ORIGINAL RESEARCH

Inequities in Mental Health Care Quality and Clinical Outcomes Among Inpatients with Depression Within a Tax-Financed Universal Health Care System

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Purpose: The objective was to examine potential socioeconomic inequities in guideline recommended quality of care as well as several clinical outcomes among first-time inpatients with major depressive disorder (MDD) in a tax-financed universal health care system.

Patients and Methods: A nationwide cohort study was performed based on individual-level record linkage of public registers in Denmark. The study included all adult incident inpatients with MDD at Danish psychiatric hospitals in the period 2011–2017 (n=10,949). Socioeconomic position was assessed according to the level of education and income. Outcomes included quality of depression care for inpatients as reflected by the fulfillment of guideline recommended quality of care measures as well as clinical outcomes in terms of all-cause mortality, suicidal behavior, readmission for depression and all-cause readmission.

Results: Patients with low-level education or low-level income were statistically significantly less likely to receive high quality of in-hospital care, defined as fulfillment of at least 70% of relevant performance measures (adjusted relative risk (RR) 0.92 and 0.87, respectively). In addition, the same patients had a higher all-cause mortality (adjusted RR 1.22 and 1.41, respectively). Patients with low education or middle income were associated with a higher risk of suicidal behavior (adjusted RR 1.28 and 1.19, respectively). While no differences were found in the risk of all-cause readmission, low-level education and income was associated with a lower risk of readmission due to MDD (adjusted RR 0.91 and 0.87, respectively).

Conclusion: Inequities in quality of care and clinical outcomes were observed among MDD inpatients in a tax-financed universal health care system, indicating that lack of access to care and insurance is not the only explanation for inequity in health.

Keywords: quality of care, depression, mental health, health equity, health equality, major depressive disorder

Plain Language Summary

Socioeconomic inequities in health have been widely described. However, very little is known on potential socioeconomic inequities among patients with major depressive disorder. This nationwide study investigates these potential inequities in several different aspects. First, it documents that patients with low-level education or low income receive a worse quality of care when admitted to the hospital for their depression, when compared to patients with a high socioeconomic position. Furthermore, the study documents that in the year following hospitalization, patients with a low-level education or a low income have a higher risk of death and patients with a low-level education have a higher risk of suicide. In addition, patients in a low socioeconomic position are less likely to be readmitted with depression. Overall, this study documents differences in the quality of care patients receive in the hospital system as well as in their risk of death and readmission afterwards, based on the length of education and the size of their income. This indicates that social inequities in psychiatric care and clinical outcomes are present even in a tax-financed universal health care system.

Introduction

Socioeconomic differences in health are well described across populations and low socioeconomic position (SEP) is consistently associated with adverse health outcomes in the general population.[1] Such differences are often termed inequities.[2] Social inequities in health are a consequence of a wide range of determinants and many of these are outside the control of the health care system, eg, the societal distribution of wealth and employment policies. In contrast, SEP-related differences in quality of care (QoC) are potentially amenable for intervention. Insufficient QoC may result in adverse patient outcomes[3–5] and inequities in the QoC have been reported for somatic conditions.[6–8]

Major depressive disorder (MDD) is a major public health challenge associated with an increased risk of early death and suicide.[9] However, little is known about potential SEP associated inequities in inpatient MDD care or in clinical outcomes among MDD inpatients. To address these gaps, a nationwide register-based cohort study was conducted among all Danish patients admitted for incident MDD between 2011 and 2017 to examine the associations between SEP and the quality of inpatient depression care as well as the association between SEP and clinical outcomes in terms of all-cause mortality, suicidal behavior, readmission for MDD, and all-cause readmission at 1-year follow-up.

Materials and Methods

Study Design

A nationwide register-based cohort study was performed based on data from public registers in Denmark (5.8 million inhabitants). The national health care system provides health care coverage free of charge.[10] Patients requiring inpatient psychiatric care are exclusively admitted to public psychiatric hospitals. Here, the use of services as well as the QoC is recorded in national registers using a unique personal identifier, assigned to all residents.[10] This identifier was used to retrieve and merge individual data from the different registers.

Data Sources

The Danish Depression Database (DDD) is a nationwide clinical quality registry, established in 2011.[11] It contains information on the QoC, admission-, and discharge dates for all patients admitted at Danish psychiatric hospitals with a primary diagnosis of MDD (ICD-10: F32, F33, F34.1, and F06.32 including all subcodes).[11] Patients from the age of 18 with permanent residence in Denmark are included.

The Danish National Patient Registry (DNPR) is a national register of patients treated at all hospitals from 1977 and onwards.[12] From 1995, data on patients from psychiatric hospitals are included. Data include date and time of any hospital contact, procedures performed and primary and secondary diagnosis. Data from the psychiatric hospitals was used to identify patients who had an inpatient admission for MDD before their index admission in DDD as well as readmissions for MDD. Data from somatic hospitals was used to assess substance/alcohol abuse and to identify all-cause readmissions. Data from DNPR was also used to identify suicide attempts.

Information on the patient's vital status was obtained from The Danish Civil Registration System[13] and information on the causes of death, including suicide, from The Register of Causes of Death.[14]

Statistics Denmark is a collection of registry data.[15,16] From here, data from three registers were used: The Population Register which contains data on sex, age, migrant status, and residence area for each citizen. The Education Register which contains information on the type of education, and the Income Registry, which contains data on income at the individual and household level.

Study Population

The study population was identified through DDD and included all adult (≥18 years) incident inpatients in the period 2011–2017 with MDD as the primary diagnosis (n=20,749). Stays shorter than 24 hours were not included. If multiple hospital contacts occurred within periods of up to four days, they were considered to reflect the same admission. Some of these combined admissions can contain contacts shorter than 24 hours. However, if all contacts were <24 hours, the combined admission was also excluded. Subjects were excluded from the study population if they had been registered in the DNPR with a MDD diagnosis up to ten years before their first registration in DDD (n=9601). The subjects were thus,

for all practical purposes, patients with first-time depression. Subjects were also excluded if they had immigrated to Denmark within five years before or had left the country before the index disease (n=199). The final study cohort included 10,949 patients. In the analyses of the clinical outcomes, follow-up time was set to one year. Thus, patients admitted in 2017 were omitted from these analyses (n=1174).

Socioeconomic Position

SEP was assessed at the time of admission by level of education and income level. The International Standard Classification of Education (ISCED)[17] was used to categorize the level of education as low (primary and lower secondary level), middle (upper secondary level), or high (short-cycle tertiary, bachelor, master, and doctoral or equivalent level). To account for yearly variations in income, the average yearly total income in the five years before admission was calculated for the household and categorized into terciles of increasing income. Family income was chosen to better reflect the person's living conditions and consumption opportunities than personal income. Low SEP was defined as either low-level education or low income.

Outcomes

Quality of Care

QoC was assessed by nine performance measures reflecting national clinical guidelines selected by a national multi-disciplinary expert group consisting of psychiatrists, psychologists, nurses, social workers, and occupational therapists (see Table 1).[18] The measures were basic clinical services which should be provided to all patients regardless of their characteristics such as being somatically examined and having a suicide risk assessment.

However, some required a certain minimum length of stay and others did not need to be performed if it could be demonstrated that they had recently been performed and documented elsewhere in the healthcare system. The patients were classified as eligible or ineligible for the individual process performance measures depending on these criteria. To investigate potential bias, the proportion of patients classified as ineligible was investigated for each performance measure based on educational and income level. An overall composite measure of QoC was calculated by dividing the number of fulfilled process performance measures by the number of relevant process measures for each patient. A cut-off of 70% or more of the relevant quality process performance measure met was considered to reflect high QoC. This cut-off is often used in analyses of composite indicators[19] and was a pragmatic estimate in which most of the care processes

Table 1 Performance Measures of Quality of Care in the Danish Depression Database for Inpatients

	Performance Measures	Definition
1	Examination by psychiatrist	Indication of whether the patient's psychopathological assessment was performed by a specialist in psychiatry within seven days after admittance to the hospital ward.
2	Somatically examined	Neurological examination, relevant laboratory tests and other examinations within two days of admittance.
3	Assessment by social worker	Assessment of need for acute or longer-term support, such as help with changing housing, financial help to purchase medicine, educational guidance, rehabilitation, and application for disability benefits.
4	HAM-D17[a] assessment (In)	Initial assessment using HAM-D17 within seven days of admittance.
5	HAM-D17 assessment (Out)	Assessment using HAM-D17 at discharge from hospital.
6	Suicide risk assessment (In)	Using structured interview at admittance for suicide risk assessment.
7	Suicide risk assessment (Out)	Clinician's assessment of the patient's risk of suicide when discharge from hospital is planned.
8	Contact with relatives	Staff have established or tried to establish contact with the patient's relatives during hospitalization.
9	Psychiatric aftercare	Before discharge, an agreement has been made on a specific time and place for follow-up care after discharge in an outpatient clinic or at the general practitioner.

Abbreviation: [a]HAM-D17, Hamilton depression scale (17-item version).

were fulfilled while still providing enough patients with the outcome to conduct meaningful analyses.[20] Additional cut-offs of 60% and 80% were applied in the sensitivity analyses.

Clinical Outcomes

All-cause mortality was defined as death occurring up to 365 days after the day of hospital admission. Suicidal behavior was defined as suicide or suicide attempts due to intentional self-harm (ICD-10: X60-X84 and Y870) or poisoning (ICD-10: T36.0-T50.8) up to 365 days after the day of hospital admission. Readmission for MDD was defined as readmission with a primary MDD diagnosis and all-cause readmission as any readmission within 365 days after discharge.

Potential Confounders

Relevant covariates were identified a priori using directed acyclic graphs and included age, sex, substance/alcohol abuse, and migrant status[21] (see online Supplement, Figure 1). Abuse was defined as any previous hospital contact related to alcohol/substance abuse or dependence (ICD-10: F10.0–19.9). While migrants principally have the same right to treatment for acute conditions such as MDD, migrants represent a potentially vulnerable population regarding mental disorders, since they may be exposed to risk factors before, during, and after migration, including potential discrimination in the health care system.[22] Migrant-status was categorized into non-migrants and migrants, including their descendants. Migrants were further divided based on their country of origin into Western and non-Western migrants.

Statistical Analyses

Patient characteristics were assessed for the overall population and according to the two markers of SEP. The associations between SEP and high QoC as well as the individual process performance measures were examined using Poisson regression models with robust error variances, reporting relative risk (RR) with corresponding 95% confidence intervals (CI).

The associations between SEP markers and clinical outcomes were assessed with adjusted Aalen-Johansen cumulative incidence using inverse probability of treatment weight and bootstrapped to derive 95% CIs of the RR at 365 days follow-up. Missing information on patient-related characteristics were imputed ten times by multiple imputations (MI) using available patient characteristics including exposure. MI was performed separately for each outcome and the respective outcome was included in the imputation model.

For all outcomes and exposures, the associations were calculated in three models. Model 1 was crude, model 2 was partly adjusted by including sex and age. Model 3 were fully adjusted by additionally including migrant status and substance/alcohol abuse. To investigate potential interactions, the analysis were furthermore stratified by sex and age. To account for the risk of residual confounding due to variations in hospitals serving different catchment areas, a sensitivity analysis was performed, which adjusted for the residential region of the patients. In addition, sensitivity analysis was performed with income as a continuous variable using a spline function with four knots.

Results were presented as Forest plots with associated proportions. Analyses were performed using STATA v.15 (StataCorp LP, College Station, TX, USA).

Results

Patient Characteristics

Patient characteristics are presented in Table 2. Characteristics of the study population according to the outcomes are presented in the online Supplement, Table 1.

No systematic educational or income-related differences were identified in the proportion of patients considered not eligible for the individual performance measure (see online Supplement, Table 2).

Quality of In-Hospital Care

Having a low SEP were related to a significantly lower chance of getting high QoC (see Figure 1). The fully adjusted RRs were 0.92 (95% CI 0.85–0.99) for low-level education, and 0.87 (95% CI 0.81–0.94) for low-level income. Similar results were in general found in the crude and partly adjusted models and sensitivity analyses with alternative cut-offs of

Table 2 Patient Characteristics According to Each Stratum of Education, Income, and Employment Status

	Total		Education						Income					
			Low (N = 3762)[a]		Middle (N = 4433)[a]		High (N = 2528)[a]		Low (N = 3639)[a]		Middle (N = 3639)[a]		High (N = 3638)[a]	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sex														
Woman	6082	55.6	2148	57.1	2288	51.6	1531	60.6	2084	57.3	2008	55.2	1981	54.5
Age group														
< 31 years	1394	12.7	959	25.5	890	20.1	234	9.3	721	19.8	737	20.3	644	17.7
21–60 years	4198	38.4	1396	37.1	2276	51.3	1539	60.9	1227	33.7	1689	46.4	2399	65.9
61–100 years	4139	37.8	1407	37.4	1267	28.6	755	29.9	1691	46.5	1213	33.3	595	16.4
Immigrant status														
Native Danes	9957	91.8	3505	93.2	4090	92.3	2297	90.1	3302	90.8	3309	90.9	3402	93.5
Western migrants	576	5.3	59	1.6	115	2.6	118	4.7	105	2.9	112	3.1	98	2.7
Other migrants	310	2.9	198	5.3	228	5.1	113	4.5	232	6.4	218	6.0	138	3.8
Substance/alcohol abuse														
Yes	1304	11.9	540	14.4	528	11.9	209	8.3	570	15.7	429	11.8	297	8.2

Note: [a]Patients with missing values not included.

60% and 80% showed the same pattern (see online Supplement, Table 2). The analyses stratified by sex and age showed no systematic differences, ie, no signs of interaction (see online Supplement, Figure 2A–B).

A similar overall pattern was observed in the analyses of the individual process performance measures, with a low SEP generally being associated with a lower chance of fulfillment of the individual measures (see Figure 2). Fully adjusted RRs for the lowest categories of socioeconomic markers ranged from 0.81 (95% CI 0.76–0.85) to 1.00 (95% CI 0.94–1.05) across the individual process performance measures.

Clinical Outcomes

Compared with the best-off patients, a higher risk of 1-year all-cause mortality was observed for patients with low-level education (RR 1.22, 95% CI 0.87–1.70) and low-level income (RR 1.41, 95% CI 0.96–2.08) (see Figure 1). Low-level education (RR = 1.28, 95% CI 0.96–1.70) and middle-level income (RR = 1.19, 95% CI 0.94–1.50) were associated with an increased risk of suicidal behavior. The risk of readmission due to depression was substantial, with all groups having a 1-year readmission risk above 40%. Lower RRs of readmission due to depression were observed for low-level
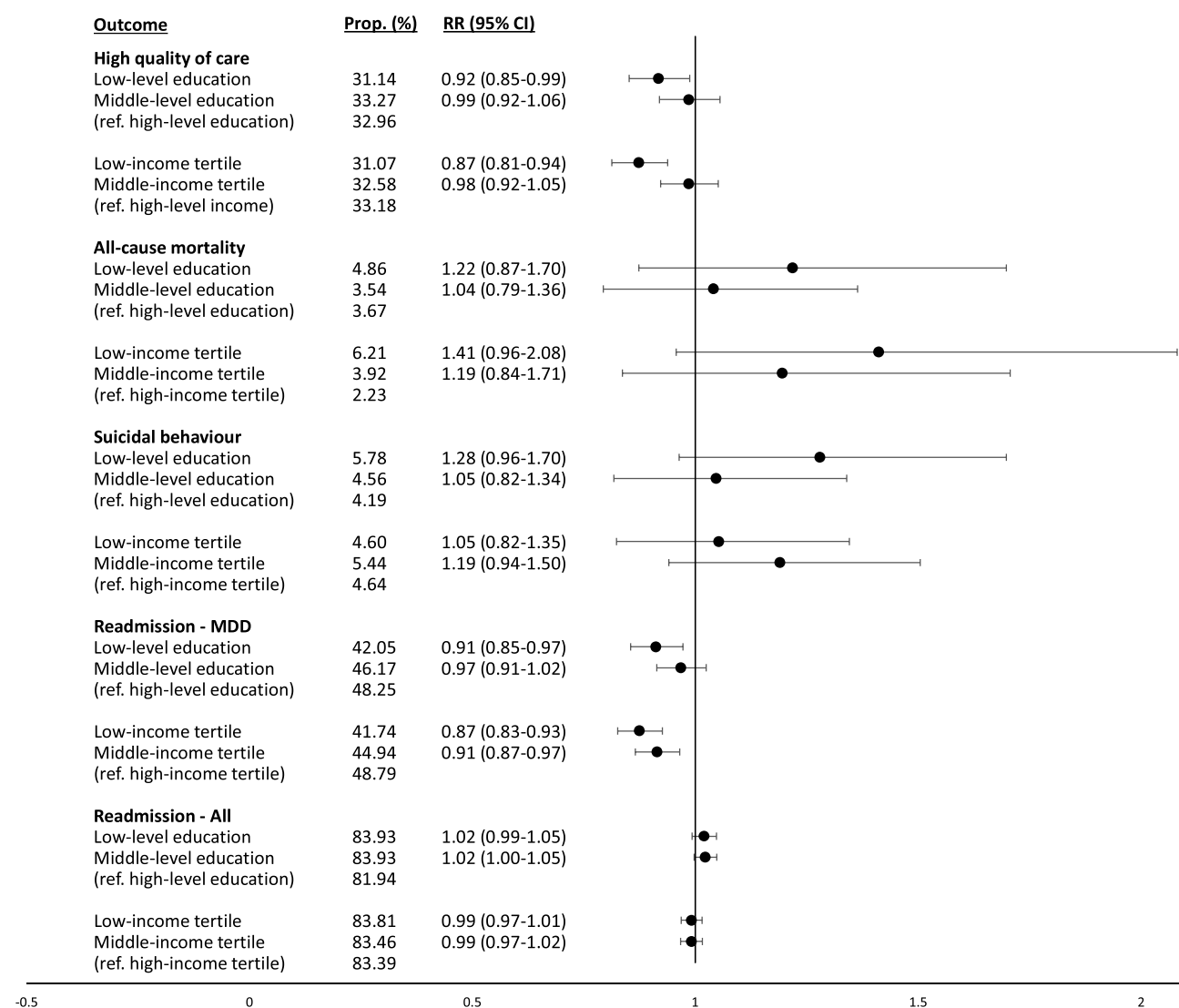
Outcome	Prop. (%)	RR (95% CI)
High quality of care		
Low-level education	31.14	0.92 (0.85-0.99)
Middle-level education	33.27	0.99 (0.92-1.06)
(ref. high-level education)	32.96	
Low-income tertile	31.07	0.87 (0.81-0.94)
Middle-income tertile	32.58	0.98 (0.92-1.05)
(ref. high-level income)	33.18	
All-cause mortality		
Low-level education	4.86	1.22 (0.87-1.70)
Middle-level education	3.54	1.04 (0.79-1.36)
(ref. high-level education)	3.67	
Low-income tertile	6.21	1.41 (0.96-2.08)
Middle-income tertile	3.92	1.19 (0.84-1.71)
(ref. high-income tertile)	2.23	
Suicidal behaviour		
Low-level education	5.78	1.28 (0.96-1.70)
Middle-level education	4.56	1.05 (0.82-1.34)
(ref. high-level education)	4.19	
Low-income tertile	4.60	1.05 (0.82-1.35)
Middle-income tertile	5.44	1.19 (0.94-1.50)
(ref. high-income tertile)	4.64	
Readmission - MDD		
Low-level education	42.05	0.91 (0.85-0.97)
Middle-level education	46.17	0.97 (0.91-1.02)
(ref. high-level education)	48.25	
Low-income tertile	41.74	0.87 (0.83-0.93)
Middle-income tertile	44.94	0.91 (0.87-0.97)
(ref. high-income tertile)	48.79	
Readmission - All		
Low-level education	83.93	1.02 (0.99-1.05)
Middle-level education	83.93	1.02 (1.00-1.05)
(ref. high-level education)	81.94	
Low-income tertile	83.81	0.99 (0.97-1.01)
Middle-income tertile	83.46	0.99 (0.97-1.02)
(ref. high-income tertile)	83.39	

Figure 1 Proportions and relative risk for high quality of care, 1-year all-cause mortality, 1-year suicidal behavior (suicide attempts and suicide completions), 1-year readmission with depression and 1-year all-cause readmission according to educational- and income level. Variables used for adjustment included sex, age, migration status, and substance/alcohol abuse.
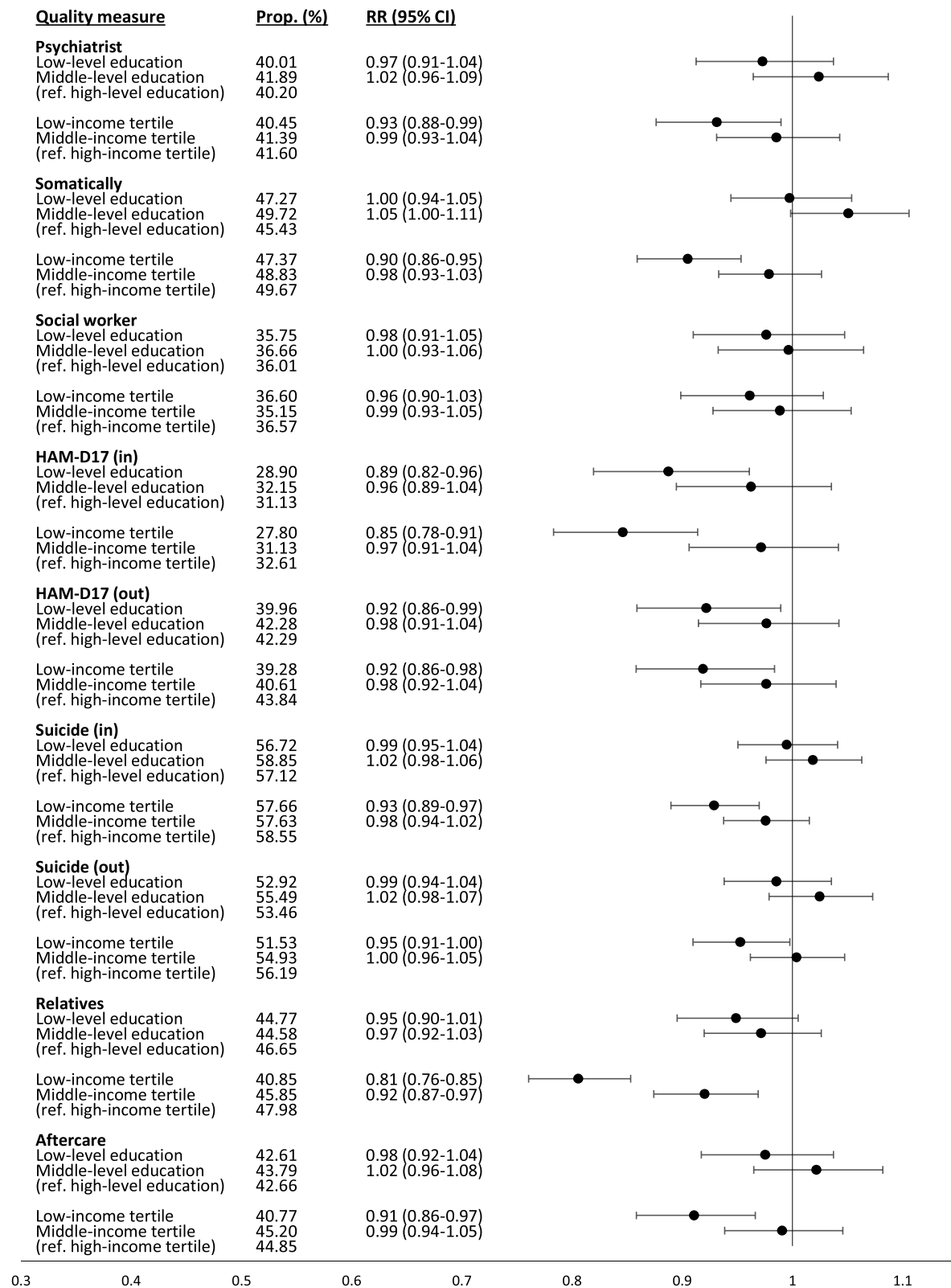**Abbreviation**: MDD, major depressive disorder.

Quality measure	Prop. (%)	RR (95% CI)
Psychiatrist		
Low-level education	40.01	0.97 (0.91-1.04)
Middle-level education	41.89	1.02 (0.96-1.09)
(ref. high-level education)	40.20	
Low-income tertile	40.45	0.93 (0.88-0.99)
Middle-income tertile	41.39	0.99 (0.93-1.04)
(ref. high-income tertile)	41.60	
Somatically		
Low-level education	47.27	1.00 (0.94-1.05)
Middle-level education	49.72	1.05 (1.00-1.11)
(ref. high-level education)	45.43	
Low-income tertile	47.37	0.90 (0.86-0.95)
Middle-income tertile	48.83	0.98 (0.93-1.03)
(ref. high-income tertile)	49.67	
Social worker		
Low-level education	35.75	0.98 (0.91-1.05)
Middle-level education	36.66	1.00 (0.93-1.06)
(ref. high-level education)	36.01	
Low-income tertile	36.60	0.96 (0.90-1.03)
Middle-income tertile	35.15	0.99 (0.93-1.05)
(ref. high-income tertile)	36.57	
HAM-D17 (in)		
Low-level education	28.90	0.89 (0.82-0.96)
Middle-level education	32.15	0.96 (0.89-1.04)
(ref. high-level education)	31.13	
Low-income tertile	27.80	0.85 (0.78-0.91)
Middle-income tertile	31.13	0.97 (0.91-1.04)
(ref. high-income tertile)	32.61	
HAM-D17 (out)		
Low-level education	39.96	0.92 (0.86-0.99)
Middle-level education	42.28	0.98 (0.91-1.04)
(ref. high-level education)	42.29	
Low-income tertile	39.28	0.92 (0.86-0.98)
Middle-income tertile	40.61	0.98 (0.92-1.04)
(ref. high-income tertile)	43.84	
Suicide (in)		
Low-level education	56.72	0.99 (0.95-1.04)
Middle-level education	58.85	1.02 (0.98-1.06)
(ref. high-level education)	57.12	
Low-income tertile	57.66	0.93 (0.89-0.97)
Middle-income tertile	57.63	0.98 (0.94-1.02)
(ref. high-income tertile)	58.55	
Suicide (out)		
Low-level education	52.92	0.99 (0.94-1.04)
Middle-level education	55.49	1.02 (0.98-1.07)
(ref. high-level education)	53.46	
Low-income tertile	51.53	0.95 (0.91-1.00)
Middle-income tertile	54.93	1.00 (0.96-1.05)
(ref. high-income tertile)	56.19	
Relatives		
Low-level education	44.77	0.95 (0.90-1.01)
Middle-level education	44.58	0.97 (0.92-1.03)
(ref. high-level education)	46.65	
Low-income tertile	40.85	0.81 (0.76-0.85)
Middle-income tertile	45.85	0.92 (0.87-0.97)
(ref. high-income tertile)	47.98	
Aftercare		
Low-level education	42.61	0.98 (0.92-1.04)
Middle-level education	43.79	1.02 (0.96-1.08)
(ref. high-level education)	42.66	
Low-income tertile	40.77	0.91 (0.86-0.97)
Middle-income tertile	45.20	0.99 (0.94-1.05)
(ref. high-income tertile)	44.85	

Figure 2 Proportions and relative risk for the nine individual quality performance measures according to educational- and income level. Variables used for adjustment included sex, age, migration status, and substance/alcohol abuse.

Abbreviations: MDD, major depressive disorder; HAM-D17, Hamilton depression scale (17-item version).

education (RR 0.91, 95% CI 0.85–0.97), low-level income (RR 0.87, 95% CI 0.83–0.93) and middle-level income (RR 0.91, 95% CI 0.87–0.97). The absolute risk of 1-year all-cause readmission was for all patients above 80%. No systematic differences in all-cause readmission risk according to socioeconomic markers were observed. Several of the results for the clinical outcomes were not statistically significant and a difference in RR within the CI range is also reasonably likely. The analyses stratified by sex and age showed no systematic differences, ie, no signs of interaction (see online Supplement, Figure 2). In sensitivity analyses, neither adjusting for regional residence (see online Supplement, Figure 3) nor using income as exposure as a continuous variable changed the overall results (see online Supplement, Figure 4A–E).

Discussion

Principal Findings

In this nationwide study of first-time diagnosed inpatients with MDD, we found a lower quality of in-hospital care for patients in the lowest social positions in terms of education and income. We also found that some aspects of low SEP were associated with higher all-cause mortality and increased risk of suicidal behavior within a year. In contrast, low SEP was associated with a lower risk of readmission due to MDD.

Comparison with Other Studies

This study appears to be the first to examine the impact of SEP factors on adherence to performance measures among in-hospital patients with MDD. Among the few studies identified on the association between SEP and clinical outcomes, one study found long education and high income associated with a higher risk of suicide,[23] another found no significant association between income and readmission.[24] While the association between SEP and all-cause mortality in inpatients with affective disorders in general has been investigated,[25] no studies, to our knowledge, exist specifically on inpatients with depression.

Strengths and Limitations

This study used a population-based design using a personal identifier to enable linkage through national registries. All residents in Denmark have equal access to psychiatric hospitals, and all treatment is free of charge. Thus, in principle, there should be no difference in access to psychiatric care by SEP.[26] In addition, there are no private psychiatric hospitals in Denmark. Thus, all patients diagnosed with depression in a hospital regime are registered in the DDD, which ensures almost no selection bias.[11] Furthermore, the design ensures that it is highly likely that only patients with new onset depression are included. This reduces the risk of case-mix in the form of patients who potentially respond well to treatment to treatment-refractory patients whose lives are complicated by socioeconomic and comorbidity consequences due to previous depression. Regarding the clinical outcomes, the risk of bias due to loss of follow-up are very low, due to the very high data completeness of databases.[12,14]

A potential limitation is that the QoC data was collected at multiple sites during routine clinical practice. While detailed guidelines with explicit data definitions included in standardized registration forms are used, problems regarding the completeness of some of the data have been reported.[11] The extent of potential information bias is unknown, since "missing" are registered as "not performed" in the DDD. The unknown proportion of patients with missing data may have two implications. First, as patients with missing information are considered to have received care not meeting the QoC performance measures, the data are likely to give a conservative estimate of the true level of QoC. Secondly, if the proportion of patients with missing data on QoC differs according to socioeconomic background, it may bias our findings on inequity in QoC. However, since information on these factors are typically not easily available for the staff involved in the registration process, it seems most likely that the missing registrations are randomly distributed according to socioeconomic background. The fact that the same pattern was identified throughout the nine different quality measures could furthermore indicate that any potential missing data would most likely be unrelated to SEP.

Another consideration is whether the variations attributed to SEP may instead reflect problems of casemix with variations in hospitals serving different catchment areas with different patient composition regarding SEP. However,

a directed acyclic graph was used to a priori identify potential confounders. Here, place of residence was identified as a potential mediating variable. Including it could thus risk masking some of the problems. Furthermore, in Denmark, there is a substantial homogeneity between all five administrative regions, which are responsible for psychiatric hospitals, regarding sociodemographic and health-related characteristics.[11] It is therefore unlikely that potential information bias should emerge because of variations in registration practice in hospitals serving different catchment areas. Nonetheless, a sensitivity analysis was performed, which included data on the geographic residence of the patients. Adjusting for this factor did not change the overall results.

Generalizability

This paper focused on patients hospitalized with MDD. Since most cases of mild depression are diagnosed and treated in the primary sector and many cases of moderate depression are treated as outpatients at the hospitals, the results on the clinical outcomes cannot necessarily be extrapolated to the entire population with depression.

This study was carried out in a universal healthcare system, which may limit the application of the results to, for example insurance-based systems. In these systems, low SEP are associated with being uninsured or having inadequate health insurance,[11] which may lead to undertreatment, lower quality of care, and poor clinical outcomes. However, the fact that SEP-related differences in clinical outcomes exist in countries with a universal health care system indicates that lack of access to care and insurance is not the only explanation for inequities in clinical outcomes. In other words, "universal" does not necessarily translate to "equal".

Clinical Considerations

In daily clinical practice, it may be the reality that clinicians cannot give the preferred treatment to all patients. Sometimes problems arise because the patients are not able or willing to participate. Likewise, the fulfilment of the separate performance measures should not necessarily be interpreted as causally associated with the patient's lower death or altered suicide risk. A high-quality care may look different depending on the individual patient, and the best care for a depressed patient may need to be individualized to some extent. Nonetheless, the performance measures in DDD reflect basic processes of care that will be relevant to almost all patients, irrespective of socioeconomic background.

While fewer readmissions sometimes are used as an indicator of good quality of care, the findings in this paper, where low social position was associated with a lower risk of readmission in combination with higher mortality in a tax-financed universal health coverage system, could indicate that a lower readmission rate for vulnerable groups may reflect problems with continuity, compliance, and other barriers to access in case of relapse of depression or worsening of comorbidities.

Although it may not be possible to provide the optimal treatment to all patients every time, our findings indicate that those who have the greatest clinical need, as reflected by a higher risk of adverse clinical outcomes, received a lower QoC and this mismatch seems inappropriate. This pattern indicates that patients with low SEP may experience a quadruple risk: To develop depression, to receive a suboptimal in-hospital QoC, to experience more barriers for being readmitted in case of relapse, and finally to have worse clinical outcomes in terms of higher risk of death and suicidal behavior. Future studies are warranted to further clarify the mechanisms leading to worse outcomes for low SEP patients with MDD and sustained clinical and political efforts are needed to ensure the delivery of equitable care among the patients.

Conclusions

Low socioeconomic positions among inpatients with incident MDD in a universal tax-financed healthcare system were associated with lower quality of in-hospital care. Furthermore, low SEP was associated with a higher all-cause mortality, an increased risk of suicidal behavior, and a lower risk of being readmitted with depression within a year after discharge, although not all findings reached statistical significance.

Abbreviations

SEP, socioeconomic position; MDD, major depressive disorder; QoC, quality of care; DDD, Danish Depression Database; DNPR, Danish National Patient Registry.

Data Sharing Statement

Data cannot be shared publicly because of Danish legislation. Data can be accessed through the Danish Health Data Authority and Statistics Denmark for researchers at authorized institutions. Information on data access is available online (http://sundhedsdatastyrelsen.dk/da/forskerservice). Access to data requires approval from the Danish Data Protection Agency (https://www.datatilsynet.dk/english/legislation). The authors did not have special access privileges to these data.

Ethics Approval and Informed Consent

The study was approved by the Danish Data Protection Agency (record no. 2018-47) and the Danish Clinical Registries. According to Danish law, registry-based studies do not require ethical approval or patient consent.

Consent for Publication

All authors confirms that the details of any images, etc. can be published, and that the persons providing consent have been shown the article contents to be published.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

None of the authors have any conflicts of interest to disclose.

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