

What accounts for depressive symptoms among mothers? The impact of socioeconomic status, family structure and psychosocial stress

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Abstract

Objectives Based on a cross-sectional population survey of 3,129 women with minor children, it was analyzed how socioeconomic status, family structure and perceived psychosocial stress are linked and how they contributed to women's self-reported depressive symptoms.

Methods Pearson's χ^2 test and multi-factor analysis of variance were used for investigating relationships between social status, family characteristics and psychosocial stress. Logistic regression models were computed for estimating their impact on depressive symptoms.

Results Mothers having more than two children, early mothers and single mothers were prone to socioeconomic disadvantages. Low income was associated with higher psychosocial stress, however also an inverse social gradient was found indicating increased psychosocial stress among higher educated mothers. Having a youngest child below 16 years and low income increased while being a housewife was associated with decreased risks of depressive symptoms. Psychosocial stress, in particular due to family demands, conflicts with (former) partner and loneliness revealed to be highly relevant for depressive symptoms.

Conclusions The findings are pointing to the importance of life-phase specific stressors for explaining depressive symptoms among mothers.

Keywords Mother · Depressive symptoms · Family characteristics · Psychosocial stress

Introduction

The association between socioeconomic determinants and health has been amply demonstrated. The findings suggest that the social gradient in mortality and morbidity in women is lower than among men (Drever et al. 2004; Sacker et al. 2000; Arber 1997; Macran et al. 1996). For this reason, several studies pointed out that gender-specific research is needed to better understand causes of illness in women as well as in men (Artazcoz et al. 2004; Arber 1997). Given that living circumstances vary strongly between mothers and childless women, this differentiation is relevant not only for men and women, but also for mothers and women without childcare responsibility. In this context, Bell et al. (1988) found that low income in mothers was associated with depressive symptoms, because it predicts life-stage specific problems, such as parenting problems and childcare difficulties. This suggests that among mothers associations between depression and socioeconomic status may be mediated by different risk factors when compared with the rest of the population. Mathiesen et al. (1999) assumed that during motherhood women are preoccupied with care-taking and concerns about the well being of their child. This preoccupation may act as a filter through which other life circumstances are experienced.

To explain health variations among mothers, recent studies have emphasized the importance of home and family characteristics. A growing body of evidence suggests that single motherhood may increase health risks, especially for minor psychiatric morbidity, mental distress,

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psychosomatic symptoms and depression (Curtis and Phipps 2004; Lahelma et al. 2002; Whitehead et al. 2000). In particular, health risks appear when single mothers are young or have a perceived lack of social as well as emotional support (Franz et al. 2003). However, lack of social resources turned out to be a risk factor for maternal mental health problems in general, not only in single mothers (Mistry et al. 2007). Previous studies lead to the assumption that also very young mothers are at higher risk of developing mental health problems, in particular for depression (Mirowsky and Ross 2002; Deal and Holt 1998). Well documented are also higher psychological distress and lower well being in mothers having children with intellectual, emotional or physical disabilities (Campo et al. 2007; McConnell and Llewellyn 2006). For normally developed children, studies suggest that the age of the youngest child is relevant for the health outcomes in parents. Some studies provide evidence that mothers with young and therefore more demanding children have higher risks for mental health problems (Mistry et al. 2007). However, in contrast, some studies found higher parental health risks when children are older (over 6 years of age) (Matthews and Power 2002), while other studies revealed no significant association (Walters et al. 2002; Fokkema 2002). Inconsistent results were also found for the health-related impact of family size. Although some studies found that health risks of parents increased with the number of children (Artazcoz et al. 2004; Matthews and Power 2002), others found no significant association in this regard (Walters et al. 2002; Mastekaasa 2000). A large body of evidence supports the assumption that the impact of family characteristics on mothers' health may be mediated by structural disadvantages. In this context, several studies found that health risks were mainly caused by financial hardships and decreased significantly when financial resources were controlled (Emerson et al. 2006; Artazcoz et al. 2004; Lahelma et al. 2002). Attention is being increasingly paid to the health-related impact of perceived stress (Gadalla 2009; Gehring et al. 2009; McDonough et al. 2002; Stronks et al. 1998). In view of the fact that the nature of stressors are changing over the life cycle, recent studies have considered life-phase-specific demands and burdens. In this context, research on new parents has shown that besides structural disadvantages parenting-related as well as child-related stressors were predominantly important for mothers' health (Mistry et al. 2007; Romito et al. 1999). However, for women with childcare responsibility, not much is known about family and social determinants contributing to health. This paper aims to deepen the knowledge about the way in which socioeconomic status, family structure and perceived stress are linked and affect mothers' health. More precisely, the paper addresses the following questions:

1. What are the interrelations between socioeconomic status and family characteristics? Analyzing this question will provide information about family conditions associated with elevated risks of social disadvantages.
2. How are socioeconomic status and family characteristics associated with mothers' perception of stress? Answering this question will clarify whether there is a social gradient in mothers' perception of stress and provide insight into the stress-related effects of family conditions, such as family status and number of children.
3. Which social factor accounts for mothers' mental health risks? This question aims to analyze the impact of socioeconomic status, family characteristics and perceived psychosocial stress on mothers' depressive symptoms and tries to draw conclusions about social determinants most important for mothers' mental health.

Methods

Data

The sample consists of 3,219 mothers living in Germany collected in 2009 by means of a mail survey. The cross-sectional population survey was conducted by the Institute TNS Healthcare on behalf of the Department of Medical Sociology at the Medical School Hannover. The sample is based on the Healthcare Access Panel comprising 27,038 women with minor children and the response rate was 62.3%. The sample can be considered as representative with respect to German federal states, age of mothers and youngest child, school education, family status and number of children.

Measures

Health outcome

Depressive symptoms were assessed using the depression scale of the Hospital Anxiety and Depression Scale, German Version (HADS-D) (Herrmann et al. 1995). The subscale depression contains seven items: (1) I still enjoy the things I used to enjoy, (2) I can laugh and see the funny side of things, (3) I feel cheerful, (4) I feel as if I am slowed down, (5) I have lost interest in my appearance, (6) I look forward with enjoyment to things and (7) I can enjoy a good book or radio or TV program. The depression score is constructed by summation, whereby increasing scores indicate increasing burden. Each item has four categories

ranging from 0 to 3 and consequently the depression subscale has a range from 0 to 21. According to Herrmann et al. (1995) cut-off of ≥ 9 was used to identify mothers with elevated depressive symptoms.

Social factors

Socioeconomic status was measured using the following variables: school education, professional qualification, occupational position (lowest = unskilled and semi-skilled workers, low = simple blue- and white-collar workers and employees, skilled workers, intermediate = middle grade workers and employees, high = executive workers and employees) and per capita income. Per capita income was calculated as follows: a weighting of ‘1’ was assigned to heads of household. Each further adult got a weighting of 0.7 and every child a weighting of 0.4. *Family structure* was assessed by the following variables: marital status, single motherhood (i.e. living alone with at least one dependent child in the household), number of children, age of youngest child, early motherhood (age at first birth ≤ 20) and late motherhood (age at first birth ≥ 35) (categories are shown in Table 1).

Table 1 Sociodemographic characteristics of the study sample ($n = 3,129$), Germany 2009

	<i>n</i>	Valid (%)
Mother’s age (years)		
17–19	4	0.1
20–29	291	9.4
30–39	1,328	42.8
40–49	1,339	43.2
50–60	137	4.4
Missing	30	
Age of youngest child (years)		
0–2	479	15.5
3–5	500	16.2
6–11	1,008	32.6
12–15	687	22.2
16–18	420	13.6
Missing	35	
School education		
Secondary general school	1,008	32.6
Intermediate secondary school	1,256	40.6
Upper secondary school	830	26.8
Missing	35	
Single motherhood		
Yes	506	16.8
No	2,511	83.2
Missing	112	

Table 1 continued

	<i>n</i>	Valid (%)
Per capita income^a (€)		
<925	959	35.5
926–1,542	1212	44.9
>1,543	530	19.6
Missing	427	
Marital status		
Married	2,214	71.9
Married but separated	80	2.6
Single	400	13.0
Divorced	362	11.8
Widowed	24	0.8
Missing	49	
Number of children		
1	1,187	40.5
2	1,277	43.5
>2	470	16.0
Missing	196	
Age at first birth (years)		
Early (≤ 20)	349	11.4
Intermediate (21–34)	2,579	84.4
Late (≥ 35)	143	14.2
Missing	57	
Job position		
Lowest	306	10.6
Low	1,494	51.7
Intermediate	821	28.4
High	271	9.4
Missing	188	
Not yet employed	49	
Employment status		
Housewife	439	14.3
Maternity leave	127	4.1
Unemployed	97	3.2
Early retirement	28	0.9
Work up to 19 hours per week	669	21.8
Work half-time (20–37 hours per week)	1163	37.8
Work full-time (>37 hours per week)	550	17.9
Missing	56	

^a For calculation of per capita income information about household size and number of children were required resulting in higher number of missing data. Employment status: in following analyses ‘Maternity leave’ was combined with category ‘Housewife’

Perceived psychosocial stress was measured by nine items selected from a scale covering parental stressors (Sperlich et al. 2011). Each one has five categories, ranging from 1 (not at all distressed/not applicable) to 5 (extremely distressed). Mothers were asked how much they are

currently distressed with respect to the following stressors: (1) family demands (i.e. permanent availability for the family), (2) household requirements, (3) child-related stress (conflicts in mother–child interaction), (4) conflicts with current or former spouse or life partner, (5) stress due to combining job and family demands, (6) conflicts with other family members (e.g. with parents-in-law), (7) stress due to living alone and feelings of isolation, (8) work-related burdens (also including stress due to unemployment) and (9) financial strain.

The Life Orientation Test (Scheier et al. 1994) was used to assess individual differences in personality traits, i.e. generalized optimism versus pessimism. The scale consists of six items referring to general attitudes towards life, for example, ‘In uncertain times, I usually expect the best’. This scale was used for reducing confounding effects between predictors and depressive symptoms as our study being based solely on subjective data.

Statistical analyses

Pearson’s χ^2 was used for testing significance of relationships between socioeconomic status and family characteristics (i.e. time of motherhood, single motherhood, number of children). Factorial analyses of variance (ANOVAs) were computed for estimating effects of family structure and socioeconomic factors on psychosocial stress. We performed these analyses with each domain of perceived psychosocial stress as dependent variable and socioeconomic factors as well as family characteristics as predictors. The predictors are considered simultaneously, consequently the estimated marginal means reflect the mean of each predictor adjusted for all other covariates. Due to the large number of predictors we computed only main effects and did not consider interactions terms. Finally, four logistic regression models were computed consecutively for estimating the impact of different social factors on depressive symptoms. Regression coefficients and standard errors were used for calculating odds ratios and their 95% confidence intervals. Depressive symptoms were dichotomized in the way that odds ratios indicate risks of high depression scores (≥ 9). Regression Model 1 only contains family characteristics as predictors, Model 2 adds socioeconomic status, Model 3 include employment status and Model 4 finally adds perceived psychosocial stress. Statistical analyses were performed with SPSS program, Version 17.0.

Results

Women’s age ranged from 17 to 60 years (mean age 39.1 ± 6.8), their youngest child ranged from 0 to 18 (mean age 9.4 ± 5.3). On an average, the mothers had 1.8

Table 2 Distribution of depressive symptoms and perceived psychosocial stress in the sample, Germany 2009

	<i>n</i>	Miss	Mean	SD	% ^a
Depressive Symptoms (HADS-D)	3,077	52	5.56	3.87	21.5
Perceived psychosocial stress					
Family demands	3,106	23	2.82	1.18	29.8
Household requirements	3,103	26	2.90	1.03	25.4
Financial strain	3,104	25	2.70	1.32	28.3
Work-related stress	3,097	32	2.26	1.34	21.4
Child-related stress	3,089	40	2.39	1.22	19.3
Combining job and family demands	3,102	27	2.22	1.25	17.2
Conflicts with (former) partner	3,109	20	2.11	1.27	16.6
Conflicts with other family members	3,103	26	1.94	1.14	11.7
Living alone/loneliness	3,105	24	1.43	0.99	7.3

Miss number of missing cases

^a Percentage of mothers reporting high depressive symptoms (sum score ≥ 9) and high psychosocial stress (categories 4 and 5 of response format, ranging from 1 to 5). Due to high intercorrelations between stress due to ‘Family demands’ and ‘Household Requirements’ the following analyses based only on the item ‘Family demands’

children, around 40.5% of them had one, 43.5% had two and about 16% had three and more children. Most of the women (71.6%) were married, 17% were single mothers. One-third (32.6%) of the participants had a secondary general school degree and about 36% got a per capita income below 925 €. Overall, about 78% of the mothers were employed, including mothers working only few hours a week (22%), working part time (38%) and full time (18%) (Table 1).

Every fifth woman exhibited high depressive symptoms, i.e. the sum score was ≥ 9 . With regard to perceived psychosocial stress, burdens due to family demands and financial strains were the most common maternal stressors. The number of mothers reporting high psychosocial stress ranged from 7.3 to 29.8% (Table 2).

Associations between socioeconomic factors and family characteristics

As displayed in Table 3, socioeconomic conditions varied strongly by family characteristics. Single mothers were more likely to hold lower educational attainment levels as well as lower occupational positions and low incomes. They also experienced higher unemployment rates. However, proportion of those having high educational attainment levels and high occupational status did not differ significantly to partnered mothers. Mothers who had given birth to the first child below the age of 21, and mothers having more than two children were in particularly affected by social disadvantages. They had significant

Table 3 Relationships between mothers' social status and family characteristics, Germany 2009

	Time of motherhood (years)						Single motherhood				Number of children					
	≤20		21–34		≥35		Yes		No		1		2		>2	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Education (years)																
≤9	173	50.3	795	31.1	22	15.5	187	37.4	772	31	338	28.8	396	31.3	196	42.2
10	136	39.5	1,035	40.5	63	44.4	181	36.2	1,037	41.6	525	44.8	477	37.7	178	38.3
≥12	35	10.2	723	28.3	57	40.1	132	26.4	682	27.4	310	26.4	392	31	91	19.6
Pearson's χ^2	$p = 0.000$						$p = 0.014$				$p = 0.000$					
Job position																
Lowest	90	28.8	210	8.7	4	2.9	70	14.7	218	9.4	100	9.1	119	10	68	15.6
Low	165	52.7	1,255	52.2	51	37.5	253	53	1,189	51.4	592	53.8	585	49.2	239	54.8
Intermediate	49	15.7	707	29.4	54	39.7	111	23.3	687	29.7	297	27	369	31.1	100	22.9
High	9	2.9	234	9.7	27	19.9	43	9	221	9.5	112	10.2	115	9.7	29	6.7
Pearson's χ^2	$p = 0.000$						$p = 0.001$				$p = 0.001$					
Per capita income																
≤925 €	183	59.2	742	33.1	23	18.3	306	65.1	601	28.1	369	34.8	336	31	200	48.5
926–1,542 €	105	34	1,033	46	64	50.8	138	29.4	1,051	49.2	450	42.5	524	48.3	173	42
≥1,543 €	21	6.8	470	20.9	39	31	26	5.5	486	22.7	241	22.7	225	20.7	39	9.5
Pearson's χ^2	$p = 0.000$						$p = 0.000$				$p = 0.000$					
Employment status																
1–19 h/week	55	16.1	578	22.7	31	21.8	71	14.5	584	23.6	205	17.5	307	24.3	120	26.1
20–37 h/week	100	29.3	1,003	39.4	46	32.4	200	40.8	922	37.2	478	40.8	481	38.1	131	28.5
≥38 h/week	67	19.6	441	17.3	27	19	124	25.3	394	15.9	264	22.5	191	15.1	61	13.3
Housewife	88	25.8	465	18.3	31	21.8	51	10.4	529	21.4	165	14.1	258	20.4	137	29.8
Unemployed	31	9.1	58	2.3	7	4.9	44	9	48	1.9	59	5	26	2.1	11	2.4
Pearson's χ^2	$p = 0.000$						$p = 0.000$				$p = 0.000$					

lower school educational degrees, more often a lower job position, distinctly less financial resources and higher rates of unemployment.

Effects of socioeconomic factors and family characteristics on perceived psychosocial stress

As shown in Table 4, perception of psychosocial stress tended to decrease with mothers' age, but reached statistical significance only with respect to child-related stress. A low income was strongly associated with the perception of high financial strains. Mothers with low income reported also higher work-related stress, more conflicts with the partner and with other family members and suffered more often from loneliness. In contrast, also an inverse social gradient in the perception of psychosocial stress was found: higher educated mothers perceived more stress due to family demands as well as child-related and work-related burdens and they also reported significantly higher stress due to balancing job and family demands compared to women with lower educational attainment. Mothers in superior occupational positions also reported more work-

related stress and burdens due to reconcile work and family life as compared to mothers with lower occupational status. These burdens also increased with mothers' participation in the labor market, whereas child-related stress as well as distress due to loneliness decreased with increasing mothers' working time. Housewives reported the lowest, full-time mothers the highest level of financial strain. Overall, unemployed mothers perceived highest burdens reaching statistical significance with respect to work-related stress, financial strain and loneliness.

With regard to family characteristics, foremost single motherhood was associated with enhanced psychosocial stress: as compared to mothers living with a partner single mothers reported significantly higher levels of stress in almost each domain particularly with respect to loneliness, financial strain and child-related stress. Also age of youngest child affected mothers' stress perception: family demands and conflicts with other family members were highest when youngest child is aging between three and five years and tended to decrease when the child is getting older. Differently, child-related stress remained largely stable when the youngest child has reached this age group.

Table 4 Effects of family characteristics and socioeconomic factors on perceived psychosocial stress: mean values and *F* ratio, Germany 2009

Independent var.	Perceived stress							
	Family demands	Child-related stress	Conflicts with partner	Conflicts with family members	Living alone/loneliness	Combining job and family	Work-related stress	Financial strain
Age mother (years)								
20–29	2.75	2.64	2.43	1.99	1.90	2.37	2.64	2.94
30–39	2.92	2.76	2.28	2.06	1.87	2.36	2.73	2.92
40–49	2.90	2.56	2.25	2.00	1.87	2.20	2.68	2.75
50–60	2.82	2.39	1.91	1.71	1.90	1.99	2.45	2.78
<i>F</i> ratio	1.71, <i>p</i> = 0.320	3.84, <i>p</i> = 0.009	2.39, <i>p</i> = 0.067	2.27, <i>p</i> = 0.079	0.08, <i>p</i> = 0.969	2.59, <i>p</i> = 0.051	1.32, <i>p</i> = 0.267	2.08, <i>p</i> = 0.101
Education (years)								
≤9	2.64	2.47	2.15	1.89	1.98	2.12	2.42	2.86
10	2.87	2.62	2.27	1.99	1.85	2.18	2.72	2.82
≥12	3.03	2.68	2.23	1.93	1.82	2.39	2.74	2.87
<i>F</i> ratio	12.30, <i>p</i> = 0.000	33.74, <i>p</i> = 0.024	1.39, <i>p</i> = 0.250	1.40, <i>p</i> = 0.248	5.08, <i>p</i> = 0.006	6.41, <i>p</i> = 0.002	10.51, <i>p</i> = 0.000	0.34, <i>p</i> = 0.712
Job position								
Lowest	2.71	2.75	2.20	1.99	1.92	2.01	2.53	2.98
Low	2.88	2.50	2.20	1.95	1.84	2.13	2.57	2.90
Intermediate	2.94	2.54	2.28	1.90	1.85	2.17	2.50	2.82
High	2.86	2.56	2.18	1.92	1.95	2.61	2.90	2.69
<i>F</i> ratio	1.82, <i>p</i> = 0.141	2.79, <i>p</i> = 0.039	0.59, <i>p</i> = 0.619	0.33, <i>p</i> = 0.807	1.38, <i>p</i> = 0.246	8.94, <i>p</i> = 0.000	5.55, <i>p</i> = 0.001	2.11, <i>p</i> = 0.097
Per capita income								
≤925 €	2.86	2.66	2.41	2.15	2.01	2.32	2.97	3.48
926–1,542 €	2.86	2.57	2.12	1.88	1.86	2.24	2.51	2.80
≥1,543 €	2.82	2.53	2.12	1.79	1.79	2.14	2.34	2.27
<i>F</i> ratio	0.19, <i>p</i> = 0.828	1.42, <i>p</i> = 0.243	9.70, <i>p</i> = 0.000	12.59, <i>p</i> = 0.000	9.46, <i>p</i> = 0.000	2.40, <i>p</i> = 0.091	29.57, <i>p</i> = 0.000	114.92, <i>p</i> = 0.000
Employment status								
1–19 h/week	2.78	2.76	2.19	1.94	1.86	2.18	2.21	2.64
20–37 h/week	2.93	2.67	2.24	1.92	1.85	2.56	2.54	2.80
≥38 h/week	2.75	2.42	2.20	1.88	1.72	2.73	2.59	2.82
Housewife	2.84	2.63	2.05	1.95	1.80	–	–	2.53
Unemployed	2.93	2.46	2.40	2.01	2.20	–	3.80	3.46
<i>F</i> ratio	2.48, <i>p</i> = 0.042	5.00, <i>p</i> = 0.001	1.83, <i>p</i> = 0.121	0.32, <i>p</i> = 0.868	6.26, <i>p</i> = 0.000	47.52, <i>p</i> = 0.000	40.45, <i>p</i> = 0.000	11.68, <i>p</i> = 0.000
Number of children								
1	2.54	2.33	2.05	1.86	1.96	2.14	2.65	2.79
2	2.85	2.71	2.27	1.95	1.89	2.25	2.65	2.84

Table 4 continued

Independent var.	Perceived stress							
	Family demands	Child-related stress	Conflicts with partner	Conflicts with family members	Living alone/loneliness	Combining job and family	Work-related stress	Financial strain
>2	3.15	2.73	2.33	2.00	1.81	2.31	2.58	2.91
<i>F</i> ratio	26.94, <i>p</i> = 0.000	23.83, <i>p</i> = 0.000	7.76, <i>p</i> = 0.000	<i>1.71, p</i> = 0.181	3.42, <i>p</i> = 0.033	<i>2.39, p</i> = 0.092	<i>0.32, p</i> = 0.727	<i>0.98, p</i> = 0.376
Age of youngest child								
0–2	2.94	2.31	2.18	1.84	1.95	2.29	2.57	2.92
3–5	3.04	2.64	2.27	2.10	1.91	2.33	2.77	2.90
6–11	2.89	2.65	2.26	1.94	1.89	2.25	2.65	2.86
12–15	2.74	2.66	2.19	1.85	1.84	2.10	2.59	2.83
16–18	2.63	2.69	2.18	1.96	1.87	2.18	2.54	2.73
<i>F</i> ratio	3.93, <i>p</i> = 0.003	4.28, <i>p</i> = 0.002	<i>0.51, p</i> = 0.729	3.31, <i>p</i> = 0.010	<i>0.58, p</i> = 0.677	1.67, <i>p</i> = 0.154	<i>1.71, p</i> = 0.145	<i>0.68, p</i> = 0.606
Single motherhood								
Yes	2.96	2.83	2.40	1.92	2.56	2.42	2.82	3.09
No	2.73	2.35	2.03	1.95	1.21	2.04	2.43	2.61
<i>F</i> ratio	10.60, <i>p</i> = 0.000	42.45, <i>p</i> = 0.000	23.86, <i>p</i> = 0.000	<i>0.18, p</i> = 0.675	759.72, <i>p</i> = 0.000	27.23, <i>p</i> = 0.000	28.22, <i>p</i> = 0.000	44.20, <i>p</i> = 0.000
Age at first birth (years)								
Early (≤20)	2.70	2.67	2.12	1.81	1.94	2.08	2.83	2.90
Intermediate (21–34)	2.96	2.51	2.25	1.89	1.94	2.35	2.55	2.92
Late (≥35)	2.88	2.59	2.28	2.11	1.79	2.26	2.49	2.73
<i>F</i> ratio	4.55, <i>p</i> = 0.011	<i>2.01, p</i> = 0.134	<i>0.94, p</i> = 0.391	<i>2.02, p</i> = 0.133	<i>1.50, p</i> = 0.223	4.78, <i>p</i> = 0.009	4.57, <i>p</i> = 0.010	<i>1.23, p</i> = 0.293

Significant effects in bold, valid *n* varied between 2,294 and 2,310

Table 5 Effects of family characteristics, socioeconomic factors and perceived psychosocial stress on depressive symptoms: logistic regression statistics, Germany 2009

Predictors	Depressive symptoms							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
Single mother	1.69***	1.29–2.22	1.44*	1.31–1.41	1.28	0.93–1.77	0.74	0.50–1.11
Number of children								
1	0.72	0.50–1.02	0.72	0.48–1.08	0.65	0.43–0.98	0.86	0.55–1.36
2	0.85	0.62–1.16	0.85	0.60–1.22	0.80	0.56–1.15	0.85	0.57–1.26
>2	ref.		ref.		ref.			
Age youngest child (years)								
0–2	1.77	0.98–3.19	1.37	0.70–2.70	1.78	0.88–3.59	1.43	0.66–3.07
3–5	2.06**	1.22–3.47	1.77	0.98–3.20	1.93*	1.06–3.52	1.36	0.70–2.64
6–11	1.97**	1.29–3.01	1.89**	1.17–3.05	1.96**	1.20–3.19	1.58	0.92–2.70
12–15	1.89**	1.26–2.82	1.99**	1.26–3.14	1.99**	1.25–3.16	2.00**	1.20–3.33
16–18	ref.		ref.		ref.		ref.	
Age at first birth (years)								
Early (≤ 20)	0.89	0.44–1.78	0.70	0.32–1.51	0.57	0.26–1.26	0.68	0.29–1.60
Intermediate (21–34)	0.94	0.55–1.62	0.92	0.51–1.68	0.83	0.45–1.52	0.93	0.48–1.82
Late (≥ 35)	ref.						ref.	
Income (€)								
<60% of median			1.67**	1.16–2.41	1.78**	1.23–2.58	1.62*	1.08–2.44
61–99% of median			1.04	0.76–1.43	1.08	0.78–1.49	1.19	0.84–1.69
≥ 100 of median			ref.		ref.		ref.	
School education (years)								
≤ 9			0.77	0.53–1.12	0.81	0.55–1.19	0.98	0.64–1.49
10			1.07	0.77–1.48	1.06	0.77–1.48	1.17	0.82–1.68
≥ 12			ref.		ref.		ref.	
Job position								
Lowest			1.35	0.74–2.48	1.43	0.77–2.70	2.04*	1.03–4.03
Low			0.90	0.55–1.49	0.97	0.59–1.62	1.10	0.63–1.92
Intermediate			0.99	0.61–1.60	1.03	0.64–1.67	0.97	0.57–1.65
High			ref.		ref.		ref.	
Employment status								
Unemployed					1.69	0.83–3.43	1.69	0.83–3.43
Housewife					0.55**	0.32–0.89	0.53*	0.32–0.89
1–19 h/week					0.75	0.50–1.12	0.84	0.54–1.31
20–37 h/week					1.06	0.75–1.50	1.04	0.71–1.52
≥ 38 h/week					ref.		ref.	
Psychosocial stress								
Family demands							3.25***	2.44–4.32
Child-related stress							1.08	0.79–1.48
Work-related stress							1.55**	1.13–2.13
Combining job–family							1.04	0.74–1.47
Conflicts with partner							3.04***	2.22–4.16
Conflicts with other family members							1.45*	1.02–2.08
Living alone/loneliness							2.37**	1.48–3.80

Table 5 continued

Predictors	Depressive symptoms							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
Nagelkerke Pseudo- R^2	0.27		0.29		0.30		0.43	
<i>n</i>	2,657		2,183		2,151		2,103	

OR odds ratio, CI confidence interval

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$, significant effects in bold, adjusted for mothers' age and personality trait (Life Orientation Test Score). Financial strain was not considered in Model 3 due to strong correlation with low income

With number of children family demands, child-related stress and conflicts with (former) partner increased whereas loneliness significantly decreased. Time of first motherhood has just a moderate impact on the perception of psychosocial stress. Early mothers perceived significant higher levels of work-related stress as compared to late mothers, whereas stress due to family demands and combining job and family were significantly less frequent among early mothers in particular compared to the 'intermediate' mothers.

Impact of social factors on mothers' health

Single motherhood and having a youngest child below 16 years of age was associated with increased risk of maternal depression, whereas no significant impact of number of children and time of first motherhood was found (Table 5, Model 1). By adding socioeconomic factors (Model 2) the influence of single motherhood decreased but remained statistically significant, whereas a youngest child between 3 and 5 years failed to reach statistical significance. Low income revealed to be most important for high depression scores. Low school education tended to decrease whereas being on the bottom of the occupational status hierarchy increased the risk of depressive symptoms, but these differences did not reach statistical significance. By adding employment status (Model 3) the significant impact of single motherhood disappeared, whereas income was still relevant and having a youngest child aging between 3 and 5 years reached again statistical relevance. When compared with full-time mothers, unemployed mothers tended to show increased depressive symptoms while being housewife significantly decreased the risk of depression. By adding perceived psychosocial stress (Model 4) having a very low occupational position achieved statistical significance while the impact of income and being housewife decreased, but remained significant at the 95% level. Having a youngest child at puberty still increased the risk of mothers' depression, whereas all other age groups failed to reach statistical significance. Generally, the impact of perceived psychosocial stress on mental

health was found to be remarkably strong, the explained variance increased from 0.30 (Model 3) to 0.43 (Model 4). Particularly stress due to family demands and conflicts with the (former) partner contributed significantly to the risk of maternal depression. In addition, the other psychosocial stressors except for child-related stress and stress due to balancing job and family demands showed a significant impact on mental health.

Discussion

This paper analyzed the way in which socioeconomic status, family structure and perceived psychosocial stress are linked in mothers and how these social factors contribute to women's health. As our study is based exclusively on the subjective data, the association between perceived stress and self-reported mental health should be interpreted cautiously, as there is some evidence that individual differences in personality traits may affect the reporting of stressors and health problems alike (Stronks et al. 1998). In addition, with our cross-sectional study design, we cannot draw conclusions about causality, but we assume that social factors act on depressive symptoms rather than the other way around (Power et al. 2002). To minimize sources of error caused by self-reported measures, we adjusted for optimism/pessimism as a personality trait that may influence mothers' responses. However, further investigations with repeated measures over time as well as more objective measures of mental health are needed to further validate the findings.

Associations between socioeconomic factors and family characteristics

With these restrictions in mind, the analyses revealed strong associations between socioeconomic status and family characteristics indicating that in particular early mothers and mothers with more than two children were prone to socioeconomic disadvantages. Graham (2007) argued that early and lone motherhood independently increased the risk of persisting disadvantage, compounding

the effects of childhood disadvantage with which both are associated. She pointed out that beside childhood disadvantages captured by the concept of ‘the socioeconomic lifecourse’ (Kuh et al. 2004) also partnership and parenthood histories are critical determinants of women’s lifetime circumstances. However, so far this ‘domestic lifecourse’ has not been adequately taken into consideration in concepts linking socioeconomic circumstances in childhood to adult social status (Graham et al. 2010). Our findings give support to the significance of domestic lifecourse analyses for better understanding onset and maintenance of social inequalities in women.

Effects of socioeconomic factors and family structure on perceived stress

In accordance with expectations, low-income mothers reported higher strain due to financial hardship as well as work-related stress. This is in line with Stronks et al. 1998 who pointed out that psychosocial stressors frequently have structural origins. In particular, this holds for single mothers who reported remarkably higher levels of financial burdens and work-related stress. Moreover, low income was also associated with higher stress due to conflicts with the (former) partner and with other family members and stress due to living alone and loneliness. This finding gives support to the assumption that financial restrictions not only caused material problems, but also affected partnership and evoked feelings of loneliness. However, also an inverse social gradient in the perception of psychosocial stress was found indicating that higher educated mothers perceived more stress due to family demands, child-related and work-related burdens and also suffered from higher stress due to balancing job and family demands. A study by Mathiesen et al. (1999) led to similar results revealing that parental problems with children’s behavior and with child care did not show the common social gradient which could be found for other types of stress. As an extension our study suggests that stress due to balancing job and family demands was more pronounced among higher educated mothers. Similarly, early mothers exclusively perceived higher work-related stress, whereas no significant associations with financial strain and other burdens were found, even though they were socially disadvantaged. All in all the results provide evidence that associations between social status and maternal psychosocial stress may be different from what is known about the overall relationships between social disadvantages and stress experience.

Impact of social factors on mothers’ health

Our analyses revealed that about 22% of mothers reported high levels of depressive symptoms. Depression therefore

seems to be an important health issue in women with childcare responsibilities. When compared with a previous study (Hinz and Schwarz 2001), mental health problems are more pronounced in this study. However, studies often failed to differentiate between mothers and women without childcare leading to reduced comparability of results. To gain a more precise picture of maternal health, distinction between women and mothers should become more important in social–epidemiological research.

On the question of what factors accounting for maternal depressive symptoms, our findings are pointing to the importance of stressors related to childrearing and partnership. Recent studies on parental health have already emphasized the health-related impact of an unsatisfactory couple relationship, the lack of confidants and chronic strain related to children and child care taking (Mistry et al. 2007; Naerde et al. 2000; Romito et al. 1999). Our findings underline the significance of family- and partner-related problems, while against expectations child-related problems or burdens due to combining job and family demands did not affect mothers’ mental health. One possible explanation might be that benefits related to caring for the children and working outside the home may have compensating effects on perceived burdens and thus protect from adverse health consequences. The number of children tended to affect mothers’ mental health indicating enhanced risks with increasing number of children. Although this association failed to reach statistical significance it confirms the results of previous studies revealing increasing health risks of parents with the number of children (Artazcoz et al. 2004; Matthews and Power 2002). In accordance with the previous studies, single motherhood also showed a significant impact on depressive symptoms (Curtis and Phipps 2004; Lahelma et al. 2002; Whitehead et al. 2000). By introducing socioeconomic factors into the explanatory model, the influence of single motherhood on mental health decreased, but remained statistically significant. This effect had already been demonstrated and interpreted in the way that the health risks of single motherhood are in part due to socioeconomic circumstances, but could not solely explained by financial hardship (Lahelma et al. 2002). After adding employment status in the model, the significant impact of single motherhood disappeared indicating that employment conditions contributed to depressive symptoms among single mothers. Housewives revealed to be at lowest risk for mental health problems suggesting that a higher employment rate among single mothers may contribute to their higher mental health problems. The finding that being a housewife seemed to be the best choice with respect to maternal mental health is contrary to previous studies that reported elevated health risks among housewives as compared to mothers in paid work (Fokkema 2002; Khlal et al. 2000). Also against

expectation, the risks of depressive symptoms were not highest among mothers with very young children, but with children aging between 12 and 15. This may lend support to the assumption that having children in puberty may represent a risk factor for maternal depressive symptoms. As had been already shown for psychosocial stress we also found no higher prevalence of depressive symptoms among early mothers, whereas previous research suggested mental health disadvantages of early mothers (Mirowsky and Ross 2002; Deal and Holt 1998). Unexpectedly, we also found only a low-income level increasing the risk of depressive symptoms, whereas low levels of school attainment proved to be of minor relevance. Ambiguous results of our study might be due to the fact that health-related impacts of each single social factor may differ in dependence of women's living circumstances. Supporting this assumption, Fokkema (2002) found that the health-related impact of employment status differs according to children's age and family status. Similarly, Artazcoz et al. (2004) have shown that family demands had different effects in dependency of women's educational attainment. This may lead to the conclusion that focussing on living circumstances rather than on isolated social factors would be more adequate to depict health-related living conditions in a more comprehensive way. Appropriate statistical methods for this objective might be explorative procedures like cluster analysis which so far have scarcely received recognition in social-epidemiological research.

All in all our findings suggest that associations between social status and maternal mental health are influenced by different risk factors as compared to the male population. Hence, conventional approaches using exclusively income, occupational status and school attainment seem to be insufficient for adequately depicting social determinants of mothers' health. Our results rather underline the importance of life-phase-specific stressors to which more attention in health inequality research could be given in the future.

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