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Socioeconomic position and perceived barriers to accessing mental health care for individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

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Transparency declaration

Aake Packness affirms that this manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned have been explained.

Abstract

Objective: To evaluate if perceived barriers to accessing mental health care (MHC) among individuals with symptoms of depression are associated with their socioeconomic position (SEP).
Design: Cross-sectional questionnaire-based population survey from the Lolland-Falster Health Study (LOFUS) 2016-17 including 5,076 participants.
Participants: The study included 372 individuals who scored positive for depression in the Major Depression Inventory (MDI).
Interventions: A set of five questions on perceived barriers to accessing professional care for a mental health problem was prompted to individuals responding with symptoms of depression (MDI score >20).
Outcomes: The association between SEP (as measured by education, employment status, and financial strain) and five different types of barriers to accessing MHC were analysed in separate multivariable logistic regression models adjusted for gender and age.
Results: 314 out of 372 (84%) completed the survey questions and reported experiencing barriers to MHC access. Worry about expenses related to seeking or continuing MHC was a considerable barrier for 30% of the individuals responding, and as such the greatest problem. 22% perceived stigma as a barrier to accessing MHC, but there was no association between perceived stigma and SEP. Transportation was the barrier of least concern for individuals in general, but also the issue with greatest and most consistent socioeconomic disparity (odds ratio (OR) 2.99; confidence interval (CI) 1.19 – 7.52) for lowest vs highest educational groups, and likewise concerning expenses (OR 2.77, CI 1.34 – 5.76) for the same groups.
Conclusion: Issues associated with *Expenses* and *Transport* are more frequently perceived as barriers to accessing MHC for people in low SEP compared to people in high SEP. Stigma showed no association to SEP.

Informed written consent was obtained. Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015) approved the study.

Strengths and limitations of this study:

- A strength of this study is that it is a population study in a socioeconomically-deprived area and combines data on present depression scores and SEP with proportions of perceived barriers to accessing mental health care services; thus, the study can shed light on factors that deter individuals with symptoms of depression from seeking MHC services.
- The questions used to assess barriers to accessing mental health care are not standardized, although they were validated for content and do have external validity.
- There was a potential overlap in the questions, between transportation barriers and barriers of expenses related to seeking or continuing mental health care services. Thus it was not clear whether "expenses" included "transport expenses" and whether transport was a logistical or economical barrier.

Introduction

Major depressive disorders (MDD) rank third among leading causes of years lived with disability (YLD) in high-income countries, as MDD is common and has an early onset.[1] Mental health problems in early age can have a profound impact on educational achievements[2], on income[3], and on later unemployment[4]. Additionally, having a diagnosis of depression is associated with a substantially shorter life expectancy [5].

In spite of this, far from all people suffering from depression are treated. In a Norwegian survey study only 12% of respondents with symptoms of depression had ever sought help [6], and a Canadian study found that 40% with symptoms of depression or anxiety perceived an unmet need for care [7]. Generally, treatment of patients suffering from depression is insufficient even in high-income countries, as only one in five receives adequate treatment[8].

Depressive disorders are closely associated with socioeconomic position (SEP). A dose response relationship has been found between income as well as education on incidence, prevalence, and persistence of depression[9]. Likewise, studies have found negative socioeconomic changes increase the risk of incidents of mental disorders, particularly of mood disorders [10], and financial strain in itself is associated with depressive disorder[11 12].

Thus, people in low SEP may have a higher need for mental health care due to increased incidence and prevalence of depression. A recent study found predictors of need for highly-specialized MDD care to be: depression severity, younger age at onset, prior poor treatment response, psychiatric comorbidity, somatic comorbidity, childhood trauma, psychosocial impairment, older age, and a socioeconomically disadvantaged status[13]. Although people in low SEP have an increased need for mental health services, it is not evident that they use more specialized care. Some studies have found access to specialist care to be based on clinical need, with little inequity in SEP[14 15 16], whereas others report specialized mental health services are not provided equally to persons in low SEP according to need [17 18 7 19] or that higher SEP is associated with more usage of specialized mental health services [20 21].

The background for initiating the present study was that health care statistics (unpublished) in 2013 revealed a significant disparity, as the most socioeconomically deprived municipality in Denmark (Lolland), had 20% fewer individuals in contact with out-patient mental health care (psychologist, private or public psychiatry) than could be expected for the population size (unpublished). Several reasons may account for this discrepancy between expected need and actual use of mental health care services, one of them being perceptions of barriers that affect patients' choices or preferences, which we aimed to address in this study.

The study objective was to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to SEP. We thereby expected to gain knowledge valuable to addressing inequity in the use of mental health care services.

Method

Study design

The study was conducted as a cross-sectional questionnaire-based population survey.

Setting

The Danish health care system is tax-funded and free at delivery for both primary and secondary care; for adults, dental care and psychotherapy are only partly subsidized[22]. The general practitioner (GP) fulfills a gatekeeper function, as specialized care is only free after GP referral. Psychotherapy by a psychologist is subsidized for patients referred by a GP for specific conditions: reaction to specific traumatic events; moderate depression; and, specifically for citizens between 18 and 38 years old, moderate anxiety disorders. In 2014, the out of pocket cost to individuals at time of service was equivalent to 52€ for the first consultation and 44€ for the following sessions [23].

Study population and data sources

The Lolland-Falster Health Study (LOFUS) is a population survey conducted in the two remote municipalities of Lolland and Guldborgsund, located in a socioeconomically deprived area of Denmark that is a 1½-2 hours' drive south from the capital Copenhagen. In the 2017 national ranking of all 98 municipalities these two were ranked the most deprived and the 8th most deprived municipalities[24]. Together, the municipalities comprise 103,000 citizens, 50% being 50 years of age or older[25] in 2017. The study aims to enroll 25,000 participants of all ages and will be conducted from 2016 to 2020. Participants are randomly selected by civil registration numbers[26], invited by mail, and re-invited by phone. The study covers several health areas: mental health, health literacy, social issues, genetics, kidney, ear nose & throat problems, and more. Beyond questionnaire responses, LOFUS data contains blood samples and biometrics. The study is described in detail elsewhere[27]. The present study relies on responses to the questionnaire from adults, with data drawn from LOFUS at the end of 2017, while data collection was still ongoing.

The subjects included in this study are respondents with symptoms of depression. All respondents who scored >20 on the Major Depression Inventory (MDI) were prompted the specific questions on perceived barriers to seeking help for mental health problems, which are described below.

Independant variables

Major Depression Inventory

As part of the LOFUS questionnaire, the respondents filled out the Major Depression Inventory (MDI). The MDI is based on the 12-item Likert scale and has been found to have an adequate internal and external validity for defining different stages of depression[28]. The MDI is based on the ICD-10 diagnostic criteria for depressive disorder[29], with scores ranging from 0 to 50. We used the sum score after excluding the lowest score on question 8 or 9 and likewise the lowest score on item 11 or 12, which measured increased/decreased restlessness and increased/decreased appetite, respectively. Mild depression is covered by scores from 21 –

25, moderate depression from 26 – 30 and severe depression by scores from 31 – 50[30]. If more than two items were missing in the MDI, the score was categorized as missing[31].

Socioeconomic position

SEP was measured by employment status, educational attainment, and financial strain.

Employment status was gathered using 14 different items in the questionnaire. Respondents over the age of 67 were categorized as retired, unless they were employed. The categories of employment were reduced to four in the analyses: Working (employee; self-employed; combined employee and self-employed; military; secondary school pupil; postsecondary student; apprentice; house-wife/husband); Temporary not working (unemployed; rehabilitation; sickness leave 3 months or more); Retired (retired due to age; disability benefit; early retirement); and Other (Other).

Educational attainment was measured and classified as the following: *no postsecondary education* if the respondent did not complete any postsecondary education; *1-3 years postsecondary education* for vocational or academy/professional graduates of 1 - 3 years; *3+ postsecondary education* for baccalaureate matriculants who completed 3 - 4 years; and *academic* for those who completed graduate study of ≥5 years.

The questionnaire gathered responses concerning financial strain with the following question: *How often within the last 12 months have you had problems paying your bills?* With possible answers: *Never; Few months; Approximately half the months in the year; Every month*. In the analysis, the categories were reduced to three to gain power, merging *Approximately half the months in the year* and *Every month* into one category.

Extrinsic variables:

Sociodemographic variables included were gender, age, marital status, and cohabitation.

Questions on *Self-perceived general health* (SRH) were provided to respondents with a five-point Likert scale from *very good* to *very bad*. In addition, the presence of a *Long-standing health problem* was posed as a binary question and *General activity limitation* was gauged in three grades from *severely limited* to *not at all*. These questions were adopted from the European Health Status Module[32].

The questionnaire included inquiries regarding past and present medical problems; specifically concerning mental health status, the respondents were asked if they presently suffered or had ever suffered from anxiety disorder and/or depression.

Dependent variables

We developed a short list of questions to be included in the LOFUS questionnaire for respondents who scored positive for symptoms of depression. The questions were inspired by the *Barriers to Access to Care Evaluation* (BACE) questionnaire by Sara Clement et al.[33]. Their questionnaire contains 30 items, which was too many to include in the LOFUS study. The number of questions was reduced and grouped to cover the individual abilities in approaching care as described by Levesque et al.[34]: ability to perceive; ability to seek; ability to reach; ability to pay; and ability to engage (see supplementary material on Levesque et al.'s *Model of a conceptual* *framework of access to health care* and how the BACE-questions were reduced to five in suppl. table 1). A preliminary question on whether considering seeking care had ever been a problem was prompted before the five questions related to the abilities/perceived barriers:

Have any of the reasons listed below prevented, delayed, or discouraged you from getting or continuing professional care for a mental health problem?

It has had an impact, that I ..

1) … have been unsure what to do to get professional care. (termed "Knowledge" in the following)
2) … have been concerned for what others might think, say or do. (termed "Stigma")
3) … have had difficulty with transport or travelling for treatment. (termed "Transport")
4) … have not been able to afford the expenses that followed. (termed "Expense")
5) … have had bad experiences with professional care for mental health problems. (termed "Experience")
6) These questions are not relevant for me/I do not want to answer.

Answers to question 1 – 5 were listed in four grades ranging from *Not at all* to *Quite a lot;* question 6 was binary.

In a preliminary form, the questions were evaluated for content validity in a focus group interview consisting of a group of ten patients and relatives of psychiatric patients (the Panel of Relatives and Patients of Psychiatry Services in Region Zealand) in December 2014. The group found the themes relevant and the questions understandable. They offered some suggestions for rephrasing, which were subsequently followed. The same panel commented on the preliminary results of the study in December 2017.

Statistical analysis

For respondents with symptoms of depression we estimated the association between SEP and the outcome variables (five types of barriers to MHC: knowledge; stigma; transport; expense; experience) in separate multivariable logistic regression models after excluding respondents replying *Not relevant*. Likewise, we performed the same analyses with the three grades of depression (mild, moderate and severe) and depression score uncategorized (MDI score) as independent variables, which is presented as supplementary material. The SEP categories were employment status, education, and financial strain. *Working*, *postsecondary education,* and *no economic distress* were used as reference categories.

The logistic regression models were adjusted for age (18-59 versus 60+) and gender in addition to the variables studied in the univariate (crude) analysis.

The significance level used was 5% throughout, and all reported confidence intervals were 95%. All statistical analyses were done in Stata 15[35].

Patient and Public Involvement

The study objectives were discussed with the members of the Panel of Relatives and Patients of Psychiatry Services in Region Zealand along with the validation of the questions in December 2014. The preliminary results were discussed with the group again in December 2017. The final results were distributed to the group in February 2018 along with an invitation for additional comments. One member of the patient panel responded to the invitation and provided additional comments/discussion. Comments from patients are included in the discussion.

The published article will also be distributed to the patient panel.

Ethics

Informed, written consent was obtained from all participants. The study – along with the Lolland-Falster Health Study – was approved by Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015).

Results

Figure 1: Flow chart of sampling from Lolland-Falster Health Study

By December 21, 2017, a total of 20,680 adults (age 18+) had been invited to the LOFUS study. By December 31, 2017, a total of 5,395 adults had replied to the questionnaire. 319 did not reply on the MDI score element or failed to fill in more than two answers in the test, leaving 5,076, of whom 372 (7.3%) reported symptoms of depression and thus were prompted the questions on perceived barriers to seeking mental health care. 58 replied that the questions were not relevant or would not answer them, thus 314 individuals with a MDI score >20 were included in the analyses of SEP and perceived barriers (Figure 1).

Table 1. Characteristics of study sample and respondents with symptoms of depression

Table 1. Characteristics of study sample and respondents with symptoms of depression

		Total sample				**Symptoms of depression**	
Age group		**Male**	**Female**	**Total**	**Pct**	**MDI > 20**	**Pct**
	18-29	198	212	410	8,1	55	14,8
	30-39	180	250	430	8,5	41	11,0
	40-49	357	443	800	15,8	82	22,0
	50-59	519	681	1200	23,6	84	22,6
	60-69	632	666	1298	25,6	63	16,9
	70-79	396	371	767	15,1	41	11,0
	80+	95	76	171	3,4	6	1,6
	Sum	**2377**	**2699**	**5076**		**372**	
Marital status							
	Married	1538	1708	3246	64,5	181	49,6
	Partnership	73	108	181	3,6	15	4,1
	Separated	12	9	21	0,4	5	1,4
	Divorced	169	195	364	7,2	31	8,5
	Widower	59	164	223	4,4	11	3,0
	Not married	509	487	996	19,8	122	33,4
Cohabitating							
	Yes	1917	2141	4058	80,7	248	67,9
Secondary schooling							
	Studying	20	34	54	1,1	5	1,3
	< 8 years	290	203	493	9,7	35	9,4
	8 - 9 years	610	401	1011	19,9	87	23,4
	10 - 11 years	751	913	1664	32,8	112	30,1
	High school	522	896	1418	27,9	89	23,9
	Other/foreign	163	215	378	7,4	38	10,2
Postsecondary education							
	No postsecondary	415	529	944	18,6	112	30,1
	1-3 years postsecondary	1307	1238	2545	50,1	172	46,2
	3+ years postsecondary	495	784	1279	25,2	63	16,9
	Other	143	122	265	5,2	21	5,6
Occupational status							
	Work/study	1417	1526	2943	58,0	167	44,9
	Temp. No work	68	121	189	3,7	63	16,9
	Retired	843	966	1809	35,6	115	30,9
	Other	47	77	124	2,4	27	7,3
Financial strain							
	Not at all	2136	2404	4540	89,4	275	73,9
	Few months	175	213	388	7,6	60	16,1
	Half the months	23	22	45	0,9	13	3,5
	Every month	25	32	57	1,1	19	5,1
Self-rated health							
	Very good	306	328	634	12,5	7	1,9
	Good	1348	1524	2872	56,6	83	22,3
	Fair	616	697	1313	25,9	181	48,7
	Bad	89	137	226	4,5	90	24,2
	Very bad	12	6	18	0,4	9	2,4
General activity limitation							
	Not limited at all	1561	1630	3191	63,2	114	31,0
	Limited but not severely	672	906	1578	31,3	166	45,1
	Severely limited	132	146	278	5,5	88	23,9
Longstanding illness. Yes		1052	1200	2252	44,7	244	66,3
Anxiety, now or earlier. Yes		110	223	333	6,6	111	29,8
Depression, now or earlier. Yes		145	230	375	7,4	138	37,1
Medication anxiety. Yes		71	119	190	3,8	65	17,8
Medication antidepressants. Yes		85	173	258	5,1	66	18,0

The total sample consisted of 53% women; 64.5% of the respondents were married, and 80.7% were cohabitating (table 1). For the total group, mean age was 55.7 and median age was 57.4; for individuals scoring in the depressed range on the MDI, the mean age was 50.2 and the median was 51.4 years.

Compared to the total sample, the respondents reporting symptoms of depression were younger, and more likely to be living alone, and to be unmarried. They were also more likely to have no postsecondary education, to be temporarily out of work (16.9% vs 3.7%), and to experience more frequent financial strain. Furthermore, their health indicators included: lower self-rated health, more reports of limited physical functioning, more reports of long lasting disease, and former anxiety or depression diagnoses; and more reports to be currently in pharmacological treatment for these disorders.

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

Of those responding to the questions, more than half perceived no problems at all in accessing professional care, least of all transport.

Among those who did have concerns about accessing or continuing professional mental health care, *Expense* was the most common problem, as 30.1% indicated expenses had prevented, deterred, or delayed them either *Quite a lot* or *A lot* (both responses aggregated in the *Quite a lot +* category in Figure 2). Likewise, the second most common concern was related to *Stigma*, phrased in the questionnaire as “what others might think, say or do”, which was a serious concern for 22.3%; approximately the same proportion (21.2%) had concerns related to *Knowledge*, or how to find help for a mental health problem. Transport was not a problem for 78.6%, with only 11.7% reporting it negatively affected access.

Perceived barriers to accessing health care by SEP are shown in Table 2 (crude numbers are shown in Supplementary Table 2). Perceptions of *Stigma* did not show any significant difference across the socioeconomic groups, however measured. *Lack of Knowledge* was a significant problem for respondents without postsecondary education compared to those who had completed some postsecondary education (adjusted odd ratio (aOR) 2.26 confidence interval (CI) 1.1- 4.6) and for respondents with occasional (*Few months*), but not regular, financial strain when compared to those with no financial strain. Low SEP as measured by educational level and financial strain was associated with perceived barriers concerning *Transport* and *Expense*; whereas low SEP measured by employment status alone was associated with concerns related to *Transport*. The retired respondents were more likely to perceive *Bad Experience* as a barrier to seeking or continuing MHC compared to respondents who were working. *Transport* showed the greatest disparity across the socioeconomic groups.

Table 2. Adjusted odds ratios for perceived barriers for accessing MHC by three indicators of SEP

Table 2. Adjusted odds ratios for five perceived barriers accessing mental health care by employment status, education, and financial strain

	Employment status				**Education**					**Financial strain**				
Stigma	**aOR**	**CI**		**n**		**aOR**	**CI**		**n**		**aOR**	**CI**		**n**
Working	1			291	3+years	1			290	Not at all				289
Temp. Not working	.9201	.4880	1.735		1 – 3 years	1.087	.5740	2.058		Few months	.8994	.4841	1.671	
Retired	.6808	.3420	1.356		No postsecondary	1.166	.5833	2.332		Half the time+	1.749	.6933	4.410	
Other	.3815	.1431	1.017		Other	.6699	.1969	2.279						
Knowledge														
Working	1			292	3+ years	1			291	Not at all	1			290
Temp. Not working	1.204	.6390	2.268		1-3 years	1.597	.8309	3.070		Few months	**2.515**	**1.335**	**4.739**	
Retired	.5003	.2480	1.009		No postsecondary	**2.263**	**1.115**	**4.592**		Half the time+	2.372	.9404	5.985	
Other	.5004	.1884	1.329		Other	**4.752**	**1.297**	**17.412**						
Expense														
Working	1			289	3+ years	1			288	Not at all				289
Temp. Not working	1.700	.8911	3.323		1-3 years	1.835	.9324	3.612		Few months	**4.268**	**2.172**	**8.385**	
Retired	1.537	.7451	3.171		No postsecondary	**2.773**	**1.336**	**5.757**		Half the time+	**9.623**	**2.708**	**34.194**	
Other	.7456	.2822	1.970		Other	2.031	.5762	7.156						
Experience														
Working	1			287	3+ years	1			286	Not at all	1			286
Temp. Not working	.9581	.4820	1.905		1-3 years	1.043	.5392	2.019		Few months	1.152	.5999	2.212	
Retired	**2.143**	**1.024**	**4.485**		No postsecondary	.6435	.3073	1.347		Half the time+	2.385	.9685	5.874	
Other	1.531	.5932	3.952		Other	.7503	.2024	2.781						
Transport														
Working	1			290	3+ years	1			289	Not at all				288
Temp. Not working	**3.184**	**1.463**	**6.931**		1-3 years	1.603	.6502	3.954		Few months	1.746	.8392	3.634	
Retired	**4.442**	**1.900**	**10.384**		No postsecondary	**2.988**	**1.187**	**7.518**		Half the time+	**9.889**	**3.745**	**26.113**	
Other	2.169	.6948	6.773		Other	1.019	.1835	5.659						

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), significant results are marked in bold

SEP showed no association with any of the barriers or with years of schooling (not shown). Using depression as independent variable, we found that severity of depression (both measured as a categorical variable and a score) was associated with perceived barriers in relation to *Expense* and *Transport*, but not associated with any other perceived barriers (see Supplementary Material Table 3).

Discussion

Principal findings

In this study of perceived barriers to accessing mental health care by respondents with present symptoms of depression, we found that expense was a considerable problem for almost 1/3 of the respondents; this perception was more prevalent among individuals without postsecondary education and individuals experiencing financial strain. Transport presented the least difficult barrier in general; but on the other hand, transportation also presented the greatest and most consistent socioeconomic disparity. Transport and expenses associated with mental health care are a problem for disadvantaged individuals.

Stigma was an issue of concern for 22% of the respondents but did not vary significantly according to SEP, whereas lack of knowledge about how to get help was a significantly greater problem for individuals without postsecondary education as compared to individuals with postsecondary education.

Lack of knowledge about how get to help and bad experience were perceived as a problem for 1/5 of the individuals overall as well.

Strengths and weaknesses of the study

A strength of this study was its use of information from a population study from a deprived area in combination with data on present depression score, information on SEP, and perceived barriers to accessing MHC; by this design we were able determine the significance of different barriers to access for potential MHC patients in a deprived area. We are not aware of similar studies.

In a recent systematic review of tools measuring help-seeking for mental health problems, Wei, McGrath and Hayden et al. found no single tool to be preferable over others, but recommended researchers consider tools according to the population studied. It seemed that the Mental Health Literacy Scale performed best as a help-seeking measurement tool for mental health, but the authors were reluctant to give general recommendations[36]. Measuring help-seeking behaviors in mental health is a relative new scholarly field and is still developing. A limitation in our study was that the items used as dependable variables were not fully validated; validation would be preferable in order to compare to other studies. The BACE-3, at 30 questions, was too extensive to use in the LOFUS study, which already consisted of close to 100 questions; this was also the reasoning behind our focus on five central concepts of barriers to access. The external validity of the questions is supported by the use of generally accepted and validated concepts of abilities and as such is comparable to other studies. The content validity was tested by the panel of patients and patients' relatives and the questions found to be sound, but in retrospect, might not measure the concept of self-efficacy very well. We used the answer *Not relevant/Do not want to reply* as an indicator that the individual preferred to handle problems without help. It would have been prudent, however, to ask a more direct question about perceptions of need for care; it is possible that some individuals did not find the question relevant because while they experienced mental health issues, they did not perceive a need for further care. We found no correlation between the answer to the question of relevance and SEP, except for retired respondents, who tended to state *Not relevant* less, compared to respondents working (not shown).

The question about transport was also not clearly separated from the question about perceived barriers in relation to expenses, as it was not specified whether expenses included transportation-related expenses. Thus, we have no clear distinction between whether *Transport* as a barrier is primarily a logistical or economical barrier, or some combination thereof.

Comparison with other studies

The total sample contained more respondents in the age group 50 – 69 and fewer in the age groups younger and older compared to the study population; additionally, the group without any postsecondary education was under-represented by a factor of 3, compared to the age group 15-64 in the two municipalities studied, according to general population statistics drawn from Statistics Denmark[25]. For the total sample, questions on self-rated health (SRH) were rated higher in the sample than the national levels[37] even though long-lasting illness was more prevalent in the sample (44.7% compared to national rate of 35.6%)[37]; the rate of respondents with *severely limited physical functioning* was close to the national proportions[38]. The group with symptoms of depression had scores well below national levels in all health-related variables. The total sample may overrepresent the middle-aged to older part of the population, an issue seen in national surveys, too[39].

7.3% had symptoms of depression when the summed MDI score was used, which is a considerably higher rate than found by any other survey in Denmark; however, a recent national survey reported that 7.0% adults suffer from depressed mood, including 7.8% in the Region of Zealand[37]. Eurostat reported a prevalence of 6.3% adults with depressive symptoms and 3% with major depression symptoms in Denmark[40]. In the present study, 225 respondents reported both a core symptom of depression *Most of the time* or more and a summed MDI score >20, equivalent to a MDD prevalence of 4.4%. A comparable study by Ellervik et al. found 2.5% with a summed MDI score >25; we found 3.8%[41]. The present data is a subsample from a population survey in a deprived area, which could explain the high rate of depression symptoms found.

We found perceived stigma to be of *Quite a lot* or *A lot of concern* for 20% of the respondents. This corresponds with findings in a systematic review, where overall 20 – 25% respondents in 44 studies reported stigma as a barrier to accessing mental health services[42]. Stigma showed no association to SEP in our data. We have not been able to verify this in other studies except for one Canadian study, which likewise found no association between years of education and experiencing stigma in mental health care. However, they did find perceived stigma more prevalent among respondents not working[43]. In the Panel of Relatives and Patients of Psychiatry Services of Region Zealand, it was said that patients with mental disorders, and their relatives, pull the curtains together when they meet with each other privately, and that patients are indeed concerned with what others might think.

One in five experienced *Knowledge* as a barrier and had doubts about what to do to get professional help. With free access to a GP in Denmark, and the GP universally understood to be the gatekeeper for referrals, this is puzzling. Among respondents with symptoms of depression, 138 reported former or present depression, and 35 of them (25%) still answered that they experienced *Knowledge* to be a barrier *Quite a lot* or *A lot* of the time. Of those with symptoms of depression and presently taking antidepressant medication, 8 (12%) had doubts about what to do to get help. This could be due to the nature of the disease, but we did not find support for this, as we found no association to *Knowledge* with the severity of symptoms of depression. However, a Canadian study on perceived unmet need by respondents with symptoms of anxiety or depression found high symptom scores were associated with a higher degree of unmet need[7], and not knowing how or where to get help was the most reported reason. The Panel of Relatives and Patients of Psychiatry Services of Region Zealand was not very surprised by this finding: despite free access to a GP, one individual reported that he could not get a family-GP, but had to meet changing doctors in a regional clinic (due to lack of GP's in the area). Another mentioned the waiting time for an appointment with the GP could be weeks (due to lack of GP's).

It could be argued that older people may be more reluctant to use MHC and feel more stigmatized by the need for psychotherapy[44 45]. We did not find support for this, as the retired group did not differ in perception of stigma from employed persons. Likewise, older retired persons might be less willing to pay for the expenses associated with treatment, but we did not find support for this either, as expense was not a significant barrier for the group retired compared to the group working.

The expenses associated with mental health care were a common problem and concern of almost 1/3 of our respondents, and by two- to five-fold more by respondents without postsecondary education or in financial strain. Use of mental health care is sensitive to cost[46], and especially so for persons in low SEP[47]. A German study found that even with free access to a psychologist these services are used less by people in low SEP[19], which could be explained in part by our findings; people without postsecondary education may have less knowledge of how to access professional MHC, thus leading to lower usage of available services.

Experience with former mental health care treatment made retired respondents more reluctant to seek MHC as compared to the working population. This may not necessarily be due to bad experiences with health care professionals, though stigmatization can be a problem in health services too[48]; reports of past experience as a barrier could also indicate bad experience with side effects from a medication. Our study was not designed to capture or explore this nuance. Retired individuals are more likely to have more experience with health care, and this group includes people receiving early retirement pensions, which could indicate a chronic illness leading to early retirement and thus more opportunities for more bad experiences. The patient panel questioned the respondents' experience with MHC, since the rates of bad past experiences were so low; one remarking: "*Those who are really feeling bad have not participated in this survey"*. For the panel, bad experience was a common deterrent to MHC, which may indicate an important area of future study.

Transport was perceived to be a greater problem by persons in low SEP compared to individuals in high SEP. This aligns well with our previous findings of the impact of distance and SEP on MHC use by patients in antidepressant treatment[21]. However, the question was not well distinguished from the question on expenses. Difficulty with transport or travelling includes the time spent to reach services and coordinate with other obligations – taking care of family duties or take time off at work, etc. Reliance on infrequent or inadequate public transportation could also be a reason to answer positively to this question, but the study was not designed to capture information regarding public versus private transportation, e.g. The patient panel was surprised that transport was a minor issue for the respondents, since it was viewed by them to be both time-consuming and expensive.

Meaning of the study and possible explanations and implication for policymakers

The study aimed to evaluate why mental health services were used less in a deprived area of Denmark and if this was due to perceived barriers for the patients and furthermore was correlated to SEP. The answer is quite clear: lack of postsecondary education was linked to greater perceived barriers to mental health care and expenses are a barrier to mental health care for those with no postsecondary education and in financial strain. Low mental health literacy, defined as knowledge and beliefs about mental disorders which aid in their recognition, management and prevention[49], could be a part of the explanation, since low mental health literacy is also associated with low SEP[50]. Thus, empowering the community to take action for better mental health literacy[51] can lead to increased help-seeking by individuals in low SEP. In Denmark, two programs on improving mental health literacy exist: Mental Health First Aid[52] and the ABC mental health initiative[53], both adopted from Australia. An approach directed more specifically toward deprived areas within such programs might improve SEP equity in mental health care treatment.

Addressing barriers and easing access for the deprived is obviously necessary. Lack of postsecondary education is associated with greater prevalence of perception of barriers to mental health care, in addition to an increased prevalence of mood disorders. Clearly, our results showed that *Expense* is a barrier for people in low

SEP, but as found in the German study[19], people in low SEP use psychologists less frequently even with free access. Psychotherapy is associated with the ability to engage, which in itself could be more difficult if an individual struggles with social and economic problems on top of mental ones. In order to address these related barriers, the deprived and depressed probably have additional needs beyond medication and psychotherapy, such as social supports and social/domestic/workplace intervention.

In a future study it could be interesting to investigate the association between depression score, perceived barriers and use of MHC for a period after the score. Future research could also investigate which experiences cause retired respondents with symptoms of depression to hesitate to access mental health care. Further improvements and validation of a short form questionnaire as the present could be beneficial.

Author contributions

AP conceived the research and developed and validated the questions on barriers supervised by AH. AP wrote the first draft of the manuscript assisted by LHH. AH, ES, and FBW contributed to the data analysis, interpretation of results and critical revision of the manuscript.

Acknowledgement

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Data sharing: No additional data available

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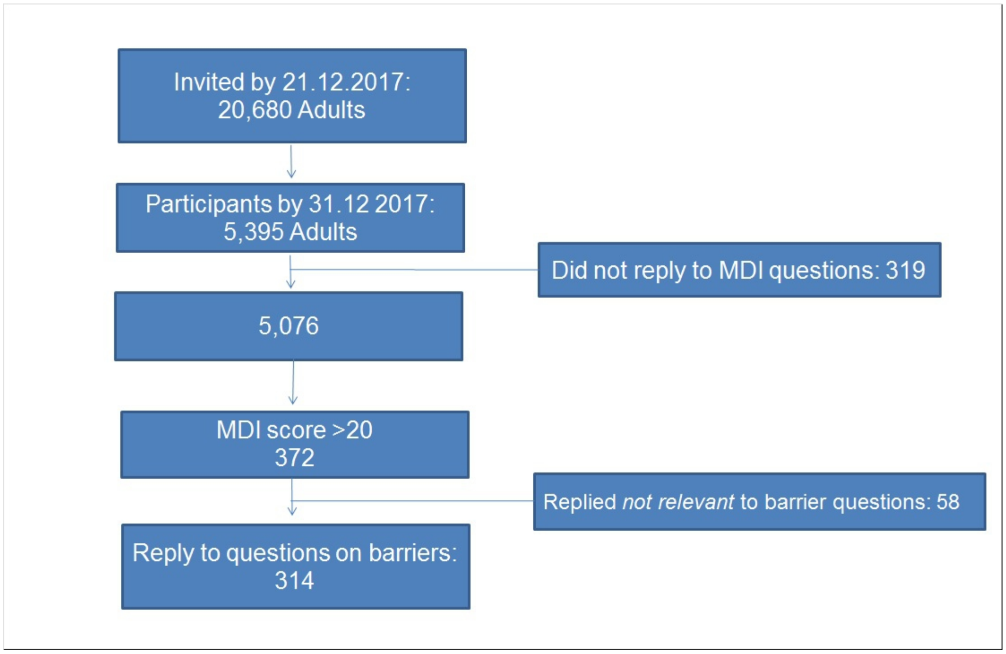

Figure 1: Flow chart of sampling from Lolland-Falster Health Study

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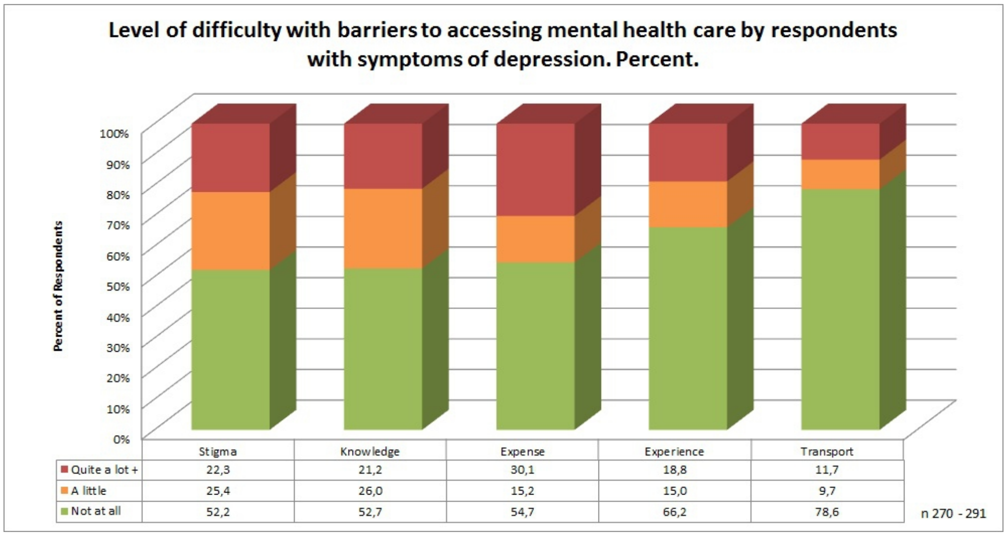

	Stigma	Knowledge	Expense	Experience	Transport
🟥 Quite a lot +	22,3	21,2	30,1	18,8	11,7
🟧 A little	25,4	26,0	15,2	15,0	9,7
🟩 Not at all	52,2	52,7	54,7	66,2	78,6

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

262x138mm (96 x 96 DPI)

Supplementary

Conceptual frame

Patients' choice of care will relate to personal preferences and abilities to access care. In a comprehensive theoretical approach by Levesque et al* they combine several theories on access to health care and final treatment outcome. The model is patient-centered and based on service demand and service supply between which they describe the stepwise fulfilment of needs in the process from recognizing a health care need to a finalized treatment. The model has five central concepts associated with enforcing or inhibiting access on the supply-side, and five corresponding abilities on the demand-side, likewise with associated enforcing or inhibiting factors.

Supplementary Figure 1: Model of a conceptual framework of access to health care*

Insert supp fig 1 here

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* Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health* 2013;12:18. doi: 10.1186/1475-9276-12-18.:18-12.

Supplementary table 1. The BACE-questions and derived condensated questions on barriers

Indsert pdf-table

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Supplementary table 2 Perceived barriers accessing MHC & symptoms of depression in crude numbers

Suppl. Table 2: Perceived barriers accessing MHC & symptoms of depression, crude numbers

Stigma	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	73	50	29	152	52,2
A little	39	20	15	74	25,4
Quite a lot	16	13	10	39	13,4
A lot	10	6	10	26	8,9
NA	11	6	6	23	
Sum	149	95	70	314	291
Knowledge	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	77	50	27	154	52,7
A little	41	21	14	76	26,0
Quite a lot	20	13	16	49	16,8
A lot	2	4	7	13	4,5
NA	9	7	6	22	
Sum	149	95	70	314	292
Expense	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	84	47	27	158	54,7
A little	20	14	10	44	15,2
Quite a lot	15	14	15	44	15,2
A lot	18	13	12	43	14,9
NA	12	7	6	25	
Sum	149	95	70	314	289
Experience	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	98	58	34	190	66,2
A little	22	11	10	43	15,0
Quite a lot	15	9	8	32	11,1
A lot	4	10	8	22	7,7
NA	10	7	10	27	
Sum	149	95	70	314	287
Transport	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	117	66	45	228	78,6
A little	10	11	7	28	9,7
Quite a lot	6	4	9	19	6,6
A lot	6	6	3	15	5,2
NA	10	8	6	24	
Sum	149	95	70	314	290

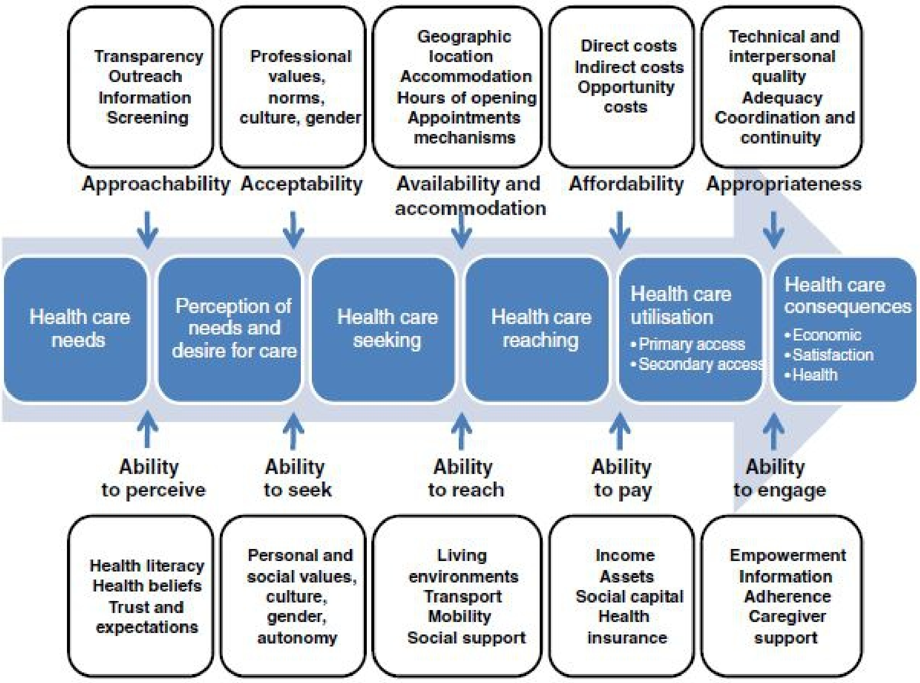
Supplementary table 3: Odds ratios for 5 perceived barriers accessing MHC by severity of symptoms of depression.

Suppl. Table 3. Adjusted odds ratios for five perceived barriers accessing mental health care by severity of symptoms of depression

	Stigma				**Knowledge**				**Expense**				**Experience**				**Transport**			
Dep. Grade	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**
Mild	1			291	1			292	**1**			289	1			287	1			290
Moderate	.8463	.4903	1.461		.9464	.5510	16.256		1.350	.7722	2.359		1.220	.6854	2.172		1.684	.8614	3.294	
Severe	1.259	.6867	2.309		1.723	.9420	3.151		**2.043**	**1.097**	**3.804**		1.739	.9220	3.279		**2.225**	**1.098**	**4.512**	
MDI score#	1.005	.9628	1.050		1.030	.9864	10.750		**1.063**	**1.016**	**1.112**		1.035	.9891	1.083		**1.076**	**1.024**	**1.130**	

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), marked bold

\# Major Depression Inventory scale > 20 ≤ 50, ungrouped



Supplementary Figure 1: Model of a conceptual framework of access to health care

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Supplementary table:* Condensation of the *Barriers to Access to Care Evaluation scale (BACE v3)

Q no	**BACE v3 Question**	Abilities#	Covered by question ¤
1	Being unsure where to go to get professional care	Perceive	1
2.	Wanting to solve the problem on my own	Perceive	(6)
3.	Concern that I might be seen as weak for having a mental health problem	Seek	2
4.	Fear of being put in hospital against my will	Seek	2
5.	Concern that it might harm my chances when applying for jobs	Seek	2
6.	Problems with transport or travelling to appointments	Reach	3
7.	Thinking the problem would get better by itself	Perceive	
8.	Concern about what my family might think or say	Seek	2
9.	Feeing embarrassed or ashamed	Seek	2
10.	Preferring to get alternative forms of care (e.g. spiritual care, non-Western healing / medicine, complementary therapies)	Perceive	
11.	Not being able to afford the financial costs involved	Pay	4
12.	Concern that I might be seen as 'crazy'	Seek	2
13.	Thinking that professional care probably would not help		(6)
14.	Concern that I might be seen as a bad parent	Seek	2
15.	Professionals from my own ethnic or cultural group not being available		
16.	Being too unwell to ask for help		
17.	Concern that people I know might find out	Seek	2
18.	Dislike of talking about my feelings, emotions or thoughts	Seek	
19.	Concern that people might not take me seriously if they found out I was having professional care	Seek	2
20.	Concerns about the treatments available (e.g. medication side effects)	Perceive	
21.	Not wanting a mental health problem to be on my medical records	Seek	2
22.	Having had previous bad experiences with professional care for mental health	Engage	5
23.	Preferring to get help from family or friends	Seek	
24.	Concern that my children may be taken into care or that I may lose access or custody without my agreement	Seek	2
25.	Thinking I did not have a problem	Perceive	6
26.	Concern about what my friends might think or say	Seek	2
27.	Difficulty taking time off work	Reach	
28.	Concern about what people at work might think, say or do	Seek	2
29.	Having problems with childcare while I receive professional care	Reach	3
30.	Having no one who could help me get professional care	Reach	

Clement et al. BMC Psychiatry 2012, 12:36

Development and psychometric properties the Development and psychometric properties the Barriers to Access to Care Evaluation scale (BACE) - related to people with mental ill health

According to model of Levesque et al. International Journal for Equity in Health 2013, 12:18
Patient-centred access to health care: conceptualising access at the interface of health systems and populations

¤ The questions in the questionnaire of the present study

STROBE Statement for the study: **Socioeconomic position and perceived barriers to access mental helath care by individuals with symptoms of depression. Results from the Lolland-Falster Health Study.**

	Item No	**Recommendation**	**Addressed on page:**
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	4
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5 - 6 Table 1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*5 - 6* *Supplement Table 1*
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	7 & Figure 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5 - 6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, explain how loss to follow-up was addressed	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Supplement table 2
		(c) Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	Report numbers of outcome events or summary measures over time	

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Table 3 Table 4 + 5
		(*b*) Report category boundaries when continuous variables were categorized	5
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	10-11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1 & 5

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.

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Socioeconomic position and perceived barriers to accessing mental health care for individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

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Socioeconomic position and perceived barriers to accessing mental health care for individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

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Transparency declaration
Aake Packness affirms that this manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned have been explained.

Abstract

Objective: To evaluate if perceived barriers to accessing mental health care (MHC) among individuals with symptoms of depression are associated with their socioeconomic position (SEP).
Design: Cross-sectional questionnaire-based population survey from the Lolland-Falster Health Study (LOFUS) 2016-17 including 5,076 participants.
Participants: The study included 372 individuals participating in LOFUS with positive scores for depression according to the Major Depression Inventory (MDI).
Interventions: A set of five questions on perceived barriers to accessing professional care for a mental health problem was prompted to individuals responding with symptoms of depression (MDI score >20).
Outcomes: The association between SEP (as measured by educational attainment, employment status, and financial strain) and five different types of barriers to accessing MHC were analysed in separate multivariable logistic regression models adjusted for gender and age.
Results: 314 out of 372 (84%) completed the survey questions and reported experiencing barriers to MHC access. Worry about expenses related to seeking or continuing MHC was a considerable barrier for 30% of the individuals responding, and as such the greatest problem among the five types of barriers. 22% perceived stigma as a barrier to accessing MHC, but there was no association between perceived stigma and SEP. Transportation was the barrier of least concern for individuals in general, but also the issue with greatest and most consistent socioeconomic disparity (odds ratio (OR) 2.99; confidence interval (CI) 1.19 – 7.52) for lowest vs highest educational groups, and likewise concerning expenses (OR 2.77, CI 1.34 – 5.76) for the same groups.
Conclusion: Issues associated with *Expenses* and *Transport* were more frequently perceived as barriers to accessing MHC for people in low SEP compared to people in high SEP. Stigma showed no association to SEP.

Informed written consent was obtained. Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015) approved the study.

Strengths and limitations of this study:

- A strength of this study is that it is a population study in a socioeconomically-deprived area and combines data on present depression scores and SEP with proportions of perceived barriers to accessing mental health care services; thus, the study can shed light on factors that deter individuals with symptoms of depression from seeking MHC services.
- The questions used to assess barriers to accessing mental health care are not standardized, although they were validated for content and do have external validity.
- There was a potential overlap in the questions, between transportation barriers and barriers of expenses related to seeking or continuing mental health care services. Thus it was not clear whether "expenses" included "transport expenses" and whether transport was a logistical or economical barrier.

Introduction

Major depressive disorders (MDD) rank third among leading causes of years lived with disability (YLD) in high-income countries, as MDD is common and has an early onset.[1] Mental health problems in early age can have a profound impact on educational achievements[2], on income[3], and on later unemployment[4]. Additionally, having a diagnosis of depression is associated with a substantially shorter life expectancy [5].

In spite of this, far from all people suffering from depression are treated. In a Norwegian survey study only 12% of respondents with symptoms of depression had ever sought help [6], and a Canadian study found that 40% with symptoms of depression or anxiety perceived an unmet need for care [7]. Generally, treatment of patients suffering from depression is insufficient even in high-income countries, as only one in five receives adequate treatment[8].

Depressive disorders are closely associated with socioeconomic position (SEP). A dose response relationship has been found between income as well as education on incidence, prevalence, and persistence of depression[9]. Likewise, studies have found negative socioeconomic changes increase the risk of incidents of mental disorders, particularly of mood disorders [10], and financial strain in itself is associated with depressive disorder[11 12].

Thus, people in low SEP may have a higher need for mental health care due to increased incidence and prevalence of depression. A recent study found predictors of need for highly-specialized MDD care to be: depression severity, younger age at onset, prior poor treatment response, psychiatric comorbidity, somatic comorbidity, childhood trauma, psychosocial impairment, older age, and a socioeconomically disadvantaged status[13]. Although people in low SEP have an increased need for mental health services, it is not evident that they use more specialized care. Some studies have found access to specialist care to be based on clinical need, with little inequity in SEP[14 15 16], whereas others report specialized mental health services as psychologist or psychiatrists are not provided equally to persons in low SEP according to need [17 18 7 19] or that higher SEP is associated with more usage of specialized mental health services [20 21].

The background for initiating the present study was that health care statistics (unpublished) in 2013 revealed a significant disparity, as 20% fewer individuals in the most socioeconomically deprived municipality in Denmark (Lolland) had been in contact with out-patient mental health care (psychologist, private, or public psychiatry) than could be expected for the population size (unpublished). Several reasons may account for this discrepancy between expected higher need in a deprived area and actual use of mental health care services, one of them being perceptions of barriers that affect patients' choices or preferences, which we aimed to address in this study.

The study objective was to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to SEP. We thereby expected to gain knowledge valuable to addressing inequality in the use of mental health care services.

Method

Study design

The study was conducted as a cross-sectional questionnaire-based population survey.

Setting

The Danish health care system is tax-funded and free at delivery for both primary and secondary care; for adults, dental care and psychotherapy are only partly subsidized[22]. The general practitioner (GP) fulfills a gatekeeper function, as specialized care is only free after GP referral. Psychotherapy by a psychologist is partly subsidized only for patients referred by a GP for specific conditions: reaction to specific traumatic events; moderate depression; and, specifically for citizens between 18 and 38 years old, moderate anxiety disorders. In 2014, the out of pocket cost to individuals partly subsidised at time of service was equivalent to 52€ for the first consultation and 44€ for the following sessions [23].

Study population and data sources

The Lolland-Falster Health Study (LOFUS) is a publicly funded population survey conducted in the two remote municipalities of Lolland and Guldborgsund, located in a socioeconomically deprived area of Denmark that is a 1½-2 hours' drive south from the capital Copenhagen. In the 2017 national ranking of all 98 municipalities these two were ranked the most deprived and the 8th most deprived municipalities[24]. Together, the municipalities comprise 103,000 citizens, 50% being 50 years of age or older[25] in 2017. The study aims to enroll 25,000 participants of all ages and is conducted from 2016 to 2020. Participants are randomly selected by civil registration numbers[26], invited by mail, and re-invited by phone. The study covers several health areas: mental health, health literacy, social issues, genetics, kidney, ear nose & throat problems, and more. Beyond questionnaire responses, LOFUS data contains blood samples and biometrics. The study is described in detail elsewhere. The present study relies on responses to the questionnaire from adults, with data drawn from LOFUS at the end of 2017, while data collection was still ongoing.

The subjects included in this study are respondents with symptoms of depression. All respondents who scored >20 on the Major Depression Inventory (MDI) were prompted the specific questions on perceived barriers to seeking help for mental health problems, which are described below.

Independent variables

Major Depression Inventory

As part of the LOFUS questionnaire, the respondents filled out the Major Depression Inventory (MDI). The MDI is based on the 12-item Likert scale and has been found to have an adequate internal and external validity for defining different stages of depression[27]. The MDI is based on the ICD-10 diagnostic criteria for depressive disorder[28], with scores ranging from 0 to 50. We used the sum score after excluding the lowest score on question 8 or 9 and likewise the lowest score on item 11 or 12, which measured increased/decreased restlessness and increased/decreased appetite, respectively[29]. Mild depression is covered by scores from 21 –

25, moderate depression from 26 – 30 and severe depression by scores from 31 – 50[30]. If more than two items were missing in the MDI, the score was categorized as missing[31].

Socioeconomic position

SEP was measured by employment status, educational attainment, and financial strain. Usually income status is included as measure of SEP but information on income was not an item in the questionnaire. Financial strain is not the optimal measurement of SEP; however, it has been found to be associated with having a depressive and/or anxiety disorder, above the effect of income, and to be negatively but not strongly correlated with income (r=−0.41, p<0.001)[11].

Employment status was gathered using 14 different items in the questionnaire. Respondents over the age of 67 were categorized as retired, unless they were employed. The categories of employment were reduced to four in the analyses: Working (employee; self-employed; combined employee and self-employed; military; secondary school pupil; postsecondary student; apprentice; house-wife/husband); Temporary not working (unemployed; rehabilitation; sickness leave 3 months or more); Retired (retired due to age; disability benefit; early retirement); and Other (Other).

Educational attainment was measured and classified as the following: *no postsecondary education* if the respondent did not complete any postsecondary education; *1-3 years postsecondary education* for vocational or academy/professional graduates of 1 - 3 years; *3+ postsecondary education* for baccalaureate matriculants who completed 3 - 4 years; and *academic* for those who completed graduate study of ≥5 years.

The questionnaire gathered responses concerning financial strain with the following question: *How often within the last 12 months have you had problems paying your bills?* With possible answers: *Never; Few months; Approximately half the months in the year; Every month*. In the analysis, the categories were reduced to three to gain power, merging *Approximately half the months in the year* and *Every month* into one category.

***Extrinsic variables*:**

Sociodemographic variables included were gender, age, marital status, and cohabitation.

Questions on *Self-perceived general health* (SRH) were provided to respondents with a five-point Likert scale from *very good* to *very bad*. In addition, the presence of a *Long-standing health problem* was posed as a binary question and *General activity limitation* was gauged in three grades from *severely limited* to *not at all*. These questions were adopted from the European Health Status Module[32].

The questionnaire included inquiries regarding past and present medical problems; specifically concerning mental health status, the respondents were asked if they presently suffered or had ever suffered from anxiety disorder and/or depression.

Dependent variables

We developed a short list of questions to be included in the LOFUS questionnaire for respondents who scored positive for symptoms of depression. The questions were inspired by the *Barriers to Access to Care Evaluation*

questionnaire by Sara Clement et al.[33]. Their questionnaire contains 30 items, which was too many to include in the LOFUS study (see supplematary table 1). The number of questions was reduced and grouped to cover the individual abilities in approaching care as described by Levesque et al.[34]: ability to perceive; ability to seek; ability to reach; ability to pay; and ability to engage (see further description in the supplementary material, Figure 1). A preliminary question on whether considering seeking care had ever been a problem was prompted before the five questions related to the abilities/perceived barriers:

Have any of the reasons listed below prevented, delayed, or discouraged you from getting or continuing professional care for a mental health problem?

It has had an impact, that I ..

1) … have been unsure what to do to get professional care. (termed "Knowledge" in the following)
2) … have been concerned for what others might think, say or do. (termed "Stigma")
3) … have had difficulty with transport or travelling for treatment. (termed "Transport")
4) … have not been able to afford the expenses that followed. (termed "Expense")
5) … have had bad experiences with professional care for mental health problems. (termed "Experience")
6) These questions are not relevant for me/I do not want to answer.

Answers to question 1 – 5 were listed in four grades ranging from *Not at all* to *Quite a lot;* question 6 was binary.

In a preliminary form, the questions were evaluated for content validity in a focus group interview consisting of a group of ten patients and relatives of psychiatric patients (the Panel of Relatives and Patients of Psychiatry Services in Region Zealand) in December 2014. The group found the themes relevant and the questions understandable. They offered some suggestions for rephrasing, which were subsequently followed. The same panel commented on the preliminary results of the study in December 2017.

Statistical analysis

For respondents with symptoms of depression we estimated the association between SEP and the outcome variables (five types of barriers to MHC: knowledge; stigma; transport; expense; experience) in separate multivariable logistic regression models after excluding respondents replying *Not relevant*. Likewise, we performed the same analyses with the three grades of depression (mild, moderate and severe) and depression score uncategorized (MDI score) as independent variables, which is presented as supplementary material. The SEP categories were employment status, education, and financial strain. *Working, postsecondary education,* and *no economic distress* were used as reference categories.

The logistic regression models were adjusted for age (18-59 versus 60+) and gender in addition to the variables studied in the univariate (crude) analysis.

The significance level used was 5% throughout, and all reported confidence intervals were 95%. All statistical analyses were done in Stata 15[35].

Patient and Public Involvement

The study objectives were discussed with the members of the Panel of Relatives and Patients of Psychiatry Services in Region Zealand along with the validation of the questions in December 2014. The preliminary results were discussed with the group again in December 2017. The final results were distributed to the group in February 2018 along with an invitation for additional comments. One member of the patient panel responded to the invitation and provided additional comments/discussion. Comments from patients are included in the discussion.

The published article will also be distributed to the patient panel.

Ethics

Informed, written consent was obtained from all participants. The study – along with the Lolland-Falster Health Study – was approved by Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015).

Results

Figure 1: Flow chart of sampling

Sampling from Lolland-Falster Health Study

By December 21, 2017, a total of 20,680 adults (age 18+) had been invited to the LOFUS study. By December 31, 2017, a total of 5,395 adults had replied to the questionnaire. 319 did not reply on the MDI score element or failed to fill in more than two answers in the test, leaving 5,076, of whom 372 (7.3%) reported symptoms of depression and thus were prompted the questions on perceived barriers to seeking mental health care. 58 replied that the questions were not relevant or would not answer them, thus 314 individuals with a MDI score >20 were included in the analyses of SEP and perceived barriers.

Table 1. Characteristics of study sample and respondents with symptoms of depression

Table 1. Characteristics of study sample and respondents with symptoms of depression (MDI >20)

		Total sample				MDI score >20	
Age group		**Male**	**Female**	**Total**	**%**	**N**	**%**
	18-29	198	212	410	8.1	55	13.4
	30-39	180	250	430	8.5	41	9.5
	40-49	357	443	800	15.8	82	10.3
	50-59	519	681	1200	23.6	84	7.0
	60-69	632	666	1298	25.6	63	4.9
	70-79	396	371	767	15.1	41	5.3
	80+	95	76	171	3.4	6	3.5
	Sum	**2377**	**2699**	**5076**		**372**	7.3
Marital status							
	Married	1538	1708	3246	64.5	181	5.6
	Partnership	73	108	181	3.6	15	8.3
	Separated	12	9	21	0.4	5	23.8
	Divorced	169	195	364	7.2	31	8.5
	Widower	59	164	223	4.4	11	4.9
	Not married	509	487	996	19.8	122	12.2
Cohabitating							
	Yes	1917	2141	4058	80.7	248	6.1
Secondary schooling							
	Studying	20	34	54	1.1	5	9.3
	< 8 years	290	203	493	9.7	35	7.1
	8 - 9 years	610	401	1011	19.9	87	8.6
	10 - 11 years	751	913	1664	32.8	112	6.7
	High school	522	896	1418	27.9	89	6.3
	Other/foreign	163	215	378	7.4	38	10.1
Postsecondary education							
	No postsecondary	415	529	944	18.6	112	11.9
	1-3 years postsecondary	1307	1238	2545	50.1	172	6.8
	3+ years postsecondary	495	784	1279	25.2	63	4.9
	Other	143	122	265	5.2	21	7.9
Occupational status							
	Work/study	1417	1526	2943	58.0	167	5.7
	Temp. No work	68	121	189	3.7	63	33.3
	Retired	843	966	1809	35.6	115	6.4
	Other	47	77	124	2.4	27	21.8
Financial strain							
	Not at all	2136	2404	4540	89.4	275	6.1
	Few months	175	213	388	7.6	60	15.5
	Half the months	23	22	45	0.9	13	28.9
	Every month	25	32	57	1.1	19	33.3
Self-rated health							
	Very good	306	328	634	12.5	7	1.1
	Good	1348	1524	2872	56.6	83	2.9
	Fair	616	697	1313	25.9	181	13.8
	Bad	89	137	226	4.5	90	39.8
	Very bad	12	6	18	0.4	9	50.0
General activity limitation							
	Not limited at all	1561	1630	3191	63.2	114	3.6
	Limited but not severely	672	906	1578	31.3	166	10.5
	Severely limited	132	146	278	5.5	88	31.7
Longstanding illness. Yes		1052	1200	2252	44.7	244	10.8
Anxiety, now or earlier. Yes		110	223	333	6.6	111	33.3
Depression, now or earlier. Yes		145	230	375	7.4	138	36.8
Medication anxiety. Yes		71	119	190	3.8	65	34.2
Medication antidepressants. Yes		85	173	258	5.1	66	25.6

The total sample consisted of 53% women; 64.5% of the respondents were married, and 80.7% were cohabitating. For the total group, mean age was 55.7 and median age was 57.4; for individuals scoring in the depressed range on the MDI, the mean age was 50.2 and the median was 51.4 years.

Compared to the total sample, the respondents reporting symptoms of depression were younger, and more likely to be living alone, and to be unmarried. They were also more likely to have no postsecondary education, to be temporarily out of work (16.9% vs 3.7%), and to experience more frequent financial strain. Furthermore, their health indicators included: lower self-rated health, more reports of limited physical functioning, more reports of long lasting disease, and former anxiety or depression diagnoses; and more reports to be currently in pharmacological treatment for these disorders.

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

Of those responding to the questions, more than half perceived no problems at all in accessing professional care, least of all transport.

Among those who did have concerns about accessing or continuing professional mental health care, *Expense* was the most common problem, as 30.1% indicated expenses had prevented, deterred, or delayed them either *Quite a lot* or *A lot* (both responses aggregated in the *Quite a lot +* category in Figure 2). Likewise, the second most common concern was related to *Stigma*, phrased in the questionnaire as “what others might think, say or do”, which was a serious concern for 22.3%; approximately the same proportion (21.2%) had concerns related to *Knowledge*, or how to find help for a mental health problem. Transport was not a problem for 78.6%, with only 11.7% reporting it negatively affected access.

Perceived barriers to accessing health care by SEP are shown in Table 2 (crude numbers are shown in Supplementary Table 2). Perceptions of *Stigma* did not show any significant difference across the socioeconomic groups, however measured. *Lack of Knowledge* was a significant problem for respondents without postsecondary education compared to those who had completed some postsecondary education (adjusted odd ratio (aOR) 2.26 confidence interval (CI) 1.1- 4.6) and for respondents with occasional (*Few months*), but not regular, financial strain when compared to those with no financial strain. Low SEP as measured by educational level and financial strain was associated with perceived barriers concerning *Transport* and *Expense*; whereas low SEP measured by employment status alone was associated with concerns related to *Transport*. The retired respondents were more likely to perceive bad *Experience* with mental health services as a barrier to seeking or continuing MHC compared to respondents who were working. *Transport* showed the greatest disparity across the socioeconomic groups.

Table 2. Adjusted odds ratios for perceived barriers for accessing MHC by three indicators of SEP

Table 2. Adjusted odds ratios for five perceived barriers accessing mental health care by employment status, education, and financial strain

	Employment status				**Education**					**Financial strain**				
Stigma	**aOR**	**CI**		**n**		**aOR**	**CI**		**n**		**aOR**	**CI**		**n**
Working	1			291	3+years	1			290	Not at all				289
Temp. Not working	.9201	.4880	1.735		1 – 3 years	1.087	.5740	2.058		Few months	.8994	.4841	1.671	
Retired	.6808	.3420	1.356		No postsecondary	1.166	.5833	2.332		Half the time+	1.749	.6933	4.410	
Other	.3815	.1431	1.017		Other	.6699	.1969	2.279						
Knowledge														
Working	1			292	3+ years	1			291	Not at all	1			290
Temp. Not working	1.204	.6390	2.268		1-3 years	1.597	.8309	3.070		Few months	**2.515**	**1.335**	**4.739**	
Retired	.5003	.2480	1.009		No postsecondary	**2.263**	**1.115**	**4.592**		Half the time+	2.372	.9404	5.985	
Other	.5004	.1884	1.329		Other	**4.752**	**1.297**	**17.412**						
Expense														
Working	1			289	3+ years	1			288	Not at all				289
Temp. Not working	1.700	.8911	3.323		1-3 years	1.835	.9324	3.612		Few months	**4.268**	**2.172**	**8.385**	
Retired	1.537	.7451	3.171		No postsecondary	**2.773**	**1.336**	**5.757**		Half the time+	**9.623**	**2.708**	**34.194**	
Other	.7456	.2822	1.970		Other	2.031	.5762	7.156						
Experience														
Working	1			287	3+ years	1			286	Not at all	1			286
Temp. Not working	.9581	.4820	1.905		1-3 years	1.043	.5392	2.019		Few months	1.152	.5999	2.212	
Retired	**2.143**	**1.024**	**4.485**		No postsecondary	.6435	.3073	1.347		Half the time+	2.385	.9685	5.874	
Other	1.531	.5932	3.952		Other	.7503	.2024	2.781						
Transport														
Working	1			290	3+ years	1			289	Not at all				288
Temp. Not working	**3.184**	**1.463**	**6.931**		1-3 years	1.603	.6502	3.954		Few months	1.746	.8392	3.634	
Retired	**4.442**	**1.900**	**10.384**		No postsecondary	**2.988**	**1.187**	**7.518**		Half the time+	**9.889**	**3.745**	**26.113**	
Other	2.169	.6948	6.773		Other	1.019	.1835	5.659						

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), significant results are marked in bold

SEP showed no association with any of the barriers or with years of schooling (not shown). Using depression as independent variable, we found that severity of depression (both measured as a categorical variable and a score) was associated with perceived barriers in relation to *Expense* and *Transport*, but not associated with any other perceived barriers (see Supplementary Material Table 3).

Discussion

Principal findings

In this study of perceived barriers to accessing mental health care by respondents with present symptoms of depression, we found that almost 1/3 of the respondents indicated that *Expense* related to accessing MHC was a considerable barrier; this perception was more prevalent among individuals without postsecondary education and individuals experiencing financial strain. Transport presented the least prevalent barrier in general; but on the other hand, transportation also presented the greatest and most consistent socioeconomic disparity across all measurements of SEP. Transport and expenses associated with accessing mental health care were a problem for disadvantaged individuals.

Stigma was an issue of concern for 22% of the respondents but did not vary significantly according to SEP, whereas lack of knowledge about how to get help was a significantly greater problem for individuals without postsecondary education as compared to individuals with postsecondary education.

Lack of knowledge about how get to help and bad experience were perceived as a problem for 1/5 of the individuals overall as well.

Strengths and weaknesses of the study

A strength of this study was its use of information from a population study from a deprived area in combination with data on present depression score, information on SEP, and perceived barriers to accessing MHC; by this design we were able determine the significance of different barriers to access for potential MHC patients in a deprived area. We are not aware of similar studies.

A limitation in our study was that the items used as dependable variables were not fully validated; validation would be preferable in order to compare to other studies. The BACE-3, at 30 questions, was too extensive to use in the LOFUS study, which already consisted of close to 100 questions; this was also the reasoning behind our focus on five central concepts of barriers to access. The external validity of the questions is supported by the use of generally accepted and validated concepts of abilities and as such is comparable to other studies. The content validity was tested by the panel of patients and patients' relatives and the questions found to be sound, but in retrospect, might not measure the concept of self-efficacy very well. We used the answer *Not relevant/Do not want to reply* as an indicator that the individual preferred to handle problems without help. It would have been prudent, however, to ask a more direct question about perceptions of need for care; it is possible that some individuals did not find the question relevant because while they experienced mental health issues, they did not perceive a need for further care. We found no correlation between the answer to the question of relevance and SEP, except for retired respondents, who tended to state *Not relevant* less, compared to respondents working (not shown).

Another limitation was that the question about transport was not clearly separated from the question about perceived barriers in relation to expenses, as it was not specified whether expenses included transportation-related expenses. Thus, we have no clear distinction between whether *Transport* as a barrier is primarily a logistical or economical barrier, or some combination thereof.

Comparison with other studies

The total sample contained more respondents in the age group 50 – 69 and fewer in the age groups younger and older compared to the study population; additionally, as compared to the background population the LOFUS sample is over represented by individuals with *+3 years postsecondary education vs no postsecondary education* by almost 3:1, according to general population statistics drawn from Statistics Denmark[25]. For the total sample, questions on self-rated health (SRH) were rated higher in the sample than the national levels[36] even though long-lasting illness was more prevalent in the sample (44.7% compared to national rate of 35.6%)[36]; the rate of respondents with *severely limited physical functioning* was close to the national proportions[37]. The group with symptoms of depression had scores well below national levels in all health-related variables. The total sample may overrepresent the middle-aged to older part of the population, an issue seen in national surveys, too[38].

7.3% had symptoms of depression when the summed MDI score was used, which is a considerably higher rate than found by any other survey in Denmark; however, a recent national survey reported that 7.0% adults suffer from depressed mood, including 7.8% in the Region of Zealand[36]. Eurostat reported a prevalence of 6.3% adults with depressive symptoms and 3% with major depression symptoms in Denmark[39]. In the present study, 225 respondents reported both a core symptom of depression *Most of the time* or more and a summed MDI score

>20, equivalent to a MDD prevalence of 4.4%. A comparable study by Ellervik et al. found 2.5% with a summed MDI score >25; we found 3.8%[40]. The present data is a subsample from a population survey in a deprived area, which could explain the high rate of depression symptoms found.

We found perceived stigma to be of *Quite a lot* or *A lot of concern* for 20% of the respondents. This corresponds with findings in a systematic review, where overall 20 – 25% respondents in 44 studies reported stigma as a barrier to accessing mental health services[41]. Stigma showed no association to SEP in our data. We have not been able to verify this in other studies except for one Canadian study, which likewise found no association between years of education and experiencing stigma in mental health care. However, they did find perceived stigma more prevalent among respondents not working[42]. In the Panel of Relatives and Patients of Psychiatry Services of Region Zealand, it was said that patients with mental disorders, and their relatives, pull the curtains together when they meet with each other privately, and that patients are indeed concerned with what others might think.

One in five respondents experienced *Knowledge* as a barrier and had doubts about what to do to get professional help. With free access to a GP in Denmark, and the GP universally understood to be the gatekeeper for referrals, this is puzzling. Among respondents with symptoms of depression, 138 reported former or present depression, and 35 of them (25%) still answered that they experienced *Knowledge* to be a barrier *Quite a lot* or *A lot* of the time. Of those with symptoms of depression and presently taking antidepressant medication, 8 (12%) had doubts about what to do to get help. This could be due to the nature of the disease, but we did not find support for this, as we found no association to *Knowledge* with the severity of symptoms of depression. However, a Canadian study on perceived unmet need by respondents with symptoms of anxiety or depression found high symptom scores were associated with a higher degree of unmet need[7], and not knowing how or where to get help was the most reported reason. The Panel of Relatives and Patients of Psychiatry Services of Region Zealand was not very surprised by this finding: despite free access to a GP, one individual reported that he could not get a family-GP, but had to meet changing doctors in a regional clinic (due to lack of GP's in the area). Another mentioned the waiting time for an appointment with the GP could be weeks (due to lack of GP's).

It could be argued that older people may be more reluctant to use MHC and feel more stigmatized by the need for psychotherapy[43 44]. We did not find support for this, as the retired group did not differ in perception of stigma from employed persons. Likewise, older retired persons might be less willing to pay for the expenses associated with treatment, but we did not find support for this either, as expense was not a significant barrier for the group retired compared to the group working.

Use of mental health care is sensitive to cost[45], and especially so for persons in low SEP[46]. This corresponds with our findings that expenses associated with mental health care was considered a common barrier for seeking help and concern of almost 1/3 of our respondents, and by two- to five-fold more by respondents without postsecondary education or in financial strain. This knowledge is important when research has shown that financial strain is strongly associated with higher odds for depression[11] and for prescription of antidepressants[47]. A German study found that even with free access to a psychologist these services are used

less by people in low SEP[19], which could be explained in part by our findings; people without postsecondary education may have less knowledge of how to access professional MHC, thus leading to lower usage of available services.

Experience with former mental health care treatment made retired respondents more reluctant to seek MHC as compared to the working population. This may not necessarily be due to bad experiences with health care professionals, though stigmatization can be a problem in health services too[48]; reports of past experience as a barrier could also indicate bad experience with side effects from a medication. Our study was not designed to capture or explore this nuance. Retired individuals are more likely to have more experience with health care, and this group includes people receiving early retirement pensions, which could indicate a chronic illness leading to early retirement and thus more opportunities for more bad experiences. The patient panel questioned the respondents' experience with MHC, since the rates of bad past experiences were so low; one remarking: "*Those who are really feeling bad have not participated in this survey*". For the panel, bad experience was a common deterrent to MHC, which may indicate an important area of future study.

Transport was perceived to be a greater problem by persons in low SEP compared to individuals in high SEP. This aligns well with our previous findings of the impact of distance and SEP on MHC use by patients in antidepressant treatment[21]. However, the question was not well distinguished from the question on expenses. Difficulty with transport or travelling includes the time spent to reach services and coordinate with other obligations – taking care of family duties or take time off at work, etc. Reliance on infrequent or inadequate public transportation could also be a reason to answer positively to this question, but the study was not designed to capture information regarding public versus private transportation, e.g. The patient panel was surprised that transport was a minor issue for the respondents, since it was viewed by them to be both time-consuming and expensive.

Meaning of the study and possible explanations and implication for policymakers

The study aimed to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to their SEP. The answer in this study is quite clear: lack of postsecondary education was linked to greater perceived barriers to mental health care and expenses are considered a barrier to mental health care for those with no postsecondary education and in financial strain. Low mental health literacy, defined as knowledge and beliefs about mental disorders which aid in their recognition, management and prevention[49], could be a part of the explanation, since low mental health literacy is also associated with low SEP[50]. Thus, empowering the community to take action for better mental health literacy[51] can lead to increased help-seeking by individuals in low SEP. In Denmark, two programs on improving mental health literacy exist: Mental Health First Aid[52] and the ABC mental health initiative[53], both adopted from Australia. An approach directed more specifically toward deprived areas within such programs might improve SEP equity in mental health care treatment.

Addressing barriers and easing access for the deprived is obviously necessary. Lack of postsecondary education is associated with greater prevalence of perception of barriers to mental health care, in addition to an increased prevalence of mood disorders. Clearly, our results showed that *Expense* is a barrier for people in low SEP, but as found in the German study[19], people in low SEP use psychologists less frequently even with free access. Psychotherapy is associated with the ability to engage, which in itself could be more difficult if an individual struggles with social and economic problems on top of mental ones. In order to address these related barriers, the deprived and depressed probably have additional needs beyond medication and psychotherapy, such as social supports and social/domestic/workplace intervention.

In a future study it could be interesting to investigate the association between depression score, perceived barriers and use of MHC for a period after the score. Future research could also investigate which experiences cause retired respondents with symptoms of depression to hesitate to access mental health care. Further improvements and validation of a short form questionnaire as the present could be beneficial.

Author contributions

AP conceived the research and developed and validated the questions on barriers supervised by AH. AP wrote the first draft of the manuscript assisted by LHH. AH, ES, and FBW contributed to the data analysis, interpretation of results and critical revision of the manuscript.

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Data sharing: No additional data available

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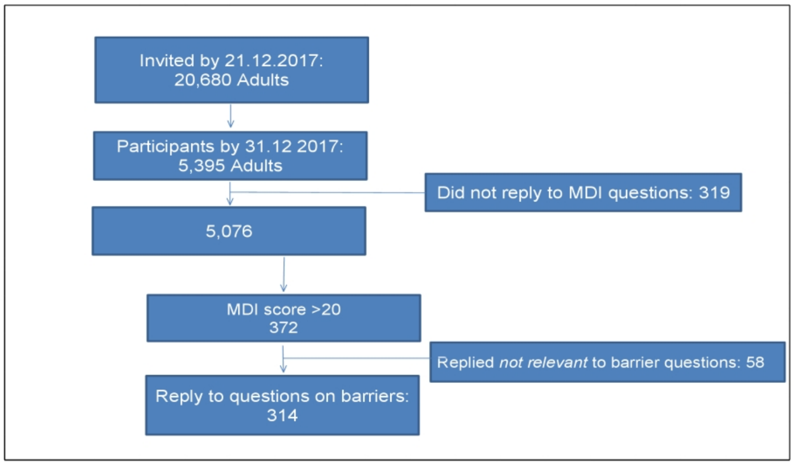
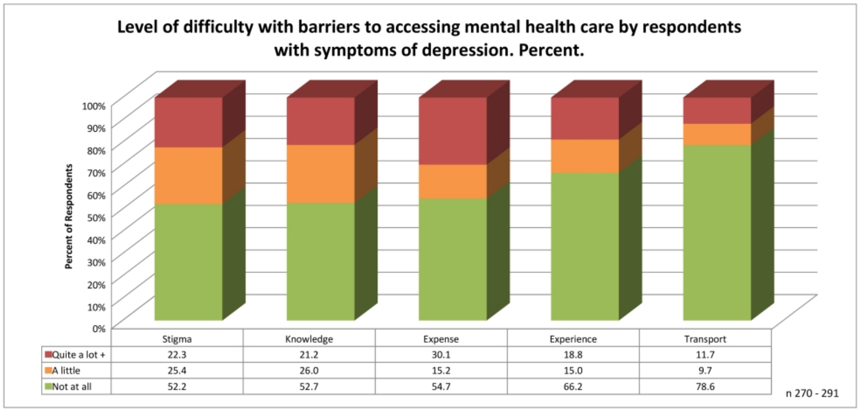


Figure 1. Sampling from the Lolland Falster Health Study

209x136mm (300 x 300 DPI)



	Stigma	Knowledge	Expense	Experience	Transport
🟥 Quite a lot +	22.3	21.2	30.1	18.8	11.7
🟧 A little	25.4	26.0	15.2	15.0	9.7
🟩 Not at all	52.2	52.7	54.7	66.2	78.6

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

331x175mm (300 x 300 DPI)

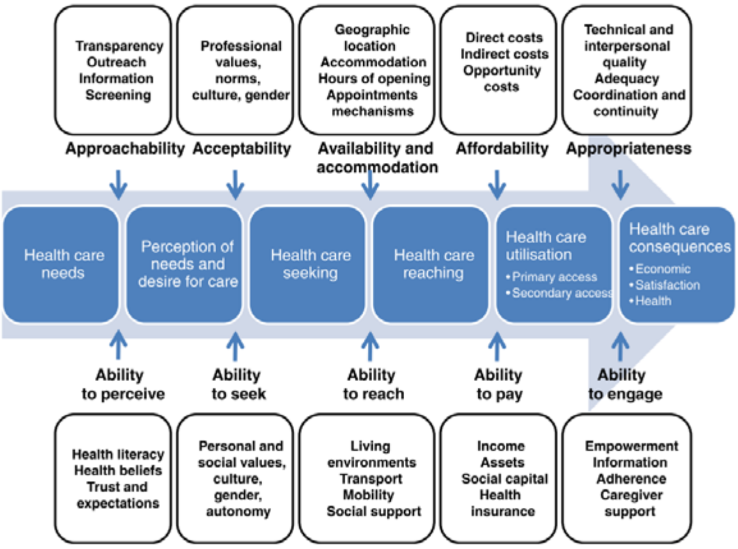
Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Supplementary

Conceptual frame

Patients' choice of care will relate to personal preferences and abilities to access care. In a comprehensive theoretical approach by Levesque et al* they combine several theories on access to health care and final treatment outcome. The model is patient-centered and based on service demand and service supply between which they describe the stepwise fulfilment of needs in the process from recognizing a health care need to a finalized treatment. The model has five central concepts associated with enforcing or inhibiting access on the supply-side, and five corresponding abilities on the demand-side, likewise with associated enforcing or inhibiting factors.

Figure 1: Model of a conceptual framework of access to health care*



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* Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health* 2013;12:18. doi: 10.1186/1475-9276-12-18.:18-12.

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Table 1. Questionnare

Supplementary table:* Condensation of the *Barriers to Access to Care Evaluation scale (BACE v3)

Q no	**BACE v3 Question**	Abilities #	Covered by question ¤
1	Being unsure where to go to get professional care	Perceive	1
2.	Wanting to solve the problem on my own	Perceive	(6)
3.	Concern that I might be seen as weak for having a mental health problem	Seek	2
4.	Fear of being put in hospital against my will	Seek	2
5.	Concern that it might harm my chances when applying for jobs	Seek	2
6.	Problems with transport or travelling to appointments	Reach	3
7.	Thinking the problem would get better by itself	Perceive	
8.	Concern about what my family might think or say	Seek	2
9.	Feeing embarrassed or ashamed	Seek	2
10.	Preferring to get alternative forms of care (e.g. spiritual care, non-Western healing / medicine, complementary therapies)	Perceive	
11.	Not being able to afford the financial costs involved	Pay	4
12.	Concern that I might be seen as ‘crazy’	Seek	2
13.	Thinking that professional care probably would not help		(6)
14.	Concern that I might be seen as a bad parent	Seek	2
15.	Professionals from my own ethnic or cultural group not being available		
16.	Being too unwell to ask for help		
17.	Concern that people I know might find out	Seek	2
18.	Dislike of talking about my feelings, emotions or thoughts	Seek	
19.	Concern that people might not take me seriously if they found out I was having professional care	Seek	2
20.	Concerns about the treatments available (e.g. medication side effects)	Perceive	
21.	Not wanting a mental health problem to be on my medical records	Seek	2
22.	Having had previous bad experiences with professional care for mental health	Engage	5
23.	Preferring to get help from family or friends	Seek	
24.	Concern that my children may be taken into care or that I may lose access or custody without my agreement	Seek	2
25.	Thinking I did not have a problem	Perceive	6
26.	Concern about what my friends might think or say	Seek	2
27.	Difficulty taking time off work	Reach	
28.	Concern about what people at work might think, say or do	Seek	2
29.	Having problems with childcare while I receive professional care	Reach	3
30.	Having no one who could help me get professional care	Reach	

Clement et al. BMC Psychiatry 2012, 12:36

Development and psychometric properties the Development and psychometric properties the Barriers to Access to Care Evaluation scale (BACE) - related to people with mental ill health

According to model of Levesque et al. International Journal for Equity in Health 2013, 12:18
Patient-centered access to health care: conceptualizing access at the interface of health systems and populations

¤ The questions in the questionnaire of the present study

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Suppl. Table 2: Perceived barriers accessing MHC & symptoms of depression, crude numbers

Stigma	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	73	50	29	152	52,2
A little	39	20	15	74	25,4
Quite a lot	16	13	10	39	13,4
A lot	10	6	10	26	8,9
NA	11	6	6	23	
Sum	149	95	70	314	291

Knowledge	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	77	50	27	154	52,7
A little	41	21	14	76	26,0
Quite a lot	20	13	16	49	16,8
A lot	2	4	7	13	4,5
NA	9	7	6	22	
Sum	149	95	70	314	292

Expense	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	84	47	27	158	54,7
A little	20	14	10	44	15,2
Quite a lot	15	14	15	44	15,2
A lot	18	13	12	43	14,9
NA	12	7	6	25	
Sum	149	95	70	314	289

Experience	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	98	58	34	190	66,2
A little	22	11	10	43	15,0
Quite a lot	15	9	8	32	11,1
A lot	4	10	8	22	7,7
NA	10	7	10	27	
Sum	149	95	70	314	287

Transport	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	117	66	45	228	78,6
A little	10	11	7	28	9,7
Quite a lot	6	4	9	19	6,6
A lot	6	6	3	15	5,2
NA	10	8	6	24	
Sum	149	95	70	314	290

Suppl. Table 3. Adjusted odds ratios for five perceived barriers accessing mental health care by severity of symptoms of depression

	Stigma				**Knowledge**				**Expense**				**Experience**				**Transport**			
Dep. Grade	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**
Mild	1			291	1			292	**1**			289	1			287	1			290
Moderate	.8463	.4903	1.461		.9464	.5510	16.256		1.350	.7722	2.359		1.220	.6854	2.172		1.684	.8614	3.294	
Severe	1.259	.6867	2.309		1.723	.9420	3.151		**2.043**	**1.097**	**3.804**		1.739	.9220	3.279		**2.225**	**1.098**	**4.512**	
MDI score#	1.005	.9628	1.050		1.030	.9864	10.750		**1.063**	**1.016**	**1.112**		1.035	.9891	1.083		**1.076**	**1.024**	**1.130**	

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), marked bold

\# Major Depression Inventory scale > 20 ≤ 50, ungrouped

STROBE Statement for the study: **Socioeconomic position and perceived barriers to access mental helath care by individuals with symptoms of depression. Results from the Lolland-Falster Health Study.**

	Item No	**Recommendation**	**Addressed on page:**
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	4
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5 - 6 Table 1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*5 - 6* *Supplement Table 1*
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	7 & Figure 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5 - 6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, explain how loss to follow-up was addressed	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Supplement table 2
		(c) Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	Report numbers of outcome events or summary measures over time	

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Table 3 Table 4 + 5
		(*b*) Report category boundaries when continuous variables were categorized	5
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	10-11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1 & 5

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.

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Are perceived barriers to accessing mental health care associated with socioeconomic position among individuals with symptoms of depression? Questionnaire-results from the Lolland-Falster Health Study.

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Are perceived barriers to accessing mental health care associated with socioeconomic position among individuals with symptoms of depression? Questionnaire-results from the Lolland-Falster Health Study.

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Competing interest statement

All authors have completed the Unified Competing Interest form (available on request from the corresponding author) and declare: no support from any organisation for the submitted, no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

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Transparency declaration

Aake Packness affirms that this manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned have been explained.

Abstract

Objective: To evaluate if perceived barriers to accessing mental health care (MHC) among individuals with symptoms of depression are associated with their socioeconomic position (SEP).
Design: Cross-sectional questionnaire-based population survey from the Lolland-Falster Health Study (LOFUS) 2016-17 including 5,076 participants.
Participants: The study included 372 individuals participating in LOFUS with positive scores for depression according to the Major Depression Inventory (MDI).
Interventions: A set of five questions on perceived barriers to accessing professional care for a mental health problem was prompted to individuals responding with symptoms of depression (MDI score >20).
Outcomes: The association between SEP (as measured by educational attainment, employment status, and financial strain) and five different types of barriers to accessing MHC were analysed in separate multivariable logistic regression models adjusted for gender and age.
Results: 314 out of 372 (84%) completed the survey questions and reported experiencing barriers to MHC access. Worry about expenses related to seeking or continuing MHC was a considerable barrier for 30% of the individuals responding, and as such the greatest problem among the five types of barriers. 22% perceived stigma as a barrier to accessing MHC, but there was no association between perceived stigma and SEP. Transportation was the barrier of least concern for individuals in general, but also the issue with greatest and most consistent socioeconomic disparity (odds ratio (OR) 2.99; confidence interval (CI) 1.19 – 7.52) for lowest vs highest educational groups, and likewise concerning expenses (OR 2.77, CI 1.34 – 5.76) for the same groups.
Conclusion: Issues associated with *Expenses* and *Transport* were more frequently perceived as barriers to accessing MHC for people in low SEP compared to people in high SEP. Stigma showed no association to SEP.

Informed written consent was obtained. Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015) approved the study.

Strengths and limitations of this study:

- A strength of this study is that it is a population study in a socioeconomically-deprived area and combines data on present depression scores and SEP with proportions of perceived barriers to accessing mental health care services; thus, the study can shed light on factors that deter individuals with symptoms of depression from seeking MHC services.
- The questions used to assess barriers to accessing mental health care are not standardized, although they were validated for content and do have external validity.
- There was a potential overlap in the questions, between transportation barriers and barriers of expenses related to seeking or continuing mental health care services. Thus it was not clear whether "expenses" included "transport expenses" and whether transport was a logistical or economical barrier.

Introduction

Major depressive disorders (MDD) rank third among leading causes of years lived with disability (YLD) in high-income countries, as MDD is common and has an early onset.[1] Mental health problems in early age can have a profound impact on educational achievements[2], on income[3], and on later unemployment[4]. Additionally, having a diagnosis of depression is associated with a substantially shorter life expectancy [5].

In spite of this, far from all people suffering from depression are treated. In a Norwegian survey study only 12% of respondents with symptoms of depression had ever sought help [6], and a Canadian study found that 40% with symptoms of depression or anxiety perceived an unmet need for care [7]. Generally, treatment of patients suffering from depression is insufficient even in high-income countries, as only one in five receives adequate treatment[8].

Depressive disorders are closely associated with socioeconomic position (SEP). A dose response relationship has been found between income as well as education on incidence, prevalence, and persistence of depression[9]. Likewise, studies have found negative socioeconomic changes increase the risk of incidents of mental disorders, particularly of mood disorders [10], and financial strain in itself is associated with depressive disorder[11 12].

Thus, people in low SEP may have a higher need for mental health care due to increased incidence and prevalence of depression. A recent study found predictors of need for highly-specialized MDD care to be: depression severity, younger age at onset, prior poor treatment response, psychiatric comorbidity, somatic comorbidity, childhood trauma, psychosocial impairment, older age, and a socioeconomically disadvantaged status[13]. Although people in low SEP have an increased need for mental health services, it is not evident that they use more specialized care. Some studies have found access to specialist care to be based on clinical need, with little inequity in SEP[14 15 16], whereas others report specialized mental health services as psychologist or psychiatrists are not provided equally to persons in low SEP according to need [17 18 7 19] or that higher SEP is associated with more usage of specialized mental health services [20 21].

The background for initiating the present study was that health care statistics (unpublished) in 2013 revealed a significant disparity, as 20% fewer individuals in the most socioeconomically deprived municipality in Denmark (Lolland) had been in contact with out-patient mental health care (psychologist, private, or public psychiatry) than could be expected for the population size (unpublished). Several reasons may account for this discrepancy between expected higher need in a deprived area and actual use of mental health care services, one of them being perceptions of barriers that affect patients' choices or preferences, which we aimed to address in this study.

The study objective was to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to SEP. We thereby expected to gain knowledge valuable to addressing inequality in the use of mental health care services.

Method

Study design

The study was conducted as a cross-sectional questionnaire-based population survey.

Setting

The Danish health care system is tax-funded and free at delivery for both primary and secondary care; for adults, dental care and psychotherapy are only partly subsidized[22]. The general practitioner (GP) fulfills a gatekeeper function, as specialized care is only free after GP referral. Psychotherapy by a psychologist is partly subsidized only for patients referred by a GP for specific conditions: reaction to specific traumatic events; moderate depression; and, specifically for citizens between 18 and 38 years old, moderate anxiety disorders. In 2014, the out of pocket cost to individuals partly subsidised at time of service was equivalent to 52€ for the first consultation and 44€ for the following sessions [23].

Study population and data sources

The Lolland-Falster Health Study (LOFUS) is a publicly funded population survey conducted in the two remote municipalities of Lolland and Guldborgsund, located in a socioeconomically deprived area of Denmark that is a 1½-2 hours' drive south from the capital Copenhagen. In the 2017 national ranking of all 98 municipalities these two were ranked the most deprived and the 8th most deprived municipalities[24]. Together, the municipalities comprise 103,000 citizens, 50% being 50 years of age or older[25] in 2017. The study aims to enroll 25,000 participants of all ages and is conducted from 2016 to 2020. Participants are randomly selected by civil registration numbers[26], invited by mail, and re-invited by phone. The study covers several health areas: mental health, health literacy, social issues, genetics, kidney, ear nose & throat problems, and more. Beyond questionnaire responses, LOFUS data contains blood samples and biometrics. The study is described in detail elsewhere. The present study relies on responses to the questionnaire from adults, with data drawn from LOFUS at the end of 2017, while data collection was still ongoing.

The subjects included in this study are respondents with symptoms of depression. All respondents who scored >20 on the Major Depression Inventory (MDI) were prompted the specific questions on perceived barriers to seeking help for mental health problems, which are described below.

Independent variables

Major Depression Inventory

As part of the LOFUS questionnaire, the respondents filled out the Major Depression Inventory (MDI). The MDI is based on the 12-item Likert scale and has been found to have an adequate internal and external validity for defining different stages of depression[27]. The MDI is based on the ICD-10 diagnostic criteria for depressive disorder[28], with scores ranging from 0 to 50. We used the sum score after excluding the lowest score on question 8 or 9 and likewise the lowest score on item 11 or 12, which measured increased/decreased restlessness and increased/decreased appetite, respectively[29]. Mild depression is covered by scores from 21 –

25, moderate depression from 26 – 30 and severe depression by scores from 31 – 50[30]. If more than two items were missing in the MDI, the score was categorized as missing[31].

Socioeconomic position

SEP was measured by employment status, educational attainment, and financial strain. Usually income status is included as measure of SEP but information on income was not an item in the questionnaire. Financial strain is not the optimal measurement of SEP; however, it has been found to be associated with having a depressive and/or anxiety disorder, above the effect of income, and to be negatively but not strongly correlated with income ($r=-0.41$, $p<0.001$)[11].

Employment status was gathered using 14 different items in the questionnaire. Respondents over the age of 67 were categorized as retired, unless they were employed. The categories of employment were reduced to four in the analyses: Working (employee; self-employed; combined employee and self-employed; military; secondary school pupil; postsecondary student; apprentice; house-wife/husband); Temporary not working (unemployed; rehabilitation; sickness leave 3 months or more); Retired (retired due to age; disability benefit; early retirement); and Other (Other).

Educational attainment was measured and classified as the following: *no postsecondary education* if the respondent did not complete any postsecondary education; *1-3 years postsecondary education* for vocational or academy/professional graduates of 1 - 3 years; *3+ postsecondary education* for baccalaureate matriculants who completed 3 - 4 years; and *academic* for those who completed graduate study of ≥5 years.

The questionnaire gathered responses concerning financial strain with the following question: *How often within the last 12 months have you had problems paying your bills?* With possible answers: *Never; Few months; Approximately half the months in the year; Every month*. In the analysis, the categories were reduced to three to gain power, merging *Approximately half the months in the year* and *Every month* into one category.

Extrinsic variables**:**

Sociodemographic variables included were gender, age, marital status, and cohabitation.

Questions on *Self-perceived general health* (SRH) were provided to respondents with a five-point Likert scale from *very good* to *very bad*. In addition, the presence of a *Long-standing health problem* was posed as a binary question and *General activity limitation* was gauged in three grades from *severely limited* to *not at all*. These questions were adopted from the European Health Status Module[32].

The questionnaire included inquiries regarding past and present medical problems; specifically concerning mental health status, the respondents were asked if they presently suffered or had ever suffered from anxiety disorder and/or depression.

Dependent variables

We developed a short list of questions to be included in the LOFUS questionnaire for respondents who scored positive for symptoms of depression. The questions were inspired by the *Barriers to Access to Care Evaluation*

questionnaire by Sara Clement et al.[33]. Their questionnaire contains 30 items, which was too many to include in the LOFUS study (see supplematary table 1). The number of questions was reduced and grouped to cover the individual abilities in approaching care as described by Levesque et al.[34]: ability to perceive; ability to seek; ability to reach; ability to pay; and ability to engage (see further description in the supplementary material, Figure 1). A preliminary question on whether considering seeking care had ever been a problem was prompted before the five questions related to the abilities/perceived barriers:
Have any of the reasons listed below prevented, delayed, or discouraged you from getting or continuing professional care for a mental health problem?
It has had an impact, that I ..

1) … have been unsure what to do to get professional care. (termed "Knowledge" in the following)
2) … have been concerned for what others might think, say or do. (termed "Stigma")
3) … have had difficulty with transport or travelling for treatment. (termed "Transport")
4) … have not been able to afford the expenses that followed. (termed "Expense")
5) … have had bad experiences with professional care for mental health problems. (termed "Experience")
6) These questions are not relevant for me/I do not want to answer.

Answers to question 1 – 5 were listed in four grades ranging from *Not at all* to *Quite a lot;* question 6 was binary.

In a preliminary form, the questions were evaluated for content validity in a focus group interview consisting of a group of ten patients and relatives of psychiatric patients (the Panel of Relatives and Patients of Psychiatry Services in Region Zealand) in December 2014. The group found the themes relevant and the questions understandable. They offered some suggestions for rephrasing, which were subsequently followed. The same panel commented on the preliminary results of the study in December 2017.

Statistical analysis

For respondents with symptoms of depression we estimated the association between SEP and the outcome variables (five types of barriers to MHC: knowledge; stigma; transport; expense; experience) in separate multivariable logistic regression models after excluding respondents replying *Not relevant*. Likewise, we performed the same analyses with the three grades of depression (mild, moderate and severe) and depression score uncategorized (MDI score) as independent variables, which is presented as supplementary material. The SEP categories were employment status, education, and financial strain. *Working*, *postsecondary education,* and *no economic distress* were used as reference categories.

The logistic regression models were adjusted for age (18-59 versus 60+) and gender in addition to the variables studied in the univariate (crude) analysis.

The significance level used was 5% throughout, and all reported confidence intervals were 95%. All statistical analyses were done in Stata 15[35].

Patient and Public Involvement

The study objectives were discussed with the members of the Panel of Relatives and Patients of Psychiatry Services in Region Zealand along with the validation of the questions in December 2014. The preliminary results were discussed with the group again in December 2017. The final results were distributed to the group in February 2018 along with an invitation for additional comments. One member of the patient panel responded to the invitation and provided additional comments/discussion. Comments from patients are included in the discussion.

The published article will also be distributed to the patient panel.

Ethics

Informed, written consent was obtained from all participants. The study – along with the Lolland-Falster Health Study – was approved by Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015).

Results

Figure 1: Flow chart of sampling

Sampling from Lolland-Falster Health Study

By December 21, 2017, a total of 20,680 adults (age 18+) had been invited to the LOFUS study. By December 31, 2017, a total of 5,395 adults had replied to the questionnaire. 319 did not reply on the MDI score element or failed to fill in more than two answers in the test, leaving 5,076, of whom 372 (7.3%) reported symptoms of depression and thus were prompted the questions on perceived barriers to seeking mental health care. 58 replied that the questions were not relevant or would not answer them, thus 314 individuals with a MDI score >20 were included in the analyses of SEP and perceived barriers.

Table 1. Characteristics of study sample and respondents with symptoms of depression

Table 1. Characteristics of study sample and respondents with symptoms of depression (MDI >20)

		Total sample				MDI score >20	
Age group		**Male**	**Female**	**Total**	**%**	**N**	**%**
	18-29	198	212	410	8.1	55	13.4
	30-39	180	250	430	8.5	41	9.5
	40-49	357	443	800	15.8	82	10.3
	50-59	519	681	1200	23.6	84	7.0
	60-69	632	666	1298	25.6	63	4.9
	70-79	396	371	767	15.1	41	5.3
	80+	95	76	171	3.4	6	3.5
	Sum	**2377**	**2699**	**5076**		**372**	7.3
Marital status							
	Married	1538	1708	3246	64.5	181	5.6
	Partnership	73	108	181	3.6	15	8.3
	Separated	12	9	21	0.4	5	23.8
	Divorced	169	195	364	7.2	31	8.5
	Widower	59	164	223	4.4	11	4.9
	Not married	509	487	996	19.8	122	12.2
Cohabitating							
	Yes	1917	2141	4058	80.7	248	6.1
Secondary schooling							
	Studying	20	34	54	1.1	5	9.3
	< 8 years	290	203	493	9.7	35	7.1
	8 - 9 years	610	401	1011	19.9	87	8.6
	10 - 11 years	751	913	1664	32.8	112	6.7
	High school	522	896	1418	27.9	89	6.3
	Other/foreign	163	215	378	7.4	38	10.1
Postsecondary education							
	No postsecondary	415	529	944	18.6	112	11.9
	1-3 years postsecondary	1307	1238	2545	50.1	172	6.8
	3+ years postsecondary	495	784	1279	25.2	63	4.9
	Other	143	122	265	5.2	21	7.9
Occupational status							
	Work/study	1417	1526	2943	58.0	167	5.7
	Temp. No work	68	121	189	3.7	63	33.3
	Retired	843	966	1809	35.6	115	6.4
	Other	47	77	124	2.4	27	21.8
Financial strain							
	Not at all	2136	2404	4540	89.4	275	6.1
	Few months	175	213	388	7.6	60	15.5
	Half the months	23	22	45	0.9	13	28.9
	Every month	25	32	57	1.1	19	33.3
Self-rated health							
	Very good	306	328	634	12.5	7	1.1
	Good	1348	1524	2872	56.6	83	2.9
	Fair	616	697	1313	25.9	181	13.8
	Bad	89	137	226	4.5	90	39.8
	Very bad	12	6	18	0.4	9	50.0
General activity limitation							
	Not limited at all	1561	1630	3191	63.2	114	3.6
	Limited but not severely	672	906	1578	31.3	166	10.5
	Severely limited	132	146	278	5.5	88	31.7
Longstanding illness. Yes		1052	1200	2252	44.7	244	10.8
Anxiety, now or earlier. Yes		110	223	333	6.6	111	33.3
Depression, now or earlier. Yes		145	230	375	7.4	138	36.8
Medication anxiety. Yes		71	119	190	3.8	65	34.2
Medication antidepressants. Yes		85	173	258	5.1	66	25.6

The total sample consisted of 53% women; 64.5% of the respondents were married, and 80.7% were cohabitating. For the total group, mean age was 55.7 and median age was 57.4; for individuals scoring in the depressed range on the MDI, the mean age was 50.2 and the median was 51.4 years.

Compared to the total sample, the respondents reporting symptoms of depression were younger, and more likely to be living alone, and to be unmarried. They were also more likely to have no postsecondary education, to be temporarily out of work (16.9% vs 3.7%), and to experience more frequent financial strain. Furthermore, their health indicators included: lower self-rated health, more reports of limited physical functioning, more reports of long lasting disease, and former anxiety or depression diagnoses; and more reports to be currently in pharmacological treatment for these disorders.

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

Of those responding to the questions, more than half perceived no problems at all in accessing professional care, least of all transport.

Among those who did have concerns about accessing or continuing professional mental health care, *Expense* was the most common problem, as 30.1% indicated expenses had prevented, deterred, or delayed them either *Quite a lot* or *A lot* (both responses aggregated in the *Quite a lot +* category in Figure 2). Likewise, the second most common concern was related to *Stigma*, phrased in the questionnaire as "what others might think, say or do", which was a serious concern for 22.3%; approximately the same proportion (21.2%) had concerns related to *Knowledge*, or how to find help for a mental health problem. Transport was not a problem for 78.6%, with only 11.7% reporting it negatively affected access.

Perceived barriers to accessing health care by SEP are shown in Table 2 (crude numbers are shown in Supplementary Table 2). Perceptions of *Stigma* did not show any significant difference across the socioeconomic groups, however measured. *Lack of Knowledge* was a significant problem for respondents without postsecondary education compared to those who had completed some postsecondary education (adjusted odd ratio (aOR) 2.26 confidence interval (CI) 1.1- 4.6) and for respondents with occasional (*Few months*), but not regular, financial strain when compared to those with no financial strain. Low SEP as measured by educational level and financial strain was associated with perceived barriers concerning *Transport* and *Expense*; whereas low SEP measured by employment status alone was associated with concerns related to *Transport*. The retired respondents were more likely to perceive bad *Experience* with mental health services as a barrier to seeking or continuing MHC compared to respondents who were working. *Transport* showed the greatest disparity across the socioeconomic groups.

Table 2. Adjusted odds ratios for perceived barriers for accessing MHC by three indicators of SEP

Table 2. Adjusted odds ratios for five perceived barriers accessing mental health care by employment status, education, and financial strain

	Employment status				**Education**					**Financial strain**				
Stigma	**aOR**	**CI**		**n**		**aOR**	**CI**		**n**		**aOR**	**CI**		**n**
Working	1			291	3+years	1			290	Not at all				289
Temp. Not working	.9201	.4880	1.735		1 – 3 years	1.087	.5740	2.058		Few months	.8994	.4841	1.671	
Retired	.6808	.3420	1.356		No postsecondary	1.166	.5833	2.332		Half the time+	1.749	.6933	4.410	
Other	.3815	.1431	1.017		Other	.6699	.1969	2.279						
Knowledge														
Working	1			292	3+ years	1			291	Not at all	1			290
Temp. Not working	1.204	.6390	2.268		1-3 years	1.597	.8309	3.070		Few months	**2.515**	**1.335**	**4.739**	
Retired	.5003	.2480	1.009		No postsecondary	**2.263**	**1.115**	**4.592**		Half the time+	2.372	.9404	5.985	
Other	.5004	.1884	1.329		Other	**4.752**	**1.297**	**17.412**						
Expense														
Working	1			289	3+ years	1			288	Not at all				289
Temp. Not working	1.700	.8911	3.323		1-3 years	1.835	.9324	3.612		Few months	**4.268**	**2.172**	**8.385**	
Retired	1.537	.7451	3.171		No postsecondary	**2.773**	**1.336**	**5.757**		Half the time+	**9.623**	**2.708**	**34.194**	
Other	.7456	.2822	1.970		Other	2.031	.5762	7.156						
Experience														
Working	1			287	3+ years	1			286	Not at all	1			286
Temp. Not working	.9581	.4820	1.905		1-3 years	1.043	.5392	2.019		Few months	1.152	.5999	2.212	
Retired	**2.143**	**1.024**	**4.485**		No postsecondary	.6435	.3073	1.347		Half the time+	2.385	.9685	5.874	
Other	1.531	.5932	3.952		Other	.7503	.2024	2.781						
Transport														
Working	1			290	3+ years	1			289	Not at all				288
Temp. Not working	**3.184**	**1.463**	**6.931**		1-3 years	1.603	.6502	3.954		Few months	1.746	.8392	3.634	
Retired	**4.442**	**1.900**	**10.384**		No postsecondary	**2.988**	**1.187**	**7.518**		Half the time+	**9.889**	**3.745**	**26.113**	
Other	2.169	.6948	6.773		Other	1.019	.1835	5.659						

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), significant results are marked in bold

SEP showed no association with any of the barriers or with years of schooling (not shown). Using depression as independent variable, we found that severity of depression (both measured as a categorical variable and a score) was associated with perceived barriers in relation to *Expense* and *Transport*, but not associated with any other perceived barriers (see Supplementary Material Table 3).

Discussion

Principal findings

In this study of perceived barriers to accessing mental health care by respondents with present symptoms of depression, we found that almost 1/3 of the respondents indicated that *Expense* related to accessing MHC was a considerable barrier; this perception was more prevalent among individuals without postsecondary education and individuals experiencing financial strain. Transport presented the least prevalent barrier in general; but on the other hand, transportation also presented the greatest and most consistent socioeconomic disparity across all measurements of SEP. Transport and expenses associated with accessing mental health care were a problem for disadvantaged individuals.

Stigma was an issue of concern for 22% of the respondents but did not vary significantly according to SEP, whereas lack of knowledge about how to get help was a significantly greater problem for individuals without postsecondary education as compared to individuals with postsecondary education.

Lack of knowledge about how get to help and bad experience were perceived as a problem for 1/5 of the individuals overall as well.

Strengths and weaknesses of the study

A strength of this study was its use of information from a population study from a deprived area in combination with data on present depression score, information on SEP, and perceived barriers to accessing MHC; by this design we were able determine the significance of different barriers to access for potential MHC patients in a deprived area. We are not aware of similar studies.

A limitation in our study was that the items used as dependable variables were not fully validated; validation would be preferable in order to compare to other studies. The BACE-3, at 30 questions, was too extensive to use in the LOFUS study, which already consisted of close to 100 questions; this was also the reasoning behind our focus on five central concepts of barriers to access. The external validity of the questions is supported by the use of generally accepted and validated concepts of abilities and as such is comparable to other studies. The content validity was tested by the panel of patients and patients' relatives and the questions found to be sound, but in retrospect, might not measure the concept of self-efficacy very well. We used the answer *Not relevant/Do not want to reply* as an indicator that the individual preferred to handle problems without help. It would have been prudent, however, to ask a more direct question about perceptions of need for care; it is possible that some individuals did not find the question relevant because while they experienced mental health issues, they did not perceive a need for further care. We found no correlation between the answer to the question of relevance and SEP, except for retired respondents, who tended to state *Not relevant* less, compared to respondents working (not shown).

Another limitation was that the question about transport was not clearly separated from the question about perceived barriers in relation to expenses, as it was not specified whether expenses included transportation-related expenses. Thus, we have no clear distinction between whether *Transport* as a barrier is primarily a logistical or economical barrier, or some combination thereof.

Comparison with other studies

The total sample contained more respondents in the age group 50 – 69 and fewer in the age groups younger and older compared to the study population; additionally, as compared to the background population the LOFUS sample is over represented by individuals with *+3 years postsecondary education vs no postsecondary education* by almost 3:1, according to general population statistics drawn from Statistics Denmark[25]. For the total sample, questions on self-rated health (SRH) were rated higher in the sample than the national levels[36] even though long-lasting illness was more prevalent in the sample (44.7% compared to national rate of 35.6%)[36]; the rate of respondents with *severely limited physical functioning* was close to the national proportions[37]. The group with symptoms of depression had scores well below national levels in all health-related variables. The total sample may overrepresent the middle-aged to older part of the population, an issue seen in national surveys, too[38].

7.3% had symptoms of depression when the summed MDI score was used, which is a considerably higher rate than found by any other survey in Denmark; however, a recent national survey reported that 7.0% adults suffer from depressed mood, including 7.8% in the Region of Zealand[36]. Eurostat reported a prevalence of 6.3% adults with depressive symptoms and 3% with major depression symptoms in Denmark[39]. In the present study, 225 respondents reported both a core symptom of depression *Most of the time* or more and a summed MDI score

>20, equivalent to a MDD prevalence of 4.4%. A comparable study by Ellervik et al. found 2.5% with a summed MDI score >25; we found 3.8%[40]. The present data is a subsample from a population survey in a deprived area, which could explain the high rate of depression symptoms found.

We found perceived stigma to be of *Quite a lot* or *A lot of concern* for 20% of the respondents. This corresponds with findings in a systematic review, where overall 20 – 25% respondents in 44 studies reported stigma as a barrier to accessing mental health services[41]. Stigma showed no association to SEP in our data. We have not been able to verify this in other studies except for one Canadian study, which likewise found no association between years of education and experiencing stigma in mental health care. However, they did find perceived stigma more prevalent among respondents not working[42]. In the Panel of Relatives and Patients of Psychiatry Services of Region Zealand, it was said that patients with mental disorders, and their relatives, pull the curtains together when they meet with each other privately, and that patients are indeed concerned with what others might think.

One in five respondents experienced *Knowledge* as a barrier and had doubts about what to do to get professional help. With free access to a GP in Denmark, and the GP universally understood to be the gatekeeper for referrals, this is puzzling. Among respondents with symptoms of depression, 138 reported former or present depression, and 35 of them (25%) still answered that they experienced *Knowledge* to be a barrier *Quite a lot* or *A lot* of the time. Of those with symptoms of depression and presently taking antidepressant medication, 8 (12%) had doubts about what to do to get help. This could be due to the nature of the disease, but we did not find support for this, as we found no association to *Knowledge* with the severity of symptoms of depression. However, a Canadian study on perceived unmet need by respondents with symptoms of anxiety or depression found high symptom scores were associated with a higher degree of unmet need[7], and not knowing how or where to get help was the most reported reason. The Panel of Relatives and Patients of Psychiatry Services of Region Zealand was not very surprised by this finding: despite free access to a GP, one individual reported that he could not get a family-GP, but had to meet changing doctors in a regional clinic (due to lack of GP's in the area). Another mentioned the waiting time for an appointment with the GP could be weeks (due to lack of GP's).

It could be argued that older people may be more reluctant to use MHC and feel more stigmatized by the need for psychotherapy[43 44]. We did not find support for this, as the retired group did not differ in perception of stigma from employed persons. Likewise, older retired persons might be less willing to pay for the expenses associated with treatment, but we did not find support for this either, as expense was not a significant barrier for the group retired compared to the group working.

Use of mental health care is sensitive to cost[45], and especially so for persons in low SEP[46]. This corresponds with our findings that expenses associated with mental health care was considered a common barrier for seeking help and concern of almost 1/3 of our respondents, and by two- to five-fold more by respondents without postsecondary education or in financial strain. This knowledge is important when research has shown that financial strain is strongly associated with higher odds for depression[11] and for prescription of antidepressants[47]. A German study found that even with free access to a psychologist these services are used

less by people in low SEP[19], which could be explained in part by our findings; people without postsecondary education may have less knowledge of how to access professional MHC, thus leading to lower usage of available services.

Experience with former mental health care treatment made retired respondents more reluctant to seek MHC as compared to the working population. This may not necessarily be due to bad experiences with health care professionals, though stigmatization can be a problem in health services too[48]; reports of past experience as a barrier could also indicate bad experience with side effects from a medication. Our study was not designed to capture or explore this nuance. Retired individuals are more likely to have more experience with health care, and this group includes people receiving early retirement pensions, which could indicate a chronic illness leading to early retirement and thus more opportunities for more bad experiences. The patient panel questioned the respondents' experience with MHC, since the rates of bad past experiences were so low; one remarking: "*Those who are really feeling bad have not participated in this survey*". For the panel, bad experience was a common deterrent to MHC, which may indicate an important area of future study.

Transport was perceived to be a greater problem by persons in low SEP compared to individuals in high SEP. This aligns well with our previous findings of the impact of distance and SEP on MHC use by patients in antidepressant treatment[21]. However, the question was not well distinguished from the question on expenses. Difficulty with transport or travelling includes the time spent to reach services and coordinate with other obligations – taking care of family duties or take time off at work, etc. Reliance on infrequent or inadequate public transportation could also be a reason to answer positively to this question, but the study was not designed to capture information regarding public versus private transportation, e.g. The patient panel was surprised that transport was a minor issue for the respondents, since it was viewed by them to be both time-consuming and expensive.

Meaning of the study and possible explanations and implication for policymakers

The study aimed to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to their SEP. The answer in this study is quite clear: lack of postsecondary education was linked to greater perceived barriers to mental health care and expenses are considered a barrier to mental health care for those with no postsecondary education and in financial strain. Low mental health literacy, defined as knowledge and beliefs about mental disorders which aid in their recognition, management and prevention[49], could be a part of the explanation, since low mental health literacy is also associated with low SEP[50]. Thus, empowering the community to take action for better mental health literacy[51] can lead to increased help-seeking by individuals in low SEP. In Denmark, two programs on improving mental health literacy exist: Mental Health First Aid[52] and the ABC mental health initiative[53], both adopted from Australia. An approach directed more specifically toward deprived areas within such programs might improve SEP equity in mental health care treatment.

Addressing barriers and easing access for the deprived is obviously necessary. Lack of postsecondary education is associated with greater prevalence of perception of barriers to mental health care, in addition to an increased prevalence of mood disorders. Clearly, our results showed that *Expense* is a barrier for people in low SEP, but as found in the German study[19], people in low SEP use psychologists less frequently even with free access. Psychotherapy is associated with the ability to engage, which in itself could be more difficult if an individual struggles with social and economic problems on top of mental ones. In order to address these related barriers, the deprived and depressed probably have additional needs beyond medication and psychotherapy, such as social supports and social/domestic/workplace intervention.

In a future study it could be interesting to investigate the association between depression score, perceived barriers and use of MHC for a period after the score. Future research could also investigate which experiences cause retired respondents with symptoms of depression to hesitate to access mental health care. Further improvements and validation of a short form questionnaire as the present could be beneficial.

Author contributions

AP conceived the research and developed and validated the questions on barriers supervised by AH. AP wrote the first draft of the manuscript assisted by LHH. AH, ES, and FBW contributed to the data analysis, interpretation of results and critical revision of the manuscript.

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Data sharing: No additional data available

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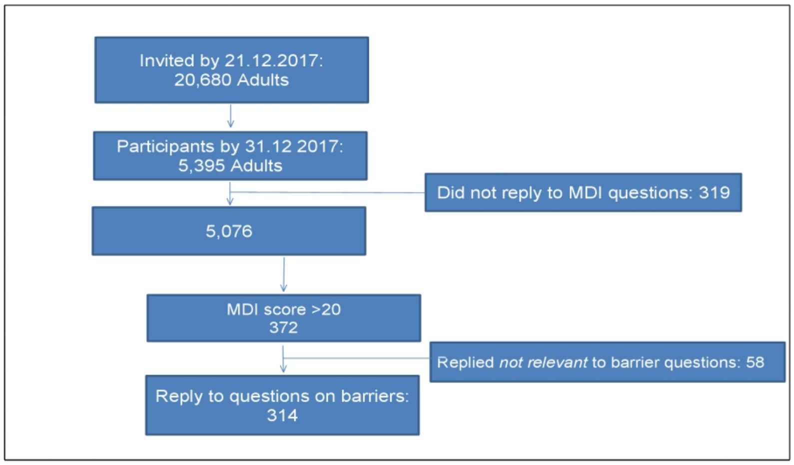
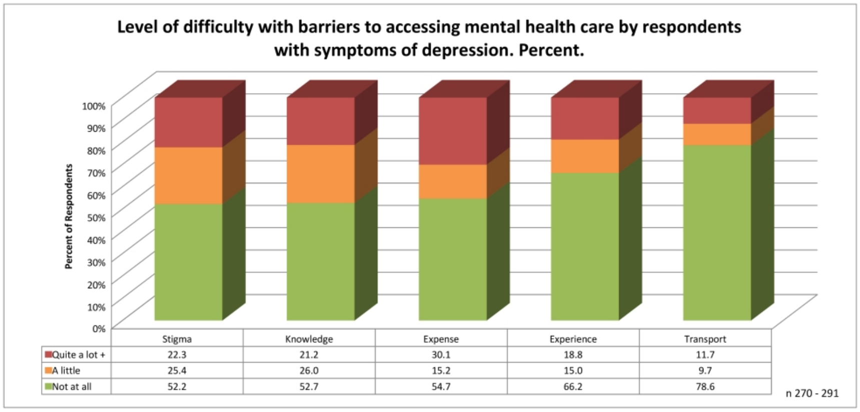


Figure 1. Sampling from the Lolland Falster Health Study

209x136mm (300 x 300 DPI)



	Stigma	Knowledge	Expense	Experience	Transport
🟥 Quite a lot +	22.3	21.2	30.1	18.8	11.7
🟧 A little	25.4	26.0	15.2	15.0	9.7
🟩 Not at all	52.2	52.7	54.7	66.2	78.6

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

331x175mm (300 x 300 DPI)

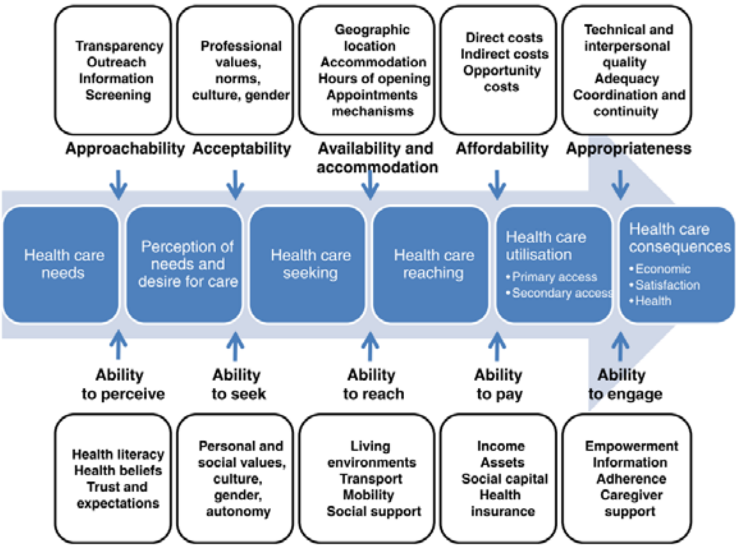
Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression:
Results from the Lolland-Falster Health Study.

Supplementary

Conceptual frame

Patients' choice of care will relate to personal preferences and abilities to access care. In a comprehensive theoretical approach by Levesque et al* they combine several theories on access to health care and final treatment outcome. The model is patient-centered and based on service demand and service supply between which they describe the stepwise fulfilment of needs in the process from recognizing a health care need to a finalized treatment. The model has five central concepts associated with enforcing or inhibiting access on the supply-side, and five corresponding abilities on the demand-side, likewise with associated enforcing or inhibiting factors.

Figure 1: Model of a conceptual framework of access to health care*



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* Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health* 2013;12:18. doi: 10.1186/1475-9276-12-18.:18-12.

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression:
Results from the Lolland-Falster Health Study.

Table 1. Questionnare

Supplementary table:* Condensation of the *Barriers to Access to Care Evaluation scale (BACE v3)

Q no	**BACE v3 Question**	Abilities #	Covered by question ¤
1	Being unsure where to go to get professional care	Perceive	1
2.	Wanting to solve the problem on my own	Perceive	(6)
3.	Concern that I might be seen as weak for having a mental health problem	Seek	2
4.	Fear of being put in hospital against my will	Seek	2
5.	Concern that it might harm my chances when applying for jobs	Seek	2
6.	Problems with transport or travelling to appointments	Reach	3
7.	Thinking the problem would get better by itself	Perceive	
8.	Concern about what my family might think or say	Seek	2
9.	Feeing embarrassed or ashamed	Seek	2
10.	Preferring to get alternative forms of care (e.g. spiritual care, non-Western healing / medicine, complementary therapies)	Perceive	
11.	Not being able to afford the financial costs involved	Pay	4
12.	Concern that I might be seen as ‘crazy’	Seek	2
13.	Thinking that professional care probably would not help		(6)
14.	Concern that I might be seen as a bad parent	Seek	2
15.	Professionals from my own ethnic or cultural group not being available		
16.	Being too unwell to ask for help		
17.	Concern that people I know might find out	Seek	2
18.	Dislike of talking about my feelings, emotions or thoughts	Seek	
19.	Concern that people might not take me seriously if they found out I was having professional care	Seek	2
20.	Concerns about the treatments available (e.g. medication side effects)	Perceive	
21.	Not wanting a mental health problem to be on my medical records	Seek	2
22.	Having had previous bad experiences with professional care for mental health	Engage	5
23.	Preferring to get help from family or friends	Seek	
24.	Concern that my children may be taken into care or that I may lose access or custody without my agreement	Seek	2
25.	Thinking I did not have a problem	Perceive	6
26.	Concern about what my friends might think or say	Seek	2
27.	Difficulty taking time off work	Reach	
28.	Concern about what people at work might think, say or do	Seek	2
29.	Having problems with childcare while I receive professional care	Reach	3
30.	Having no one who could help me get professional care	Reach	

Clement et al. BMC Psychiatry 2012, 12:36
Development and psychometric properties the Development and psychometric properties the Barriers to Access to Care Evaluation scale (BACE) - related to people with mental ill health

\# According to model of Levesque et al. International Journal for Equity in Health 2013, 12:18
Patient-centered access to health care: conceptualizing access at the interface of health systems and populations

¤ The questions in the questionnaire of the present study

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Suppl. Table 2: Perceived barriers accessing MHC & symptoms of depression, crude numbers

Stigma	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	73	50	29	152	52,2
A little	39	20	15	74	25,4
Quite a lot	16	13	10	39	13,4
A lot	10	6	10	26	8,9
NA	11	6	6	23	
Sum	149	95	70	314	291
Knowledge	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	77	50	27	154	52,7
A little	41	21	14	76	26,0
Quite a lot	20	13	16	49	16,8
A lot	2	4	7	13	4,5
NA	9	7	6	22	
Sum	149	95	70	314	292
Expense	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	84	47	27	158	54,7
A little	20	14	10	44	15,2
Quite a lot	15	14	15	44	15,2
A lot	18	13	12	43	14,9
NA	12	7	6	25	
Sum	149	95	70	314	289
Experience	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	98	58	34	190	66,2
A little	22	11	10	43	15,0
Quite a lot	15	9	8	32	11,1
A lot	4	10	8	22	7,7
NA	10	7	10	27	
Sum	149	95	70	314	287
Transport	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	117	66	45	228	78,6
A little	10	11	7	28	9,7
Quite a lot	6	4	9	19	6,6
A lot	6	6	3	15	5,2
NA	10	8	6	24	
Sum	149	95	70	314	290

Suppl. Table 3. Adjusted odds ratios for five perceived barriers accessing mental health care by severity of symptoms of depression

	Stigma				**Knowledge**				**Expense**				**Experience**				**Transport**			
Dep. Grade	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**
Mild	1			291	1			292	**1**			289	1			287	1			290
Moderate	.8463	.4903	1.461		.9464	.5510	16.256		1.350	.7722	2.359		1.220	.6854	2.172		1.684	.8614	3.294	
Severe	1.259	.6867	2.309		1.723	.9420	3.151		**2.043**	**1.097**	**3.804**		1.739	.9220	3.279		**2.225**	**1.098**	**4.512**	
MDI score#	1.005	.9628	1.050		1.030	.9864	10.750		**1.063**	**1.016**	**1.112**		1.035	.9891	1.083		**1.076**	**1.024**	**1.130**	

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), marked bold

\# Major Depression Inventory scale > 20 ≤ 50, ungrouped

STROBE Statement for the study: **Socioeconomic position and perceived barriers to access mental helath care by individuals with symptoms of depression. Results from the Lolland-Falster Health Study.**

	Item No	Recommendation	Addressed on page:
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	4
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5 - 6 Table 1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*5 - 6* *Supplement Table 1*
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	7 & Figure 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5 - 6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, explain how loss to follow-up was addressed	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Supplement table 2
		(c) Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	Report numbers of outcome events or summary measures over time	

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Table 3 Table 4 + 5
		(*b*) Report category boundaries when continuous variables were categorized	5
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	10-11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1 & 5

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.

Are perceived barriers to accessing mental health care associated with socioeconomic position among individuals with symptoms of depression? Questionnaire-results from the Lolland-Falster Health Study, a rural Danish population study.

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Are perceived barriers to accessing mental health care associated with socioeconomic position among individuals with symptoms of depression? Questionnaire-results from the Lolland-Falster Health Study, a rural Danish population study.

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Competing interest statement

All authors have completed the Unified Competing Interest form (available on request from the corresponding author) and declare: no support from any organisation for the submitted, no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, and no other relationships or activities that could appear to have influenced the submitted work.

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Transparency declaration

Aake Packness affirms that this manuscript is an honest, accurate, and transparent account of the study being reported, that no important aspects of the study have been omitted, and that any discrepancies from the study as planned have been explained.

Abstract

Objective: To evaluate if perceived barriers to accessing mental health care (MHC) among individuals with symptoms of depression are associated with their socioeconomic position (SEP).
Design: Cross-sectional questionnaire-based population survey from the Lolland-Falster Health Study (LOFUS) 2016-17 including 5,076 participants.
Participants: The study included 372 individuals participating in LOFUS with positive scores for depression according to the Major Depression Inventory (MDI).
Interventions: A set of five questions on perceived barriers to accessing professional care for a mental health problem was prompted to individuals responding with symptoms of depression (MDI score >20).
Outcomes: The association between SEP (as measured by educational attainment, employment status, and financial strain) and five different types of barriers to accessing MHC were analysed in separate multivariable logistic regression models adjusted for gender and age.
Results: 314 out of 372 (84%) completed the survey questions and reported experiencing barriers to MHC access. Worry about expenses related to seeking or continuing MHC was a considerable barrier for 30% of the individuals responding, and as such the greatest problem among the five types of barriers. 22% perceived stigma as a barrier to accessing MHC, but there was no association between perceived stigma and SEP. Transportation was the barrier of least concern for individuals in general, but also the issue with greatest and most consistent socioeconomic disparity (odds ratio (OR) 2.99; confidence interval (CI) 1.19 – 7.52) for lowest vs highest educational groups, and likewise concerning expenses (OR 2.77, CI 1.34 – 5.76) for the same groups.
Conclusion: Issues associated with *Expenses* and *Transport* were more frequently perceived as barriers to accessing MHC for people in low SEP compared to people in high SEP. Stigma showed no association to SEP.

Informed written consent was obtained. Region Zealand’s Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015) approved the study.

Strengths and limitations of this study:

- A strength of this study is that it is a population study in a socioeconomically-deprived area.
- It combines data on present depression scores and SEP with proportions of perceived barriers to accessing mental health care services.
- The study was done with patient participation.
- It is a limitation of this study that the questions used to assess barriers to accessing mental health care are not standardized.
- There was a potential overlap in the questions between transportation barriers and barriers of expenses related to seeking or continuing mental health care services.

Introduction

Major depressive disorders (MDD) rank third among leading causes of years lived with disability (YLD) in high-income countries, as MDD is common and has an early onset.[1] Mental health problems in early age can have a profound impact on educational achievements[2], on income[3], and on later unemployment[4]. Additionally, having a diagnosis of depression is associated with a substantially shorter life expectancy [5].

In spite of this, far from all people suffering from depression are treated. In a Norwegian survey study only 12% of respondents with symptoms of depression had ever sought help [6], and a Canadian study found that 40% with symptoms of depression or anxiety perceived an unmet need for care [7]. Generally, treatment of patients suffering from depression is insufficient even in high-income countries, as only one in five receives adequate treatment[8].

Depressive disorders are closely associated with socioeconomic position (SEP). A dose response relationship has been found between income as well as education on incidence, prevalence, and persistence of depression[9]. Likewise, studies have found negative socioeconomic changes increase the risk of incidents of mental disorders, particularly of mood disorders [10], and financial strain in itself is associated with depressive disorder[11 12].

Thus, people in low SEP may have a higher need for mental health care due to increased incidence and prevalence of depression. A recent study found predictors of need for highly-specialized MDD care to be: depression severity, younger age at onset, prior poor treatment response, psychiatric comorbidity, somatic comorbidity, childhood trauma, psychosocial impairment, older age, and a socioeconomically disadvantaged status[13]. Although people in low SEP have an increased need for mental health services, it is not evident that they use more specialized care. Some studies have found access to specialist care to be based on clinical need, with little inequity in SEP[14 15 16], whereas others report specialized mental health services as psychologist or psychiatrists are not provided equally to persons in low SEP according to need [17 18 7 19] or that higher SEP is associated with more usage of specialized mental health services [20 21].

The background for initiating the present study was that health care statistics (unpublished) in 2013 revealed a significant disparity, as 20% fewer individuals in the most socioeconomically deprived municipality in Denmark (Lolland) had been in contact with out-patient mental health care (psychologist, private, or public psychiatry) than could be expected for the population size (unpublished). Several reasons may account for this discrepancy between expected higher need in a deprived area and actual use of mental health care services, one of them being perceptions of barriers that affect patients' choices or preferences, which we aimed to address in this study.

The study objective was to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to SEP. We thereby expected to gain knowledge valuable to addressing inequality in the use of mental health care services.

Method

Study design

The study was conducted as a cross-sectional questionnaire-based population survey.

Setting

The Danish health care system is tax-funded and free at delivery for both primary and secondary care; for adults, dental care and psychotherapy are only partly subsidized[22]. The general practitioner (GP) fulfills a gatekeeper function, as specialized care is only free after GP referral. Psychotherapy by a psychologist is partly subsidized only for patients referred by a GP for specific conditions: reaction to specific traumatic events; moderate depression; and, specifically for citizens between 18 and 38 years old, moderate anxiety disorders. In 2014, the out of pocket cost to individuals partly subsidised at time of service was equivalent to 52€ for the first consultation and 44€ for the following sessions [23].

Study population and data sources

The Lolland-Falster Health Study (LOFUS) is a publicly funded population survey conducted in the two remote municipalities of Lolland and Guldborgsund, located in a socioeconomically deprived area of Denmark that is a 1½-2 hours' drive south from the capital Copenhagen. In the 2017 national ranking of all 98 municipalities these two were ranked the most deprived and the 8th most deprived municipalities[24]. Together, the municipalities comprise 103,000 citizens, 50% being 50 years of age or older[25] in 2017. The study aims to enroll 25,000 participants of all ages and is conducted from 2016 to 2020. Participants are randomly selected by civil registration numbers[26], invited by mail, and re-invited by phone. The study covers several health areas: mental health, health literacy, social issues, genetics, kidney, ear nose & throat problems, and more. Beyond questionnaire responses, LOFUS data contains blood samples and biometrics. The study is described in detail elsewhere[27]. The present study relies on responses to the questionnaire from adults, with data drawn from LOFUS at the end of 2017, while data collection was still ongoing.

The subjects included in this study are respondents with symptoms of depression. All respondents who scored >20 on the Major Depression Inventory (MDI) were prompted the specific questions on perceived barriers to seeking help for mental health problems, which are described below.

Independent variables

Major Depression Inventory

As part of the LOFUS questionnaire, the respondents filled out the Major Depression Inventory (MDI). The MDI is based on the 12-item Likert scale and has been found to have an adequate internal and external validity for defining different stages of depression[28]. The MDI is based on the ICD-10 diagnostic criteria for depressive disorder[29], with scores ranging from 0 to 50. We used the sum score after excluding the lowest score on question 8 or 9 and likewise the lowest score on item 11 or 12, which measured increased/decreased restlessness and increased/decreased appetite, respectively[30]. Mild depression is covered by scores from 21 –

25, moderate depression from 26 – 30 and severe depression by scores from 31 – 50[31]. If more than two items were missing in the MDI, the score was categorized as missing[32].

Socioeconomic position

SEP was measured by employment status, educational attainment, and financial strain. Usually income status is included as measure of SEP but information on income was not an item in the questionnaire. Financial strain is not the optimal measurement of SEP; however, it has been found to be associated with having a depressive and/or anxiety disorder, above the effect of income, and to be negatively but not strongly correlated with income ($r=-0.41$, $p<0.001$)[11].

Employment status was gathered using 14 different items in the questionnaire. Respondents over the age of 67 were categorized as retired, unless they were employed. The categories of employment were reduced to four in the analyses: Working (employee; self-employed; combined employee and self-employed; military; secondary school pupil; postsecondary student; apprentice; house-wife/husband); Temporary not working (unemployed; rehabilitation; sickness leave 3 months or more); Retired (retired due to age; disability benefit; early retirement); and Other (Other).

Educational attainment was measured and classified as the following: *no postsecondary education* if the respondent did not complete any postsecondary education; *1-3 years postsecondary education* for vocational or academy/professional graduates of 1 - 3 years; *3+ postsecondary education* for baccalaureate matriculants who completed 3 - 4 years; and *academic* for those who completed graduate study of ≥5 years.

The questionnaire gathered responses concerning financial strain with the following question: *How often within the last 12 months have you had problems paying your bills?* With possible answers: *Never; Few months; Approximately half the months in the year; Every month*. In the analysis, the categories were reduced to three to gain power, merging *Approximately half the months in the year* and *Every month* into one category.

***Extrinsic variables*:**

Sociodemographic variables included were gender, age, marital status, and cohabitation.

Questions on *Self-perceived general health* (SRH) were provided to respondents with a five-point Likert scale from *very good* to *very bad*. In addition, the presence of a *Long-standing health problem* was posed as a binary question and *General activity limitation* was gauged in three grades from *severely limited* to *not at all*. These questions were adopted from the European Health Status Module[33].

The questionnaire included inquiries regarding past and present medical problems; specifically concerning mental health status, the respondents were asked if they presently suffered or had ever suffered from anxiety disorder and/or depression.

Dependent variables

We developed a short list of questions to be included in the LOFUS questionnaire for respondents who scored positive for symptoms of depression. The questions were inspired by the *Barriers to Access to Care Evaluation*

questionnaire by Sara Clement et al.[34]. Their questionnaire contains 30 items, which was too many to include in the LOFUS study (see supplementary table 1). The number of questions was reduced and grouped to cover the individual abilities in approaching care as described by Levesque et al.[35]: ability to perceive; ability to seek; ability to reach; ability to pay; and ability to engage (see further description in the supplementary material, Figure 1). A preliminary question on whether considering seeking care had ever been a problem was prompted before the five questions related to the abilities/perceived barriers:
Have any of the reasons listed below prevented, delayed, or discouraged you from getting or continuing professional care for a mental health problem?
It has had an impact, that I ..

1) … have been unsure what to do to get professional care. (termed "Knowledge" in the following)
2) … have been concerned for what others might think, say or do. (termed "Stigma")
3) … have had difficulty with transport or travelling for treatment. (termed "Transport")
4) … have not been able to afford the expenses that followed. (termed "Expense")
5) … have had bad experiences with professional care for mental health problems. (termed "Experience")
6) These questions are not relevant for me/I do not want to answer.

Answers to question 1 – 5 were listed in four grades ranging from *Not at all* to *Quite a lot;* question 6 was binary.

In a preliminary form, the questions were evaluated for content validity in a focus group interview consisting of a group of ten patients and relatives of psychiatric patients (the Panel of Relatives and Patients of Psychiatry Services in Region Zealand) in December 2014. The group found the themes relevant and the questions understandable. They offered some suggestions for rephrasing, which were subsequently followed. The same panel commented on the preliminary results of the study in December 2017.

Statistical analysis

For respondents with symptoms of depression we estimated the association between SEP and the outcome variables (five types of barriers to MHC: knowledge; stigma; transport; expense; experience) in separate multivariable logistic regression models after excluding respondents replying *Not relevant*. Likewise, we performed the same analyses with the three grades of depression (mild, moderate and severe) and depression score uncategorized (MDI score) as independent variables, which is presented as supplementary material. The SEP categories were employment status, education, and financial strain. *Working, postsecondary education,* and *no economic distress* were used as reference categories.

The logistic regression models were adjusted for age (18-59 versus 60+) and gender in addition to the variables studied in the univariate (crude) analysis.

The significance level used was 5% throughout, and all reported confidence intervals were 95%. All statistical analyses were done in Stata 15[36].

Patient and Public Involvement

The study objectives were discussed with the members of the Panel of Relatives and Patients of Psychiatry Services in Region Zealand along with the validation of the questions in December 2014. The preliminary results were discussed with the group again in December 2017. The final results were distributed to the group in February 2018 along with an invitation for additional comments. One member of the patient panel responded to the invitation and provided additional comments/discussion. Comments from patients are included in the discussion.

The published article will also be distributed to the patient panel.

Ethics

Informed, written consent was obtained from all participants. The study – along with the Lolland-Falster Health Study – was approved by Region Zealand's Ethical Committee on Health Research (SJ-421) and the Danish Data Protection Agency (REG-24-2015).

Results

Figure 1: Flow chart of sampling

Sampling from Lolland-Falster Health Study

By December 21, 2017, a total of 20,680 adults (age 18+) had been invited to the LOFUS study. By December 31, 2017, a total of 5,395 adults had replied to the questionnaire. 319 did not reply on the MDI score element or failed to fill in more than two answers in the test, leaving 5,076, of whom 372 (7.3%) reported symptoms of depression and thus were prompted the questions on perceived barriers to seeking mental health care. 58 replied that the questions were not relevant or would not answer them, thus 314 individuals with a MDI score >20 were included in the analyses of SEP and perceived barriers (Figure 1).

Table 1. Characteristics of study sample and respondents with symptoms of depression

Table 1. Characteristics of study sample and respondents with symptoms of depression (MDI >20)

		Total sample				MDI score >20	
Age group		**Male**	**Female**	**Total**	**%**	**N**	**%**
	18-29	198	212	410	8.1	55	13.4
	30-39	180	250	430	8.5	41	9.5
	40-49	357	443	800	15.8	82	10.3
	50-59	519	681	1200	23.6	84	7.0
	60-69	632	666	1298	25.6	63	4.9
	70-79	396	371	767	15.1	41	5.3
	80+	95	76	171	3.4	6	3.5
	Sum	**2377**	**2699**	**5076**		**372**	7.3
Marital status							
	Married	1538	1708	3246	64.5	181	5.6
	Partnership	73	108	181	3.6	15	8.3
	Separated	12	9	21	0.4	5	23.8
	Divorced	169	195	364	7.2	31	8.5
	Widower	59	164	223	4.4	11	4.9
	Not married	509	487	996	19.8	122	12.2
Cohabitating							
	Yes	1917	2141	4058	80.7	248	6.1
Secondary schooling							
	Studying	20	34	54	1.1	5	9.3
	< 8 years	290	203	493	9.7	35	7.1
	8 - 9 years	610	401	1011	19.9	87	8.6
	10 - 11 years	751	913	1664	32.8	112	6.7
	High school	522	896	1418	27.9	89	6.3
	Other/foreign	163	215	378	7.4	38	10.1
Postsecondary education							
	No postsecondary	415	529	944	18.6	112	11.9
	1-3 years postsecondary	1307	1238	2545	50.1	172	6.8
	3+ years postsecondary	495	784	1279	25.2	63	4.9
	Other	143	122	265	5.2	21	7.9
Occupational status							
	Work/study	1417	1526	2943	58.0	167	5.7
	Temp. No work	68	121	189	3.7	63	33.3
	Retired	843	966	1809	35.6	115	6.4
	Other	47	77	124	2.4	27	21.8
Financial strain							
	Not at all	2136	2404	4540	89.4	275	6.1
	Few months	175	213	388	7.6	60	15.5
	Half the months	23	22	45	0.9	13	28.9
	Every month	25	32	57	1.1	19	33.3
Self-rated health							
	Very good	306	328	634	12.5	7	1.1
	Good	1348	1524	2872	56.6	83	2.9
	Fair	616	697	1313	25.9	181	13.8
	Bad	89	137	226	4.5	90	39.8
	Very bad	12	6	18	0.4	9	50.0
General activity limitation							
	Not limited at all	1561	1630	3191	63.2	114	3.6
	Limited but not severely	672	906	1578	31.3	166	10.5
	Severely limited	132	146	278	5.5	88	31.7
Longstanding illness. Yes		1052	1200	2252	44.7	244	10.8
Anxiety, now or earlier. Yes		110	223	333	6.6	111	33.3
Depression, now or earlier. Yes		145	230	375	7.4	138	36.8
Medication anxiety. Yes		71	119	190	3.8	65	34.2
Medication antidepressants. Yes		85	173	258	5.1	66	25.6

The total sample consisted of 53% women; 64.5% of the respondents were married, and 80.7% were cohabitating. For the total group, mean age was 55.7 and median age was 57.4; for individuals scoring in the depressed range on the MDI, the mean age was 50.2 and the median was 51.4 years.

Compared to the total sample, the respondents reporting symptoms of depression were younger, and more likely to be living alone, and to be unmarried (Table 1). They were also more likely to have no postsecondary education, to be temporarily out of work of whom 33% had symptoms, and to experience more frequent financial strain. Furthermore, their health indicators included: lower self-rated health, more reports of limited physical functioning, more reports of long lasting disease, and former anxiety or depression diagnoses; and more reports to be currently in pharmacological treatment for these disorders.

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

Of those responding to the questions, more than half perceived no problems at all in accessing professional care, least of all transport.

Among those who did have concerns about accessing or continuing professional mental health care, *Expense* was the most common problem, as 30.1% indicated expenses had prevented, deterred, or delayed them either *Quite a lot* or *A lot* (both responses aggregated in the *Quite a lot +* category in Figure 2). Likewise, the second most common concern was related to *Stigma*, phrased in the questionnaire as "what others might think, say or do", which was a serious concern for 22.3%; approximately the same proportion (21.2%) had concerns related to *Knowledge*, or how to find help for a mental health problem. Transport was not a problem for 78.6%, with only 11.7% reporting it negatively affected access.

Perceived barriers to accessing health care by SEP are shown in Table 2 (crude numbers are shown in Supplementary Table 2). Perceptions of *Stigma* did not show any significant difference across the socioeconomic groups, however measured. *Lack of Knowledge* was a significant problem for respondents without postsecondary education compared to those who had completed some postsecondary education (adjusted odd ratio (aOR) 2.26 confidence interval (CI) 1.1- 4.6) and for respondents with occasional (*Few months*), but not regular, financial strain when compared to those with no financial strain. Low SEP as measured by educational level and financial strain was associated with perceived barriers concerning *Transport* and *Expense*; whereas low SEP measured by employment status alone was associated with concerns related to *Transport*. The retired respondents were more likely to perceive bad *Experience* with mental health services as a barrier to seeking or continuing MHC compared to respondents who were working. *Transport* showed the greatest disparity across the socioeconomic groups.

Table 2. Adjusted odds ratios for perceived barriers for accessing MHC by three indicators of SEP

Table 2. Adjusted odds ratios for five perceived barriers accessing mental health care by employment status, education, and financial strain

	Employment status				Education					Financial strain				
Stigma	**aOR**	**CI**		**n**		**aOR**	**CI**		**n**		**aOR**	**CI**		**n**
Working	1			291	3+years	1			290	Not at all				289
Temp. Not working	.9201	.4880	1.735		1 – 3 years	1.087	.5740	2.058		Few months	.8994	.4841	1.671	
Retired	.6808	.3420	1.356		No postsecondary	1.166	.5833	2.332		Half the time+	1.749	.6933	4.410	
Other	.3815	.1431	1.017		Other	.6699	.1969	2.279						
Knowledge														
Working	1			292	3+ years	1			291	Not at all	1			290
Temp. Not working	1.204	.6390	2.268		1-3 years	1.597	.8309	3.070		Few months	**2.515**	**1.335**	**4.739**	
Retired	.5003	.2480	1.009		No postsecondary	**2.263**	**1.115**	**4.592**		Half the time+	2.372	.9404	5.985	
Other	.5004	.1884	1.329		Other	**4.752**	**1.297**	**17.412**						
Expense														
Working	1			289	3+ years	1			288	Not at all				289
Temp. Not working	1.700	.8911	3.323		1-3 years	1.835	.9324	3.612		Few months	**4.268**	**2.172**	**8.385**	
Retired	1.537	.7451	3.171		No postsecondary	**2.773**	**1.336**	**5.757**		Half the time+	**9.623**	**2.708**	**34.194**	
Other	.7456	.2822	1.970		Other	2.031	.5762	7.156						
Experience														
Working	1			287	3+ years	1			286	Not at all	1			286
Temp. Not working	.9581	.4820	1.905		1-3 years	1.043	.5392	2.019		Few months	1.152	.5999	2.212	
Retired	**2.143**	**1.024**	**4.485**		No postsecondary	.6435	.3073	1.347		Half the time+	2.385	.9685	5.874	
Other	1.531	.5932	3.952		Other	.7503	.2024	2.781						
Transport														
Working	1			290	3+ years	1			289	Not at all				288
Temp. Not working	**3.184**	**1.463**	**6.931**		1-3 years	1.603	.6502	3.954		Few months	1.746	.8392	3.634	
Retired	**4.442**	**1.900**	**10.384**		No postsecondary	**2.988**	**1.187**	**7.518**		Half the time+	**9.889**	**3.745**	**26.113**	
Other	2.169	.6948	6.773		Other	1.019	.1835	5.659						

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), significant results are marked in bold

SEP showed no association with any of the barriers or with years of schooling (not shown). Using depression as independent variable, we found that severity of depression (both measured as a categorical variable and a score) was associated with perceived barriers in relation to *Expense* and *Transport*, but not associated with any other perceived barriers (see Supplementary Material Table 3).

Discussion

Principal findings

In this study of perceived barriers to accessing mental health care by respondents with present symptoms of depression, we found that almost 1/3 of the respondents indicated that *Expense* related to accessing MHC was a considerable barrier; this perception was more prevalent among individuals without postsecondary education and individuals experiencing financial strain. Transport presented the least prevalent barrier in general; but on the other hand, transportation also presented the greatest and most consistent socioeconomic disparity across all measurements of SEP. Transport and expenses associated with accessing mental health care were a problem for disadvantaged individuals.

Stigma was an issue of concern for 22% of the respondents but did not vary significantly according to SEP, whereas lack of knowledge about how to get help was a significantly greater problem for individuals without postsecondary education as compared to individuals with postsecondary education.

Lack of knowledge about how get to help and bad experience were perceived as a problem for 1/5 of the individuals overall as well.

Strengths and weaknesses of the study

A strength of this study was its use of information from a population study from a deprived area in combination with data on present depression score, information on SEP, and perceived barriers to accessing MHC; by this design we were able determine the significance of different barriers to access for potential MHC patients in a deprived area. We are not aware of similar studies.

A limitation in our study was that the items used as dependable variables were not fully validated; validation would be preferable in order to compare to other studies. The BACE-3, at 30 questions, was too extensive to use in the LOFUS study, which already consisted of close to 100 questions; this was also the reasoning behind our focus on five central concepts of barriers to access. The external validity of the questions is supported by the use of generally accepted and validated concepts of abilities and as such is comparable to other studies. The content validity was tested by the panel of patients and patients' relatives and the questions found to be sound, but in retrospect, might not measure the concept of self-efficacy very well. We used the answer *Not relevant/Do not want to reply* as an indicator that the individual preferred to handle problems without help. It would have been prudent, however, to ask a more direct question about perceptions of need for care; it is possible that some individuals did not find the question relevant because while they experienced mental health issues, they did not perceive a need for further care. We found no correlation between the answer to the question of relevance and SEP, except for retired respondents, who tended to state *Not relevant* less, compared to respondents working (not shown).

Another limitation was that the question about transport was not clearly separated from the question about perceived barriers in relation to expenses, as it was not specified whether expenses included transportation-related expenses. Thus, we have no clear distinction between whether *Transport* as a barrier is primarily a logistical or economical barrier, or some combination thereof.

Comparison with other studies

The total sample contained more respondents in the age group 50 – 69 and fewer in the age groups younger and older compared to the study population; additionally, as compared to the background population the LOFUS sample is over represented by individuals with *+3 years postsecondary education vs no postsecondary education* by almost 3:1, according to general population statistics drawn from Statistics Denmark[25]. For the total sample, questions on self-rated health (SRH) were rated higher in the sample than the national levels[37] even though long-lasting illness was more prevalent in the sample (44.7% compared to national rate of 35.6%)[37]; the rate of respondents with *severely limited physical functioning* was close to the national proportions[38]. The group with symptoms of depression had scores well below national levels in all health-related variables. The total sample may overrepresent the middle-aged to older part of the population, an issue seen in national surveys, too[39].

7.3% had symptoms of depression when the summed MDI score was used, which is a considerably higher rate than found by any other survey in Denmark; however, a recent national survey reported that 7.0% adults suffer from depressed mood, including 7.8% in the Region of Zealand[37]. Eurostat reported a prevalence of 6.3% adults with depressive symptoms and 3% with major depression symptoms in Denmark[40]. In the present study, 225 respondents reported both a core symptom of depression *Most of the time* or more and a summed MDI score

>20, equivalent to a MDD prevalence of 4.4%. A comparable study by Ellervik et al. found 2.5% with a summed MDI score >25; we found 3.8%[41]. The present data is a subsample from a population survey in a deprived area, which could explain the high rate of depression symptoms found.

We found perceived stigma to be of *Quite a lot* or *A lot of concern* for 20% of the respondents. This corresponds with findings in a systematic review, where overall 20 – 25% respondents in 44 studies reported stigma as a barrier to accessing mental health services[42]. Stigma showed no association to SEP in our data. We have not been able to verify this in other studies except for one Canadian study, which likewise found no association between years of education and experiencing stigma in mental health care. However, they did find perceived stigma more prevalent among respondents not working[43]. In the Panel of Relatives and Patients of Psychiatry Services of Region Zealand*,* it was said that patients with mental disorders, and their relatives, pull the curtains together when they meet with each other privately, and that patients are indeed concerned with what others might think.

One in five respondents experienced *Knowledge* as a barrier and had doubts about what to do to get professional help. With free access to a GP in Denmark, and the GP universally understood to be the gatekeeper for referrals, this is puzzling. Among respondents with symptoms of depression, 138 reported former or present depression, and 35 of them (25%) still answered that they experienced *Knowledge* to be a barrier *Quite a lot* or *A lot* of the time. Of those with symptoms of depression and presently taking antidepressant medication, 8 (12%) had doubts about what to do to get help. This could be due to the nature of the disease, but we did not find support for this, as we found no association to *Knowledge* with the severity of symptoms of depression. However, a Canadian study on perceived unmet need by respondents with symptoms of anxiety or depression found high symptom scores were associated with a higher degree of unmet need[7], and not knowing how or where to get help was the most reported reason. The Panel of Relatives and Patients of Psychiatry Services of Region Zealand was not very surprised by this finding: despite free access to a GP, one individual reported that he could not get a family-GP, but had to meet changing doctors in a regional clinic (due to lack of GP's in the area). Another mentioned the waiting time for an appointment with the GP could be weeks (due to lack of GP's).

It could be argued that older people may be more reluctant to use MHC and feel more stigmatized by the need for psychotherapy[44 45]. We did not find support for this, as the retired group did not differ in perception of stigma from employed persons. Likewise, older retired persons might be less willing to pay for the expenses associated with treatment, but we did not find support for this either, as expense was not a significant barrier for the group retired compared to the group working.

Use of mental health care is sensitive to cost[46], and especially so for persons in low SEP[47]. This corresponds with our findings that expenses associated with mental health care was considered a common barrier for seeking help and concern of almost 1/3 of our respondents, and by two- to five-fold more by respondents without postsecondary education or in financial strain. This knowledge is important when research has shown that financial strain is strongly associated with higher odds for depression[11] and for prescription of antidepressants[48]. A German study found that even with free access to a psychologist these services are used

less by people in low SEP[19], which could be explained in part by our findings; people without postsecondary education may have less knowledge of how to access professional MHC, thus leading to lower usage of available services.

Experience with former mental health care treatment made retired respondents more reluctant to seek MHC as compared to the working population. This may not necessarily be due to bad experiences with health care professionals, though stigmatization can be a problem in health services too[49]; reports of past experience as a barrier could also indicate bad experience with side effects from a medication. Our study was not designed to capture or explore this nuance. Retired individuals are more likely to have more experience with health care, and this group includes people receiving early retirement pensions, which could indicate a chronic illness leading to early retirement and thus more opportunities for more bad experiences. The patient panel questioned the respondents' experience with MHC, since the rates of bad past experiences were so low; one remarking: "*Those who are really feeling bad have not participated in this survey*". For the panel, bad experience was a common deterrent to MHC, which may indicate an important area of future study.

Transport was perceived to be a greater problem by persons in low SEP compared to individuals in high SEP. This aligns well with our previous findings of the impact of distance and SEP on MHC use by patients in antidepressant treatment[21]. However, the question was not well distinguished from the question on expenses. Difficulty with transport or travelling includes the time spent to reach services and coordinate with other obligations – taking care of family duties or take time off at work, etc. Reliance on infrequent or inadequate public transportation could also be a reason to answer positively to this question, but the study was not designed to capture information regarding public versus private transportation, e.g. The patient panel was surprised that transport was a minor issue for the respondents, since it was viewed by them to be both time-consuming and expensive.

Meaning of the study and possible explanations and implication for policymakers

The study aimed to evaluate if perceived barriers to accessing mental health care differ across individuals with symptoms of depression according to their SEP. The answer in this study is quite clear: lack of postsecondary education was linked to greater perceived barriers to mental health care and expenses are considered a barrier to mental health care for those with no postsecondary education and in financial strain. Low mental health literacy, defined as knowledge and beliefs about mental disorders which aid in their recognition, management and prevention[50], could be a part of the explanation, since low mental health literacy is also associated with low SEP[51]. Thus, empowering the community to take action for better mental health literacy[52] can lead to increased help-seeking by individuals in low SEP. In Denmark, two programs on improving mental health literacy exist: Mental Health First Aid[53] and the ABC mental health initiative[54], both adopted from Australia. An approach directed more specifically toward deprived areas within such programs might improve SEP equity in mental health care treatment.

Addressing barriers and easing access for the deprived is obviously necessary. Lack of postsecondary education is associated with greater prevalence of perception of barriers to mental health care, in addition to an increased prevalence of mood disorders. Clearly, our results showed that *Expense* is a barrier for people in low SEP, but as found in the German study[19], people in low SEP use psychologists less frequently even with free access. Psychotherapy is associated with the ability to engage, which in itself could be more difficult if an individual struggles with social and economic problems on top of mental ones. In order to address these related barriers, the deprived and depressed probably have additional needs beyond medication and psychotherapy, such as social supports and social/domestic/workplace intervention.

In a future study it could be interesting to investigate the association between depression score, perceived barriers and use of MHC for a period after the score. Future research could also investigate which experiences cause retired respondents with symptoms of depression to hesitate to access mental health care. Further improvements and validation of a short form questionnaire as the present could be beneficial.

Author contributions

AP conceived the research and developed and validated the questions on barriers supervised by AH. AP wrote the first draft of the manuscript assisted by LHH. AH, ES, and FBW contributed to the data analysis, interpretation of results and critical revision of the manuscript.

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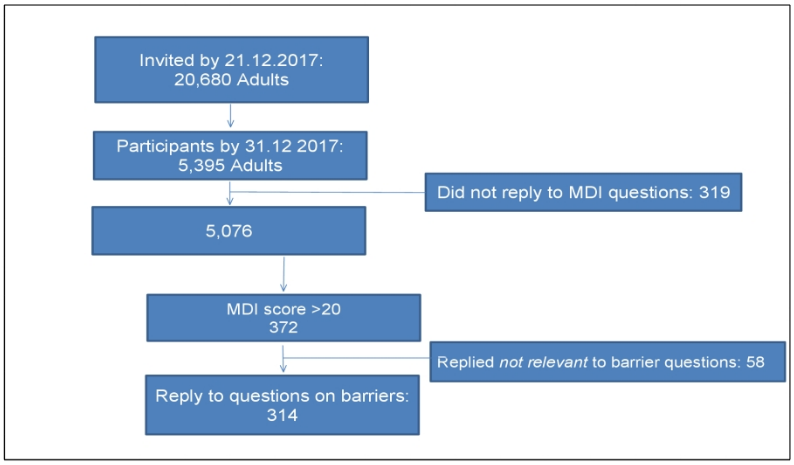
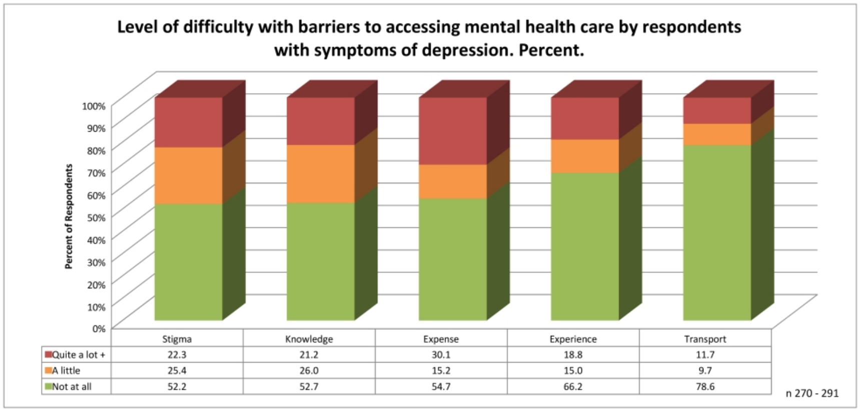


Figure 1. Sampling from the Lolland Falster Health Study

209x136mm (300 x 300 DPI)



	Stigma	Knowledge	Expense	Experience	Transport
🟥Quite a lot +	22.3	21.2	30.1	18.8	11.7
🟧A little	25.4	26.0	15.2	15.0	9.7
🟩Not at all	52.2	52.7	54.7	66.2	78.6

Figure 2. Responses on perceived barriers to accessing mental health care, proportions

331x175mm (300 x 300 DPI)

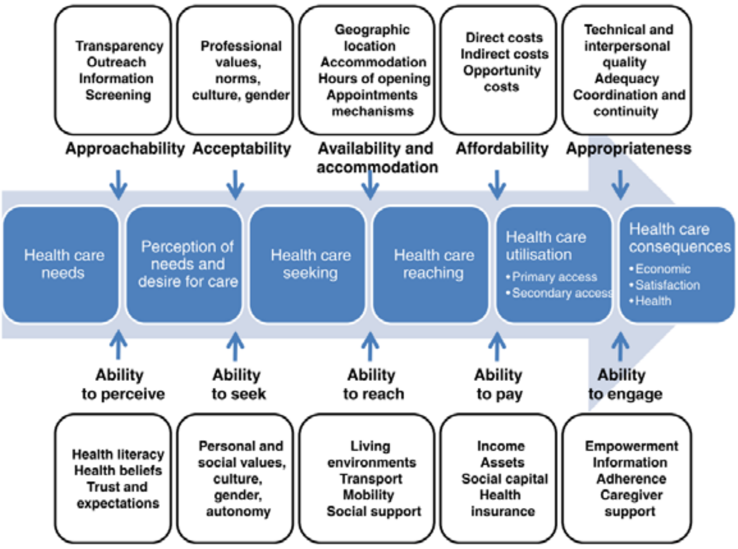
Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression:
Results from the Lolland-Falster Health Study.

Supplementary

Conceptual frame

Patients' choice of care will relate to personal preferences and abilities to access care. In a comprehensive theoretical approach by Levesque et al* they combine several theories on access to health care and final treatment outcome. The model is patient-centered and based on service demand and service supply between which they describe the stepwise fulfilment of needs in the process from recognizing a health care need to a finalized treatment. The model has five central concepts associated with enforcing or inhibiting access on the supply-side, and five corresponding abilities on the demand-side, likewise with associated enforcing or inhibiting factors.

Figure 1: Model of a conceptual framework of access to health care*



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* Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *Int J Equity Health* 2013;12:18. doi: 10.1186/1475-9276-12-18.:18-12.

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Table 1. Questionnare

Supplementary table:* Condensation of the *Barriers to Access to Care Evaluation scale (BACE v3)

Q no	**BACE v3 Question**	Abilities #	Covered by question ¤
1	Being unsure where to go to get professional care	Perceive	1
2.	Wanting to solve the problem on my own	Perceive	(6)
3.	Concern that I might be seen as weak for having a mental health problem	Seek	2
4.	Fear of being put in hospital against my will	Seek	2
5.	Concern that it might harm my chances when applying for jobs	Seek	2
6.	Problems with transport or travelling to appointments	Reach	3
7.	Thinking the problem would get better by itself	Perceive	
8.	Concern about what my family might think or say	Seek	2
9.	Feeing embarrassed or ashamed	Seek	2
10.	Preferring to get alternative forms of care (e.g. spiritual care, non-Western healing / medicine, complementary therapies)	Perceive	
11.	Not being able to afford the financial costs involved	Pay	4
12.	Concern that I might be seen as ‘crazy’	Seek	2
13.	Thinking that professional care probably would not help		(6)
14.	Concern that I might be seen as a bad parent	Seek	2
15.	Professionals from my own ethnic or cultural group not being available		
16.	Being too unwell to ask for help		
17.	Concern that people I know might find out	Seek	2
18.	Dislike of talking about my feelings, emotions or thoughts	Seek	
19.	Concern that people might not take me seriously if they found out I was having professional care	Seek	2
20.	Concerns about the treatments available (e.g. medication side effects)	Perceive	
21.	Not wanting a mental health problem to be on my medical records	Seek	2
22.	Having had previous bad experiences with professional care for mental health	Engage	5
23.	Preferring to get help from family or friends	Seek	
24.	Concern that my children may be taken into care or that I may lose access or custody without my agreement	Seek	2
25.	Thinking I did not have a problem	Perceive	6
26.	Concern about what my friends might think or say	Seek	2
27.	Difficulty taking time off work	Reach	
28.	Concern about what people at work might think, say or do	Seek	2
29.	Having problems with childcare while I receive professional care	Reach	3
30.	Having no one who could help me get professional care	Reach	

Clement et al. BMC Psychiatry 2012, 12:36

Development and psychometric properties the Development and psychometric properties the Barriers to Access to Care Evaluation scale (BACE) - related to people with mental ill health

According to model of Levesque et al. International Journal for Equity in Health 2013, 12:18
Patient-centered access to health care: conceptualizing access at the interface of health systems and populations

¤ The questions in the questionnaire of the present study

Socioeconomic position and perceived barriers to accessing mental health care by individuals with symptoms of depression: Results from the Lolland-Falster Health Study.

Suppl. Table 2: Perceived barriers accessing MHC & symptoms of depression, crude numbers

Stigma	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	73	50	29	152	52,2
A little	39	20	15	74	25,4
Quite a lot	16	13	10	39	13,4
A lot	10	6	10	26	8,9
NA	11	6	6	23	
Sum	149	95	70	314	291
Knowledge	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	77	50	27	154	52,7
A little	41	21	14	76	26,0
Quite a lot	20	13	16	49	16,8
A lot	2	4	7	13	4,5
NA	9	7	6	22	
Sum	149	95	70	314	292
Expense	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	84	47	27	158	54,7
A little	20	14	10	44	15,2
Quite a lot	15	14	15	44	15,2
A lot	18	13	12	43	14,9
NA	12	7	6	25	
Sum	149	95	70	314	289
Experience	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	98	58	34	190	66,2
A little	22	11	10	43	15,0
Quite a lot	15	9	8	32	11,1
A lot	4	10	8	22	7,7
NA	10	7	10	27	
Sum	149	95	70	314	287
Transport	**Mild**	**Mod.**	**Severe**	**Sum**	**Pct (resp)**
Not at all	117	66	45	228	78,6
A little	10	11	7	28	9,7
Quite a lot	6	4	9	19	6,6
A lot	6	6	3	15	5,2
NA	10	8	6	24	
Sum	149	95	70	314	290

Suppl. Table 3. Adjusted odds ratios for five perceived barriers accessing mental health care by severity of symptoms of depression

	Stigma				**Knowledge**				**Expense**				**Experience**				**Transport**			
Dep. Grade	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**	**aOR**	**CI**		**n**
Mild	1			291	1			292	**1**			289	1			287	1			290
Moderate	.8463	.4903	1.461		.9464	.5510	16.256		1.350	.7722	2.359		1.220	.6854	2.172		1.684	.8614	3.294	
Severe	1.259	.6867	2.309		1.723	.9420	3.151		**2.043**	**1.097**	**3.804**		1.739	.9220	3.279		**2.225**	**1.098**	**4.512**	
MDI score#	1.005	.9628	1.050		1.030	.9864	10.750		**1.063**	**1.016**	**1.112**		1.035	.9891	1.083		**1.076**	**1.024**	**1.130**	

Adjusted for: gender; age +/- 60; 95% confidence intervals (CI), marked bold

\# Major Depression Inventory scale > 20 ≤ 50, ungrouped

STROBE Statement for the study: **Socioeconomic position and perceived barriers to access mental helath care by individuals with symptoms of depression. Results from the Lolland-Falster Health Study.**

	Item No	**Recommendation**	**Addressed on page:**
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	4
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	5
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5 - 6 Table 1
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*5 - 6* *Supplement Table 1*
Bias	9	Describe any efforts to address potential sources of bias	
Study size	10	Explain how the study size was arrived at	7 & Figure 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5 - 6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) If applicable, explain how loss to follow-up was addressed	
		(*e*) Describe any sensitivity analyses	
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	Supplement table 2
		(c) Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	Report numbers of outcome events or summary measures over time	

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Table 3 Table 4 + 5
		(*b*) Report category boundaries when continuous variables were categorized	5
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	10-11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-12
Generalisability	21	Discuss the generalisability (external validity) of the study results	11
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	1 & 5

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at http://www.strobe-statement.org.