

**The link between financial problems,
health status and medical care**

**A cross-sectional study among over-indebted individuals
in Germany**

Doctoral thesis

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List of Abbreviations

CRN Cost-related medication nonadherence

aOR adjusted Odds Ratio

95 % CI 95 % Confidence Interval

SES Socioeconomic status

GP General practitioner

1. Abstract

Background: About ten percent of European households are unable to cover payment obligations and living expenses with available income and assets on an ongoing basis, and are thus considered over-indebted. Mounting international evidence suggests that over-indebtedness might reflect a potential cause and consequence of health problems and contribute to limited access to health care. However, little is known about the relationship between over-indebtedness and mental illness, medication use and patient-physician communication among the over-indebted, specifically in Germany.

Methods: An explorative cross-sectional survey among clients of 70 debt advice agencies was conducted in North Rhine-Westphalia, Germany, in 2017 (German acronym: ArSemü). Data on health status, medication use and health care utilization were collected by using a self-administered written questionnaire which was returned by 699 individuals with a response of 50.2 %. Descriptive statistics and multiple logistic regression analysis were used to examine antidepressant use, cost-related medication nonadherence (CRN) and patient-physician communication about financial problems. To examine the association between over-indebtedness and mental illness, data were merged with the first wave of the German Health Interview and Examination Survey for Adults (DEGS1, n=7115) which provides representative data for the adult population living in Germany.

Results: The over-indebted were significantly more likely to use antidepressants than the German general population after controlling for other socioeconomic, demographic and health factors (aOR 1.83; 95 % CI 1.35-2.48). The prevalence of CRN was 33.6 % (n=203). Those who reported a chronic illness or communication about financial problems in general practice had significantly greater odds of CRN. Patient-physician communication about financial problems with general practitioners was reported by 22.6 % (n=135) of respondents. There was a significant association between patients' educational level, ethnic origin, health status, level of financial distress and strategies to cope with medication cost, and patient-physician communication.

Conclusions: Stakeholders in health care, debt counselling, research and policy should consider over-indebtedness as a specific risk factor for health problems and limited access to medical care. Preventive measures are needed to address the complex link between over-indebtedness and illness.

2. Introduction

Recent estimates suggest that about 10 percent of European citizens are over-indebted, and the numbers continue to increase (Angel and Heitzmann, 2015; European Commission, 2008). In 2019, 6.92 million citizens in Germany alone were considered over-indebted which is defined as being unable to cover payment obligations and living expenses with available income and assets on an ongoing basis (Creditreform Wirtschaftsforschung, 2019). Over-indebtedness is often associated with low income, however, individuals in all socioeconomic positions may encounter this situation where debt burden exceeds the payment capacity (Statistisches Bundesamt [Destatis], 2020).

A large body of literature on the social determinants of health has focused on measures of individuals' socioeconomic status (SES), including educational attainment, income and occupation (Braveman et al., 2005). The association between low SES and a wide range of health outcomes has been well documented (Adler and Ostrove, 1999; Mackenbach et al., 2008), whereas there has been little empirical research into the relationship between over-indebtedness and health (Drentea and Lavrakas, 2000; Richardson et al., 2013; Turunen and Hiilamo, 2014).

2.1 Literature review

Household debt generally refers to a common tool to finance housing, purchase durable goods and smooth consumption (André, 2016). Accordingly, there is some evidence that debt can be beneficial for both economic welfare and health (Clayton et al., 2015). Over-indebtedness, by contrast, implies substantial problems repaying debt that most commonly arise due to sudden loss of income through unemployment, persistent low income and poor money management but also health problems (European Commission, 2008). According to the German Federal Statistical Office, health-related problems were referred to as the main reason for over-indebtedness by 16.3 percent of those affected in Germany in 2019 (Destatis, 2020). As such, unmanageable debt has been suggested to reflect a potential cause and consequence of poor health (Jacoby, 2002; Richardson et al., 2013; Turunen and Hiilamo, 2014). Recently, mounting evidence has found an association between over-indebtedness and health outcomes that is not explained by conventional SES measures (Turunen and Hiilamo, 2014).

Mechanisms that explain how over-indebtedness may account for differences in health are still unclear. Evidence points to adverse effects of unmanageable debt on a social, economic and psychological level which may influence health both directly and indirectly via physiological processes and health-related behaviours (Jacoby, 2002; Turunen and Hiilamo, 2014). More specifically, the over-indebted may experience financial hardship and exclusion from social and economic life (for example, difficulty finding employment or property to rent) due to lack of material resources, loss of creditworthiness, payment defaults and debt collection measures such as property foreclosure (Drentea and Lavrakas, 2000; Drentea and Reynolds, 2012; European Commission, 2013; Gathergood, 2012; Hiilamo and Grundy, 2020). Previous research has suggested that unmanageable debt leads to ongoing stress which may impair the well-being of those affected (Bridges and Disney, 2010; Drentea and Lavrakas, 2000; Gathergood, 2012). When available resources are largely allocated to debt repayment, over-indebted individuals might lack physical, mental and material capacities to maintain health, increase unhealthy coping behaviour and struggle to cover costs of health care and medications (Alley et al., 2011; Drentea and Lavrakas, 2000; Jacoby, 2002; Turunen and Hiilamo, 2014). These complex dimensions of over-indebtedness are not fully captured by the standard measures of socioeconomic position.

So far there is a lack of a broadly accepted definition of over-indebtedness (Betti et al., 2007; European Commission, 2008). Previous studies that have examined the health effects of debt repayment problems considered diverse measures of over-indebtedness (Richardson et al., 2013; Turunen and Hiilamo, 2014). These include administrative data on payment defaults (Blomgren et al., 2016) and self-reported data on problems repaying debts (Bridges and Disney, 2010; Gathergood, 2012; Gunasinghe et al., 2018), particular sources of debt such as mortgage arrears (Alley et al., 2011; Gathergood, 2012; Hojman et al., 2016; Meltzer et al., 2013), use of debt advice agencies (Münster et al., 2009; Ochsmann et al., 2009) or debt-to-assets (Drentea and Lavrakas, 2000) or -income ratios (Sun and Houle, 2020). These studies have shown a relationship between over-indebtedness and various measures of mental and physical health as well as use of health care.

Mental health

Previous findings have indicated that over-indebted individuals are more likely to suffer from mental disorders, specifically depression, even when controlling for other measures of socioeconomic status (Alley et al., 2011; Bridges and Disney, 2010; Gathergood, 2012; Gunasinghe et al., 2018; Hojman et al., 2016; Meltzer et al., 2013).

In a cross-sectional random probability sample (n=7461) of adults in England, those who were in arrears in paying for utilities, housing or shopping were more than twice as likely to have a diagnosis of a common mental disorder (aOR 2.83; 95 % CI 2.34-3.43), such as a depressive disorder (aOR 2.36; 95 % CI 1.59-3.50) and generalised anxiety disorder (aOR 2.51; 95 % CI 1.85-3.41), irrespective of the sources of debt (Meltzer et al., 2013). Results from available longitudinal studies confirm a strong association between over-indebtedness and mental health: Based on household panel data for the United Kingdom, Bridges and Disney (2010) found that subjective debt problems and financial stress are associated with a greater incidence of depression, independent of demographic variables, health status and other measures of the household's financial position. Likewise, Gathergood (2012), using the British Household Panel Survey, presents evidence of an association between the onset of problem debt and the deterioration in mental health, as measured by self-reported psychological health and the General Health Questionnaire, controlling for time-invariant heterogeneity. The results also support positive selection into problem debt due to mental illness which accounted for most of the observed cross-sectional variation in health between over-indebted individuals and those without such financial problems.

Physical health

There is also some evidence that over-indebtedness can have adverse effects on physical health, and vice versa. Drentea and Lavrakas (2000), using a representative sample of adults in Ohio, found a significant association between the ratio of credit card debt to a family's income and worse self-reported physical health and greater impairment of physical functioning after controlling for other socioeconomic and demographic characteristics. Stress regarding overall debt explained in part this association between debt-to-income ratio and physical health and impairment. Findings from a cross-sectional survey among debt advice clients in Germany (Münster et al., 2009; Ochsmann et al.,

2009) also suggest that over-indebted individuals are more likely to report overweight (aOR 1.97; 95 % CI 1.65-2.35), obesity (aOR 2.56; 95 % CI 2.07-3.16) and back pain (aOR 10.92; 95 % CI 8.96-13.46) compared to the general population. Recently, a first register-based study among 48778 Finnish adults examined the incidence of chronic disease using 15-year follow-up data on long-term over-indebted individuals and matched controls (Blomgren et al., 2016). Over-indebtedness was associated with an increased risk of chronic diseases such as diabetes, bronchial asthma and coronary heart disease. In contrast, findings from the Health and Retirement Study, a longitudinal survey representative of US adults older than 50 years, showed that those who fell behind on their mortgages between 2006 and 2008 had a higher likelihood of incident depressive symptoms, food insecurity and cost-related medication nonadherence but not a major decline in self-rated health (Alley et al., 2011).

Health care

Prior research demonstrates an increased risk of poor health among the over-indebted. In line with these findings, the demand for medical care in this population group is likely to be high. As a consequence, over-indebted individuals may face competing financial and health needs, and in turn, weigh spending on debt repayment and necessities such as medications that require co-payments. Many patients across high-income countries have been shown to use less medication than prescribed for cost reasons (Morgan and Lee, 2017; Piette et al., 2004; Piette et al., 2006). Past research has considered low income and characteristics of health insurance as important determinants of cost-related medication nonadherence (Briesacher et al., 2007; Piette et al., 2006) whereas the role of over-indebtedness has been understudied. There is some evidence of an association between over-indebtedness and CRN that remained significant after control of sociodemographic characteristics, other SES measures, health status and health insurance. In a sample of Arizona households, over-indebtedness was associated with cost-related delays in obtaining or inability to obtain prescribed medications (Herman et al., 2011). Likewise, in a nationally representative sample of older US adults, over-indebted individuals were more likely to experience CRN over the 2-year follow-up (Alley et al., 2011). Evidence from a survey among debt advice clients in Germany in 2007 indicated that a majority of over-indebted individuals restricted seeking medical care and

filling prescriptions because of cost concerns (Münster et al., 2010).

Within health systems across Europe, patients often first seek medical advice from general practitioners (GPs) that have a coordinating role in many countries (WONCA Europe, 2020). In this respect, GPs may initiate treatment for health conditions related to financial problems and help patients manage medical expenses, for instance, by reducing out-of-pocket costs or referring patients to social services (Alexander et al., 2005; Hunter et al., 2016; Popay et al., 2007; Wilson et al., 2007). The few available studies that have assessed communication about financial problems in the general practice setting indicated that many patients and GPs never discuss these problems (Alexander et al., 2003; Heisler et al., 2004; O'Toole et al., 2004; Rosendal et al., 2013; Schmittiel et al., 2010; Wilson et al., 2007; Zimmermann et al., 2018) although patients were consistently shown to have a desire to have cost conversations (Alexander et al., 2003; Tseng et al., 2007; Wilson et al., 2007).

2.2 Summary of existing evidence and research gaps

There is only a limited number of studies that have explicitly assessed the link between over-indebtedness and health outcomes, yet previous findings consistently indicate that over-indebtedness can have adverse effects on both mental and physical health, and might contribute to limited access to health care. Research has pointed to a two-way causality, that is, over-indebtedness may lead to poor health but also individuals with poorer health are more likely to face over-indebtedness (Gathergood, 2012; Meltzer et al., 2013). Given that most of the available literature is based on cross-sectional studies conducted in the United States and the United Kingdom (Richardson et al., 2013; Turunen and Hiilamo, 2014), the generalizability of the findings to other country settings and populations remains to be established. There are considerable differences in legal as well as social and economic consequences of over-indebtedness across countries (André, 2016; European Commission, 2008) which are likely to influence its impact on health among those affected (André, 2016; Gathergood, 2012; Hiilamo and Grundy, 2020). Recently, a first comparative study, using data from the Survey of Health, Ageing and Retirement in Europe (SHARE), has pointed to country differences in the association between substantial financial household debt and depressive symptoms between European countries (Hiilamo and Grundy, 2020) which was greater in Germany and

Belgium than in France. Previous research suggests that social norms play a role in mediating the consequences of over-indebtedness on health (Drentea and Reynolds, 2012; Gathergood, 2012). Likewise, access to and use of health care for the over-indebted will vary by factors including forms of health insurance coverage and co-payments for prescription drugs and health care services. Moreover, patient-physician communication about financial problems can contribute to prevent limited access to health care and poor health outcomes among those at risk (Riedl and Schüßler, 2017; Street et al., 2009). In Germany, adults enrolled in statutory health insurance are required to pay co-payments for medical services including medications. Currently, co-payments range from 5 to 10 euros for each prescribed medication, and any costs of over-the-counter drugs that are excluded from reimbursement. Recent estimates show that patients in Germany most frequently consult general practitioners rather than other physicians (Rattay et al., 2013). It is yet unclear to what extent cost concerns influence medication use among over-indebted patients and those affected discuss their financial problems in general practice.

Building on previous research, the aims of the present explorative study were

- I) to examine the association between over-indebtedness and mental illness among over-indebted individuals in Germany (*Publication 1*);
- II) to estimate the prevalence and determine factors associated with cost-related medication nonadherence among over-indebted individuals who are enrolled in statutory health insurance in Germany (*Publication 2*);
- III) to assess the frequency of patient-physician communication about financial problems among over-indebted individuals in Germany, and to identify patients' characteristics that are associated with discussion of such concerns in general practice (*Publication 3*).

The study was submitted to and approved by the institutional ethics committee of the University Medical Faculty in Bonn, Germany (No. 167/17).

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RESEARCH ARTICLE

Association between over-indebtedness and antidepressant use: A cross-sectional analysis

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Abstract

Background

Burden of disease caused by depression and its association with socioeconomic status is well documented. However, research on over-indebtedness is scarce although millions of European citizens in all socioeconomic positions are over-indebted. Prior studies suggested that over-indebtedness is associated with poor physical and mental health.

Aims

Investigate the association between over-indebtedness and antidepressant use in Germany.

Method

A cross-sectional survey among debt advice agencies' clients was conducted in North Rhine-Westphalia, Germany, in 2017 (OID). Data were merged with the first wave of the German Health Interview and Examination Survey for Adults (DEGS1). Descriptive statistics and logistic regression analysis were used to examine antidepressant use in the previous 7 days (OID: n = 699; DEGS1: n = 7115).

Results

Prevalence of antidepressant use was higher in the over-indebted (12.3%) than the general population (5.0%). The over-indebted were significantly more likely to use antidepressants than the general population even after controlling for other socioeconomic, demographic and health factors (adjusted odds ratio 1.83; 95% confidence interval 1.35–2.48).

Conclusions

Stakeholders in health care, debt counselling, research and social policy should consider the link between over-indebtedness and mental illness to advance the understanding of health inequalities and to help those who have mental health and debt problems.

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Data Availability Statement: The data on over-indebted participants (OID survey) are not publicly available as these contain potentially identifying participant information that could compromise

participants' privacy. Therefore, data requests may be sent to the ethics committee of the Medical Faculty of the University of Bonn (Email: ethik@uni-bonn.de). Data from the general population survey (DEGS1) conducted by the Robert Koch Institute is available to use by the scientific community on application as Public Use Files. Data can be requested upon application from the Research Data Centre: https://www.rki.de/EN/Content/Health_Monitoring/Public_Use_Files/public_use_file_node.html.

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Introduction

Recent estimates suggest that about 10 percent of households across EU countries are over-indebted and numbers continue to increase [1,2]. In Germany, 6.9 million individuals are considered over-indebted, thus unable to cover payment obligations and living expenses with available assets on an ongoing basis [3]. Over-indebtedness may reflect both a cause and consequence of poor health [4].

Research on social determinants of health has a long tradition but most studies have focused on socioeconomic status (SES) measures including education, income and occupation [5]. However, individuals across the socioeconomic spectrum may face over-indebtedness which cannot be considered interchangeable with the standard socioeconomic measures [2,5]. Several studies have shown that measures of over-indebtedness are associated with various health outcomes, independent of standard SES measures [6]. Besides physical morbidity, e.g. diabetes [7], obesity [8] and pain [9,10], over-indebtedness has consistently been found to be associated with mental illness, including psychoses [7] and depression [11–17].

Prescriptions of antidepressants continue to increase worldwide [18,19]. While depressive disorders are the main indication for antidepressant prescriptions, antidepressants are also prescribed for other indications such as anxiety, sleeping disorders and pain [20,21]. Thus, antidepressant use may not only serve as an indicator of mental illness but also provide a first insight into access to mental health care. Depressive disorders are currently one of the three leading causes of disability globally and the associated disease burden continues to increase [22,23]. A large body of evidence suggests a social gradient in the prevalence of depression: Those in low socioeconomic positions are more frequently affected by depression [24–26]. Some studies have suggested an association between SES measures and antidepressant use but evidence is inconsistent [27–30]. Previous studies mainly examined US data. However, there are variations in legal as well as social consequences of over-indebtedness across countries that may affect the prevalence of mental illness and medication use considerably. Therefore, the aim of the present explorative study was to investigate the association between over-indebtedness and antidepressant use in Germany.

Materials and methods

To evaluate the association of over-indebtedness and use of antidepressants, we cross-sectionally compared a sample of clients of debt advice agencies (OID survey) to a secondary data sample of the German general population from the first wave of the German Health Interview and Examination Survey (DEGS1).

Data

We pooled data from the following two sources for the analysis.

In the OID survey (“medication use and self-medication in the over-indebted”; German acronym: ArSemü), clients of debt advice agencies received a standardised questionnaire and a postage-paid return envelope from their counsellor that could be returned to the study centre anonymously. Recruitment took place between July and October 2017 in the German federal state of North Rhine-Westphalia (NRW). Non-profit debt advice agencies were enlisted as recruiters in the study after declaring intent to participate. All debt advice agencies in the state associated with either the local German Consumer Organisation or one of the member organisations of the “Specialist Counselling Debt Counselling NRW” group were invited to act as recruiters by their respective umbrella organizations. The target population consisted of those clients that (a) did not live in the same household as other participants, (b) were at least 16 years of age and (c) had visited the debt advice agency at least twice. The latter criterion was

designed to prevent disruption of initial debt consultations of clients. All questionnaires returned within one month after the end of recruitment were included. Respondents were provided information on study procedures, voluntariness and confidentiality, and confirmed their willingness to participate in the study by returning the questionnaire. The Ethics Committee of the University Medical Faculty in Bonn, Germany, approved the OID-survey (No. 167/17).

The first wave of the German Health Interview and Examination Survey (DEGS1) was designed to serve general-purpose national health monitoring in Germany and was conducted by the Robert Koch Institute, the national public health agency, with the data partly being made available for public use ($n = 7987$) [31]. In DEGS1, adults from the German general population that had replied to a mailed invitation or were successfully followed up, were interviewed by phone, filled out questionnaires and (mostly) underwent physical examination at local study centres between November 2008 and 2011. The target population consisted of adults aged 18–79 years with permanent residence in Germany. The sampling frame was arrived at by randomly sampling local population registries and the follow-up population of a precursor study (German National Health Interview and Examination Survey 1998, GNHIES98) in two stages subsequently stratifying by municipality and age. The size of the survey was predetermined by power analyses. Participants provided written informed consent. The Charité-Universitätsmedizin Berlin Ethics Committee approved the DEGS1 study protocol (No. EA2/047/08). Further details have been reported elsewhere [32].

We excluded those subjects from our analysis who did not participate in the standardised interview on medication use in DEGS1 ($n = 872$) as this comprises information on the use of antidepressants.

Variables

OID participants were asked which, if any, medications they had used within the last 7 days. Medical experts classified medications according to the Anatomical Therapeutic Chemical Classification System (ATC) taking given information on generic or brand or class name and medical indication into account. In DEGS1, participants presented the packages of any medications used in the last 7 days at their physical examination. Medications were then automatically coded according to ATC classes. Missing data was followed up by phone or mail [32]. Based on these data, in both surveys, antidepressant use was assumed for a participant if any of the medications used were classified as ATC class “N06A”.

Over-indebtedness was assumed for all participants from the OID survey. Data on confounders was gathered by questionnaire (OID) and phone interview (DEGS1). Age was categorised because the public dataset for DEGS1 did not include a continuous age variable and AIC (Akaike Information Criterion) showed categorisation to be vastly advantageous for the OID survey data. ISCED (International Standard Classification of Education) education level (low, medium, high) of OID participants was derived from questions about the highest level of school qualification and the highest level of tertiary education/vocational training. The latter items developed for the OID survey were similar but less detailed than those used in DEGS1 were. Marital status was recorded using the same item in both surveys. “Previously married” combines divorced, widowed, or separated. Participants of both surveys were asked whether they suffered from any chronic disease with the option of answering “I don’t know” (considered missing). A chronic disease was assumed for OID participants if their self-reported medication regimen could be attributed to a chronic disease according to medical experts. Different items were used to measure employment status in the two surveys. Participants who indicated any kind of full or part-time employment including marginal employment in the OID survey

were classified as currently employed. If employment status was not recorded for OID participants, receiving unemployment benefits was assumed to indicate non-employment. In DEGS1, participants whose employment status was summarised as currently employed were compared to the previously or never employed.

Statistical methods

Statistical analyses were carried out using R (3.5.2) [33]. To assess the association between antidepressant use, over-indebtedness and multiple confounders, crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) were estimated using multiple logistic regression analysis. Multiple imputation was used to handle missing data assuming missingness at random. Based on all and only the variables included in the regression model reported below, 30 data-sets were generated and pooled using the “mice” package for R.

Results

In the OID survey, debt advisors handed out the study material to 1393 eligible clients. A total number of 699 individuals returned the questionnaire with complete data on sex and age, which reflects a response rate of 50.2%. In DEGS1, the response rate was 42% among newly recruited participants and 62% among those who had already participated in GNHIES98 [32].

The merged sample comprised 7814 participants, of which 699 were over-indebted clients of debt advice agencies in the German federal state of North Rhine-Westphalia (OID survey), and 7115 adults living in Germany that participated in the national health survey DEGS1. Females represented 52.3% of the study population (Table 1). Participants of the OID survey were younger and had a lower educational level compared to DEGS1 participants. The majority of over-indebted participants was below the age of 45 (OID survey: 53.3%; DEGS1: 35.1%) and had a low or medium educational level (OID survey: 93.6%; DEGS1: 67.2%). The over-indebted were more frequently unemployed (OID survey: 45.8%; DEGS1: 38.0%), less often married (OID survey: 22.3%; DEGS1: 62.9%) and reported chronic diseases more often (OID survey: 59.9%; DEGS1: 31.8%) than DEGS1 respondents.

In the merged sample, the prevalence of antidepressant use in the last 7 days was 5.6% (Table 2). Prevalence was higher among the over-indebted (12.3%) than the general population sample (5.0%).

Logistic regression analysis found an association between over-indebtedness and use of antidepressants (aOR 1.83; 95% CI 1.35–2.48) that remained significant after adjustment for sociodemographic (i.e. age, sex and marital status), standard socioeconomic measures (educational level and unemployment) and chronic disease (Table 3). Those above the age of 45 were more likely to report antidepressant use than the youngest age group. Females (aOR 2.27; 95% CI 1.81–2.84) had higher odds of antidepressant use than males. Respondents who self-reported chronic disease were nearly four times more likely to use antidepressants (aOR 3.62; 95% CI 2.86–4.57). Individuals who were previously married had greater odds of antidepressant use than the married (aOR 1.39; 95% CI 1.09–1.78). There was evidence of an association between unemployment (aOR 1.67; 95% CI 1.31–2.13) and antidepressant use whereas the association with educational level was not significant after adjustment.

Discussion

The present study is the first to show increased odds of antidepressant use (aOR 1.83; 95% CI 1.35–2.48) among the over-indebted compared to the general population in Germany. An essential finding was that this association remained significant even after adjustment for

Table 1. Characteristics of participants.

Variable	Total (n = 7814)		DEGS1 ^a (n = 7115)		OID survey ^b (n = 699)	
Age (years) (n, %)						
18–29	1187	15.2	1070	15.0	117	16.7
30–44	1689	21.6	1433	20.1	256	36.6
45–64	3039	38.9	2759	38.8	280	40.1
65–79	1899	24.3	1853	26.0	46	6.6
Sex (n, %)						
Male	3726	47.7	3410	47.9	316	45.2
Female	4088	52.3	3705	52.1	383	54.8
Education level (ISCED) (n, %)						
Low	1310	16.8	1006	14.1	304	43.5
Medium	4131	52.9	3781	53.1	350	50.1
High	2314	29.6	2280	32.0	34	4.9
Missing	59	0.8	48	0.7	11	1.6
Chronic disease (n, %)						
No	4714	60.3	4468	62.8	246	35.2
Yes	2684	34.3	2265	31.8	419	59.9
Missing	416	5.3	382	5.4	34	4.9
Marital status (n, %)						
Married	4633	59.3	4477	62.9	156	22.3
Previously married	1247	16.0	978	13.7	269	38.5
Never married	1845	23.6	1586	22.3	259	37.1
Missing	89	1.1	74	1.0	15	2.1
Employment status (n, %)						
Employed	4562	58.4	4204	59.1	358	51.2
Not employed	3025	38.7	2705	38.0	320	45.8
Missing	227	2.9	206	2.9	21	3.0

^aGeneral population sample, Germany (2008–2011)

^bOver-indebted sample, Germany (2017)

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standard socioeconomic measures (i.e. educational level and unemployment), sociodemographic and health factors.

Research shows that the findings of the present study may be attributable to higher psychological morbidity in the over-indebted. In a recent national survey among adults in England, the prevalence of common mental disorders (CMD) was 38% among the over-indebted [15]. Our results are consistent with previous studies that demonstrated an association of over-

Table 2. Prevalence of antidepressant use in the last 7 days.

Variable	Total (n = 7814)		DEGS1 ^a (n = 7115)		OID survey ^b (n = 699)	
Antidepressant use in last 7 days (n, %)						
No	7277	93.1	6736	94.7	541	77.4
Yes	441	5.6	355	5.0	86	12.3
Missing	96	1.2	24	0.3	72	10.3

^aGeneral population sample, Germany (2008–2011)

^bOver-indebted sample, Germany (2017)

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Table 3. Association of over-indebtedness and antidepressant use (n = 7814).

Variable	Unadjusted OR	95% CI	Adjusted OR	95% CI
Over-indebtedness				
No	Reference	–	Reference	–
Yes	2.86	2.22–3.67	1.83	1.35–2.48
Age (years)				
18–29	Reference	–	Reference	–
30–44	1.76	1.08–2.87	1.6	0.94–2.71
45–64	4.18	2.71–6.43	3.32	2.0–5.5
65–79	3.48	2.22–5.44	1.84	1.06–3.2
Sex				
Male	Reference	–	Reference	–
Female	2.44	1.97–3.03	2.27	1.81–2.84
Education level (ISCED)				
Low	Reference	–	Reference	–
Medium	0.78	0.61–1.0	1.01	0.77–1.32
High	0.58	0.44–0.78	0.95	0.69–1.31
Chronic disease				
No	Reference	–	Reference	–
Yes	4.91	3.94–6.11	3.62	2.86–4.57
Marital status				
Married	Reference	–	Reference	–
Previously married	2.17	1.74–2.72	1.39	1.09–1.78
Never married	0.71	0.54–0.94	1.19	0.85–1.66
Employment status				
Employed	Reference	–	Reference	–
Not employed	2.19	1.79–2.67	1.67	1.31–2.13

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indebtedness and depression independent of other standard socioeconomic measures such as income, education, and employment status [12,13,16]. Likewise, our findings are in line with those of other recent studies that found an association of over-indebtedness and common mental disorders including anxiety which also reflect common indications for antidepressant prescriptions [15,11,17].

Previous studies have examined the association of diverse measures of over-indebtedness, such as self-reported problems repaying debts [12,11,17] or mortgage arrears [11,13,16] and mental health outcomes. Longitudinal analyses based on the British Household Panel Survey (BHPS) documented that over-indebtedness was associated with worse mental health outcomes including anxiety and the GHQ Caseness Score [11]. In a cross-sectional sample of adults in England, those who were in arrears in utilities, housing or shopping had an increased likelihood of common mental disorders, irrespective of the sources of debt. More specifically, the over-indebted were twice as likely to have a depressive disorder (aOR 2.36, 95% CI 1.59–3.50) and generalised anxiety disorder (aOR 2.51, 95% CI 1.85–3.41) [15]. Likewise, evidence from the South East London Community Health (SELCoH) study showed a significant increase in the odds of CMD among over-indebted respondents over time [17]. Moreover, the latter study found an association between continuous over-indebtedness and talking therapy use in the past year even after adjustment for sociodemographic and socioeconomic variables and prior mental health.

Yet, in the present study the association between over-indebtedness and antidepressant use remained significant even after adjusting for chronic disorders which comprise mental illness.

Hence, increased antidepressant use in the over-indebted might also reflect factors other than psychological morbidity. On the one hand, some studies suggest that prescribing bias might lead to a higher likelihood of pharmacological treatment for patients with lower socioeconomic status [30,34,35]. However, available evidence of an association between standard SES measures and antidepressant use is inconsistent [27–30].

On the other hand, previous studies indicate that individuals with poor mental health are significantly more likely to report cost-related medication nonadherence (CRN) such as not filling prescriptions, skipping doses or splitting pills [36]. Likewise, over-indebtedness has been found to be associated with CRN [37,38,39,13]. In a nationally representative study of Americans older than 50 years, 32.1 percent of those considered over-indebted reported CRN [13]. Among over-indebted individuals that participated in the present study, the prevalence of CRN was 33.6% [40]. The chronically ill were found to have significantly greater odds of CRN than those without a chronic illness. In Germany, co-payments of 5 to 10 euros are required for each prescribed medication for adults covered by statutory health insurance [41]. Thus, over-indebted patients may be bound to weigh competing financial commitments and spending on necessities, such as (various) medications owing to co-payments. In line with these findings, this explorative study provides only a rough estimate of mental illness underlying antidepressant use among the over-indebted in Germany, and might underestimate the association between over-indebtedness and antidepressant use.

A key question that is unanswered yet is which causal mechanisms link over-indebtedness, mental illness and health care utilization. Legal and material consequences as well as stigmatization related to over-indebtedness may affect health both directly and indirectly via physiological processes and health-related behaviours. Over-indebtedness can reflect a source of chronic stress and ongoing worry which induce feelings of hopelessness and failure and lead to a decrease in mental health [6,11,14]. Since available resources may be largely allocated to debt repayment, the over-indebted may lack physical, mental and material capacities to maintain health and struggle to cover costs of health care and medications [6]. Moreover, due to decreased labour market participation and decreased workplace productivity, those suffering from a mental illness may be at greater risk of reduced income and job loss, respectively, that can in turn cause over-indebtedness [42].

A few limitations need to be acknowledged when interpreting the findings of this study. Due to the cross-sectional nature of the present study, the causal direction of the observed association remains unclear. It is both possible that mental illness underlying antidepressant use results from over-indebtedness and mental illness contributes to over-indebtedness by reducing the capability to manage debt [11,6,7]. Furthermore, a broadly accepted definition of over-indebtedness is not yet available [1]. Therefore, we defined OID participants that were seeking debt advisory agencies as over-indebted and assumed DEGS1 participants not to be over-indebted due to lack of data on indebtedness. However, it is likely that the DEGS1 population also includes individuals that are over-indebted according to this definition. This procedure might have yielded attenuated estimates of the association between over-indebtedness status and antidepressant use. Moreover, it cannot be excluded that the over-indebted who neither seek debt advice nor medical services are underrepresented in the OID survey. This, in turn, might overestimate antidepressant use in this population whereas CRN might have the opposite effect.

Given that antidepressants are mostly available only on prescription, the advantage of this measure is that it specifically takes underlying mental illnesses into account that have been diagnosed by a clinician. However, it is not possible to distinguish indications for antidepressant use or identify unmet need based on available data. Finally, the processes of collection of data on medication use differed between the two survey populations. In contrast to DEGS1,

OID relied solely on self-reporting which might have led to minor under-reporting. However, several studies suggest high validity of self-reported use of various medication types [43], such as antidepressants [44,45]. Despite limitations, this study provides first evidence of an association between over-indebtedness and antidepressant use and enhances the scientific understanding of socioeconomic inequalities in mental health.

Conclusions

Depression is one of the leading causes of disability. In view of millions of over-indebted households across high-income countries, a growing body of evidence suggests higher morbidity among those affected. In support of previous research on socioeconomic inequalities in mental health, the present study is the first to show that over-indebted individuals are more likely to use antidepressants compared to the general population in Germany. Over-indebtedness thus seems to reflect an important public health issue. The findings emphasize the need to consider the potential risk of mental illness associated with over-indebtedness in health care, debt counselling, research and social policy. More specifically, a multidisciplinary approach is an essential prerequisite to facilitate effective and accessible treatment of widespread mental disorders that integrates both pharmacological and non-pharmacological intervention according to need. Further research is necessary to examine the causal mechanisms that may underlie the association between over-indebtedness and mental health in order to advance the understanding of health inequalities—beyond standard measures of socioeconomic status.

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RESEARCH ARTICLE

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Cost-related medication nonadherence among over-indebted individuals enrolled in statutory health insurance in Germany: a cross-sectional population study

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Abstract

Background: Millions of citizens in high-income countries face over-indebtedness that implies being unable to cover payment obligations with available income and assets on an ongoing basis. Studies have shown an association between over-indebtedness and health outcomes, independent of standard socioeconomic status measures. Patterns of cost-related medication nonadherence (CRN) among over-indebted individuals are yet unclear. The aim of this study was to examine the frequency of nonadherence to prescribed medications due to cost, and to identify risk factors for CRN among over-indebted individuals in Germany.

Methods: In 2017, we conducted a cross-sectional survey among over-indebted individuals recruited in 70 debt advice agencies in North Rhine-Westphalia, Germany. Data on CRN in the last 12 months (i.e. not filling prescriptions, skipping or decreasing doses of prescribed medication due to financial problems) were collected by a survey using a self-administered written questionnaire that was returned by 699 individuals with a response rate of 50.2%. Prevalence of CRN was assessed using descriptive statistics. Multiple logistic regression analysis was performed to examine risk factors of CRN, including participants enrolled in statutory health insurance with complete data ($n = 521$).

Results: The prevalence of CRN was 33.6%. The chronically ill had significantly greater odds of cost-related medication nonadherence (aOR 1.96; 95% CI 1.27–3.03) than individuals without a chronic illness. CRN was more likely to occur in individuals who had discussed financial problems with their general practitioner (aOR 1.58; 95% CI 1.01–2.47). There was no association between CRN and other sociodemographic factors or socioeconomic status.

Conclusions: Medication nonadherence due to financial pressures is common among over-indebted citizens enrolled in statutory health insurance in Germany. Stakeholders in social policy, research and health care need to address over-indebtedness to develop strategies to safeguard access to relevant medications, especially among those with high morbidity.

Trial registration: Arzneimittelkonsum, insbesondere Selbstmedikation bei überschuldeten Bürgerinnen und Bürgern in Nordrhein-Westfalen (ArSemü), (engl. 'Medication use, particularly self-medication among over-indebted citizens in North Rhine-Westphalia'), German Clinical Trials Register: [DRKS00013100](https://www.clinicaltrialsregister.eu/ct3/showStudy?studyid=DRKS00013100). Date of registration: 23.10.2017. Date of enrolment of the first participant: 18.07.2017, retrospectively registered.

Keywords: Nonadherence, Over-indebtedness, Debt, Socioeconomic status, Delinquency, Health inequality, Access to health care, Prescription, Medication

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Background

Across European countries, about 10% of households are considered over-indebted, and this number continues to increase [1, 2]. In Germany alone, 6.9 million citizens are over-indebted which is defined as being unable to cover payment obligations and living expenses with available income and assets on an ongoing basis [3]. Over-indebtedness may reflect both a cause and consequence of poor health for individuals at all socioeconomic positions [4, 5]. Previous research has revealed an association between over-indebtedness and various physical and mental health outcomes [6–9] that was not explained by standard socioeconomic status (SES) measures such as income and education. Recently, a first register-based study among 48,778 Finnish adults examined the incidence of chronic disease using 15-year follow-up data on long-term over-indebted individuals and matched controls [10]: Over-indebtedness was associated with an increased risk of chronic diseases such as diabetes, bronchial asthma, coronary heart disease and psychoses. In line with these findings, the demand for medical care among the over-indebted is likely to be high.

Previous studies indicate that many patients restrict their medication use due to cost although most high-income countries provide various forms of coverage and co-payments for prescription drugs [11, 12]. Studies consistently found those with a low income and poor health, and individuals without drug coverage, to have an increased risk of cost-related medication nonadherence (CRN) [11–14]. However, evidence on how medication cost pressures affect the over-indebted is scarce, yet might be relevant to advance the understanding of inequalities in health and facilitate access to medical care [15].

Several studies suggest an association between measures of debt and cost-related medication nonadherence [16–18]. However, in contrast to over-indebtedness, the mere presence of debt does not reflect financial difficulties. Over-indebted individuals may be bound to weigh competing financial commitments and spending on necessities, such as essential medications when co-payments are required. In a longitudinal survey representative of US adults older than 50 years, over-indebted individuals were more likely to experience CRN over the 2-year follow-up [18]. In a cross-sectional study of 666 adults seeking debt counselling in Germany in 2010, a majority of over-indebted individuals restricted seeking medical care and filling prescriptions in the face of their financial strain [19]. Hence, the over-indebted may reflect a vulnerable population group that is especially susceptible to co-payments but has been largely neglected in health policy and health services research. In view of the fact that access to essential medicines is considered a component of the human right to health, and goal of

national health systems, CRN reflects a critical public health issue [20]. Serious adverse health effects and increased use of medical services can arise from cost-related medication nonadherence [21–23].

In Germany, adults enrolled in statutory health insurance (SHI) are required to pay co-payments for medical services including medications. More specifically, co-payments for medications range from 5 to 10 euros per prescription, and any costs of over-the-counter drugs that are excluded from reimbursement. Patients can apply for reimbursement or waiver of co-payments if these exceed a 2 % ceiling of gross household income per annum. When patients' attending physician attests a chronic condition, the ceiling can be reduced to 1 % (§ 62 German Social Code Book V). The objective of the present study is to examine the prevalence and factors associated with cost-related medication nonadherence among over-indebted individuals who are enrolled in statutory health insurance in Germany.

Methods

This cross-sectional study among clients of debt advice agencies was conducted to examine medication use and self-medication in the over-indebted (OID survey; German acronym: ArSemü). In Germany, approved debt advice agencies provide debt and insolvency counselling services to over-indebted consumers (Insolvency Statute; German: Insolvenzordnung; §305). Between July and October 2017, 70 of 145 debt advice agencies throughout the federal state of North Rhine-Westphalia that all have a mandated role in insolvency proceedings and target over-indebted clients, served as recruiting offices. These agencies were associated with the local German Consumer Organisation or one of the member organisations of the 'Expert Committee Debt Counselling of Non-statutory Welfare NRW' (German: Fachausschuss Schuldnerberatung der Freien Wohlfahrtspflege NRW) that invited the agencies to conduct recruitment. The demographic structure of North Rhine-Westphalia, which is the most populous of the 16 federal states in Germany, is similar to the national average [23]. Reasons for non-participation of agencies were primarily lack of resources (time and staff) for recruitment.

A comprehensive study guide informed the debt advisors about study objectives, procedures and eligibility criteria in order to standardise recruitment. Eligibility criteria for over-indebted clients were a) having completed at least an initial consultation based on the premise that it reflects a sensitive situation necessary to build trust, b) at least 16 years of age to assure contractual capability, c) sufficient language, reading and writing skills to complete the questionnaire. Moreover, all nationalities but only one respondent within each household were considered eligible. When debt advisors identified clients as eligible,

they invited clients to participate in the anonymous survey during the consultation in chronological order, and handed out the study material (standardised questionnaire, postage paid return envelope) (Fig. 1). Since approved debt advisory centres throughout Germany offer

counselling specifically for over-indebted private households, all eligible clients were considered “over-indebted”. We specifically designed a questionnaire for the survey among the over-indebted which was reviewed by selected debt advisors. To ensure validity and reliability of

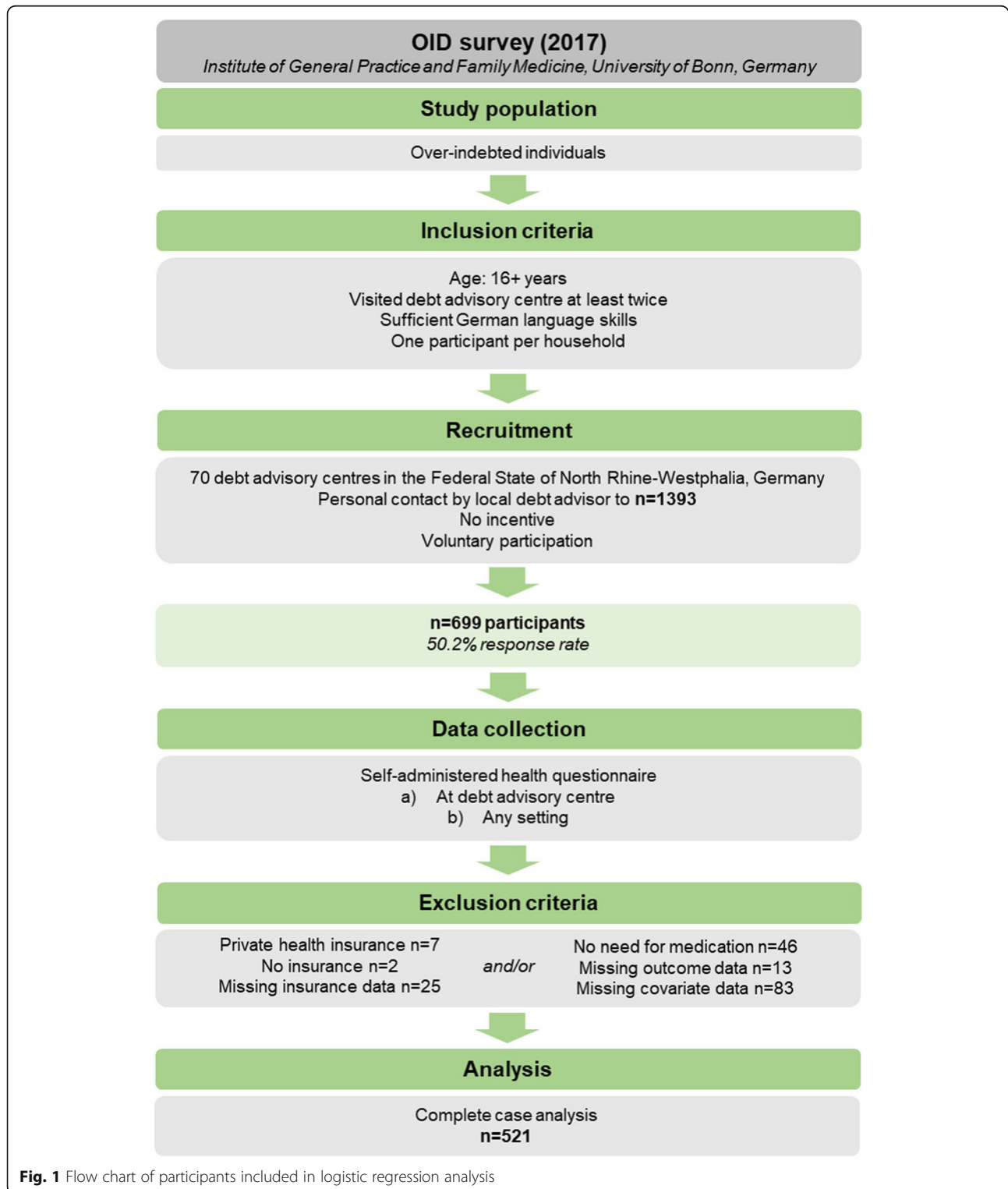


Fig. 1 Flow chart of participants included in logistic regression analysis

the questionnaire, we used several items from questionnaires that were developed for representative surveys of the adult population in Germany by the Robert Koch Institute, the national public health agency [24, 25], and surveys that examined access to medication in the German population [26], and in a population of over-indebted clients [19]. Questionnaires returned within one month after the end of recruitment were included in the analysis.

The questionnaire assessed cost-related underuse of medication and dietary supplements in the last 12 months. First, participants self-reported difficulty in obtaining medical products due to their financial situation (yes; no; no need for medication and dietary supplements). Second, the survey assessed specific CRN behaviours. Participants self-reported whether they had been delaying or not filling a prescription, skipping or decreasing doses of prescribed medications and skipping prescribed or over-the-counter medication for financial reasons in the previous year. In line with previous studies that have assessed test-retest reliability [27] and construct validity [28] for similar measures of CRN, a dichotomous outcome variable was generated to indicate subjects' nonadherence to prescribed medications due to cost pressures. CRN was assumed when subjects reported not filling a prescription and/or skipping or decreasing doses of a prescribed medication.

According to a conceptual framework developed by Piette et al. [29], patients' medication use and adherence in response to financial pressures is not only modified by patient characteristics and medication but also provider and health system factors. Therefore, analysis was limited to members of statutory health insurance. Due to a variety of tariffs, co-payments for privately insured individuals differ considerably from those enrolled in statutory health insurance in Germany. Hence, we excluded members of private health insurance ($n = 7$) a priori. Likewise, uninsured subjects ($n = 2$) and those with missing data on health insurance ($n = 25$) were excluded. Moreover, subjects who self-reported they "did not need medication or dietary supplements" in the last 12 months ($n = 46$) or missing outcome data ($n = 13$) were excluded from the analysis.

The role of providers in cost-related medication underuse was controlled for by taking into account whether patients had ever discussed financial problems with their general practitioner (yes, no). Moreover, sociodemographic characteristics, including age, sex, migration background, marital status, number of children, as well as socioeconomic status, and health status were considered as covariates in multiple logistic regression analysis. Age was classified into four age groups (18–29; 30–49; 50–64; 65–79 years) to differentiate phases of life. Immigrants and individuals who had at least one parent who was born outside of Germany were considered as having a

migration background. We also controlled for marital status, classified into three groups, namely married, previously married (i.e. divorced or widowed), and never married subjects, and the number of children, categorised into four groups. Educational attainment was derived from questions about the highest general educational and vocational qualifications (low; medium; high) using the International Standard Classification of Education (ISCED) [30]. Current employment was assumed if subjects reported any kind of full, part-time or marginal employment. Those who did not report employment status but receiving unemployment benefits were considered unemployed. Moreover, individuals' morbidity was controlled for in terms of self-reported chronic health conditions. Medical professionals examined any chronic health conditions respondents self-reported as free-text responses, and verified the data by comparing these to respondents' self-reported health complaints underlying current medication use in the last 7 days. Based on the available data, medical professionals classified existing chronic conditions according to ICD-10-GM chapters (German adaptation of the International Statistical Classification of Diseases and Related Health Problems). The most common chronic conditions included endocrine, nutritional and metabolic diseases (Chapter IV; 20.9%), mental and behavioural disorders (Chapter V; 20.2%) and diseases of the circulatory system (Chapter IX; 19.5%). The presence or absence of a chronic health condition also gives some indication of subjects' co-payment ceiling of one or 2 % of annual household income, respectively.

We used descriptive statistics to examine population characteristics and the prevalence of cost-related medication nonadherence among the over-indebted, and chi-squared test or Fisher's exact test to examine differences in the distribution of characteristics across comparison groups. In order to examine factors that are associated with cost-related underuse of prescribed medication, crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) were estimated using multiple logistic regression analysis. For logistic regression analysis, we performed a complete case analysis to handle missing data as the proportion of missing values in most variables was small and considered to be missing at random. In all models, the reference group for covariates was defined as the most frequent category, except for the reference category of age (youngest age group and chronic illness (absence of a chronic illness)). All independent variables were entered into the model simultaneously. The level of statistical significance was set at 0.05. Analyses were carried out using IBM SPSS Statistics (version 25).

Results

Debt advisors invited 1393 clients to participate in the OID survey. Of these, 699 individuals returned the

questionnaire with complete data on sex and age which corresponds to a response rate of 50.2%. Following the exclusion of participants based on health insurance status, need for medical products and missing outcome data, the sample comprised 604 individuals. Table 1 presents characteristics of these participants, stratified by cost-related medication nonadherence. Participants' mean age was 43.1 years (standard deviation 12.8 years; range 19–76 years). The prevalence of any cost-related medication nonadherence in the last 12 months among the over-indebted was 33.6% ($n = 203$). More specifically, the share of respondents that reported not filling a prescription was 26.8% ($n = 162$) while 13.4% ($n = 81$) reported skipping or decreasing doses of a prescribed medication due to cost.

Table 2 presents the results of multiple regression analysis that included individuals with complete covariate and outcome data only ($n = 521$). The chronically ill had significantly greater odds of cost-related medication nonadherence (aOR 1.96; 95% CI 1.27–3.03) than those who did not report a chronic illness. Over-indebted individuals who had discussed financial problems with their general practitioner were significantly more likely to report CRN (aOR 1.58; 95% CI 1.01–2.47) than those who never had such conversations. However, there was no significant association between CRN and other sociodemographic factors or measures of socioeconomic position in the over-indebted respondents.

Discussion

The present study is the first to provide detailed estimates of cost-related medication nonadherence in a population of over-indebted individuals enrolled in statutory health insurance in Germany. A third of the over-indebted reported not filling prescriptions and/or skipping or decreasing doses of a prescribed medication due to financial pressures in the last year. The findings suggest that individuals' responses to medication cost problems vary significantly by health status and patient-physician communication about financial problems. However, there was no association between cost-related medication nonadherence and other demographic characteristics or socioeconomic factors.

Thus, the results may indicate that the over-indebted often trade off payment obligations against spending on necessities such as prescribed medications – although all individuals in the present study were enrolled in statutory health insurance which covers about 90% of the German population [31].

Previous research suggests considerable variations in rates of CRN across countries and in individuals' responses to medication cost pressures. In a recent large cross-sectional study among adults aged 55 and older the estimated prevalence of CRN in the previous year

ranged from less than 4 % in France, Norway, Sweden, Switzerland, UK and Germany up to 17% in the US [12]. Individuals' susceptibility to cost-related medication nonadherence has been found to vary by factors such as sociodemographic characteristics, and health insurance [13, 32]. More specifically, studies consistently showed that lower income reflects a primary risk factor of CRN [12, 33]. Besides income, most studies on CRN have taken a limited set of other socioeconomic indicators into account [13, 29, 33]. However, it is essential to consider that individuals at all socioeconomic positions including those with a high income may face over-indebtedness [3].

The high prevalence of CRN observed in the present study is consistent with prior estimates in various samples of individuals considered over-indebted: The prevalence of CRN ranged from 32% in a nationally representative sample of older US mortgage-delinquent adults [18] up to 65% in a cross-sectional survey of German citizens who sought debt advice agencies [19].

Few studies have explicitly examined the association between measures of over-indebtedness, including mortgage delinquency [18] and inability to pay or problems paying for medical bills [17], and CRN. This association remained significant even after control of sociodemographic characteristics, SES measures such as income and employment status, health status and health insurance. In a nationally representative sample of older US adults over-indebtedness was associated with taking less medication than was prescribed because of cost at any time in the past 2 years (aOR 8.66; 95% CI 3.72–20.16) [18]. In a sample of Arizona households, over-indebtedness was associated with cost-related delays in obtaining or inability to obtain prescribed medications (aOR 6.16; 95%-CI 3.87–9.81) [17]. Another population-based study among US adults found no association between overall indebtedness and CRN [16]. However, when types of debt were examined separately, medical debt (aOR 3.84; 95%-CI 1.70–1.12) and credit card debt (aOR 2.41; 95%-CI 1.03–5.65), as opposed to housing, automobile or student loan, were significantly associated with skipping or cutting medications due to cost even after adjustment [16].

Previous studies suggest that over-indebtedness is associated with cost-related medication nonadherence. Mechanisms that possibly explain patterns of CRN in the over-indebted population may relate to ongoing limited material resources, paralleled by psychosocial and legal stressors that those affected are assumed to face. Over-indebted individuals enrolled in statutory health insurance in Germany may not benefit from the income-related ceiling on co-payments. Those who reported delaying, not filling a prescription, skipping or decreasing doses of prescribed medications for financial reasons

Table 1 Characteristics of participants

Variables	Total sample (n = 604) ^a		CRN ^b				Diff. between groups ^c p-value
	n	%	Yes (n = 203)		No (n = 401)		
Age							0.173
18–29 years	107	17.7	41	20.2	66	16.5	
30–49 years	303	50.2	107	52.7	196	48.9	
50–64 years	156	25.8	47	23.2	109	27.2	
65–79 years	38	6.3	8	3.9	30	7.5	
Missing	0	0.0	0	0.0	0	0.0	
Gender							0.023
Female	348	57.6	130	64.0	218	54.4	
Male	256	42.4	73	36.0	183	45.6	
Missing	0	0.0	0	0.0	0	0.0	
Migrant background							0.923
No	343	56.8	116	57.1	227	56.6	
Yes	225	37.3	76	37.4	149	37.2	
Missing	36	6.0	11	5.4	25	6.2	
Marital status							0.119 ^d
Married	131	21.7	34	16.7	97	24.2	
Previously married	232	38.4	83	40.9	149	37.2	
Never married	234	38.7	85	41.9	149	37.2	
Missing	7	1.2	1	0.5	6	1.5	
Number of children							0.668 ^d
No children	176	29.1	58	28.6	118	29.4	
1 child	133	22.0	48	23.6	85	21.2	
2 children	154	25.5	54	26.6	100	24.9	
3 or more children	137	22.7	43	21.2	94	23.4	
Missing	4	0.7	0	0.0	4	1.0	
Education level							0.209 ^d
Low	273	45.2	100	49.3	173	43.1	
Medium	304	50.3	95	46.8	209	52.1	
High	26	4.3	7	3.4	19	4.7	
Missing	1	0.2	1	0.5	0	0.0	
Employment status							0.964 ^d
Employed	307	50.8	102	50.2	205	51.1	
Unemployed	287	47.5	98	48.3	189	47.1	
Missing	10	1.7	3	1.5	7	1.7	
Chronic illness							< 0.001
No	215	35.6	51	25.1	164	40.9	
Yes	364	60.3	143	70.4	221	55.1	
Missing	25	4.1	9	4.4	16	4.0	
Communication about financial problems with GP							0.044
No	416	68.9	135	66.5	281	70.1	
Yes	127	21.0	53	26.1	74	18.5	
Missing	61	10.1	15	7.4	46	11.5	

^aLogistic regression analysis included individuals with complete covariate and outcome data only (n = 521)

^bCRN: Any cost-related medication nonadherence in the last 12 months

^cDifferences between groups examined by chi-squared test or Fisher's exact test^d

Table 2 Crude (OR), adjusted odds ratios (aOR) and 95% confidence intervals (CI) of CRN^a (n = 521)

Variables	OR	95% CI	aOR	95% CI
Age				
18–29 years	Reference	–	Reference	–
30–49 years	0.82	0.50–1.35	0.77	0.44–1.35
50–64 years	0.67	0.38–1.17	0.58	0.30–1.12
65–79 years	0.49	0.21–1.17	0.43	0.16–1.13
Gender				
Female	Reference	–	Reference	–
Male	0.72	0.49–1.05	0.86	0.57–1.28
Migrant background				
No	Reference	–	Reference	–
Yes	1.08	0.74–1.59	1.08	0.72–1.61
Marital status				
Never married	Reference	–	Reference	–
Married	0.55	0.32–0.93	0.57	0.32–1.04
Previously married	1.00	0.67–1.51	1.04	0.61–1.76
Number of children				
No children	Reference	–	Reference	–
1 child	1.12	0.67–1.86	1.16	0.67–2.02
2 children	1.12	0.68–1.83	1.29	0.72–2.30
3 or more children	0.94	0.55–1.59	1.06	0.56–2.00
Education level				
Low	1.30	0.89–1.90	1.18	0.78–1.77
Medium	Reference	–	Reference	–
High	0.70	0.27–1.81	0.78	0.29–2.07
Employment status				
Employed	Reference	–	Reference	–
Unemployed	1.09	0.76–1.58	0.96	0.64–1.44
Chronic illness				
No	Reference	–	Reference	–
Yes	1.89	1.26–2.83	1.96	1.27–3.03
Communication about financial problems with GP				
No	Reference	–	Reference	–
Yes	1.75	1.14–2.67	1.58	1.01–2.47

^aCRN: Any cost-related medication nonadherence in the last 12 months

might have been unable to cover the amount of co-payments up to the ceiling. Others might refrain from applying for reimbursement or waiver of co-payments even when exceeding the ceiling, for reasons such as administrative barriers or disease burden. The ceiling on co-payments can be reduced to 1 % for patients with a chronic condition according to the German Social Code Book V (§62). Nevertheless, the over-indebted with a chronic condition were more likely to experience cost-related medication nonadherence than those without a

chronic condition. Specifically over-indebted individuals who are employed (n = 307; 50.8%) might not exceed the ceiling as it is based on the gross annual household income rather than income available for living expenses including co-payments. Thus, even when income is largely spent on debt repayments to satisfy creditors, the amount of co-payments will correspond to the amount of individuals' income only.

Therefore, CRN among the over-indebted is assumed to arise from difficulty paying for medications in the present study. On the one hand, the high prevalence of cost-related medication nonadherence may be attributable to morbidity [6–9] and associated need for medication among the over-indebted. On the other hand, medication underuse, in turn, may contribute to maintaining existing health problems. Moreover, experiences of psychological distress, social stigma and feelings of shame related to over-indebtedness [4, 5, 7] might contribute to patients' medication underuse as a strategy to cope with medication cost. In Germany, co-payments not only apply to prescription medication but also hospital care, medical aids, rehabilitation and home nursing care unless patients actively apply for reimbursement or a waiver of co-payments that exceed the income-related ceiling. Thus, over-indebted individuals might be at increased risk of forgone medical care that goes beyond medication nonadherence [34, 35].”

Patient characteristics, medication, provider and health system factors have been suggested to influence the relationship between cost pressures and medication nonadherence [29]. In line with previous research [13, 19, 33], the present study indicates that some patient groups are at increased risk of underusing prescribed medication due to cost although all respondents were over-indebted and enrolled in statutory health insurance:

First, the chronically ill are likely to face disproportionate financial burden of medication cost, hence are more susceptible to CRN than others are. Second, studies found that patients and physicians rarely discuss medication cost problems although alternative strategies of reducing medication costs might exist in clinical practice [36–38]. In the present study, patient-physician communication about financial problems did not reflect a protective factor of CRN but was associated with greater odds of CRN. Previous findings of the role of patients' relationship to physicians in CRN were inconsistent [36, 39].

Limitations

A strength of this study is the high response rate of 50.2% that was achieved by recruiting participants via debt advice agencies in North Rhine-Westphalia, Germany. However, this study has some limitations. Population groups such as those who lack sufficient

language skills to participate in the survey might be underrepresented. It can be assumed that those clients who experienced major difficulties paying for medications might have been either more likely to participate in the study to share their debt-related burden or decline participation. Hence, the prevalence of cost-related medication nonadherence can be both overestimated and underestimated but this potential selection bias is unlikely to affect the results of multiple logistic regression analysis. However, we need to consider that the generalizability of findings is possibly limited. Since the data was cross-sectional, further research is necessary to examine causal mechanisms in more detail. Complete case analysis might lead to imprecise results of logistic regression analysis. However, the loss of information is limited due to the small proportion of missing data, and missing values considered missing at random. Therefore, this method used to handle missing data is assumed to introduce only a minor bias. Another limitation of the study is that data on income that is a relevant risk factor of CRN was not assessed due to the difficulty to examine discretionary income when it is committed to debt payments, distraised or yet unclear to over-indebted clients. However, other standard SES measures (education, employment status) were taken into account. The annual report on over-indebtedness in Germany suggested that most of the over-indebted are not lowest-income earners but members of the middle class [3]. There are differences in administrative and legal procedures to over-indebtedness across countries [2]. Likewise, pharmaceutical policies and physicians' means to support patients in following prescribed treatment despite cost concerns differ considerably between and within countries. Therefore, prevalence rates of CRN may vary accordingly [40–42].

Despite these limitations, the present study provides a valuable insight into patterns of CRN in the population of over-indebted individuals in Germany. This population group may face considerable barriers to access to prescribed medications even when enrolled in statutory health insurance. There is considerable evidence on adverse health effects of cost-related medication nonadherence, including increased rates of hospitalization [43] and decline in health status [21]. Given the vast number of over-indebted citizens in high-income countries, the findings suggest that cost-related medication underuse reflects a major public health problem in health systems that charge direct patient payments.

Conclusions

Cost sharing can contribute to medication underuse due to cost, specifically in vulnerable population groups such as the over-indebted. In light of possible detrimental effects of nonadherence to prescribed medications on health, the findings of this study have important

practical implications for health care, research and social policy. First, this study indicates that co-payments are often a barrier to access to medication for over-indebted individuals. Second, there is a need to monitor and evaluate the impact of cost sharing policy to prevent unmet health needs and adverse health outcomes, specifically among vulnerable population groups including over-indebted individuals. Third, raising awareness among both clinicians and debt advisors for medication underuse due to competing financial demands – including debts – may facilitate access to affordable medical care for all.

Abbreviations

aOR: adjusted Odds Ratio; CI: Confidence interval; CRN: Cost-related medication nonadherence; ICD-10-GM: German adaptation of the International Statistical Classification of Diseases and Related Health Problems; ISCED: International Standard Classification of Education; OID: Over-indebtedness survey; SES: Socioeconomic status; SHI: Statutory health insurance

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Authors' contributions

EM substantial contributions to conception and design of the study, acquisition of funding, project administration and methodology as project manager; KW and UZ substantial contributions to funding acquisition, conception and design of the study; JT substantial contribution to the acquisition of data; JW prepared the manuscript, analysis and interpretation of data, substantial contribution to project administration; MP, NB and JP substantial contribution to data curation and/or interpretation of data; BW contribution to strategy for data analysis and thorough review of the manuscript. All authors (JW, MP, JT, NB, JP, UZ, KW, BW, EM) have contributed to drafting the article and/or substantially revised the manuscript, and have approved the submitted version to be published.

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Availability of data and materials

The dataset generated and analysed during the current study is not publicly available due to confidentiality concerns but are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was submitted to and approved by the institutional ethics committee of the University Medical Faculty in Bonn, Germany (No. 167/17). All participants received information on study procedures, anonymity and confidentiality. Written informed consent was not obtained in order to ensure anonymity but respondents confirmed their willingness to participate in the study by returning the questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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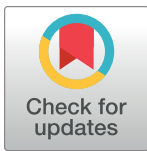
RESEARCH ARTICLE

Patient-physician communication about financial problems: A cross-sectional study among over-indebted individuals

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Data Availability Statement: Data on over-indebted individuals (OID survey) cannot be shared publicly, as it contains potentially identifying participant information that could compromise

Abstract

Background

About every tenth household across Europe is unable to meet payment obligations and living expenses on an ongoing basis and is thus considered over-indebted. Previous research suggests that over-indebtedness reflects a potential cause and consequence of psychosomatic health problems and limited access to care. However, it is unclear whether those affected discuss their financial problems with general practitioners. Therefore, this study examined patient-physician communication about financial problems in general practice among over-indebted individuals.

Methods

We conducted a cross-sectional survey among clients of 70 debt advice agencies in North Rhine-Westphalia, Germany, in 2017. We assessed the prevalence of patient-physician communication about financial problems and its association with patient characteristics using descriptive statistics and logistic regression analysis. Of 699 individuals who returned the questionnaire (response rate:50.2%), we included 598 respondents enrolled in statutory health insurance with complete outcome data in the analyses.

Results

Conversations about financial problems with general practitioners were reported by 22.6% (n = 135) of respondents. Individuals with a high educational level were less likely to report such conversations than those with medium educational level (aOR 0.11; 95%CI 0.01–0.83) after adjustment for other sociodemographic characteristics, health status and measures of financial distress. Those without a migrant background (aOR 2.09; 95%CI 1.32–3.32), the chronically ill (aOR 1.90; 95%CI 1.16–3.13) and individuals who reported high financial

participants' privacy. Data access requests may be sent to the ethics committee of the Medical Faculty of the University of Bonn (Email: ethik@unibonn.de).

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distress (aOR 2.15; 95%CI 1.22–3.78) and cutting on necessities to pay for medications (aOR 1.86; 95%CI 1.12–3.09) were more likely to discuss financial problems than their counterparts.

Conclusions

Few over-indebted individuals discussed financial problems with their general practitioner. Patients' health status, coping strategies and perception of financial distress might contribute to variations in disclosure of financial problems. Thus, enhancing communication and screening by routine assessment of financial problems in clinical practice can help to identify vulnerable patients and promote access to health care and social services and well-being for all.

Introduction

General practitioners (GPs) are often the point of first medical contact for health problems within health care systems in Europe and have a coordinating role in many countries [1]. In line with research on the social determinants of health [2, 3], social factors are part of day-to-day clinical practice. However, the prevalence of social problems such as financial difficulties among patients, let alone communication about these problems, in the general practice setting has yet been understudied.

Over-indebtedness is widespread in Europe [4]. Currently, 6.9 million individuals in Germany alone face over-indebtedness which implies being unable to meet payment obligations and cover living expenses with available income and assets on an ongoing basis [5]. Recent studies have drawn attention to over-indebtedness as a potential cause and consequence of poor health [6]. Studies found an association between over-indebtedness and poor health outcomes that was not explained by standard socioeconomic status (SES) measures such as income and education [7–12]. A 15-year longitudinal study among 48778 adults in Finland found an association between over-indebtedness and an increased incidence of various chronic diseases including diabetes and psychoses [13]. These findings suggest that over-indebtedness may reflect a distinct risk factor of poor health. Furthermore, cost of illness can adversely affect health outcomes and access to medical services, and may ultimately, result in increased use of health care [14, 15]. Studies suggest that particularly vulnerable patient groups such as those with a low income, lack of health insurance or debt have an increased risk of cost-related medication non-adherence (CRN) [16–21] or forgone care [22]. Most health systems across high-income countries such as Germany impose cost sharing for health services [23].

Thus, prior research indicates that over-indebtedness is likely to reflect not only financial but also considerable health-related problems. In line with a number of studies patient-physician communication might generally contribute to improved health outcomes [24, 25]. More specifically, patient-physician communication about financial problems may help to prevent limited access to health care and poor health outcomes among those at risk. General practitioners may assist patients with health-related financial problems by a variety of strategies including reducing out-of-pocket costs or referral to social services [26–29]. However, little is known about whether and how patients and physicians discuss financial problems in general practice.

Estimates of the frequency of financial problems among patients in general practice vary considerably by population characteristics and measures used [30, 31, 32]. In a survey among 489 general practitioners in Germany, the majority of GPs (53.4 percent) reported that they were consulted by patients with poverty and/or financial problems at least three times a week [33]. Prevalence of cost conversations assessed by surveys among patients ranged from 16 percent in a US sample of 4050 chronically ill adults aged 50 years or older [34] up to 61 percent of elderly Medicare beneficiaries who reported cost-related medication non-adherence [26]. Findings are mixed as to what role patient and physician sociodemographic characteristics and patients' health status play in patient-physician communication related to financial issues [33, 34–40]. Nevertheless, studies have consistently found that patients have a desire to have cost conversations with their physician, yet many patients never had these conversations [26, 41, 42].

It is important to advance the understanding of patient-physician communication about social problems, including over-indebtedness, to promote health and access to health care for all. Therefore, the aim of this study is to assess the frequency of patient-physician communication about financial problems among over-indebted individuals in Germany, and to identify patients' characteristics that are associated with discussion of such concerns in general practice.

Methods

Data

This cross-sectional survey among clients of debt advice agencies examined health, medication use and self-medication in the over-indebted (OID survey; German acronym: ArSemü) [43]. Between July and October 2017, 70 of 145 approved debt advice agencies throughout the German federal state of North Rhine-Westphalia (NRW) conducted the recruitment of participants. Debt advice agencies that provide debt and insolvency counselling services to over-indebted consumers in Germany (Insolvency Statute; German: Insolvenzordnung; §305) were invited to act as recruiters by their umbrella organisation, namely the local German Consumer Organisation or the 'Expert Committee Debt Counselling of Non-statutory Welfare NRW' (German: Fachausschuss Schuldnerberatung der Freien Wohlfahrtspflege NRW) [44]. Each debt advice agency that agreed to participate received a specific amount of study material that corresponded to the number of clients and advisors at each site identified a priori (mean 24; min. 5 to max. 100 questionnaires). Data was collected by a self-administered written questionnaire returned to the study centre by mail: Clients received an anonymous standardised questionnaire and a postage-paid return envelope from their counsellor after the consultation when these were identified eligible according to the following criteria: a) completed at least an initial consultation based on the premise that it reflects a sensitive situation necessary to build trust; b) minimum age of 16 years due to contractual capability; c) sufficient language, reading and writing skills owing to the data collection method; d) one participant per household.

Variables

The outcome measure was patient-physician communication about financial problems in general practice. Participants self-reported whether they had ever discussed their financial situation with their regular general practitioner (yes; no) when they reported to have a GP, they first consult in case of health problems (yes; no). Sociodemographic and health factors as well as participants' financial distress due to debt were considered in the analysis.

Sociodemographic information included sex, age, educational level, employment status, migrant background, marital status and number of children to account for general differences

in patient-physician communication patterns [45–52]. We classified age into three age groups (18–29; 30–49; 50–79 years). Self-reported data on the highest general educational and vocational qualifications were classified into three levels of education using the International Standard Classification of Education (ISCED) [53]: We distinguished between low (primary education, lower secondary education), medium (upper secondary education, post-secondary non-tertiary education) and high educational levels (tertiary education). Participants that reported full, part-time or marginal employment were classified as employed. In our study, we assumed that those with a lower SES (low educational level; unemployment), on the one hand, might feel compelled to discuss financial problems with their GP or have limited communication abilities that prevent such dialogue, on the other hand. Those with a higher SES might be especially reluctant to disclose financial problems due to feelings of shame, and may adopt different coping strategies. A migrant background was assumed when participants or at least one parent were born outside of Germany. Factors such as language barriers or differences in beliefs about illness and patient-physician interaction may hinder communication about financial problems in those with a migrant background [47, 52]. We classified participants' marital status into three groups: married, previously married (divorced or widowed), and never married. Number of children was classified into three groups (no children; 1 child; 2 or more children). The latter two variables were taken into account to examine patients' social support linked to marital status and household living expenses that vary by the number of children, and may influence communicative behaviour and interaction with their GP.

Patients' needs and expectations that can influence patient-physician communication might also depend on health status, disease stage and course of treatment [49]. Therefore, we considered both chronic diseases and recent visit to a general practitioner in the statistical analysis. Participants self-reported any chronic health conditions (yes,—please specify; no; don't know) and medication use in the last seven days. Medical experts reviewed self-reported data on both chronic conditions and medication use (pharmaceutical, underlying health condition) to identify and categorize chronic diseases according to ICD-10-GM (German adaptation of the International Statistical Classification of Diseases and Related Health Problems). Participants reported the use of outpatient and inpatient health care in the previous 12 months, including a visit to the GP (yes; no).

Moreover, we assumed that a high degree of financial distress increases individuals' perceived need for communication about financial problems. Thus, we included the following measures in the analysis to account for the degree of stress related to debt and cost of illness as well as patients' strategies to cope with their financial problems: The level of self-reported subjective financial distress due to debt was measured on a five-point Likert-scale which was dichotomized to distinguish low (not at all; somewhat; moderately) and high financial distress (to a great extent; to a very great extent). In Germany, adults enrolled in statutory health insurance need to pay co-payments for health services (German Social Code Book V § 61). For instance, co-payments for in-patient care amount to ten euros per calendar day, ten percent of costs for each prescribed medication (min. five, max. ten euros), and an additional fee of ten euros per prescription of therapies such as physiotherapy, speech therapy or occupational therapy [54]. Therefore, data on self-reported strategies to cope with health-related expenses were collected, including cost-related medication non-adherence and cutting on necessities to pay for medications (yes; no) in the previous 12 months was assessed. More specifically, the questionnaire captured CRN behaviours such as delaying or not filling prescriptions, skipping or decreasing doses of prescribed medications for financial reasons (yes; no).

Statistical analysis

Descriptive analyses were performed to examine the prevalence of patient-physician communication about financial problems and characteristics of over-indebted individuals who discussed financial problems with their GP. Subsequently, multiple logistic regression analysis was used to assess the association between both sociodemographic and health factors, as well as measures of financial distress due to debt and patient-physician communication about financial problems (no; yes). All missing values within covariates were assigned to the most frequent response category when these were below the threshold of 5%. A separate response category was generated for missings in data on migrant background as these were above the predefined threshold. Covariates were entered into the model simultaneously. Statistical significance level was set at $\alpha = 0.05$. We performed sensitivity analysis using complete case data to validate this approach. Analyses were carried out using IBM SPSS Statistics (version 25).

Results

Of 1393 clients that were invited to participate in this study by debt advisors, 699 subjects returned the questionnaire with complete data on sex and age (response rate: 50.2%). We excluded participants who had a private health insurance ($n = 7$) or no health insurance ($n = 2$), and those who provided no information on insurance ($n = 25$), did not report to have a GP and/or provided no outcome information ($n = 74$). Characteristics of all participants included in the analysis ($n = 598$), stratified by patient-physician communication about financial problems are shown in [Table 1](#).

Male (43.5%) and female (56.5%) participants were included in the analyses in nearly equal shares. The mean age of all subjects was 43.8 years (median 44.0; standard deviation ± 13.0 ; minimum-maximum 19–76 years). Chronic diseases were widespread in the over-indebted sample (62.2%).

The prevalence of patient-physician communication about financial problems in general practice was 22.6 percent. Nearly a quarter of participants with a low (22.6%) and medium (24.4%) educational level have talked about this issue with their GP whereas only 3.6 percent of participants with a high educational level reported such communication. Among the chronically ill, 27.4 percent have discussed financial problems with their GP (14.0% in those without a chronic disease). In participants who reported high subjective financial distress, 25.9 percent discussed financial problems with their general practitioner. Among those who reported CRN, hence did not fill a prescription or skipped or decreased doses of prescribed medication due to financial problems in the last 12 months, less than a third of participants discussed this issue in general practice (28.2%) whereas such communication was more frequent in participants who reported to have recently cut on necessities to pay for medications (35.4%).

Multiple logistic regression analysis ([Table 2](#)) showed that patient-physician communication about financial problems was associated with over-indebted individuals' sociodemographic characteristics, health factors and measures of financial distress. After adjusting for other covariates, those with high educational level had significantly lower odds of self-reported communication about financial problems with their general practitioner than those with medium educational level (aOR 0.11; 95% CI 0.01–0.83). Individuals without a migrant background had greater odds of communication about financial problems than those with a migrant background (aOR 2.09; 95% CI 1.32–3.32). Other sociodemographic characteristics including sex, age, employment status, marital status and number of children were not associated with patient-physician communication about financial problems. The chronically ill had significantly higher odds of reporting such a conversation than those without a chronic disease (aOR 1.90; 95% CI 1.16–3.13). Bivariate analysis found a significant association between

Table 1. Characteristics of participants (OID survey, n = 598).

Variables	Communication about financial problems [†]					
	Total (n = 598)		Yes (n = 135)		No (n = 463)	
	n	Col %	n	Row %	n	Row %
Sociodemographic variables						
Sex						
Male	260	43.5	54	20.8	206	79.2
Female	338	56.5	81	24.0	257	76.0
Age						
18–29 years	99	16.6	16	16.2	83	83.8
30–49 years	297	49.7	71	23.9	226	76.1
50–79 years	202	33.8	48	23.8	154	76.2
Educational level						
Low	266	44.5	60	22.6	206	77.4
Medium	303	50.7	74	24.4	229	75.6
High	28	4.7	1	3.6	27	96.4
Missing	1	0.2	0	0.0	1	100.0
Employment status						
Employed	303	50.7	65	21.5	238	78.5
Unemployed	283	47.3	65	23.0	218	77.0
Missing	12	2.0	5	41.7	7	58.3
Migrant background						
Yes	212	35.5	33	15.6	179	84.4
No	352	58.9	92	26.1	260	73.9
Missing	34	5.7	10	29.4	24	70.6
Marital status						
Married	134	22.4	26	19.4	108	80.6
Previously married	234	39.1	58	24.8	176	75.2
Never married	223	37.3	50	22.4	173	77.6
Missing	7	1.2	1	14.3	6	85.7
Number of children						
No children	171	28.6	40	23.4	131	76.6
1 child	138	23.1	33	23.9	105	76.1
2 or more children	285	47.7	61	21.4	224	78.6
Missing	4	0.7	1	25.0	3	75.0
Health status						
Chronic disease						
No	200	33.4	28	14.0	172	86.0
Yes	372	62.2	102	27.4	270	72.6
Missing	26	4.3	5	19.2	21	80.8
Visit to GP, 12 months						
No	112	18.7	17	15.2	95	84.8
Yes	485	81.1	118	24.3	367	75.7
Missing	1	0.2	0	0.0	1	100.0
Financial distress						
Subjective financial distress						
Low	144	24.1	18	12.5	126	87.5
High	437	73.1	113	25.9	324	74.1
Missing	17	2.8	4	23.5	13	76.5

(Continued)

Table 1. (Continued)

Variables	Communication about financial problems [†]					
	Total (n = 598)		Yes (n = 135)		No (n = 463)	
	n	Col %	n	Row %	n	Row %
Cost-related medication non-adherence, 12 months						
No	410	68.6	82	20.0	328	80.0
Yes	188	31.4	53	28.2	135	71.8
Missing	0	0.0	0	0.0	0	0.0
Cutting on necessities to pay for medications, 12 months						
No	472	78.9	90	19.1	382	80.9
Yes	113	18.9	40	35.4	73	64.6
Missing	13	2.2	5	38.5	8	61.5

[†]Patient-physician communication about financial problems in general practice.

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visiting a general practitioner in the last 12 months (OR 1.79; 95% CI 1.03–3.13) and communication about financial problems which, however, did not remain significant after adjusting for other covariates. Individuals who faced greater financial distress due to debt were more likely to report that they have discussed financial problems with their general practitioner: High subjective financial distress was associated with 2.15-fold (95% CI 1.22–3.78) higher odds of reporting communication about financial problems compared to low financial distress among the over-indebted. Cost-related medication non-adherence (OR 1.57; 95% CI 1.05–2.34) was associated with patient-physician communication about financial problems in bivariate analysis but not after adjusting for other factors. Individuals who reported cutting on necessities to pay for medications in the last 12 months (aOR 1.86; 95% CI 1.12–3.09) were significantly more likely to report such a conversation with their general practitioner. Sensitivity analysis showed similar patterns of findings.

Discussion

The findings of this study demonstrate that less than one in four over-indebted individuals ever discussed financial problems in general practice. Even among those who reported high subjective financial distress or cost-related medication non-adherence, less than one in three talked with their GP about financial issues.

In line with previous research on patient-physician communication about financial problems [26, 30, 32–34, 39, 41, 55], these results reflect a considerable communication gap among over-indebted individuals. Opportunities to discuss financial problems in general practice might have been missed by both patients and general practitioners. Previous studies suggested that reasons why patients do not talk about financial problems in general practice may relate to individuals' preferences and abilities to communicate as well as their expectations of the patient-physician relationship and prior experiences [37, 41, 42, 56, 57]. Some patients may not disclose financial problems to their GP if they seek advice from other medical or social services such as debt advice agencies instead. General practitioners may also fail to initiate such conversations due to time constraints and competing demands, discomfort or perceived lack of knowledge about solutions to patients' financial problems [56, 58, 59].

Although all participants in the present study were considered over-indebted, there were significant variations in patient-physician communication about financial problems by specific patient characteristics.

Table 2. Logistic regression analysis for patient-physician communication about financial problems (OID survey, n = 598)†.

	OR	95% CI	aOR	95% CI
Sociodemographic variables				
Sex				
Male	Reference	–	Reference	–
Female	1.20	0.81–1.78	1.08	0.70–1.66
Age				
18–29 years	Reference	–	Reference	–
30–49 years	1.63	0.90–2.96	1.61	0.83–3.12
50–79 years	1.62	0.86–3.02	1.38	0.67–2.88
Educational level				
Low	0.91	0.61–1.34	1.00	0.65–1.53
Medium	Reference	–	Reference	–
High	<i>0.12</i>	<i>0.02–0.86</i>	<i>0.11</i>	<i>0.01–0.83</i>
Employment status				
Employed	Reference	–	Reference	–
Unemployed	1.04	0.71–1.53	0.90	0.59–1.37
Migrant background				
Yes	Reference	–	Reference	–
No	<i>1.92</i>	<i>1.24–2.98</i>	<i>2.09</i>	<i>1.32–3.32</i>
Missing	2.26	0.99–5.16	2.60	1.08–6.25
Marital status				
Married	Reference	–	Reference	–
Previously married	1.35	0.80–2.26	1.13	0.65–1.96
Never married	1.20	0.71–2.04	1.23	0.66–2.29
Number of children				
No children	Reference	–	Reference	–
1 child	1.03	0.61–1.74	1.02	0.56–1.86
2 or more children	0.89	0.57–1.41	0.89	0.50–1.59
Health status				
Chronic disease				
No	Reference	–	Reference	–
Yes	2.26	<i>1.43–3.57</i>	<i>1.90</i>	<i>1.16–3.13</i>
Visit to GP, 12 months				
No	Reference	–	Reference	–
Yes	<i>1.79</i>	<i>1.03–3.13</i>	1.53	0.85–2.77
Financial distress				
Subjective financial distress				
Low	Reference	–	Reference	–
High	2.43	<i>1.42–4.16</i>	2.15	<i>1.22–3.78</i>
Cost-related medication non-adherence, 12 months				
No	Reference	–	Reference	–
Yes	<i>1.57</i>	<i>1.05–2.34</i>	1.14	0.73–1.77
Cutting on necessities to pay for medications, 12 months				
No	Reference	–	Reference	–
Yes	2.25	<i>1.44–3.51</i>	1.86	<i>1.12–3.09</i>

†Odds ratios (OR), adjusted odds ratios (aOR) and 95% confidence intervals (CI); italics indicate significant results at alpha = 0.05.

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Over-indebtedness may affect any individual across the socioeconomic spectrum [60]. However, experiences of loss of status, stigmatization and feelings of shame that can arise from ongoing over-indebtedness [61] possibly hamper patient-physician communication. Such experiences might be particularly distressing for individuals with a high educational level, and in turn reflect a barrier to communication about financial problems with their general practitioner. Likewise, cultural variations in the perception of debt-related worries, shame as well as expectations of the patient-physician relationship might contribute to the significant differences in patient-physician communication about financial problems by ethnic origin [47, 52].

Moreover, this study found an association between chronic disease as well as subjective financial distress and cutting on necessities to pay for medications in the last 12 months, and patient-physician communication about financial problems after adjustment. Patients who are chronically ill may be more likely to discuss their financial problems linked to continuity of care as well as co-payments for necessary medical services. In Germany, about 90 percent of the population is enrolled in statutory health insurance which enables adults to apply for reimbursement or waiver of co-payments that exceed two percent of the annual household income. When a physician attests a chronic condition, this ceiling can be reduced to one percent (§ 62 German Social Code Book V). High self-reported subjective financial stress and cutting on necessities to pay for medications might reflect the severity of financial problems on the one hand, and individuals' willingness to disclose and proactively deal with their financial problems on the other hand.

An encouraging finding is that some over-indebted patient groups that possibly bear a particularly heavy burden regarding their health status and financial distress are more likely to communicate about their financial problems with their general practitioner. The predictors of patient-physician communication in general practice identified in the present study were in line with several prior patient surveys [34, 39, 40]. However, few studies have examined the link between social determinants and patient-physician communication about financial problems in clinical encounters yet, most of which assessed communication in diverse US patient groups [32–42]. This is the first explorative study of such communication in a population of over-indebted individuals in Germany. The findings highlight that communication about such concerns in clinical encounters is rare even among over-indebted patients who face an increased risk of disease and are particularly susceptible to cost problems with regards to co-payments required for health services in Germany. These results warrant further research to draw conclusions about underlying reasons for differences in communication about financial problems within the over-indebted population. More specifically, qualitative data may help to gain a better understanding of barriers to communication both for patients and physicians.

Limitations

This study has several limitations. First, data on patient-physician communication about financial problems was self-reported. Thus, data might be subject to recall or social desirability bias and differ from actual behaviour. Second, those who visit a debt advice agency to seek help might be less likely to seek additional advice from their GP. Likewise, individuals who lack sufficient language skills to complete the questionnaire were not included in the present study but are likely to face barriers to communication with their GP. Therefore, the prevalence of patient-physician communication in the over-indebted population could be underestimated. Individuals who disclosed communicating about their financial situation with their general practitioner might have been more likely to participate in the study to communicate about their debt-related health problems. Moreover, only patients who had reported having a regular general practitioner were subsequently asked about their communication with their

GP. Due to the latter aspects, the prevalence of conversations about financial distress by the over-indebted in the primary care setting might be overestimated. However, this selection bias can be assumed to have a minor effect on results of multiple regression analysis.

Third, on the basis of the available data, it is not possible to identify reasons why patients or general practitioners chose (not) to discuss financial problems but previous studies have addressed this issue [34, 37, 58]. Prior studies identified various strategies used during consultation to deal with health-related expenses in general practice [28, 62]. It remains to be established to what extent the conversations examined in the present study reflect an effective pathway for over-indebted patients and their general practitioners to enhance health outcomes and course of treatment, or to address the overall causes and consequences of financial problems.

Several methodological limitations and country-specific legal consequences of over-indebtedness limit the generalizability of our findings. Nevertheless, the present study reveals a need to raise awareness of patients' financial problems among relevant stakeholders throughout Germany. These findings may also apply to similar health and legal systems because any over-indebted individual can be considered at increased risk of illness and may experience limited access to health care.

Conclusion

Although several studies have demonstrated that over-indebtedness may reflect a cause and consequence of poor physical and mental health, few over-indebted individuals were found to communicate about their financial problems in general practice. When financial problems remain unvoiced in general practice, patients may underuse medication and suffer from preventable adverse health effects associated with financial strain. It is therefore crucial to increase awareness about pathways to seek advice among patients when facing financial problems. General practice may serve as an important focal point for vulnerable patient groups due to GPs' key role in initiating and managing treatment, preventive healthcare and rehabilitation, and in coordinating various health and social services. Therefore, further training for GPs to identify and communicate about patients' financial problems as well as to transfer knowledge about available strategies and local social services is required. More specifically, routinely assessing financial problems like over-indebtedness in general practice can help to identify patients at risk. Recognition of such non-medical problems may facilitate general practitioners' efforts to provide patients with affordable and effective health care according to their need, and to prevent psychosomatic health complaints and concerns related to cost of illness.

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4. Discussion

The present explorative study was the first to examine the relationship between over-indebtedness and mental illness, and to investigate patterns of medication use and patient-physician communication in the face of financial problems in a sample of over-indebted individuals in Germany.

First, this study provides a first estimate of the prevalence of mental illness among over-indebted individuals in Germany, and documents that those affected are more likely to use antidepressants compared to the general population (aOR 1.83; 95% CI 1.35-2.48). The study contributes to the growing body of literature on the health effects of unmanageable debt, in demonstrating that the association between over-indebtedness and antidepressant use among those affected in Germany is not explained by sociodemographic characteristics, or other measures of health status and socioeconomic position. As there are considerable variations in the definition of over-indebtedness and measures of mental illness in the literature, it is difficult to compare effect sizes across studies. Moreover, differences in social norms (Gathergood, 2012) and policy measures as well as varying administrative and legal approaches to over-indebtedness across countries (European Commission, 2013) might influence the consequences for the affected individuals. Yet, the findings of the present study are consistent with previous studies from other high-income countries that support an independent association of over-indebtedness and depression (Alley et al., 2011; Bridges and Disney, 2010; Hojman et al., 2016) as well as other common mental disorders such as anxiety which are main indications for antidepressant prescriptions (Gathergood, 2012; Gunasinghe et al., 2018; Meltzer et al., 2013).

Given that the numbers of over-indebted individuals continue to rise (Angel and Heitzmann, 2015; European Commission, 2008), the findings of the present study highlight the relevance of taking account of over-indebtedness as a specific social determinant of mental illness. Depressive disorders reflect a leading cause of the global burden of disease (James et al., 2018; Kessler and Bromet, 2013) and have been associated with substantial consequences for individuals and society as a whole that include decreased quality of life, disability, premature death as well as health care expenditure (Ferrari et al., 2013; Gustavsson et al., 2011; Luppá et al., 2007). In this

context, national social policy and consumer credit regulation may contribute to alleviate adverse health effects for those affected by over-indebtedness. More specifically, policy measures may aim to facilitate social and financial inclusion and safeguard a minimum standard of living throughout debt recovery proceedings to reduce financial distress among over-indebted individuals and their families (André, 2016; European Commission, 2008). In line with prior research, the present findings underline that such measures need to account for the ratio between personal disposable income and financial commitments as well as payment difficulties rather than income and assets alone.

Due to the cross-sectional nature of the present study, it is not possible to draw conclusions about a causal relationship between over-indebtedness and mental illness. Estimates presented here consider medical indications for antidepressant medication that is mostly available only on prescription, but are unable to capture other forms of treatment and underlying mental disorders or to quantify unmet need. Therefore, the findings may underestimate the association between over-indebtedness and mental illness, as measured by antidepressant use. Accordingly, further research is required to gain a greater understanding of mechanisms that explain the relationship between over-indebtedness and mental illness, and utilization of health care, and to develop preventive interventions that specifically target those at risk of running into unmanageable debt or developing a mental illness.

Second, this study is the first to quantify patterns of medication nonadherence due to financial problems among over-indebted patients enrolled in statutory health insurance in Germany in the context of current cost-sharing policies. Previous studies from other high-income countries consistently indicate that those with a low income and poor health, and individuals without drug coverage, have an increased risk of CRN (Briesacher et al., 2007; Lexchin and Grootendorst, 2004; Morgan and Lee, 2017; Piette et al., 2004), which in turn, can lead to serious adverse health effects and increased use of medical services (Heisler, Langa et al., 2004; Hsu et al., 2006; Tamblyn et al., 2001). To date, however, little is known about how medication cost pressures affect over-indebted patients, and specifically in Germany where patients enrolled in statutory health insurance can apply for reimbursement or waiver of co-payments for medical services including medication if these exceed a 2 % ceiling (1 % for patients with a chronic condition) of gross household

income per annum (§ 62 German Social Code Book V). Despite these provisions, the findings document that CRN is common among the over-indebted. A third of the over-indebted reported not filling prescriptions and/or skipping or decreasing doses of a prescribed medication due to financial problems in the last year. The findings also reveal that patients with a chronic condition were more likely to experience cost-related medication nonadherence than those without a chronic condition. Those who had discussed financial problems with their general practitioner were also found more likely to report CRN. These findings add to the limited body of research on the association between over-indebtedness and cost-related medication underuse that has pointed to over-indebtedness as an independent predictor of CRN after accounting for sociodemographic characteristics, standard SES measures, health status and health insurance (Alley et al., 2011; Herman et al., 2011; Kalousova and Burgard, 2014). While the present study indicates that over-indebted patients in Germany may be at risk of unmet medical need in terms of medication due to cost concerns, the available literature suggests that this may also apply to other medical services (Kalousova and Burgard, 2013; Münster et al., 2010). According to the present study, co-payments may reflect a barrier to access to health care for vulnerable population groups such as over-indebted patients, specifically those with an increased disease burden. Patient-physician communication about financial problems was not a protective factor of CRN. Further research and policy change are required to address the impact of cost-sharing policies on health outcomes, by examining patients' responses to cost of medical services, and implementing insurance schemes that take account of patients' financial conditions, including debt. In this context, communication about financial problems in clinical encounters may help physicians to consider patients' cost concerns about diagnostic options or treatment that might influence their decisions about treatment and adherence, and affect their recovery (Alexander et al., 2003).

Third, this study is the first to explore how frequently over-indebted patients and physicians discuss financial problems, and to examine the social determinants of such communication in general practice in Germany. Less than one in four over-indebted individuals ever discussed financial problems in general practice. These findings are in line with existing research that has suggested a considerable gap in communication about financial problems, mostly in diverse US patient groups (Alexander et al., 2003; Heisler, Wagner and Piette, 2004; O'Toole et al., 2004; Rosendal et al., 2013; Schmittdiel et al.,

2010; Wilson et al., 2007; Zimmermann et al., 2018). More specifically, this study indicates that patients' sociodemographic characteristics, including educational status and ethnic origin contribute to variations in disclosure of financial problems in general practice. Moreover, those patients who reported a chronic condition, high subjective financial distress or cutting on necessities to pay for medications were found more likely to have conversations about financial problems with their GP. A possible limitation of the self-reported data on patient-physician communication about financial problems is that it may underestimate the frequency of such discussions in general practice due to factors including recall inaccuracy and social desirability bias. In contrast, potential selection bias might result in overestimating the frequency of such discussions in the over-indebted population because only those patients that have sufficient language skills and are willing to participate in the survey, and reported having a regular general practitioner are included in the analysis. Yet, these methodological issues are considered to have a minor impact on the results of multiple regression analysis.

Despite these limitations, this explorative study was able to provide a first estimate of patient-physician communication in a population of over-indebted individuals in Germany, and has important implications for clinical practice. Both patients and physicians may be encouraged to frequently initiate conversations about financial problems in clinical encounters. Given that general practice plays a key role in initiating and managing treatment, preventive healthcare and rehabilitation, and in coordinating health and social services, the results suggest a need to raise awareness on over-indebtedness and its health implications among physicians. Guidance on available local social services such as debt advice and strategies to reduce medical expenses (e.g. reimbursement of co-payments, generic medicines), as well as further training to recognize and communicate about patients' financial problems may help to address the adverse effects of financial distress on mental and physical health and medical cost problems. Moreover, these measures may facilitate timely, accessible and effective intervention that integrates both pharmacological and non-pharmacological approaches.

In conclusion, the findings of this study emphasize the need to consider over-indebtedness as a specific social determinant of health in research, policy and clinical practice. It is important to acknowledge that it is difficult to generalise the findings to other

countries and health care systems due to differences in national approaches to over-indebtedness, health care provision and levels of cost sharing. However, in line with prior research that has described over-indebtedness as a potential cause and consequence of poor mental and physical health, this explorative study is the first to show that those individuals who are over-indebted in Germany are at increased risk of mental illness. Although about 90 percent of the German general population is enrolled in statutory health insurance that offers patients to apply for reimbursement or waiver of co-payments, the present study shows that medical cost problems are common among over-indebted patients. Thus, difficulties to access medication and other medical care might, in turn, contribute to maintaining or deteriorating the poor health status of those affected by over-indebtedness. Public health interventions are needed to tackle the considerable health implications of over-indebtedness. More specifically, interventions should aim to prevent over-indebtedness, its causes and impact on well-being, and safeguard access to care according to need, for instance, by offering advice on available cost-saving measures and financial support that specifically targets over-indebted patients, and informing professionals working with over-indebted individuals and their families about the relationship between over-indebtedness and health.

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