant. Analysis of change in self-assessed health in all subcategories for each age group was performed using ANOVA analyses, independent *T*-test, and paired samples *T*-test. SPSS for Mac, version 25, was used to perform statistical analysis after data transfer from SAS.

Ethical Considerations

The Prospective Population Study of Women in Gothenburg, Sweden was approved by the ethics committee of the University of Gothenburg and Regional Ethical Review Board in Gothenburg from 1968 and all later follow-up (latest DNr 258–16, 20160411). The studies comply with the Declaration of Helsinki and all participant consent was written informed consent.

Results

There was a decline in self-assessed health among 38-year-old women in Gothenburg from 1992 to 2017. The deterioration of health was most apparent in the subcategories of social functioning, mental health, vitality, general health, and mental component summary scores. A deterioration in vitality was also shown among 50-year-old women.

Analyses of Secular Trends in 38-, 50- and 70-Year-Old Women from 1992–1993 to 2016–2017

The 38-year-old women showed a decrease in SF (–10.2 points), MH (–5.9 points), VT (–13.3 points), GH (–10.2 points), and MCS (–5.1 points) 1992 to 2016. 50-year olds showed an increase in PF (+6.7 points), but a decrease in

Table 2 Secular Trends in Self-Assessed Health, Selected Subcategories Among 38-, 50-, 70–75-Year-Old Women from 1992–1993 to 2017–2017

38 Years	Year of Birth	n	M	95% CI	p
Social functioning	1954	69	91.5	87.7–95.3	0.001
	1966	202	85.6	82.6–88.6	
	1978	262	81.3	78.6–83.8	
Mental health	1954	69	78.3	74.3–82.4	0.012
	1966	201	76.3	73.7–78.9	
	1978	262	72.4	70.4–74.5	
Vitality	1954	69	66.7	62.0–71.5	<0.0001
	1966	201	60.5	57.5–63.5	
	1978	262	53.4	50.9–55.9	
General health	1954	69	82	77.7–86.3	<0.0001
	1966	201	78.5	75.9–81.1	
	1978	261	71.8	69.5–74.2	
Mental component summary	1954	68	48.8	46.3–51.3	0.001
	1966	199	46.5	44.9–48	
	1978	255	43.7	42.4–45.1	
50 years					
Physical functioning	1942	99	83.5	79.4–87.7	0.002
	1954	289	87.8	85.6–89.8	
	1966	306	90.2	88.6–91.7	
Vitality	1942	99	64.6	59.8–69.4	0.011
	1954	287	60.6	58.0–63.2	
	1966	305	57.0	54.4–59.7	
70–75 years					
Physical role	1922	285	68.7	8.4 (2.1-14.7)	0.009
	1930	248	77.1		
Emotional role	1922	285	72.9	9.7 (3.6-15.6)	0.002
	1930	246	82.6		

VT (−7.6 points). Mean of RP (+8.4 points) as well as RE (+9.7 points) scores increased in 70-year olds born in 1930 compared to those born in 1922, see Table 2. Women born in 1930 showed a significant decrease in their self-rated health in all subcategories of SF-36 from the age of 70 to 75, that is, when comparing the studies in 2000 and 2005 (the results are not shown).

Table 3 and Figure 1 show variables that significantly associated the outcome of SF-36 in the respective subcategory in 38-, 50- and 70-year olds.

Thirty-eight-Year Olds

Mental stress and drinking beer were associated with SF. Women who never experienced mental stress in (group “i”) perceived higher SF (+12.4 points) than women

who sometimes experienced mental stress (group “ii”/+8.5 points) as well as women who regularly experienced mental stress (group “iii”). Women drinking beer sometimes (group “ii”) perceived higher SF (+3.6 points), both compared to women drinking beer more often (group “iii”) and never (group “i”/−6.3 points). Mental stress was also associated with MH, VT, GH and MCS; the less mental stress a woman experienced, the better scores at MH, VT, GH and MCS. Smoking was associated with GH; smokers had lower perceived GH than non-smokers.

Fifty-Year Olds

Mental stress, education, socioeconomic status, BMI, and drinking beer were associated with PF. Women who never

Table 3 All Variables That Significantly Affect the Outcome of SF-36 in the Respective Subcategory in 38-, 50- and 70-Year Olds

		PF	RP	SF	MH	RE	VT	GH	MCS
38 years									
Mental stress	Never			+12.4	+14.0		+19.7	+14.0	+8.0
	Sometimes			+8.5	+11.0		+16.9	+12.0	+5.8
	Regularly			0	0		0	0	0
Smoking daily	No							0	
	Yes							-9.3	
Drinking beer	Never			-6.3					
	Sometimes			+3.6					
	Regularly			0					
50 years									
Physical activity	Inactive						-25.0		
	4h/w						-16.0		
	Regularly						-11.0		
	Hard						0		
Mental stress	Never	+3.7					+17.0		
	Sometimes	+1.0					+13.1		
	Regularly	0					0		
Education	Elementary	-7.3							
	Secondary	-1.9							
	University	0							
SES	Low	0							
	Middle	+2.5							
	High	+5.1							
BMI	With each increased unit	-0.84							
Drinking beer	Never	-1.8							
	Sometimes	+2.0							
	Regularly	0							
70 years									
Physical activity	Inactive		-55.9			-39.7			
	4h/w		-28.7			-13.1			
	Regularly		-11.2			-7.2			
	Hard		0			0			
Mental stress	Never		+16.6			+22.8			
	Sometimes		+0.6			+12.5			
	Regularly		0			0			
BMI	With each increased unit		-1.1						

Notes: Zero indicates reference value. Positive numbers indicate an increase in the number of points relative to the reference value. Negative numbers indicate a decrease in the number of points relative to the reference value.

Abbreviations: SF, social function; MH, mental health; VT, vitality; GH, general health; MCS, mental component summary.

experienced mental stress in (group “i”) perceived higher PF (+3.7 points) than women who sometimes experienced mental stress (group “ii”/+1.0 points) as well as women who regularly experienced mental stress (group “iii”). The

higher education and SES a woman had, the higher PF she perceived. Women drinking beer sometimes (group “ii”) perceived higher PF (+2.0 points), both compared to women drinking beer more often (group “iii”) and never

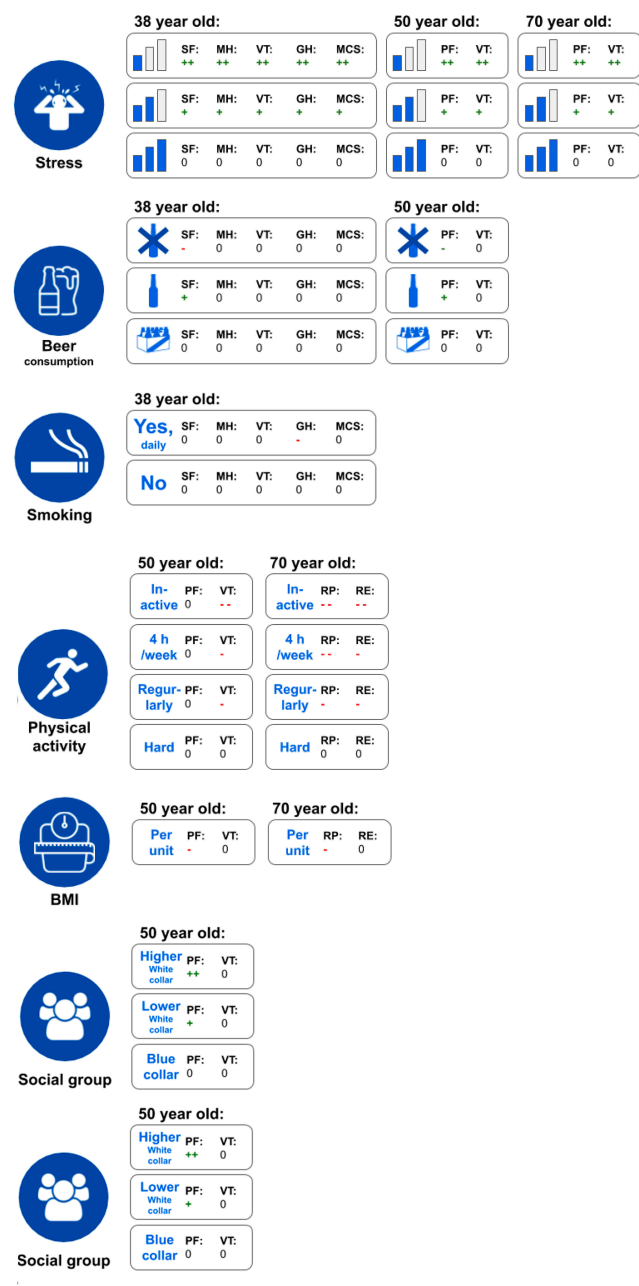


Figure 1 How the different variables significantly affect the outcome of SF-36 in the respective subcategory in 38-, 50- and 70-year olds. Mental stress, one bar includes mental stress levels 0 and 1, two bars include mental stress level 2 and three bars include mental stress levels 3, 4 and 5. Beer drinking, crossed bottle includes drinking levels 0, 1 and 2, one bottle includes drinking levels 3 and 4, a beer crate includes drinking levels 5 and 6. Education, one bar includes education elementary school, two bars include upper secondary school and three bars include university. Zero indicates reference value. Positive numbers indicate an increase in the number of points relative to the reference value. Negative numbers indicate a decrease in the number of points relative to the reference value.
Abbreviations: SF, social function; MH, mental health; VT, vitality; GH, general health; MCS, mental component summary; PF, physical functioning; RP, physical role; RE, emotional role.

(group “i”/-1.8 points). Mental stress and physical activity were associated with VT. The more physical activity a woman performed a week, the higher VT she perceived.

Seventy-Year Olds

Mental stress, physical activity, and BMI were associated with RP. Women who never experienced mental stress (group “i”) perceived higher RP (+16.6 points) than women who sometimes experienced mental stress (group “ii”/+0.6 points) points as well as women who regularly experienced mental stress (group “iii”). The more physical activity a woman performed a week, the higher RP she perceived. Mental stress and physical activity were also associated with RE. Women who never experienced mental stress (group “i”) perceived higher RE (+22.8 points) than women who sometimes experienced mental stress (group “ii”/+12.5 points) as well as women who regularly experienced mental stress (group “iii”). The more physical activity a woman performed a week, the higher RE she perceived.

Discussion

Our study shows that there has been a decline in self-assessed health among 38-year-old women in Gothenburg from 1992 to 2017. The deterioration of health was most apparent in the subcategories of social functioning, mental health, vitality, general health, and the Mental Component Summary. A deterioration in vitality was also shown among 50-year-old women. Our study also showed an improved self-assessed health among 50-year-old women regarding physical activity and among 70-year olds regarding the categories physical role and emotional role.

In the Swedish validation of the SF-36 survey in the 1990s, women had poorer self-assessed health than men, with the greatest differences observed in the age groups 30–40 years and over 70 years. Poorer health profiles were associated with sociodemographic risk factors such as unemployment, low education, and divorce.²⁰ Our study found that a lower level of education was associated with poorer physical functioning and more bodily pain among 50-year-old women. In the Swedish validation, poorer self-assessed general health was also associated with a greater use of healthcare.²⁰ Self-assessed satisfaction with town health was strongly associated with general health and vitality reflecting both physical and mental health. High scores on vitality, mental health, and social function correlated positively with satisfaction regarding work, leisure, and communication with others.²⁰ As 38-year-old women today perceive themselves to be poorer on all of these subcategories than 24 years ago, this could mean that satisfaction with their own

health, work and leisure has decreased and utilization of healthcare has increased. It is very possible that daily life activities have become more difficult to co-ordinate and that factors such as communication with others and leisure activities are eliminated, which affects health negatively.²⁵ On the other hand, mean leisure time physical activity level have significantly increased for 38- and 50-year olds, during the same period.²⁶

In a study from northern Sweden conducted between 1990 and 2014, women and men aged 24–34 could answer the question: “How would you rate your overall health condition when compared to people of your own age?”, using the response options “better”, “worse” or “similar”. During this 24-year period, the proportion of women who responded “worse” increased from 8.5% in 1990 to 20% in 2014. The men’s responses were in the opposite direction, with more men rating their health as “better”.²⁷ The results of our study are consistent with this negative development among women. The Public Health Agency’s annual report for 2017 also supports the current results, as 19% of women in Sweden between 16 and 84 years reported reduced mental well-being compared with 13% of all men.⁷

The significant increase in self-assessed stress levels in 38-year-old women is alarming, and self-assessed mental stress was associated with poorer outcomes in almost all the subcategories. The increasing mental stress among 38-year-old women is in line with the Public Health Report for 2017, where 18% of all people aged 30–44 years reported “quite or much stress”, whereas perceived mental stress was unchanged in people aged 45–64 and 65–84 years. Between 2006 and 2016, self-reported stress increased among both sexes, and by 2016, 18% of all women indicated “quite or much stress” compared to 11% of all men.⁷ Earlier studies based on PSWG have previously demonstrated that the experience of mental stress more than doubled from the start of the study in 1968 to the study in 2004.^{28,29}

The Swedish Social Insurance Agency’s statistics on sick leave also shows that mental stress in society has increased. Between 2010 and 2015, the number of persons on sick leave in Sweden increased by 98,000, where psychiatric diagnoses increased the most and accounted for 59% of the increase. Of these diagnoses, adjustment disorders and response to severe stress made up about half. In Sweden, stress-related illnesses have developed into a public health challenge.^{30–32}

The fact that mental stress among middle-aged women in society has increased is probably due to many different factors, among which the work situation may be one. The

county council sector accounts for the highest proportion of sick leave, while the lowest proportion is in the state and private sectors. In women-dominated occupations, an increase of excessive workload is reported, that is, a combination of high demands and low control at work. Public sector cuts that are strongly women-dominated increase workload when the same or greater work is done by fewer people. This increases the mental stress and influence over the work situation, which can be a contributory explanation for the increase in women’s sickness absence and the prevalence of depressive symptoms in comparison with men.³³

The advantages of this study are the longitudinal design as well as the high participation rate when following the 38-, 50- and 70-year-old women in the study 1992–93 until the study in 2016–17, using exactly the same examination protocol in all follow ups. The sample was large enough to represent different answers from the participants in PPSWG. This indicates that our findings are generalizable. A random sample of women in five age strata was studied, they were obtained from the Revenue Office Register and consisted of women born on certain dates. They were representative of the total female population in Gothenburg in these ages. We have not found other surveys using SF-36 for such a long follow-up time, but cross-sectional findings like “Measurement Properties and Normative Data” from Norway³⁴ as well as from China³⁵ may indicate that our findings can be seen outside Sweden.

There are some limitations to this study. Unfortunately, the participation rate has fallen and, for example, was down to 60% in 2004–05, resulting in a lower degree of representativeness. Each woman participating must have a half-day free-time check-up. Probably, those women who care a lot about their health and have time to spend half a day are those who participate in the study, which may result in a higher self-assessed health compared to the general population. The women who experience a high level of stress and those who are sick are most likely not to participate. Moreover, the language in the questionnaire has shown in previous studies to be a limiting factor with regard to response rate, as all items are formulated in Swedish.

Future studies in the field are necessary to more clearly identify which groups of women indicate a significantly reduced self-assessed health, in order to tailor the prevention efforts according to their needs.

Conclusion

In summary, this study shows increased poor self-rated mental health among middle-aged women and increasing

mental stress could be an important risk factor. It is important to raise awareness about women's risk of poor mental health in order to identify women at risk prior to the onset of disease and the need for sick leave. More individual information about the importance of recovery from their work, a reasonable level of physical activity, and reducing the number of stressors in life can help women to manage their everyday life. Our society needs more knowledge about increased poor mental health among middle-aged women in order to develop preventive measures, especially in primary health care.

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Author Contributions

All authors contributed to data analysis, drafting or revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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