Secular changes in the relation between social factors and depression. A study of two birth cohorts of Swedish septuagenarians followed for 5 years.

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ABSTRACT

Background: Rapid societal changes occurred in the Western world during the 20th century. It is not clear whether this has changed the relation between social factors and depression in older people.

Methods: Representative samples of 70-year-olds from Gothenburg, Sweden, were examined with identical psychiatric examinations in 1971-72 (N= 392; 226 women and 166 men) and 2000-01 (N= 499; 270 women and 229 men). Follow-up studies were conducted after five years. Social factors were obtained by self-report and depression was diagnosed according to DSM-IV-TR.

Results: Feelings of loneliness were related to both concurrent depression at baseline and new depression at follow-up in both birth cohorts. Visits with others than children and neighbours once per month or less, compared to having more visits, and the perception of having too little contact with others, were related to both concurrent and new depression in 70-year-olds examined 1971-72, but not in those examined 30 years later.

Limitations: The response rate declined from 85.2 % in 1971-72 to 65.8 % in 2000-01. Participation bias may have resulted in an underestimation of depression in the later-born cohort.

Conclusions: Social contacts with others were related to depression in 70-year-olds examined in the 1970s, but not in those examined in the 2000s. This may reflect period changes in the ways of socialising, communicating and entertaining, e.g. due to technological development and expansion of mass media. Findings may be useful when developing modern and effective programs for the prevention of mental ill-health in older people.

Keywords: Old age, depression, psychosocial, incidence, epidemiology, cohort differences.

1. Introduction

The numbers and proportions of older people are increasing in most countries in the world (Christensen et al., 2009, Vaupel, 2010), and in high-income countries the total burden of disease is dominated by people 60 years of age and older (WHO, 2008). Depression is one of the most common causes of disability and reduced life satisfaction in older people (WHO, 2003, Skoog, 2011).

Social activity has long been recognized as an essential component of healthy aging (Rowe and Kahn, 1997). Decreased social network and social support and feelings of loneliness have been associated with depression or depressive symptoms in both cross-sectional (Prince et al., 1997, Kahn et al., 2003, Shin et al., 2008, Mechakra-Tahiri et al., 2009, Mullins and Dugan, 1990, Beekman et al., 1995) and longitudinal studies (Skoog, 2011, Luo et al., 2012, Djernes, 2006, Cacioppo et al., 2010, Heikkinen and Kauppinen, 2004). However, more longitudinal research using representative samples of older people is needed to detect the direction of causality (Antonucci et al., 2002, Bruce, 2002, Smit et al., 2006), and to explore in greater detail the mechanisms leading to onset of late-life depression in relation to both quantitative and qualitative aspects of social relations (Buchtemann et al., 2012, Cabello et al., 2012, Antonucci et al., 2002, Fiori et al., 2006, Arean and Reynolds, 2005, Bruce, 2002).

Rapid societal changes occurred during the 20th century in Sweden, especially in the later decades (Bergmark et al., 2000). These include the introductions of compulsory health insurance (1955), universal child benefits (1947), improved housing standards and working conditions, and three weeks of statutory vacation (1951). In addition, rapid technological changes (Parker and Thorslund, 2007, Schoeni et al., 2008, Sundin and Willner, 2007) have affected people's lives. Comparisons between different birth cohorts could be useful in order

to detect cohort differences that may be related to societal change, and to better understand the context in which social factors influence the prevalence and incidence of depression.

1.1 Aim of the article

The aim of this study was to test whether the relation between social factors and depression in older people has changed between the 1970s and 2000s. To study this, we used two representative birth cohorts of Swedish septuagenarians examined in 1971-72 and 2000-01, and subsequently followed-up after five years.

2. Methods

2.1 Samples

The multidisciplinary H70 studies started in 1971-72 with a representative population sample of 70-year-olds born 1901-02. In 2000-01, another population sample of 70-year-olds born in 1930 was examined. Both samples were examined with identical instruments in order to study secular trends, health and health-related factors in older populations from Gothenburg, Sweden. The study included people living in private households and in institutions, and samples were systematically derived from the Swedish Population Register, which covers names and addresses of all residents in Sweden. The samples are described below.

Cohort 1901-02: All 70-year-olds living in Gothenburg and born between July 1, 1901 and June 30, 1902 on dates ending with 2, 5 or 8 were invited to a health examination in 1971-72 (Rinder et al., 1975). All individuals were numbered consecutively in repeated groupings of 1 to 5. Those with numbers 1 and 2 (n=460) were invited to take part in a psychiatric examination. Of these, 392 (226 women, 166 men) participated (response rate 85.2%).

Cohort 1930: All 70-year-olds living in Gothenburg and born between January 1 and December 31, 1930 on days 3, 6, 12, 18, 21, 24, or 30 of each month, were invited to a health examination in 2000-01 (n=778). One person could not be found, eleven could not speak Swedish and eight persons had died, leaving an effective sample of 758. Of these, 499 (270 women, 229 men) participated in the psychiatric examination (response rate 65.8 %).

Responders and non-responders in each of the two samples were similar regarding sex, marital status and 3-year mortality rate based on information from the Swedish Population Register (Beckman et al., 2008). Responders and non-responders in 1971-72 were further compared with regard to income, municipal rent allowance, previous outpatient or in-patient psychiatric care and registration with the Temperance Board for alcohol abuse. There were no significant differences between responders and non-responders regarding these factors (Nilsson, 1983, Persson, 1980). Responders and non-responders in 2000-01 were also further compared with regard to in-patient psychiatric care during the past two years according to the Swedish Hospital Discharge Register. No differences were found (Beckman et al., 2008).

For the purpose of this study, 10 persons (5 women, 5 men) in 1971-72, and 12 persons (10 women, 2 men) in 2000-01 were excluded due to dementia. This left a sample 382 (221 women, 161 men) examined in 1971-72 and 487 (260 women, 227 men) examined in 2000-01.

5-year follow-ups at age 75 were performed in both cohorts. For the study of new depressions at follow-up, 65 persons born 1901-02, and 65 born 1930 were excluded due to major or minor depression at baseline, leaving 317 born 1901-02 and 422 born 1930. During follow-up, a further 38 in cohort 1901-02, and 14 in cohort 1930 were lost due to death, leaving 279

born 1901-02 (157 women, 122 men), and 408 born 1930 (211 women, 197 men). Among those who survived, 26 persons born 1901-02 and 86 born 1930, declined participation, leaving 253 (147 women, 106 men) born 1901-02 (response rate 90.7 %) and 322 (170 women, 152 men) born 1930 (response rate 78.9 %). For the incidence study of depression, 8 persons in cohort 1901-02 and 12 in cohort 1930 developed dementia and were therefore excluded at follow-up. This left a follow-up sample of 245 (144 women, 101 men) born 1901-02 and 310 (165 women, 145 men) born 1930.

2.2 Ethical considerations

Informed consent was obtained from all subjects. The Ethics Committee for Medical Research at the University of Gothenburg approved the study and the research was conducted in accordance with the Helsinki Declaration.

2.3 Examinations and interviews

The general examinations included home-visits by nurses, psychiatric, physical, and neuropsychological examinations, and examinations of social factors, functional ability and somatic disorders.

The psychiatric examination included psychiatric signs and symptoms rated according to the Comprehensive Psychopathological Rating Scale (CPRS) (Åsberg et al., 1978). In 1971-72, an early version of the CPRS-scale was used (Arfwidsson et al., 1971). The semi-structured questions and the physical examinations were almost identical at each examination. The examinations were performed by psychiatrists in 1971-72 and 1976-77 and by experienced psychiatric nurses in 2000-01 and 2005-06. The psychiatric nurses in 2000-01 and 2005-06 were supervised and trained by a psychiatrist (Ingmar Skoog) who, in his turn, was trained by

the psychiatrists who performed the examinations in 1971-72 and 1976-77. Before data collection began, inter-rater reliability was investigated among 50 individuals who had concomitant dual ratings by either psychiatric research nurses or psychiatrists. Kappa values for the presence versus absence of signs and symptoms necessary to diagnose depression were between 0.62 and 1.00 indicating "good" (reference range kappa=0.61-0.80) or "excellent" (kappa=0.81-1.00) agreement.

2.4 Diagnoses of dementia and depression

The diagnosis of dementia was only used for exclusion. It was not possible to diagnose dementia according to DSM criteria in 1971-72. To make comparisons between the birth cohorts possible we therefore had to diagnose dementia according to the historical criteria described by Kay et al (Kay et al., 1964) which were widely used in the 1970s. These criteria required the presence of severe disorientation for time or place, or severe memory impairment. In 2000-01, dementia was diagnosed according to both the historical and the DSM-III-R criteria (Wancata et al., 2007). The observed agreement for a dementia diagnosis between the historical- and the DSM-III-R criteria was high (kappa=0.81).

Major depression was diagnosed according to DSM-IV-TR (APA, 2000). The diagnosis of major depression required the presence of at least 5 out of 9 pre-specified symptom clusters, of which one needed to be depressed mood or diminished interest/pleasure. Minor depression was diagnosed according to Criteria Sets and Axes Provided for Further Study in DSM-IV-TR (APA, 2000). The diagnosis of minor depression required the presence of 2-4 of the same pre-specified symptom clusters as in major depression. Thus, major and minor depression were mutually exclusive. The diagnoses were based on symptoms during the month preceding the examination.

2.5 Social factors

For the purpose of this study, the social factors were dichotomised. Contacts with others were defined as having daily contact in person or by telephone versus not having it. In 2000-01, the question also included having daily contacts via email. Visits with children were dichotomised as having visits once per month or less versus more than that. Visits with neighbours were defined as having regular (often or sometimes) versus having no regular visits. Visits with others other than children or neighbours were dichotomised as once per month or less versus more than that. Subjective contacts were classified as having too little contact with children, neighbours or others versus having good enough contact with children, neighbours or others. Feelings of loneliness were defined as often or sometimes versus seldom or never. Having a regular hobby was classified as performing a hobby once per month or more versus less than that.

2.6 Other factors

The partner-related and demographic factors were also dichotomised. Marital status was classified as unmarried versus married/cohabitating, and widowed versus not widowed. Education was stratified as compulsory education (6 years in those born 1901-02, 7 years in those born 1930) or less versus more than that. Perception of marriage was defined as happy or very happy versus ordinary or unhappy. Partner's physical health was dichotomized as healthy versus unhealthy (physically ill or disabled), and sexual activity as having sexual intercourse during the last year versus not having it. Basal activities of daily living (ADL) included three activities (dressing, toilet use and eating), which were defined as dependent versus independent of personal assistance. Chronic diseases were defined as having either none or any. Five diseases were considered. Coronary heart disease was defined as angina pectoris according to the Rose criteria (Rose, 1962), documented history of myocardial

infarction or ECG-evidence of ischemia, (complete left bundle branch block or major Q-waves, pronounced ST-depression, and/or negative T-waves). Chronic obstructive pulmonary disease was defined as morning cough or taking asthma drugs. Hypertension was defined as systolic blood pressure ≥160 mmHg and/or diastolic blood pressure ≥90 mmHg in sitting position after 5 minutes rest or taking antihypertensive medication. Diabetes mellitus and stroke were defined as being told by a doctor.

2.7 Statistical methods

Fisher's exact test was used to test differences in proportions. Multiple logistic regressions were used in each cohort in order to examine associations between psychosocial factors as explanatory variables and depression at baseline and follow-up. All models were adjusted for sex and marital status since these are well known factors associated with depression in older people (Koster et al., 2006). More comprehensive models adjusted for education, ADL and chronic diseases were also analysed. In a second step, cohort data were merged and interaction effects between birth cohort and explanatory variables were added in order to check for potential effect modification by birth cohort. To avoid estimation of an excessive number of parameters in relation to number of cases, separate models for different subsets of covariates were analysed. The associations are presented as odds ratios with 95 % confidence intervals. Statistical methods were carried out using IBM SPSS STATISTICS 19. All statistical tests were two-tailed and p-values <0.05 were considered statistically significant.

3. Results

3.1 Characteristics of the samples

Characteristics of the samples at baseline at age 70 are presented in Table 1. The prevalence of depression at baseline and the cumulative incidence at follow-up are presented in Table 2.

3.2 Social factors and depression at baseline

Cross-sectional analyses between social factors and depression at age 70 are presented by cohort in Table 3. In both cohorts, feelings of loneliness and the perception of having too little contact with children, neighbours or others were related to higher prevalence of depression. In cohort 1901-02, being happily married, being sexually active, and having daily contacts were related to a lower prevalence of depression, while having visits once per month or less with others than children and neighbours was related to higher prevalence of depression. In cohort 1930, having a regular hobby was related to lower prevalence of depression, while being unmarried, being widowed and having less education were related to higher prevalence of depression.

When education and the three-factor index of ADL were included in the models, all associations remained except for being a widow that was no longer related to higher prevalence of depression, and having a hobby which were no longer related to lower prevalence of depression in cohort 1930. In addition, the association between being sexually active and lower prevalence of depression was now also significant in cohort 1930. When chronic diseases were added to the original model, all associations remained (data not shown).

The only factor that had a significant interaction effect with birth cohort (i.e. birth cohort significantly modified the association between the social factor and depression) was having daily contacts in person or by telephone (interaction effect p=0.041).

3.3 Social factors at baseline in relation to new depression at 5-year follow-up

We then excluded those with depression at age 70, and compared those with and without depression at age 75. Social factors at age 70 in relation to new depression at follow-up are presented by cohort in Table 3. In both cohorts, feelings of loneliness at baseline were associated with new cases of depression at the 5-year follow-up. In cohort 1901-02, having visits once per month or less with others than children and neighbours and the perception of having too little contact with others at age 70 were related to higher frequency of depression at age 75.

When education and the three-factor index of ADL were included in the models all associations remained except that having daily contacts in person or by telephone was now related to lower incidence of depression in cohort 1901-02, and having a healthy partner was related to lower incidence of depression in cohort 1930. When chronic diseases were added to the original model, all associations remained except that having a healthy partner was related to lower incidence of depression in cohort 1930, as in the education and ADL adjusted model above (data not shown).

Significant interaction effects with birth cohort (i.e. birth cohort significantly modified the association between the social factor and depression) included having visits with others than children and neighbours once per month or less (interaction effect with cohort p=0.037) and the perception of having too little contact with others (interaction effect with cohort p=0.009).

3.4 Relation to type of depression

As may be seen in Table 4, most associations with baseline social factors were found for minor depression at 5-year follow-up. For example, having visits once per month or less with others and the perception of having too little contact with others were only related to higher incidence of minor depression in cohort 1901-02, and feelings of loneliness were only related to higher incidence of minor depression in cohort 1930. The only association that was related to higher incidence of major depression was being sexually active in cohort 1930.

4. Discussion

We followed a population sample of two birth cohorts of 70-year-olds for five years and found that feelings of loneliness were related to concurrent and new depression in both birth cohorts. Some cohort differences were also observed. We found that low frequency of contacts with others than children and neighbours and the perception of these contacts were related to both concurrent and new depression at follow-up in 70-year-olds examined in 1971-72, but not in those examined 30 years later. These findings are supported by the fact that we found similar birth cohort differences in both cross-sectional and longitudinal analyses.

Our findings that low frequency of reported contacts with others and the perception of low social contacts were related to both prevalence and incidence of depression in those examined in 1971-72 is consistent with other studies on earlier-born birth cohorts of older people examined in 1993-94 (Prince et al., 1997, Prince et al., 1998). The finding that social contacts may be less important in later-born cohorts of older people may be supported by some recent studies. A cross-sectional study reported that subjective social contacts were not related to depressive symptoms in persons aged 65-85 years examined in 2005-06 (Litwin, 2011), and

social support did not predict change in depressive symptoms over five years in a younger cohort (50-68 years) examined in 2002-06 (Cacioppo et al., 2010).

There may be some potential reasons for the lack of effect of social contacts on depression in later-born birth cohorts. First, rapid technological development (such as expansion of television and radio broadcasting, the introduction of cell-phones and internet) has changed the ways of socialising, communicating and entertaining. The powerful interlace of social and technical systems has created a society where social relations and entertainment to a larger extent can be mediated through the mass media (Beck and Beck-Gernsheim, 2002). It may be that these technological changes have created socio-technical relations that to a higher extent can compensate for low frequency of social contacts in later-born cohorts of older people. Previous studies in our samples have suggested that the later-born birth cohort have a larger cognitive and physiological reserve (Sacuiu et al., 2010, Lak et al., 2012). The findings in the present study may indicate that later-born birth cohorts also have access to a larger external social reserve due to these technological developments. Second, later-born cohorts have been more affected by the "second modernization", characterized by an intensification of an individualization process where traits such as autonomy, independence and self-actualization have been highly desirable (Ester et al., 1994, Arts and Halman, 2004, Beck et al., 2003, Giddens, 1991). Thus, low frequency of social contacts might be perceived as more acceptable for those examined in 2000-01 than for those examined in 1971-72. It is plausible that such shifts in values have affected the impact of low frequency of contacts on the risk for depression. Third, the later-born birth cohort has lived in a society with stronger economic growth, greater access to higher education and higher employment security (Beck et al., 1994, Arts and Halman, 2004). These factors have contributed to higher socio-economic status (SES) in later-born birth cohorts. Psychosocial resources may have a larger impact on

emotional outcomes and depression in cohorts with lower SES (Gallo et al., 2005). Thus, the lack of effect of social contacts on depression in the later-born birth cohort may be partly due to their higher SES.

Contact with others seemed to be more important, in terms of developing depression, than contact with children and neighbours in the earlier-born birth cohort. Results from several cross-sectional studies focusing on older people suggest that support from friends is ranked more important than support from children or family in relation to depressive symptoms (Dean et al., 1990, Litwin, 2011, Golden et al., 2009). A 5-year follow-up showed the same finding in relation to perceived emotional and social togetherness (Tiikkainen et al., 2008). Social relations with others than children and neighbours are voluntary (Blau, 1981, Antonucci and Akiyama, 1995). Those relationships thus create feelings of autonomy and independence (Ester et al., 1994, Mendes de Leon, 2005). In contrast, family relations are to a wider extent built on obligations and normative rules (Bengtsson, 1985).

The perceived feeling of loneliness was related to both concurrent and new depression at 5-year follow-up in both birth cohorts. Feelings of loneliness have been related to depression among older people in several cross-sectional studies (Cohen-Mansfield and Parpura-Gill, 2007, Alpass and Neville, 2003, Prince et al., 1997), and predicted depressive symptoms in follow-up studies on 75-year-olds (Heikkinen and Kauppinen, 2004) and on people aged 50 years and older (Cacioppo et al., 2010, Luo et al., 2012). Feelings of loneliness may not reflect low contact with others, but a personality trait, such as high inner expectations, which makes an individual more vulnerable to future depression (Routasalo et al., 2006). Feelings of loneliness may also be a consequence of depression or depressive symptoms (Tiikkainen and Heikkinen, 2005, Luo et al., 2012).

The only partner-related factor that was related to incidence of depression was having a healthy partner when adjusting for education, ADL or chronic diseases. Our lack of association between partner-related factors and incidence of depression is in contrast to both cross-sectional and longitudinal studies reporting that marital status and being a widow are important risk factors for depression or depressive symptoms (Yan et al., 2011). However, that meta-analysis focused on people aged 55 years and above and other sources have suggested that marriages may be less supportive at an older age. Further, being a widow is an expected event at an older age (Holmberg and Persson, 1986). This may in part explain our lack of findings regarding partner-related factors in relation to new depression at follow-up.

It is noteworthy that most of our associations with psychosocial factors at follow-up were observed for minor depression. It has been suggested that minor depression is more closely related to psychosocial factors than major depression, which seems to be more strongly associated with genetics, personality and previous history of depression (Beekman et al., 1995).

4.1 Strengths and limitations

Major strengths of this study are the longitudinal study design with two birth cohorts examined 30 years apart, and the population-based sample. We reported both cross-sectional and longitudinal data. Associations found in cross-sectional analyses are a mixture of the effect of strong risk factors and influences from the studied disorder, while longitudinal studies generally lend support for a causal relation. Further, identical examinations were performed by psychiatrists and psychiatric nurses and the inter-rater reliability was high between them. Some limitations also need to be considered. First, due to lack of information, the duration criterion in DSM-IV-TR was not included. Second, the response rate declined

from 85.2 % in 1971-72 to 65.8 % in 2000-01. This might have caused a participation bias and an underestimation of the frequency of depression in the later-born cohort, as depressed persons might be less likely to participate. Third, the psychosocial data are based on self-report and thus vulnerable to reporting bias. Fourth, the CPRS-scale was not possible to use in 1971-72, therefore an earlier version of the CPRS-scale (Arfwidsson et al., 1971) was used. However, the diagnoses could be made similarly with both scales, and inter-rater reliability was good (Persson, 1980, Nilsson and Persson, 1984). Fifth, except for education and exclusion of participants with dementia, it was not possible to further adjust for socio-economic factors and cognitive impairment since we do not have additional variables that are equivalent for both of the birth cohorts. However, most indicators of socio-economic position (SEP) measure the same aspects of socioeconomic stratification and are thus fairly well correlated with each other. Furthermore, education is commonly used as an indicator of SEP in epidemiological studies (Galobardes et al., 2007). Sixth, it is possible that the exclusion of participants with dementia may have affected the results. However, inclusion of demented would likely compromise the reliability in both depression diagnosis and self-reported answers. Seventh, the statistical power might have been too weak to detect associations and differences in some analyses regarding depression subtypes and the 5-year follow-up of depression.

5. Conclusion

The frequency and perception of social contacts with others were related to depression in 70-year-olds examined in the 1970s, but not in those examined in the 2000s. This might reflect period changes in the ways of socialising, communicating and entertaining. This finding may be useful when developing modern and effective programs for the prevention of mental ill-health in older people.

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Conflict of Interest

None of the authors had any conflicts of interest in relation to this paper.

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Contributors

Author L Sjöberg formulated the research questions, analysed the data and drafted the paper, I Skoog formulated the research questions, analysed the data and supervised the writing of the paper, S Östling interpreted data, commented on and revised the paper, M Waern interpreted data, commented on and revised the paper, H Falk commented on and revised the paper, V Sundh assisted with statistical analysis. All authors have approved the final manuscript.

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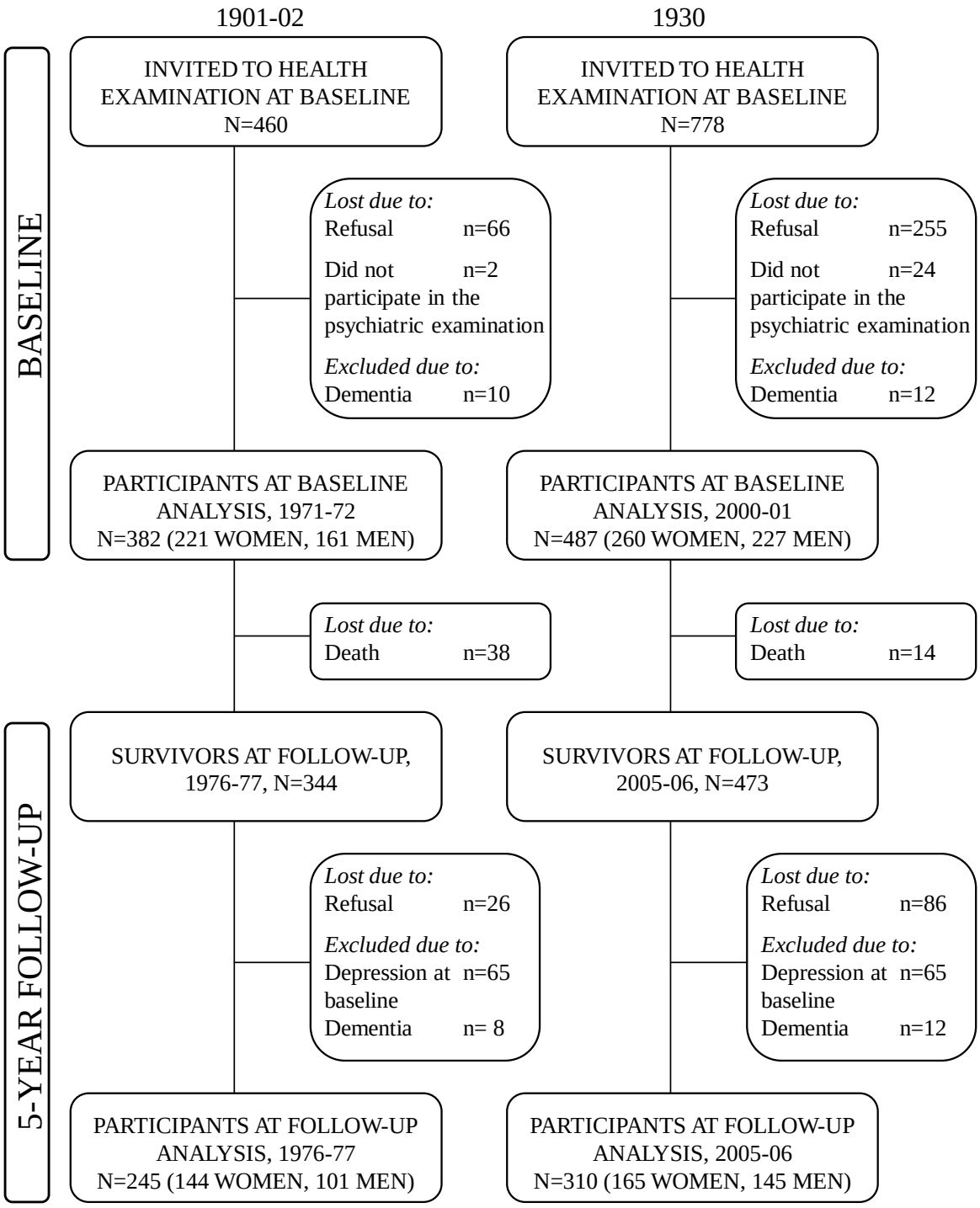

Fig. 1. Flow-chart of the sampling at baseline and 5-year follow-up

Table 1. Demographic and psychosocial characteristics of 70-year-olds born 1901-1902 and 1930 by birth cohort and sex [a]

	Women		Men	
	1901-02 (N=221)	1930 (N=260)	1901-02 (N=161)	1930 (N=227)
	No. of cases/ no. of total cases	No. of cases/ no. of total cases	No. of cases/ no. of total cases	No. of cases/ no. of total cases
Demographics				
Unmarried	124/220 (56.4 %)	141/257 (54.9 %)	35/161 (21.7 %)	59/227 (26.0 %)
Married/cohabitant	96/220 (43.6 %)	116/257 (45.1 %)	126/161 (78.3 %)	168/227 (74.0 %)
Widowed	72/220 (32.7 %)	73/257 (28.4 %)	**15/161 (9.3 %)**	**8/227 (3.5 %)***
Compulsory education or less	**191/219 (87.2 %)**	**158/256 (61.7 %)****	**133/158 (84.2 %)**	**128/226 (56.6 %)****
Relation with partner				
Happy marriage [b]	**32/87 (36.8 %)**	**71/138 (51.4 %)***	**49/122 (40.2 %)**	**111/194 (57.2 %)****
Healthy spouse [b]	**57/92 (62.0 %)**	**106/139 (76.3 %)***	**84/125 (67.2 %)**	**166/193 (86.0 %)****
Sexually active	**35/210 (16.7 %)**	**66/222 (29.7 %)****	76/156 (48.7 %)	120/203 (59.1 %)
Contacts with others				
Daily personal or phone contact	**193/217 (88.9 %)**	**134/244 (54.9 %)****	**137/157 (87.3 %)**	**122/211 (57.8 %)****
infrequent visits with children, neighbours or others	**157/219 (71.7 %)**	**153/245 (62.4 %)***	**131/159 (82.4 %)**	**121/211 (57.3 %)****
- Children	19/141 (13.5 %)	31/212 (14.6 %)	10/118 (8.5 %)	29/186 (15.6 %)
- Neighbours	**125/217 (57.6 %)**	**108/241 (44.8 %)****	**112/157 (71.3 %)**	**78/210 (37.1 %)****
- Others	64/214 (29.9 %)	86/244 (35.2 %)	59/145 (40.7 %)	74/210 (35.2 %)
Perceived contacts				
Feelings of loneliness	**51/218 (23.4 %)**	**79/245 (32.2 %)***	19/159 (11.9 %)	37/211 (17.5 %)
Too little contact with children, neighbours or others	65/218 (29.8 %)	63/245 (25.7 %)	**27/158 (17.1 %)**	**62/211 (29.4 %)****
- Children	30/139 (21.6 %)	32/211 (15.2 %)	**7/118 (5.9 %)**	**32/183 (17.5 %)****
- Neighbours	26/215 (12.1 %)	20/244 (8.2 %)	6/155 (3.9 %)	18/210 (8.6 %)
- Others	31/214 (14.5 %)	30/244 (12.3 %)	19/151 (12.6 %)	29/211 (13.7 %)
Having a regular hobby	111/217 (51.2 %)	122/241 (50.6 %)	80/159 (50.3 %)	122/208 (58.7 %)

[a] Cross-tabulation with Fisher's Exact Test. Dementia excluded. *P< 0.05 birth cohort differences. **P< 0.01 birth cohort differences. [b] Unmarried and non-cohabitants excluded.

Table 2. Prevalence and cumulative incidence of depression by birth cohort and sex [a]

	Women		Men	
	1901-02 (N=221)	1930 (N=260)	1901-02 (N=161)	1930 (N=227)
	No. of cases/ no. of total cases	No. of cases/ no. of total cases	No. of cases/ no. of total cases	No. of cases/ no. of total cases
Depression				
Depression at baseline	53/221 (24.0 %)	44/260 (16.9 %)	12/161 (7.5 %)	21/227 (9.3 %)
Major depression	6/221 (2.7 %)	14/260 (5.4 %)	1/161 (0.6 %)	5/227 (2.2 %)
Minor depression	**47/221 (21.3 %)**	**30/260 (11.5 %)****	11/161 (6.8 %)	16/227 (7.0 %)
New depression at age 75 [b]	**11/144 (7.6 %)**	**30/165 (18.2 %)****	8/101 (7.9 %)	14/145 (9.7 %)
Major depression	4/144 (2.8 %)	3/165 (1.8 %)	4/101 (4.0 %)	1/145 (0.7 %)
Minor depression	**7/144 (4.9 %)**	**27/165 (16.4 %)****	4/101 (4.0 %)	13/145 (9.0 %)

[a] Cross-tabulation with Fisher's Exact Test. Dementia excluded. *P< 0.05 birth cohort differences. **P< 0.01 birth cohort differences. [b] Persons with depression at baseline at age 70 excluded.

Table 3: Psychosocial factors at age 70 in relation to depression at age 70 and new depression at 5-year follow-up [b] in two birth cohorts of Swedish septuagenarians

	Concurrent [a]			5-year follow-up [b]		
	Cohort 1901-02 (N=382) OR (95 % CI) [a]	Cohort 1930 (N=487) OR (95 % CI) [a]	Interaction cohort P-value	Cohort 1901-02 (N=245) OR (95 % CI) [b]	Cohort 1930 (N=310) OR (95 % CI) [b]	Interaction cohort P-value
Demographics						
Unmarried	1.01 (0.57-1.79)	**2.27 (1.29-3.97)****	0.130	0.48 (0.16-1.49)	1.39 (0.70-2.78)	0.059
Widowed	1.21 (0.65-2.24)	**2.14 (1.13-4.03)***	0.423	0.39 (0.09-1.83)	0.64 (0.24-1.66)	0.438
Compulsory education or less	1.10 (0.48-2.51)	**2.03 (1.12-3.68)***	0.220	0.64 (0.19-2.06)	1.07 (0.56-2.06)	0.369
Female sex	**3.83 (1.92-7.68)****	1.60 (0.89-2.86)	0.163	1.26 (0.46-3.49)	1.80 (0.88-3.69)	0.215
Partner relation						
Happy marriage [d]	**0.26 (0.09-0.74)***	0.51 (0.24-1.07)	0.309	2.73 (0.76-9.82)	0.70 (0.31-1.58)	0.079
Healthy partner [d]	1.08 (0.47-2.48)	0.52 (0.23-1.16)	0.290	0.73 (0.22-2.44)	0.41 (0.16-1.01)	0.390
Sexually active	**0.31 (0.13-0.75)***	0.48 (0.22-1.02)	0.511	1.97 (0.64-6.00)	1.24 (0.57-2.67)	0.130
Contact with others						
Daily personal or phone contact	**0.26 (0.12-0.55)****	0.73 (0.42-1.27)	**0.041**	0.28 (0.07-1.16)	1.04 (0.51-2.09)	0.175
Infrequent visits with children, neighbours or others	1.22 (0.63-2.35)	1.69 (0.94-3.07)	0.507	- [c]	1.77 (0.86-3.63)	0.997
- Children	0.51 (0.14-1.84)	1.36 (0.64-2.89)	0.152	2.72 (0.65-11.42)	1.57 (0.58-4.26)	0.861
- Neighbours	1.64 (0.89-3.01)	1.61 (0.93-2.79)	0.999	1.38 (0.50-3.78)	1.18 (0.58-2.40)	0.712
- Others	**2.55 (1.39-4.66)****	1.70 (0.98-2.96)	0.279	**5.15 (1.79-14.75)****	1.60 (0.77-3.31)	**0.037**
Perceived contacts						
Feelings of loneliness	**4.64 (2.42-8.89)****	**7.91 (4.24-14.77)****	0.113	**3.81 (1.10-13.20)***	**2.80 (1.23-6.39)***	0.678
Too little contact with children, neighbours or others	**2.47 (1.37-4.43)****	**3.83 (2.17-6.77)****	0.287	2.59 (0.96-6.97)	1.52 (0.68-3.39)	0.388
- Children	1.38 (0.57-3.31)	**2.44 (1.22-4.89)***	0.321	0.44 (0.05-3.75)	1.57 (0.58-4.24)	0.243
- Neighbours	**3.83 (1.74-8.42)****	**4.23 (1.99-9.00)****	0.788	3.28 (0.79-13.57)	1.44 (0.29-7.00)	0.517
- Others	**2.86 (1.43-5.76)****	**3.29 (1.69-6.39)****	0.762	**8.10 (2.84-23.14)****	1.16 (0.38-3.59)	**0.009**
Having a regular hobby	0.75 (0.43-1.30)	**0.55 (0.31-0.97)***	0.367	1.02 (0.39-2.65)	1.33 (0.64-2.75)	0.640

[a] Multivariate logistic regressions presented as odds ratios (OR) with 95 % CI, adjusted for sex and marital status. Dementia excluded.
[b] Multivariate logistic regressions presented as odds ratios (OR) with 95 % CI, adjusted for sex and marital status. Depression at baseline at age 70 and dementia at age 70 and 75 excluded. * P<0.05, **P<0.01, psychosocial differences between dichotomised risk/protective factor. The interaction effect between cohort and variable X are presented with a p-value. [c] Model not estimable due to zero cell count.
[d] Unmarried and non-cohabitants excluded.

Table 4: Psychosocial factors at age 70 in relation to new depression at 5-year follow-up [a] in two birth cohorts of Swedish septuagenarians, by depression type

	Major		Minor	
	Cohort 1901-02 (N=245) OR (95 % CI)	Cohort 1930 (N=310) OR (95 % CI)	Cohort 1901-02 (N=245) OR (95 % CI)	Cohort 1930 (N=310) OR (95 % CI)
Demographics				
Unmarried	0.54 (0.09-3.09)	4.28 (0.39-46.49)	0.47 (0.11-1.97)	1.23 (0.59-2.51)
Widowed	- [b]	1.32 (0.12-14.43)	0.74 (0.15-3.75)	0.58 (0.21-1.62)
Compulsory education or less	0.52 (0.10-2.71)	2.49 (0.26-24.44)	0.78 (0.16-3.82)	0.98 (0.49-1.93)
Female sex	0.87 (0.19-4.01)	1.65 (0.15-17.99)	1.64 (0.43-6.23)	1.79 (0.85-3.77)
Partner relation				
Happy marriage [c]	1.46 (0.28-7.48)	- [b]	6.13 (0.66-56.62)	0.84 (0.36-1.95)
Healthy partner [c]	0.52 (0.10-2.69)	0.22 (0.01-3.74)	1.08 (0.19-6.11)	0.45 (0.17-1.14)
Sexually active	2.96 (0.51-17.22)	**12.24 (1.06-142)***	1.39 (0.34-5.73)	0.92 (0.41-2.07)
Contact with others				
Daily personal or phone contact	- [b]	0.33 (0.03-3.74)	**0.12 (0.02-0.57)****	1.16 (0.56-2.41)
Infrequent visits with children, neighbours or others	- [b]	1.64 (0.14-18.67)	- [b]	1.76 (0.84-3.69)
- Children	3.19 (0.31-32.83)	- [b]	2.37 (0.42-13.33)	1.81 (0.67-4.94)
- Neighbours	4.46 (0.54-37.03)	3.49 (0.30-40.20)	0.73 (0.22-2.50)	1.06 (0.50-2.22)
- Others	1.21 (0.27-5.36)	5.35 (0.47-61.42)	**25.62 (3.07-213)****	1.39 (0.65-2.97)
Perceived contacts				
Feelings of loneliness	3.24 (0.53-19.91)	1.84 (0.15-22.07)	3.72 (0.79-17.49)	**2.83 (1.21-6.62)***
Too little contact with children, neighbours or others	1.12 (0.21-5.87)	2.43 (0.21-28.14)	**4.14 (1.18-14.53)***	1.43 (0.62-3.27)
- Children	- [b]	- [b]	0.59 (0.07-5.24)	1.75 (0.64-4.77)
- Neighbours	2.21 (0.24-20.83)	- [b]	3.76 (0.68-20.87)	1.57 (0.33-7.63)
- Others	2.53 (0.48-13.32)	5.62 (0.47-67.26)	**14.48 (3.74-56.02)****	0.89 (0.25-3.12)
Having a regular hobby	1.52 (0.35-6.59)	1.50 (0.13-16.95)	0.77 (0.23-2.63)	1.30 (0.62-2.76)

[a] Multivariate logistic regressions presented as odds ratios (OR) with 95 % CI, adjusted for sex and marital status. Depression at baseline at age 70 and dementia at age 70 and 75 excluded. * P<0.05, **P<0.01, psychosocial differences between dichotomised risk/protective factor.
[b] Model not estimable due to zero cell count. [c] Unmarried and non-cohabitants excluded.