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Zdravotní gramotnost uživatelů návykových látek

Health literacy among drug users

Dizertační práce

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Contents

Abstrakt

Východiska: Jedinci s poruchami způsobenými užíváním návykových látek jsou náchylní k nízké zdravotní gramotnosti v důsledku rizikových faktorů souvisejících s jejich osobními a socioekonomickými charakteristikami. Současné znalosti jsou omezené, pokud jde o pochopení, zda nízká zdravotní gramotnost přispívá k nepříznivým zdravotním výsledkům a zda ovlivňuje chování související s užíváním návykových látek v této populaci.

Design: Průzkumná průřezová studie s využitím dotazníkového šetření.

Cíle: Zkoumat mnohorozměrnou zdravotní gramotnost a její koreláty u pacientů léčených v rezidenčních programech léčby závislostí a zkoumat zdravotní gramotnost jako prediktor subjektivních zdravotních ukazatelů a kvality života.

Nastavení: Rezidenční programy léčby závislostí (tj. detoxikační jednotky, ústavní péče, terapeutické komunity) v České republice.

Participanti: Byly analyzovány údaje 613 pacientů léčených v rezidenčních programech léčby závislostí pro poruchy duševní a poruchy chování vyvolané účinkem psychoaktivních látek (F10-F19, ICD-10).

Metody měření: Zdravotní gramotnost byla měřena pomocí české verze European Health Literacy Survey Questionnaire (HLS-EU-Q47). Byly shromážděny údaje o socioekonomických charakteristikách účastníků, subjektivních zdravotních ukazatelích a kvalitě života, chování souvisejícím s užíváním návykových látek a zkušenostech s léčbou. Jednoduchá lineární regrese byla použita k odhadu zdravotní gramotnosti a jejích korelátů. Hierarchická logistická regrese byla použita k identifikaci přímého vlivu zdravotní gramotnosti na subjektivní zdravotní ukazatele a kvalitu života po úpravě o relevantní proměnné.

Výsledky: Průměrné skóre bylo 34.7 ± 6.7 z 50 v HLS-EU-Q47. Prevalence omezené/nízké zdravotní gramotnosti byla 40,5%. Zdravotní gramotnost byla spojena s formálním zdravotním vzděláváním, čistým příjmem domácnosti, podmínkami bydlení, zaměstnaneckým statusem a různými vzorcemi užívání alkoholu. Zdravotní gramotnost byla v adjustované analýze spojena se subjektivním celkovým zdravotním stavem, duševním zdravím a kvalitou života. Nebyl zjištěn žádný vztah mezi zdravotní gramotností a dalšími proměnnými týkajícími se užívání návykových látek a zkušeností s léčbou.

Závěry: Mnoho pacientů léčených v rezidenčních programech léčby závislostí může mít potíže s orientací ve zdravotnickém systému a s řízením sebepéče k udržení si a zlepšení zdraví. Zvýšení zdravotní gramotnosti by mělo postupně zlepšit jejich celkový zdravotní stav, stav duševního zdraví a kvalitu života. Zdá se, že chování související s užíváním návykových látek nehraje významnou roli ve zdravotní gramotnosti této populace.

Klíčová slova: Zdravotní gramotnost – HLS-EU-Q47 – Poruchy duševní a poruchy chování způsobené užíváním psychoaktivních látek – Závislost na alkoholu – Závislost na návykových látkách – Rezidenční adiktologické služby

Abstract

Background: Individuals with substance use disorders are likely to have low health literacy due to risk factors related to their personal and socioeconomic characteristics. Current knowledge is limited in understanding whether low health literacy contributes to adverse health outcomes and whether it influences the substance use behavior of this population.

Design: An exploratory cross-sectional study using a questionnaire survey.

Aims: To explore multidimensional health literacy and its correlates in patients treated in residential addiction treatment programs and investigate health literacy as a predictor of self-reported health indicators and quality of life.

Setting: Multiple residential addiction treatment programs (i.e., detoxification units, inpatient care, therapeutic communities) in the Czech Republic.

Participants: Data of 613 patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use (F10-F19, ICD-10) were analyzed.

Measurements: Health literacy was measured using the Czech version of the European Health Literacy Survey Questionnaire (HLS-EU-Q47). Data on participants' socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences were collected. Simple linear regression was used to estimate health literacy and its correlates. Hierarchical logistic regression was used to investigate whether health literacy has a direct effect on self-reported health indicators and quality of life when adjusted for relevant covariates.

Results: The mean score was 34.7 ± 6.7 out of 50 in HLS-EU-Q47. The prevalence of limited/low health literacy was 40.5%. Health literacy was associated with formal health education, household net income, housing conditions, employment status, and various patterns of alcohol use. Health literacy was associated with self-reported general health status, mental health status, and quality of life in the adjusted analysis. No relationship was found between health literacy and other variables related to substance use and treatment experiences.

Conclusions: Many patients treated in residential addiction treatment programs may have difficulties navigating the healthcare system and managing self-care to maintain and improve their health. Increasing health literacy should gradually improve their general health status, mental health status, and quality of life. Substance use behavior does not seem to play an important role in health literacy in this population.

Keywords: Health Literacy – HLS-EU-Q47 – Mental and Behavioral Disorders due to Psychoactive Substance Use – Alcohol Use Disorders – Substance Use Disorders – Residential Addiction Treatment Programs

Introduction

Health literacy (HL), a multidimensional concept addressing the use of health information, has recently gained increased attention in health research, policy, and practice (Kickbusch, 2001; Nutbeam, 2000; Sørensen et al., 2012).

The growing interest in health literacy has been accelerated by the ongoing global crisis of non-communicable diseases attributable to preventable risk factors that have impelled researchers and policymakers to focus their attention on prevention and health promotion strategies to improve population health (Kickbusch et al., 2013; Murray et al., 2020). Identified as an important modifiable social determinant of population health, health literacy has been recognized as one of the key factors in health promotion, empowering people to gain control over their health (Kickbusch et al., 2013; Nutbeam, 2000; Okan et al., 2019).

Health literacy has been directly and indirectly associated with health outcomes. In particular, individuals with low health literacy have been found to be at risk of adverse health consequences such as poor health status, higher mortality rates, increased number of hospitalization and emergency care use, lower medication adherence, worse ability to understand written health information, and lower use of preventive care (Berkman et al., 2011). Indirectly, health literacy influences health through its strong association with socioeconomic determinants, i.e., education and income (Paasche-Orlow et al., 2005; Stormacq et al., 2019). Therefore, promoting health literacy has the potential to gradually improve health indicators at individual and population level (Berkman et al., 2011; Nutbeam, 2000), reduce health inequalities (Batterham et al., 2016), and prevent non-communicable and chronic diseases and conditions (Kickbusch et al., 2013).

In addiction sciences, health literacy is a highly relevant topic for at least two reasons. First, the harmful use of alcohol, tobacco, and illicit drugs has been recognized as one of the major risk factors contributing to the global burden of disease (Degenhardt et al., 2018; Rehm et al., 2006; Room et al., 2005). People with substance use disorders (SUDs) are often burdened with substance use-related diseases many of which may persist long after the reduction in substance use (Degenhardt et al., 2018; Rehm et al., 2006). Health literacy has been identified as an effective strategy to contribute to the prevention and management of infectious and non-communicable diseases by empowering people to take control over their determinants of health (Kickbusch et al., 2013; Nutbeam, 2017; Vamos & Rootman, 2013). Therefore, promoting health literacy should contribute to better health outcomes in people with SUDs (Berkman et al., 2011).

Second, the evidence suggests that health literacy is linked to risky health behaviors, including substance use (e.g., Aaby et al., 2017; Farrell et al., 2019; Husson et al., 2015; von Wagner et al., 2007). This indicates a potentially important role of health literacy in the prevention and treatment of SUDs.

In the Czech Republic, the prevalence of both low health literacy and substance use is high. A representative survey of health literacy showed that about 60% of Czechs have low health literacy (Kučera et al., 2016). In terms of substance use, it is estimated that around 2.4 million adults (25.3%) are current smokers, 1.5 million (17.2%) are risky alcohol users, and 45.1 thousand are high-risk illicit drug users (Csémy et al., 2020; Mravčík et al., 2020).

Individuals living with serious mental illness or SUDs, as well as other disadvantaged, marginalized, and hard-to-reach populations, are prone to low health literacy due to multiple risk factors (Bennett et al., 2009; Degan et al., 2020; Stormacq et al., 2020). Substance use and other mental illness has been linked to lower socioeconomic status (Hudson, 2005), poor health outcomes (Degenhardt et al., 2018; Rehm et al., 2006), poor mental health (Torrens et al., 2015), lower life expectancy (Gavurová et al., 2020), and deterioration in cognitive functioning (Green, 2006; Rock et al., 2014) that all showed association with low health literacy (Berkman et al., 2011; Chesser et al., 2016; Federman et al., 2009; Mantell et al., 2020; Paasche-Orlow et al., 2005; Stormacq et al., 2019). Moreover, as highly stigmatized, they are at risk of poor access to healthcare (Palepu et al., 2013) and getting suboptimal healthcare (van Boekel et al., 2013). Specifically, in the Czech Republic, the treatment gap, or the disparity between the number of people who need care and those who get it, is as high as 77% for SUD and 93% for alcohol use disorder (AUD) (Kagstrom et al., 2019).

Consequently, there is a potential risk that low health literacy may contribute to poor health outcomes in this population. Furthermore, previous research showed that low health literacy could be a barrier to the effective management of mental illness and the utilization of mental health services. Individuals with mental illness and low health literacy may have difficulty accessing healthcare services and adhering to the therapeutic regime (Clausen et al., 2016; Galletly et al., 2012). Issues in accessing, understanding, appraising, and applying health information may place them at risk of unmet healthcare needs or exclude them from healthcare altogether (Lincoln et al., 2015; Lincoln et al., 2008).

Overall, little research has been done in the field of multidimensional health literacy in people treated for SUDs (Degan et al., 2020). One major gap in current knowledge is limited evidence of whether low health literacy contributes to poor health outcomes and plays an important role in the substance use behavior of this population.

In this thesis, we explored health literacy and its correlates in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use (F10-F19, ICD-10). We also investigated health literacy as a predictor of self-reported health indicators and quality of life.

1. Literature Review

1.1 Substance Use and Related Disorders

Substance use is one of the major public health challenges contributing to the global burden of disease (United Nations Office on Drugs and Crime [UNODC], 2020; World Health Organization [WHO], 2019).

In International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), a medical classification of disease by the WHO, substance use-related disorders are categorized under the block of *Mental and behavioral disorders due to psychoactive substance use* (F10-F19). Under this main category, SUDs are further classified by the type of substance and by the clinical condition, e.g., acute intoxication, harmful use, dependence syndrome, etc. (WHO, 1992).

In 2016, approximately 2.3 billion people worldwide (43%) were estimated to be current alcohol users and around 318.6 million people (5.4%) suffered from AUD (WHO, 2019). In terms of illicit substance use, in 2018, around 269 million people worldwide (5.4%) were estimated to have at least one experience with illicit drug use and 35.6 million people (0.7%) suffered from SUD due to illicit drug use. Cannabis, followed by opioids, amphetamines, MDMA, and cocaine, were among the most frequently used illicit drugs (UNODC, 2020).

In the Czech Republic, about 10.3% of the population abstain from alcohol, according to the last data from the national survey 2019. On the other hand, frequent drinking and heavy episodic drinking (HED) are currently on the rise in the Czech Republic; 8.5% of Czechs reported use of alcohol daily or every other day and 15% reported past-year binge drinking. In terms of risk categorization, about 6.9–8.7% of Czechs is estimated to be involved in hazardous alcohol consumption (use of 20–40 g/day of ethanol for women and 40–60 g/day for men) and another 6.0–9.3% in harmful alcohol consumption (use of more than 40 g/day of ethanol for women and 60 g/day for men). In summary, around 1.5 million (17.2%) are risky alcohol users. It is estimated that around 10.6% of Czech suffer from AUD (Csémy et al., 2020; Mravčík et al., 2020).

In the case of illicit drugs, it was estimated that approximately 12.1% of Czechs have had experience with illicit drug use in 2019. Cannabis, hallucinogens, MDMA, heroin and other opioids, and methamphetamine and other amphetamines are the most widely used illicit drugs. Prescription drug misuse is also highly prevalent in the Czech Republic, especially in women and older than 45 years. A total of 45.1 thousand are high-risk illicit drug users (Mravčík et al., 2020).

Substance use, especially harmful alcohol use, is among the leading risk factors for preventable morbidity and mortality. Harmful alcohol use has been causally linked to more than 200 physical and mental diseases and unintentional and intentional injuries. Globally,

it was estimated that approximately 3 million (5.3%) of all deaths were attributable to alcohol in 2016. Of those, 28.7% were due to alcohol-related injuries, 21.3% due to gastrointestinal disease, 19.0% due to cardiovascular disease, 12% due to infectious disease, and 12.6% due to cancers (WHO, 2019). As for illicit drugs, around 585,000 deaths were estimated to be attributed to illicit drug use in 2017, of which most are due to liver diseases related to hepatitis C (UNODC, 2020). In addition to physical disorders, comorbid mental disorders are also common in people with substance use disorders; it is estimated that the prevalence of psychiatric comorbidity is as high as 50% (Torrens et al., 2015).

Initiation of substance use and development of SUDs have been linked to low income and poverty, low educational attainment and poor school performance, unstable housing and homelessness, neighborhood poverty, unemployment, and other risk factors of social inequality. Conversely, risky substance use and SUDs may have negative consequences for the socioeconomic characteristics of an individual (UNODC, 2020; WHO, 2019).

SUDs and health inequality go hand in hand; poor socioeconomic conditions, stigmatization, and marginalization of people with substance use disorders have been linked to poor access to health services (Palepu et al., 2013), poor adherence to a treatment regime (UNODC, 2020), and risk of getting suboptimal healthcare (van Boekel et al., 2013). Specifically, in the Czech Republic, the treatment gap, or the disparity between the number of people who need care and those who get it, is as high as 77% for SUD and 93% for AUD (Kagstrom et al., 2019).

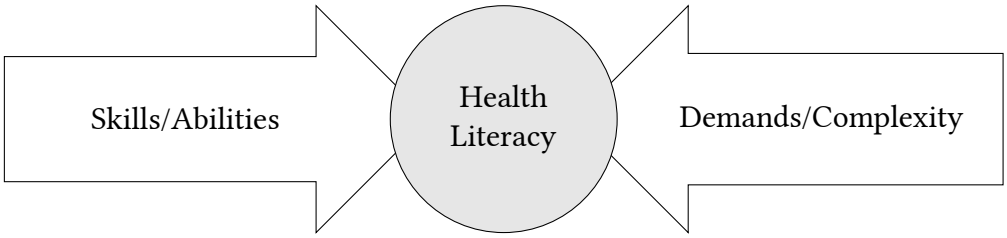
1.2 Introduction to Health Literacy

Health Literacy, a multidimensional concept addressing the use of health information, has become a recognized modern concept responding to the increasingly demanding and complex healthcare of the 21st century (Kickbusch, 2001; Nutbeam, 2000; Parker, 2009).

In modern society, people are expected to take responsibility for their health and participate actively in the healthcare process, e.g., to seek health information for themselves, understand medical reports and informed consents, follow treatment plans, measure and monitor their health functions, participate in decisions about their health, assess the risk of health-related factors, find healthcare providers, etc. (Nielsen-Bohlman et al., 2004). In order to manage self-care and navigate the healthcare system effectively, people need to be equipped with certain health-related skills and abilities. These skills and abilities have recently been conceptualized as health literacy (Kickbusch, 2001; Nutbeam, 2000).

Health literacy refers to health-related knowledge, motivation, and a wide range of individual, social, and cognitive skills, including information-seeking, problem-solving, decision-making, communication, and critical thinking. Along with the basic literacy skills of reading, writing, and numeracy, these skills are considered essential to maintain and improve health (Nutbeam, 2000; Paasche-Orlow & Wolf, 2007; Sørensen et al., 2012). Health

Figure 1.1: Health literacy framework



Note: Adapted from "Measuring Health Literacy: What? So what? Now what" by R. M. Parker, in Institute of Medicine (Ed), *Measures of Health Literacy: Workshop Summary* (pp. 92), 2009, American Journal of Health Behavior. Copyright 2009 by National Academies Press.

literacy is often described as a balance between the demands and complexity of the health-care system on one side and the skills and abilities of an individual on the other (Figure 1.1) (Parker, 2009).

According to Nutbeam et al. (2018), although being closely related to general literacy, health literacy is both "content- and context-specific". Individuals with adequate general literacy may not be able to apply their literacy skills in specific health-related situations.

Health literacy is related to the concept of patient empowerment, healthcare decision-making, and health equity. The goal of health literacy is to strengthen the position of people in making appropriate health decisions to take control over their health and social determinants of health (Batterham et al., 2016; Kickbusch, 2001; Nutbeam, 2000; Schulz & Nakamoto, 2013). On that account, health literacy is regarded as a dynamic concept fundamental for functioning in the modern society of the 21st century (Kickbusch, 2001; Nutbeam, 2000; Sørensen et al., 2012). However, health literacy is not only the characteristics of an individual but is also relevant in terms of family, community, organization, and population (Batterham et al., 2016).

Apart from general health literacy, many other specific research fields of health literacy have been defined, including mental health literacy or alcohol-related and drug-related health literacy. The concept of mental health literacy focuses on the knowledge and beliefs of mental disorders to address their prevention, recognition, and management in society (Jorm, 2000). Alcohol and drug-related health literacy is an emerging concept addressing knowledge and skills to understand alcohol- and drug-related topics and make informed decisions (Okan et al., 2020).

1.3 Definitions and Concepts of Health Literacy

Health literacy is an evolving concept with almost fifty years of history (Nutbeam, 2000; Rudd, 2015; Sørensen et al., 2012).

In 1974, the term *health literacy* first emerged in conference proceedings discussing health education as a social policy issue affecting the healthcare system (Simonds, 1974).

Over the years, the concept of health literacy evolved in its scope and depth in response to changing demands of society and healthcare (Berkman et al., 2010).

In the 1980s and 1990s, the medical orientation of health literacy emerged in the United States as a distinct and independent field of research linking multiple disciplines related to health and literacy. In this early period, the focus has been given primarily to the basic literacy skills of reading, writing, and numeracy in the medical context (Berkman et al., 2010; Peerson & Saunders, 2009; Pleasant & Kuruvilla, 2008). It was not until later that it became clear that more sophisticated and complex skills and abilities are necessary to effectively function in the rapidly evolving society. In 1998, health literacy has been recognized as an important concept of health promotion. In contrast with the medical approach, the emphasis in the public health definitions of health literacy has been given on social and cognitive skills (Berkman et al., 2010; Freedman et al., 2009; Nutbeam, 2000; Parker, 2009; Peerson & Saunders, 2009).

Nowadays, health literacy is still perceived as an evolving concept and many try to achieve a uniform definition of health literacy integrating both medical and public health approaches (Rudd, 2015; Sørensen et al., 2012). In consequence, many definitions, conceptualizations, and measuring tools currently exist side by side, with neither definition generally accepted (Berkman et al., 2010; Peerson & Saunders, 2009; Sørensen et al., 2012). Although confusing in both research and practice, as Peerson and Saunders (2009) and Berkman et al. (2010) noted, coming to a consensus on the definition of health literacy is difficult, as more and more skills and abilities are currently being recognized as essential to health literacy.

1.3.1 Medical literacy

Medical literacy, most frequently referred to as *functional health literacy*, sometimes *clinical health literacy*, refers to the knowledge and basic literacy skills of reading, writing, and numeracy that are necessary for functioning within the health system, i.e., management of diseases and other health conditions (Nutbeam, 2000; Peerson & Saunders, 2009; Pleasant & Kuruvilla, 2008).

In Nutbeam's (2008) conceptualization of medical literacy, low health literacy is seen as mediating *risk factor* in health that needs to be identified and addressed in the clinical setting. Medical literacy is perceived as the ability to read and comprehend patient information leaflets, informed consents, health insurance forms, act upon instructions given by healthcare professionals, comply with the treatment regime, etc. (Andrus & Roth, 2002; Peerson & Saunders, 2009).

Original literacy-oriented understanding is apparent from one of the first definitions formulated by the American Medical Association (AMA) (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, American Medical Association, 1999):

> "Health literacy is a constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the healthcare environment."

One of the other earlier and now widely cited definitions corresponding to the medical literacy approach was proposed by Ratzan and Parker (2000). They broadened the definition and highlighted the importance of obtaining processing, and understanding health information in health literacy:

> "Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."

Medical literacy research accounts for the vast majority of evidence reported under the concept of health literacy (Peerson & Saunders, 2009). One of the most widely used screening tools for measuring medical literacy are the Rapid Estimate of Adult Literacy in Medicine (REALM) (Davis et al., 1993) and the Test of Functional Health Literacy in Adults (TOFHLA) (Parker et al., 1995). These one-dimensional objective tools are primarily designed to assess medical-related reading skills; the REALM measures word recognition and pronunciation, the TOFHLA measures reading comprehension and numeracy (Altin et al., 2014; Frisch et al., 2012; Peerson & Saunders, 2009). However, their further use has recently been criticized for not corresponding to the current multidimensional conceptualization of health literacy (Nguyen et al., 2017; Pleasant & McKinney, 2011).

In the context of more recent approaches, the medical approach to health literacy is considered too narrow by focusing solely on patients in healthcare and not on individuals making health-related decisions in everyday life (Peerson & Saunders, 2009).

1.3.2 Public health literacy

Public health literacy, alternatively *critical health literacy*, *comprehensive health literacy*, or *multidimensional health literacy* refers to the knowledge, motivation, and use of more advanced skills that are essential to make appropriate health decisions to maintain and improve health. Unlike medical literacy, public health literacy is perceived as a multidimensional construct focusing on preventing illness and promoting health in everyday life (Freedman et al., 2009; Nutbeam, 2008; Peerson & Saunders, 2009; Pleasant & Kuruvilla, 2008).

One of the first broader definitions of health literacy was proposed by Nutbeam on behalf of WHO, introducing health literacy as an important concept relevant to health promotion and public health (Nutbeam, 1998; WHO, 1998):

> "Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health."

Nutbeam (2008) described public health literacy as an *asset*, empowering individuals to gain greater control over their social determinants of health. Health literacy in a broader conceptualization is still closely linked with literacy, as it is an essential ground for more specific skills to build upon, but a strong emphasis is given on individual, social, and cognitive skills and abilities, such as decision-making, problem-solving, communication, critical thinking, and motivation, that enable people to take control of their health (Nutbeam, 2000, 2008).

In 2000, Nutbeam introduced a hierarchical model that categorizes health literacy into three levels – functional health literacy, interactive health literacy, and critical health literacy. In this three-level model, the last level – critical health literacy – corresponds to the public health approach to health literacy.

- **Functional health literacy** refers to the basic literacy skills of reading and writing in order to function effectively in everyday health-related situations.
- **Interactive health literacy** refers to more advanced literacy and cognitive skills, which, alongside social skills, can be used to actively participate in everyday health-related situations, extract and derive meaning from health communication, and apply acquired health information to changing conditions.
- **Critical health literacy** refers to more advanced cognitive skills, which, alongside social skills, can be used to analyze health information critically and use this information to gain greater control over everyday health-related situations.

With each level, an individual gains greater autonomy and empowerment in health-related decision-making, self-care, and taking actions on social determinants of health. Critical health literacy represents the highest level of skills and abilities. Moving from one level to another depends on personal, cognitive, and social skills as well as exposure to different forms of health communication and self-efficacy to respond to those communications (Nutbeam, 2000, 2008).

Nutbeam's 2000 conceptualization of health literacy as a practical application of health-related skills and abilities is currently widely accepted by specialists in the health literacy field. However, several researchers have criticized the model, especially the critical health literacy level, for being somewhat simplistic (Chinn, 2011; Sykes et al., 2013).

In 2007, one of the other well-known definitions corresponding to the public health approach to health literacy was proposed by Freedman et al. (2009). This definition highlights the goal to promote health and reduce disparities in individuals, families, communities, and societies:

> "Health literacy is the degree to which individuals and groups can obtain, process, understand, evaluate, and act upon information needed to make public health decisions that benefit the community."

1.3.3 Integrative health literacy

Integrative concept of health literacy, also referred to as *comprehensive health literacy* or *multidimensional health literacy*, integrates both medical and public health approaches to health literacy (Kickbusch et al., 2013; Sørensen et al., 2012). In current literature, the term integrative health literacy primarily refers to a concept and definition developed by Sørensen et al. (2012).

In 2012, Sørensen et al. introduced a conceptual model along with the definition of health literacy based on a content analysis of 12 conceptual frameworks and 17 definitions of medical and public health literacy identified in a systematic review:

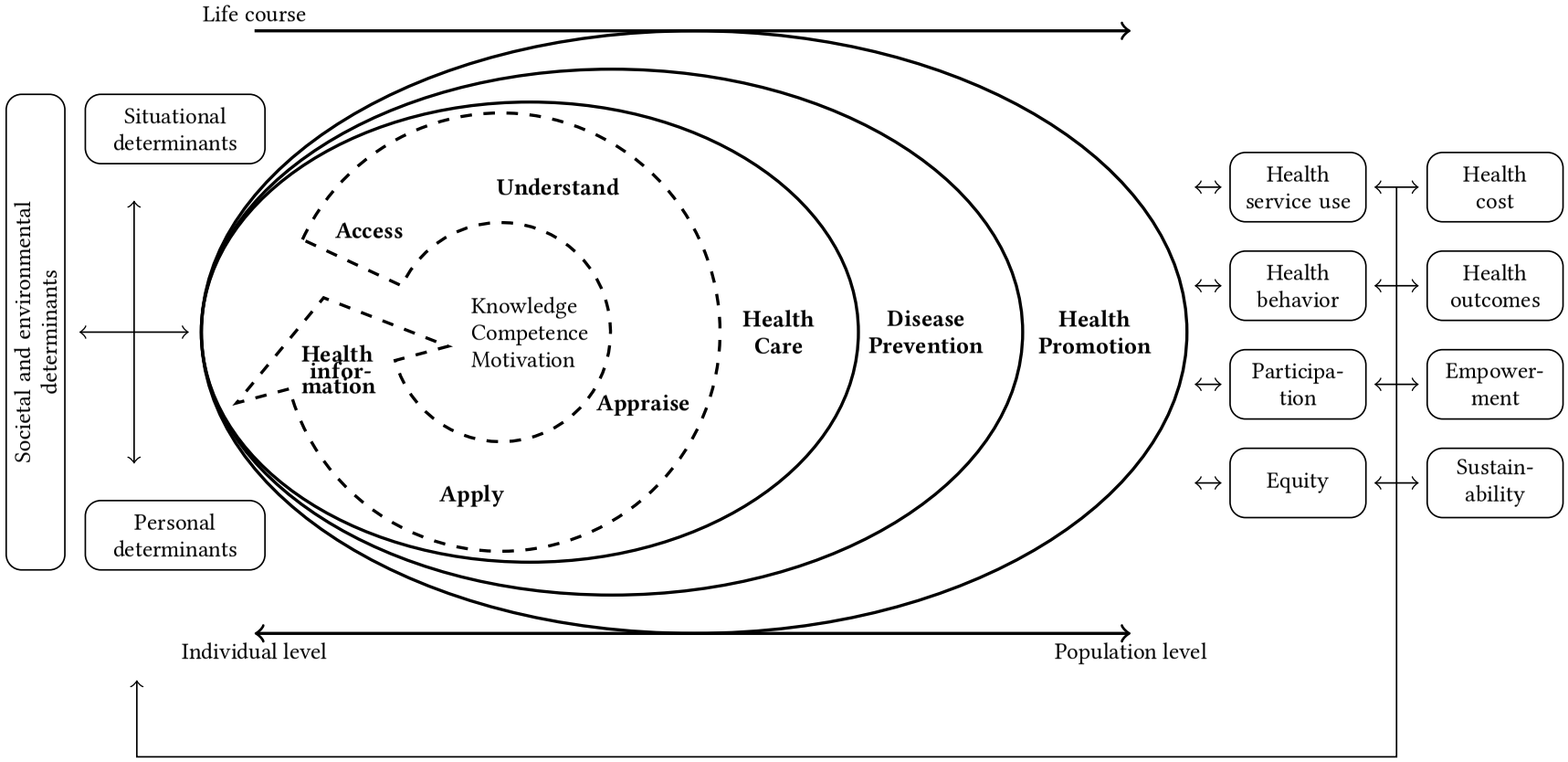
> "Health literacy is linked to literacy and entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course."

The conceptual model (Figure 1.2) describes the four types of competencies essential for dealing with health information – access, understand, appraise, and apply, within the three domains of health literacy – healthcare, disease prevention, and health promotion.

According to Sørensen et al. (2012), "*Access* refers to the ability to seek, find and obtain health information; *Understand* refers to the ability to comprehend the health information that is accessed; *Appraise* describes the ability to interpret, filter, judge and evaluate the health information that has been accessed; and *Apply* refers to the ability to communicate and use the information to make a decision to maintain and improve health." Together, the combinations of competencies and domains form a matrix with twelve dimensions of health literacy (Table 1.1).

The conceptual model underpins the development process of a multidimensional measuring tool of health literacy, the European Health Literacy Survey Questionnaire (HLS-EU-Q) (Sørensen et al., 2013).

Figure 1.2: The conceptual model of health literacy



Note: Adapted from *Comparative Report on Health Literacy in Eight EU Member States* (pp. 7) by HLS-EU Consortium, 2012. Copyright 2012 by HLS-EU Consortium.

Table 1.1: Matrix of twelve dimensions of health literacy

Health literacy	**Access/obtain information relevant to health**	**Understand information relevant to health**	**Appraise/judge /evaluate information relevant to health**	**Apply/use information relevant to health**
Healthcare	Ability to access information on medical or clinical issues	Ability to understand medical information and derive meaning	Ability to interpret and evaluate medical information	Ability to make informed decisions on medical issues
Disease prevention	Ability to access information on risk factors	Ability to understand information on risk factors and derive meaning	Ability to interpret and evaluate information on risk factors	Ability to judge the relevance of the information on risk factors
Health promotion	Ability to update oneself on health issues	Ability to understand health related information and derive meaning	ability to interpret and evaluate information on health-related issues	Ability to form a reflected opinion on health issues

Note: Adapted from *Comparative Report on Health Literacy in Eight EU Member States* (p. 8) by HLS-EU Consortium, 2012. Copyright 2012 by HLS-EU Consortium.

1.4 Health Outcomes Related to Health Literacy

Health literacy has been directly and indirectly linked to a wide range of health-related outcomes (Berkman et al., 2011; DeWalt et al., 2004).

In the 1990s, Williams et al. (1995) were one of the first to provide evidence that many hospital patients lack adequate health literacy skills in order to function in a healthcare setting. They found that patients with low health literacy are unable to read and understand basic written medical materials, such as instructions on medicine bottles or doctor appointment slips. Later, a systematic study has provided evidence that low health literacy is consistently associated with higher mortality rates in older adults, poor overall health status, lower medication adherence, and worse ability to understand medical materials and health information (Berkman et al., 2011).

Low health literacy has also been linked to higher rates of non-communicable diseases in older adults, such as hypertension, diabetes mellitus, heart failure, and stroke (Tiller et al., 2015; Wolf et al., 2005). Moreover, Schillinger et al. (2002) found low health literacy to be associated with worse diabetes outcomes. Gazmararian et al. (2003) found that people with low health literacy are more likely to have poor knowledge of their chronic diseases, such as diabetes, asthma, hypertension, and congestive heart failure. Therefore, current evidence suggests that promoting health literacy may be one of the effective ways to improve population health (Berkman et al., 2011).

Furthermore, a number of studies linked low health literacy to poor mental health (Jayasinghe et al., 2016; Tiller et al., 2015; van der Heide et al., 2013; Wolf et al., 2005) higher levels of psychological distress (Husson et al., 2015; Stewart et al., 2015), anxiety (Husson et al., 2015), and depression (Bostock & Steptoe, 2012; Husson et al., 2015) both in clinical and non-clinical populations. Low health literacy has also been associated with lower health-related quality of life (Degan et al., 2018; Husson et al., 2015; Tiller et al., 2015).

In terms of treatment, low health literacy has been linked to lower use of preventive programs, increased hospitalization, and higher use of emergency care (Berkman et al., 2011). Vandenbosch et al. (2016) found low health literacy to be associated with longer hospital stays and higher use of specialized health services, e.g., psychiatric consultations and ambulance transport services. As they pointed out, the link between low literacy and greater use of psychiatric consultations also suggests poorer mental health of those with inadequate health literacy. Other studies have found that people with low health literacy are more likely to have lower treatment adherence (Miller, 2016) and more difficulties finding healthcare providers (Levy & Janke, 2016).

The economic consequences of a higher burden of disease and higher use of health services due to low health literacy may be considerable. Eichler et al. (2009) reported in a systematic review that the additional costs of low health literacy may be as high as 3–5% on the healthcare system level and may range from USD 143 to 7,798 per patient per year.

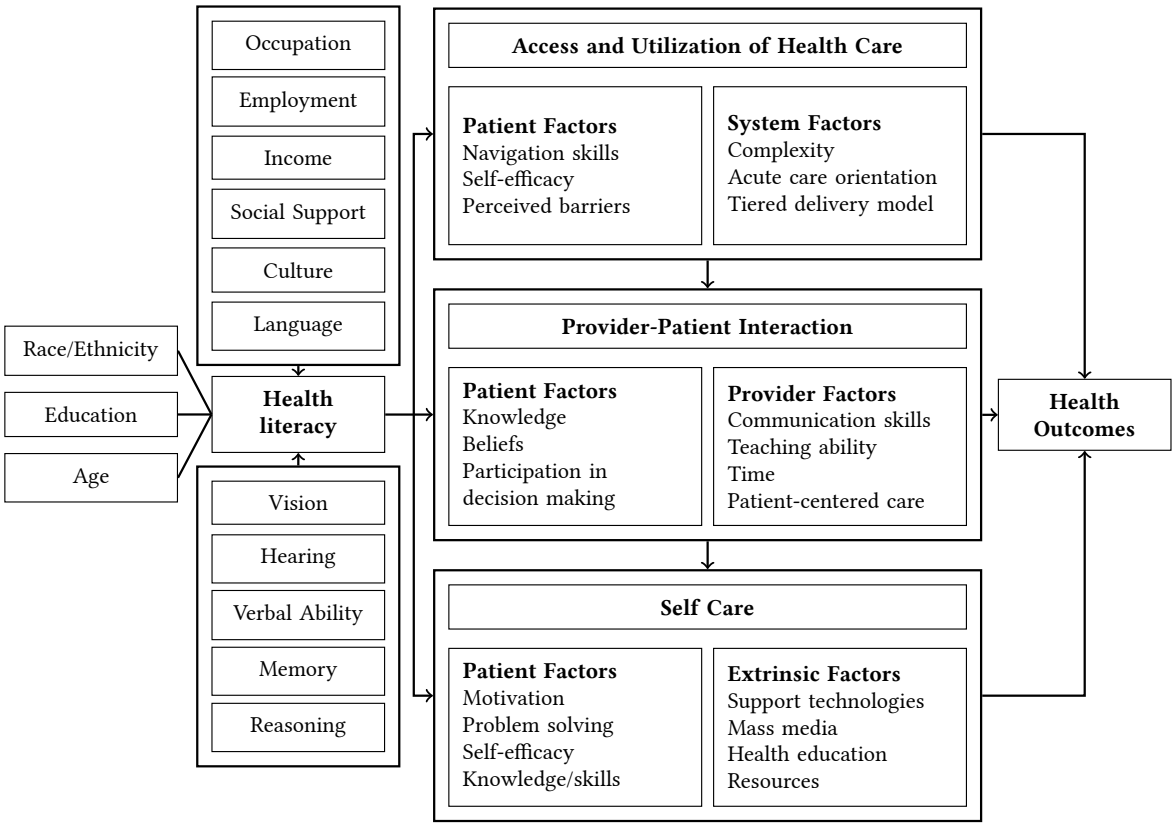
Extensive empirical evidence suggests that the relationship between low health literacy and poor health outcomes is well established. However, the causal pathways linking health literacy to health outcomes are not fully understood yet (Berkman et al., 2011; Paasche-Orlow & Wolf, 2007).

Based on a literature review, Paasche-Orlow and Wolf (2007) proposed a conceptual model that illustrates the causal pathways between low health literacy and health outcomes (Figure 1.3). They identified three major domains influenced by health literacy and in turn affecting health outcomes: access and utilization of health care, provider-patient interaction, and self-care. Within each domain, the conceptual model recognizes individual-level and system-level factors mediating and/or modifying the relationship. Apart from possible mediating pathways, the model also includes socioeconomic and individual factors that are likely to have an indirect effect on the relationship.

Osborn et al. (2011) also examined pathways that link health literacy to health outcomes and found significant paths from health literacy to knowledge, knowledge to self-efficacy, self-efficacy to physical activity, and physical activity to health status. On the other hand, Suka et al. (2015) found in their study that the relationship between health literacy and health outcomes is mediated by access to health information and by health behavior, specifically smoking and exercise.

In today's perspective, Paasche-Orlow and Wolf's 2007 conceptual causal model is limited in being based on a systematic review of previous health literacy research that focuses

Figure 1.3: Causal pathways between health literacy and health outcomes



Note: Adapted from "The Causal Pathways Linking Health Literacy to Health Outcomes", by M. K. Paasche-Orlov and M. S. Wolf, 2007, *American Journal of Health Behavior*, 31(1), p. S21. Copyright 2007 by PNG Publications.

overwhelmingly on only one dimension of health literacy – functional health literacy. Similarly, Osborn et al. (2011) also focused on functional health literacy when examining the causal pathways. Moreover, the growing body of evidence indicates that the list of factors with indirect effects on the relationship of health literacy and health outcomes is far from being exhaustive. The current multidimensional approach to health literacy indicates that the relationship could be even more complex.

An investigation of the causal pathways needs to take into account many indirect effects of factors associated with health literacy. Such factors are rather complex and interconnected, which is why the independent factors mediating this relationship are so difficult to detect (Paasche-Orlow & Wolf, 2007).

1.5 Socioeconomic Predictors of Health Literacy

Health literacy is regarded as an important social determinant of health following the social gradient (Sørensen et al., 2015; Stormacq et al., 2019).

Older age, lower socioeconomic status (low income, financial deprivation, lower educational attainment), unemployment, and minor racial and ethnic identity (e.g., African American, Hispanic in the US) are considered risk factors of low health literacy. Conversely, White and younger individuals, secondary and tertiary educated, with higher social status and income are likely to have higher health literacy (Paasche-Orlow et al., 2005; Rowlands et al., 2015; Sørensen et al., 2015; Stormacq et al., 2019). In particular, educational attainment is considered as the major social determinant of health literacy (Stormacq et al., 2019).

Previous studies measuring functional health literacy did not find health literacy to be gender-specific. Some later European studies following the multidimensional approach associated low health literacy with male gender but the evidence is mostly inconsistent (Sørensen et al., 2015; Tiller et al., 2015; Toçi et al., 2015). Regarding age, it has been documented that age-related decline in cognitive (memory and verbal fluency) and physical functioning (impaired vision and hearing) most probably contributes to lower health literacy in older adults (Chesser et al., 2016; Federman et al., 2009; Kobayashi et al., 2015).

In socioeconomically disadvantaged people, low health literacy is probably associated with insufficient financial and material resources to make healthier choices (Phelan et al., 2010). Immigrants may be at risk of lower health literacy due to encountering cultural differences and language barriers in healthcare and other health-related situation that do not allow them to make sufficient use of their potential (Kreps & Sparks, 2008).

Health literacy is considered a mediator in the relationship between socioeconomic status and health outcomes. According to the recent systematic review of Stormacq et al. (2020), there is strong evidence that health literacy at least partly mediates the relationship between socioeconomic factors and health behavior, health outcomes, access to and use of health services, and quality of life.

In addition, low health literacy as a result of disadvantaged socioeconomic background is also regarded as a modifiable risk factor contributing to socioeconomic disparities in health. Therefore, increasing health literacy in disadvantaged individuals has the potential to reduce health disparities and achieve higher equity in health (Howard et al., 2006; Stormacq et al., 2019).

1.6 Health Literacy and Health Behavior

Health literacy has been reportedly linked to a variety of adverse health behaviors and lifestyle factors (Aaby et al., 2017; Buja et al., 2020; Suka et al., 2015).

Insufficient fruit and vegetable consumption, overall poor diet, low physical activity, sedentary lifestyle, and obesity have all been associated with low health literacy (Aaby et al., 2017; Adams et al., 2013; Geboers et al., 2016; Jayasinghe et al., 2016; Suka et al., 2015; von Wagner et al., 2007; Wolf et al., 2007). Some studies have also shown that health literacy is associated with substance use behavior, including tobacco smoking, alcohol drinking, and substance use. However, as will be discussed below, the evidence regarding the association between health literacy and substance use behavior has been contradictory so far.

In terms of smoking, several previous studies have established the relationship between low health literacy and smoking (Aaby et al., 2017; Adams et al., 2013; Duong et al., 2015; Husson et al., 2015; Jayasinghe et al., 2016; Stewart et al., 2015; Suka et al., 2015; von Wagner et al., 2007), while others found no association (Friis, Vind, et al., 2016; Geboers et al., 2016; Levin-Zamir et al., 2016; Reisi et al., 2014; Svendsen et al., 2020). In addition, one study even found a positive relationship; that is, people with high health literacy are more likely to smoke (Wolf et al., 2007).

Interesting findings were brought by the studies focusing on health literacy and smoking cessation. Stewart et al. (2013) examined the relationship between health literacy and predictors of smoking cessation. Low health literacy was associated with higher nicotine dependence, more positive and less negative expectancies of smoking outcomes, less knowledge of smoking-related health risks, and lower risk perception even after controlling for relevant socioeconomic factors. In the following study, they examined the effect of low health literacy on smoking cessation. Low health literacy has been identified as an independent risk factor predicting relapse by the end of treatment among low-income racially/ethnically diverse smokers. This suggests that individuals with low health literacy might have greater difficulty quitting smoking and maintain abstinence from tobacco, which are important findings especially for smoking cessation counselors and other healthcare professionals (Stewart et al., 2014).

Current findings are even more contradictory in the relationship between health literacy and alcohol consumption. Some previous studies found an association between low health literacy and alcohol drinking (Adams et al., 2013; Geboers et al., 2016; Suka et al.,

2015; Wolf et al., 2007), others found no association (Friis, Vind, et al., 2016; Husson et al., 2015; Jayasinghe et al., 2016; Levin-Zamir et al., 2016; Svendsen et al., 2020), and a larger number of studies also reported a positive association between low health literacy and alcohol use. This suggests that people with high literacy may be more prone to developing AUDs for exceeding the health recommendations of low-risk drinking (Geboers et al., 2016).

Only two studies examining the relationship between health literacy and substance use have been found. In both cases, the relationship was studied in people living with mental illness. While one of the studies found low health literacy to be associated with higher illicit drug use (Farrell et al., 2019), other found the opposite (Lincoln et al., 2008).

Interestingly, Adams et al. (2013) studied the influence of health literacy on the perception of health risks related to health behavior. He found that individuals with low health literacy were more likely to either not perceive alcohol use and smoking as important cancer risk factors or not know if they are important.

It has been suggested that health behavior, including lifestyle factors and substance use, could be one of the potential pathways explaining the relationship between health literacy and health outcomes, (Suka et al., 2015). Another study examining the association between health literacy and health behavior has shown that the relationship is likely to be further intermediated by health-related knowledge and self-efficacy (Osborn et al., 2011).

Friis, Lasgaard, et al. (2016) examined mediating effect of health literacy in the relationship between educational attainment and various health behaviors. They found that health literacy, especially understanding health information, is a strong mediating factor in the relationship between educational attainment and low physical activity, poor diet, and obesity. However, the mediating effect of health literacy on smoking was much weaker.

In summary, the evidence suggests that health literacy is both directly and indirectly linked to health behavior. Current findings are most conclusive in the case of physical activity and diet. On the contrary, previous studies on the relationship between health literacy and substance use are inconclusive and more research needs to be done to come to a definite conclusion (Aaby et al., 2017). One way or another, health-promoting interventions may be less effective in individuals with low health literacy (Suka et al., 2015).

It should be noted that the vast majority of the above studies examined the relationship primarily in terms of functional health literacy, which is currently considered only one of the dimensions of health literacy. Studies following the multidimensional approach to health literacy may bring different results.

1.7 Population-Based Studies of Health Literacy in Europe and the Czech Republic

Health literacy research does not yet have a long tradition in European countries, but the amount of knowledge about health literacy of the populations of individual member countries has been growing steadily in recent years (Okan et al., 2019).

Until recently, most evidence has been provided by American researchers focusing mainly on functional health literacy and management of chronic diseases (Kickbusch et al., 2013). In 1991–2005, a total of 49,523 articles have been published by the researchers affiliated to the United States, while the European researchers published only about one-third of the American share (Kondilis et al., 2008). Although the United States continues to be a world-leading country in health literacy research, health literacy research gained international publicity over the past fifteen years (Bazm et al., 2019).

In 2011, the European Health Literacy Project Consortium carried out a large-scale population-based survey of health literacy, launching a history of health literacy surveys in the European Union (Okan et al., 2019). The European Health Literacy Survey (HLS-EU) was undertaken in eight countries: Austria, Bulgaria, Germany, Greece, Ireland, the Netherlands, Poland, and Spain ($n = 8000$). Data were collected using the 47-item version of HLS-EU-Q. Overall, 47.6% of all participants showed limited (low) health literacy, with 12.4% having inadequate and 35.2% problematic health literacy. However, substantial differences were found between participating countries. While the Netherlands was the country with the lowest rates of participants with limited health literacy (28.7%), Bulgaria had the highest rates of limited health literacy (62.1%), which is the difference of more than 33%. The prevalence of limited health literacy in specific sub-domains of the questionnaire was 40.9% for healthcare, 42.2% for disease prevention, and 50.9% for health promotion. In univariate analysis (measured by Spearman's Rho), limited health literacy was found to be associated with higher financial deprivation ($r = .30$), lower self-assessed social status ($r = .29$), lower level of education ($r = .24$), older age ($r = -.12$), unemployment ($r = -.12$), and male gender ($r = .05$), suggesting the social gradient in health literacy. Moreover, limited health literacy was associated with a number of health-related indicators, specifically poor self-perceived health ($r = -.27$), long-term illnesses ($r = .16$), limitations by health problems ($r = .16$), higher frequency of doctor visits ($r = -.11$), higher use of emergency services ($r = -.06$) and hospital services ($r = -.06$), and lower use of other health services ($r = .06$). In terms of health behavior, low health literacy was associated with lower physical activity ($r = -.19$), higher body mass index (BMI) ($r = -.07$), and higher alcohol consumption ($r = .07$), but no association was found for smoking (Pelikan et al., 2014; Sørensen et al., 2015).

In later years, other European countries executed health literacy surveys following the theoretical framework of HLS-EU, among them Albania, Belgium, Denmark, Germany,

Hungary, Italy, Kosovo, Malta, Norway, Portugal, and Switzerland (Okan et al., 2019).

In the Czech Republic, the health literacy survey was carried out by the National Institute of Public Health (NIPH) with the support of the Czech Ministry of Health and WHO Country Office in the Czech Republic. A representative sample of 1037 Czech adults age 15 years and older was assessed for health literacy in 2014. According to the authors, the study followed the methodology of the original HLS-EU. Overall, limited health literacy was found in 59.4% participants, of whose 19.1% had inadequate and 40.3% problematic health literacy. Compared to the eight countries included in the HLS-EU, the Czech Republic was the country with the highest rate of limited health literacy after Bulgaria. The prevalence of limited health literacy in specific sub-domains of the questionnaire was 49.5% for healthcare, 54.1% for disease prevention, and 64.3% for health promotion, exceeding the European average by more than 8% in each domain. Limited health literacy was associated with older age, lower level of education, higher self-assessed social status, higher financial deprivation, self-perceived health status, lower physical activity ($r = -.17$), higher BMI ($r = -.16$), higher frequency of doctor visits ($r = -.22$), use of emergency services ($r = -.11$), hospital services ($r = -.13$), and other health professionals ($r = .11$). In the Czech population, health literacy was not associated with smoking nor alcohol consumption (Kučera et al., 2016).

In conclusion, health literacy is surprisingly low in European countries, including the Czech Republic. Although there are considerable differences between countries, it can be expected that around half of Europeans may not have adequate health literacy skills to maintain and improve their health and navigate the healthcare system effectively (Kučera et al., 2016; Sørensen et al., 2015).

1.8 Health Literacy in People Living with Mental Illness

Individuals living with mental illness are considered one of the groups with increased risk for low health literacy due to functional and cognitive impairments related to serious mental disorders (Galletly et al., 2012; Lincoln et al., 2015; Lincoln et al., 2008; Mantell et al., 2020).

In people living with mental illness (other than SUDs), the vast majority of health literacy research focuses on functional health literacy measured by reading skills. Previous studies reported a prevalence of low functional health literacy between 3–76%, with a mean of 39.2% (Bacon et al., 2017; Brosnan et al., 2012; Christensen & Grace, 1999; Clausen et al., 2016; Drainoni et al., 2008; Farrell et al., 2019; Galletly et al., 2012; Lincoln et al., 2015; Rose et al., 2014). Only two studies assessed health literacy in people with mental illness using multidimensional measuring tools. One of these studies found a prevalence of lower health literacy 81.7% (Degan et al., 2019), the other one 40% (Mantell et al., 2020). In general, most of the evidence is covered by cross-sectional studies by researchers affiliated in the US.

Christensen and Grace (1999) were one of the firsts to examine health literacy in psy-

chiatric patients. Of the 45 homeless or vulnerably housed persons with mental illness, 76% had a reading level at or below the seventh to eighth grades, corresponding to low health literacy. They found a discrepancy between measured reading level and self-estimated reading ability of patients, concluding that patients tend to overestimate their reading skills.

Similarly, Lincoln et al. (2008) examined functional health literacy among 100 patients of a mental health outpatient clinic with various mental illnesses. Patients screened for health literacy achieved a mean score equivalent to below an eighth-grade level of reading, which corresponds to low functional health literacy. They found that lower health literacy was associated with lower levels of education ($p < .01$) and psychotic disorder ($p = .03$), whereas higher health literacy with SUD ($p < .01$). No relationship was found between health literacy and PTSD, anxiety disorder, depression, or bipolar disorder.

Drainoni et al. (2008) assessed functional health literacy in a hard-to-reach population of HIV-positive individuals at risk of getting sub-optimal healthcare for a history of mental illness, substance use, incarceration, or homelessness. Of 113 participants with recent mental illness, 22.1% were found to have lower health literacy.

In another study, Galletly et al. (2012) investigated functional health literacy in 60 people with either schizophrenia or a major depressive episode and its relationship with medication adherence. In total, 3% of participants with schizophrenia and 6% with depression had lower health literacy, which they stated was comparable to general Australians. They found a positive association between health literacy and years of education ($p = .02$). The relationship between functional health literacy and medication adherence was not significant.

Brosnan et al. (2012) estimated prevalence of low functional health literacy in patients with schizophrenia receiving the antipsychotic medication clozapine. Of the 40 participants, 27.5% had a reading level at or below the seventh- to eighth-grade, corresponding to low functional health literacy. Higher scoring in health literacy screening was associated with lower daily doses of clozapine ($p < .05$). No association was found between health literacy and age in their study.

In 2015, Lincoln et al. published preliminary results of a mixed-methods study examining the effect of low health literacy on the lives of people with serious mental illness concerning access to treatment and recovery. Of the 14 participants, 36% were found to have low functional health literacy. Moreover, they found that people with serious mental illness and low health literacy were more stigmatized, had poorer access to health information about their condition and treatment process, and were disadvantaged in the engagement with therapies requiring reading and writing skills (e.g., journaling).

Clausen et al. (2016) investigated functional health literacy in 71 people with various mental illnesses using three different measures. In total, 42.3–66.2% of participants (depending on the type of test used) had low health literacy. Low health literacy was associated with older age ($p < .05$), higher annual income ($p < .05$), lower functioning measured by the Global Assessment of Functioning ($p < .001$), and psychiatric diagnosis ($p < .05$).

Bacon et al. (2017) assessed functional health literacy of 61 patients of an inpatient psychiatric facility using two health-related screening questions; the first question asked about participants' need for help with reading hospital materials, the second question asked about problems with learning about their mental health or medical condition because of difficulty understanding written information. A total of 50.8% of patients was identified as having lower health literacy by positively answering at least one of the two screening questions. Interestingly, when healthcare providers were asked about their perception of health literacy in patients, almost all reported that they believe that the majority is health illiterate.

In a recent study, Farrell et al. (2019) examined health literacy in either homeless or vulnerably housed persons with mental illness. Of 192 participants, 24% had a reading at or below seventh- to eighth-grade level, corresponding to the low functional health literacy. Unlike the study of Christensen and Grace (1999), they found that participants tend to underestimate their reading abilities. Health literacy was significantly higher in women, housed persons ($p < .05$), those with higher levels of education, and lower levels of substance use ($p < .01$). Lower levels were associated with psychotic mental illness. No relationship was found between health literacy and age, ethnicity, mother language, employment status, and alcohol use (Farrell et al., 2019).

Degan et al. (2019) assessed the health literacy of 325 people living with mental illness using a multidimensional measurement tool, finding lower health literacy in 81.7%. They found no relationship between health literacy and age, gender, country of birth, education, employment status, living arrangements, use of emergency services, healthcare card ownership, smoking, alcohol and fruit consumption, physical activity, psychiatric diagnosis, physical health conditions, and private health insurance.

Mantell et al. (2020) investigated health literacy in 310 people with early onset of mental illness using the HLS-EU-Q47. In total, 60% had limited health literacy, which is a higher percentage than found in a general population of respective age (47.2%). Health literacy scores were lower in women, persons with mood disorders, anxiety disorders ($p < .05$), psychiatric comorbidity, poor self-assessed health status, and decreased with a number of chronic conditions ($p < .01$) and severity of depression ($p < .001$).

1.9 Health Literacy in People with Substance Use and Substance Use Disorders

Only a few studies have examined health literacy in people with SUDs.

In 2006, Lincoln et al. was one of the firsts to examine health literacy in people with SUDs. In this prospective cohort study, they estimated the prevalence of low functional health literacy and its association with severity of addiction, mental health-related quality

of life, and level of depressive symptoms in people recruited on detoxification units. Of the 380 participants, 45.8% had a reading level at or below the seventh to eighth grade, corresponding to low health literacy. In longitudinal analysis, low health literacy was significantly related to higher levels of depressive symptoms ($p < .01$), but no association was found between health literacy and mental health-related quality of life, alcohol and drug addiction severity, nor utilization of mental health services.

Drainoni et al. (2008) examined functional health literacy of 134 HIV-positive substance users, detecting low health literacy in 29.1%. However, the difference in health literacy between substance users and non-using participants was not statistically significant. In multiple regression analysis involving data of 231 HIV-positive participants, 60% of whom were current substance users, lower health literacy was associated with Afro-American ($AOR = 3.23$, $95\%CI$ [1.30, 8.33], $p = .01$) and Hispanic racial/ethnic identity ($AOR = 5.56$, $95\%CI$ [1.69, 20.00], $p = .005$), less than secondary educational attainment ($AOR = 14.29$, $95\%CI$ [4.55, 50.00], $p < .001$), heterosexual sexual orientation ($AOR = 2.27$, $95\%CI$ [0.99, 5.00], $p < .05$), and occurrence of a recent mental illness ($AOR = 2.06$, $95\%CI$ [1.01, 4.19], $p < .05$). No differences were found in the health literacy of participants in terms of gender, marital status, income, housing status, age, nor a number of other health-related indicators.

In another study, Dermota et al. (2013) described functional health literacy and its relationship with substance use among 11,930 young Swiss men. They measured general and substance use-related health literacy using four screening questions that covered accessing and understanding health information. Overall, 21.9% reported searching the internet for general health-related information and 15.7% reported searching the internet for drug-related information. Most perceived health information in various media as easy to understand and considered their knowledge of the health risks associated with drug use to be good. Regarding the relationship between health literacy and substance use, substance users tended to show higher health literacy in terms of access to and understanding substance use-related information, as the researchers concluded.

In 2018, Rolová et al. published a study examining health literacy in people undergoing addiction treatment for AUDs using the multidimensional HLS-EU-Q47. Out of 113 inpatients and outpatients, limited health literacy was identified in 46.9%. Participants' mean scores from the questionnaire survey indicated sufficient health literacy skills in healthcare and disease prevention, but problematic in health promotion. In this study, no significant differences in health literacy were found in terms of treatment setting, gender, marital status, household living situation, educational attainment, employment status, formal health education, household net income, mental illness, nor cigarette smoking status.

Degan et al. (2018) investigated health literacy in 298 individuals treated for addiction and found lower comprehensive health literacy in 87%. Individuals with lower health literacy were more likely to report living outside their families, having a poorer mental health ($p < .01$), higher levels of psychological distress, poorer quality of life, and worse self-

reported reading skills ($p < .001$). Participants did not differ in health literacy in terms of gender, age, educational attainment, marital status, and self-reported physical health status.

Most recently, Dahlman et al. (2020) examined health literacy and health-related problems of Swedish patients receiving opioid substitution treatment using the mixed-methods approach. In total, 286 patients provided responses to HLS-EU-Q16, of which limited health literacy was identified in 22%. However, this prevalence of limited health literacy is based on a calculation including both valid ($n = 195$) and invalid questionnaires with a large number of incomplete answers ($n = 91$); if invalid questionnaires were excluded from the calculation, which is the usual practice, the overall prevalence of low health literacy would be higher. It is interesting to note that the analysis of invalid questionnaires showed a positive association with the low level of education (AOR = 1.94, $95\%CI$ [1.13, 3.32]), which suggests that the literacy skills of participants providing incomplete answers may be below the level requiring completion of the HLS-EU-Q16. The qualitative part of the study revealed a patients' problems with navigating and accessing healthcare services, trust in healthcare, and comprehension of health information.

1.10 Institutions Interested in Health Literacy in the Czech Republic

In recent years, health literacy has come to the attention of political actors and other organizations alike. Here, we introduce some of the most prominent actors interested in research and promotion of health literacy in the Czech population.

Ministry of Health of the Czech Republic. In the Czech Republic, the promotion of health literacy is a part of health policy. Activities in the field of health literacy at the state level are regulated primarily by the *Strategic Framework for Health Care Development in the Czech Republic by 2030* (Strategic Framework Health 2030). It is a basic conceptual document for the health sector in the Czech Republic for the implementation period 2021–2030. The institution responsible for the preparation and implementation of the strategic document is the Ministry of Health of the Czech Republic (Ministerstvo zdravotnictví České republiky [MZ ČR], 2020).

Health literacy promotion is mentioned here as a part of Strategic Objective 1.2 – Disease Prevention, Promotion, and Protection of Health; Increasing Health Literacy. In relation to health literacy, the Implementation Plan 1.2 of the Strategic Framework Health 2030 includes a Partial Objective 1.2.4 – The Creation of the National Program for the Promotion of Health Literacy, Implementation of Partial Programs, and Health Literacy Monitoring, within which the following measures are proposed (MZ ČR, 2020):

- Implementation of the National Program for the Promotion of Health Literacy by

implementing approved intervention projects.

- Creation of the program Increasing Health Literacy by Acting on the Adolescent Population in cooperation with primary care physicians.
- Setting up a system of training of pedagogical staff with a focus on increasing health literacy among pupils and implementation of training.
- Setting up the education system for general nurses in increasing the population health literacy and health promotion.
- Promoting physical activity and implementation of programs to halt the rise in overweight and obesity in children and adults and media coverage of this topic.
- Implementation of regular health literacy monitoring within the international comparative survey.

One of the activities implemented by the Ministry of Health of the Czech Republic within the previous strategic document (Health 2020) to promote health literacy in the population is the launch of the web portal focusing on information about health, diseases, and health services – Národní zdravotnický informační portál (https://www.nzip.cz/) (MZ ČR & ÚZIS ČR, 2021).

Ústav pro zdravotní gramotnost, z.ú. Ústav pro zdravotní gramotnost, z.ú. (ÚZG), established in 2016, is a non-profit organization focused on increasing and developing health literacy in the population of the Czech Republic. The organization has the following agenda (Ústav pro zdravotní gramotnost [ÚZG], 2021):

- preparation of strategic documents related to the development of health literacy in the Czech Republic;
- health literacy research in different population groups;
- organization of professional conferences, seminars, and training to promote health literacy;
- cooperation with state administration bodies, professional institutions, non-profit organizations, and international organizations.

In 2017, ÚZG organized the 1st National Conference on Health Literacy, which was held under the auspices of the WHO Country Office in the Czech Republic in Prague, Czech Republic. Three main conclusions emerged from the conference: (1) research is crucial to

promoting health literacy, (2) the establishment of the Health Literacy Alliance, an organizational and information base open to all individuals interested in health literacy, is desirable, and (3) the distributed situation document, presenting the roles of interested parties in health literacy promotion, should be conceived as a motive for one's ideas (ÚZG, 2017a).

Later that year, ÚZG organized the 1st Czech-Austrian Colloquium entitled "Health Literacy and Health Policy". Proceedings of texts for the colloquium highlight health literacy as a priority of health policy and health care and provide an overview of selected activities for health literacy promotion and individual target groups (ÚZG, 2017b).

The organization remained active during the COVID-19 pandemic. In February 2021, a joint press conference of the Czech Medical Association of J. E. Purkyně (CzMA), WHO Country Office in the Czech Republic, Institute of Public Law and Medical Law, First faculty of medicine, Charles University, and ÚZG, took place, addressing changes in the attitudes and behavior of the Czechs in relation to the COVID-19 pandemic (ÚZG, 2021).

Centrum zdravotní gramotnosti. Centrum zdravotní gramotnosti operates under the Institute of Nursing, Midwifery and Emergency Care, Faculty of Health and Social Sciences of the University of South Bohemia in České Budějovice. It focuses its activities on promoting health literacy in primary care with the cooperation of physicians and health professionals. Centrum zdravotní gramotnosti offers:

- lecture and educational activities;
- cooperation with the practices of primary pediatricians and registered pediatricians in the field of education, monitoring, and evaluation of health literacy promotion in registered patients;
- direct work with clients in the field of increasing health literacy;
- updating educational materials;
- processing of feedback and evaluation outputs;
- project solutions.

Other cooperating actors in the research and promotion of health literacy are, e.g., WHO Country Office in the Czech Republic, NIPH, or Czech Medical Association of J. E. Purkyně (CzMA).

2. Methods

This chapter is based on the study protocol "Health Literacy in Residential Addiction Treatment Programs: Study Protocol of a Cross-Sectional Study in People with Substance Use Disorders" published in Adiktologie by Rolová, G.

In this chapter, we introduce the design and aim of this study as well as the methods of participant selection, data collection, and data analysis. We also discuss the ethical aspects of this study.

2.1 Design and Aim

In this exploratory cross-sectional study, we aimed to explore health literacy in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use (F10-F19, ICD-10).

Primary objectives

- To examine health literacy in a general sample of patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use using a multidimensional European Health Literacy Survey Questionnaire (HLS-EU-Q47; Sørensen et al., 2013).
- To estimate the relationship between health literacy and socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences for the general sample.
- To investigate health literacy as a predictor of self-reported health indicators, specifically general health status, mental health status, physical condition, and quality of life, in the general sample.

In addition, secondary objectives were set to explore health literacy in two homogeneous subsamples divided according to the primary diagnosis of SUDs to achieve more precise statistical estimates. One subsample includes patients diagnosed with AUDs (F10), the other one patients diagnosed with other SUDs (F11-F19).

That is because a separate analysis may show patterns characteristic for a given subsample that would potentially not be recognized in the general sample analysis, the two groups of patients differ consistently in, e.g., sociocultural and socioeconomic features (Mravčík et al., 2020). On the other hand, the general sample analysis has greater statistical power and is more convenient for comparisons across studies, as most previous studies did not distinguish between the two groups.

Secondary objectives

- To examine and compare health literacy in the AUD and SUD subsamples.

- To estimate the relationship between health literacy and socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences for the AUD and SUD subsamples.

- To estimate the relationship between specific subscales of HLS-EU-Q47 (health literacy subdomains and information processing dimensions) and socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences for the general sample.

2.2 Study Sample and Sampling

The study sample (also referred to as the general or total sample) comprised patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use (F10-F19, ICD-10).

After data collection, the general sample was divided into two mutually exclusive and exhaustive homogeneous subsamples based on the theoretical knowledge of these two groups of patients. The subsample of patients diagnosed with AUDs (F10) is referred to as the AUD subsample. The subsample of patients diagnosed with other SUDs (F11-F19) and is referred to as the SUD subsample.

Sampling was carried out in the following way. Institutions of residential addiction treatments, i.e., detoxification units with dedicated detoxification beds offering medical detoxification ($n = 17$), state-run psychiatric hospitals offering short- and medium-term inpatient care ($n = 19$), and therapeutic communities offering socio-therapeutic care ($n = 14$), were selected as a sampling frame for the recruitment of the participants. We used the Map of Aid maintained by the National Monitoring Centre for Drugs and Addiction to identify the eligible institutions[1].

Of these 50 selected institutions whose representatives were contacted via email, 21 (42%) granted permission to carry out the recruitment and assessment of the patients. Recruitment of the participants was conducted on-site at the selected institutions using a self-selection method. The inclusion criteria were set as follows: (1) male or female, (2) 15 years and older, (3) fluent in Czech, and (4) primary diagnosis of mental and behavioral disorders due to psychoactive substance use (F10-F19, ICD-10).

[1] https://www.drogy-info.cz/mapa-pomoci/

2.3 Data Collection

Sampling and data collection took place from May 2019 to December 2020 in the Czech Republic. Data collection was carried out in the following way:

1. Potential participants were gathered in one room and provided with oral information about the survey, its focus and purpose, their involvement, risks and benefits of participation, data processing, and dissemination of publications by the researcher.

2. Each of the eligible individuals was provided with study information leaflets and the paper-and-pencil questionnaire. Individuals could either refuse to be provided with the questionnaire or express their non-participation by not completing the questionnaire provided.

3. Participants were provided with sufficient time to complete the questionnaire and had the opportunity to ask anything that concerned the questionnaire survey. Questionnaires took around 15–30 minutes to be completed.

4. Participants submitted the questionnaire to the hand of the researcher right after its complementing.

The recruitment process and data collection took place simultaneously in each institution during a one-day visit by the researcher. Some of the data ($n = 90$) were collected with the help of internal administrators from the institutions involved. Data collection followed the same rules as described above. In addition, participants were asked to seal the completed questionnaires in envelopes to preserve the confidentiality of their responses.

2.4 Measures

2.4.1 Health literacy

Health literacy was assessed using the 47-item version of the European Health Literacy Survey Questionnaire (HLS-EU-Q47; Sørensen et al., 2013), Czech translation.

This multidimensional questionnaire is based on an integrative conceptual model of health literacy developed by the European Health Literacy Survey (HLS-EU) Consortium (Sørensen et al., 2012; Sørensen et al., 2013). The Czech version of the questionnaire was obtained from the National Institute of Public Health (Ref. PID UK1LF18G/03010 001).

In this questionnaire, participants are asked to assess the perceived difficulty of various health-related tasks on a 4-point Likert scale with the response alternatives 1 – very difficult, 2 – fairly difficult, 3 – fairly easy, 4 – very easy. Health-related tasks correspond to the four dimensions of information processing—accessing, understanding, appraising, and applying health information. Participant's competencies are evaluated within the three

subdomains of health literacy—healthcare, disease prevention, and health promotion (Pelikan et al., 2014; Sørensen et al., 2013). For an explanation of individual health literacy subdomains and information processing dimensions, see Subsection 1.3.3.

Health literacy is determined by index scores standardized on a scale of 0–50. Indices are calculated using the following formula:

$$Index = (mean - 1) \times (50/3)$$

where "*Index* is the specific index calculated, *mean* is the mean of all participating items for each individual, 1 is the minimal possible value of the mean, 3 is the range of the mean, and 50 is the chosen maximum value of the new metric" (Pelikan et al., 2014, pp. 22). Index score 0 represents the lowest possible level of health literacy, while index 50 is the highest possible level of health literacy (Pelikan et al., 2014; Sørensen et al., 2015).

General health literacy (also referred to as "health literacy") corresponds to the level of health literacy of an individual. Subindices corresponding to the level of health literacy in individual subdomains and dimensions of the questionnaire can be calculated following the same procedure. Only those questionnaires that contained at least 80% of valid answers in total and in individual subdomains and dimensions were considered valid (Pelikan et al., 2014; Sørensen et al., 2015).

In line with the recommended thresholds, four levels of health literacy were defined as "inadequate" (0–25), "problematic" ($>$ 25–33), "sufficient" ($>$ 33–42), and "excellent" ($>$ 42–50). According to the authors of the questionnaire, the threshold values were determined based on expert assessment (for more details, see Sørensen et al., 2015). Usually, the scale is further dichotomized, especially for analytical and comparative purposes, into two levels: "limited/low health literacy", which is a combination of inadequate and problematic levels and "adequate/high health literacy", a combination of sufficient and excellent levels (Pelikan et al., 2014; Sørensen et al., 2015; Sørensen et al., 2013).

2.4.2 Independent variables

Independent (predictor, explanatory) variables included socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences of participants.

For an overview of the Czech translation of the survey questions, see Attachment A.2.

Demographic and socioeconomic characteristics

Gender (male or female), age, marital status, educational attainment, employment status, formal health education, and household net income were surveyed using questions from HLS-EU-Q86, an extended version of the questionnaire (HLS-EU Consortium, 2012).

Marital status was measured using the question: What is your legal marital status?; response alternatives were: married (categorized as "married"), non-married (categorized as "non-married"), separated/divorced, widowed (categorized as "divorced/widowed"). *Educational attainment* was measured using the question: What is the highest level of education you have completed?; response alternatives were recoded according to the International Standard Classification of Education (ISCED 2011) in the following way: incomplete primary education – ISCED 0, primary education – ISCED 1 (categorized as "primary education"), secondary education without graduation, secondary education with graduation – ISCED 3 (categorized as "secondary education"), higher professional education, university degree – ISCED 6–7, academical degree – ISCED 8 (categorized as "tertiary education") (Český statistický úřad, 2016). *Employment status* was measured using the question: What is your main status of employment?; response alternatives were: full-time employee, part-time employee, self-employed (categorized as "employed"), unemployed (categorized as "unemployed"), other. *Formal health education* was measured using the question: Have you ever been trained or employed in a healthcare profession, e.g., as a nurse, doctor, pharmacist?; response alternatives were either yes or no. *Household net income* was measured using the question: Sum up all the net income of all the people in your household on average per month; wage, pension, various benefits from the state, and what you earn sideways, e.g., on a part-time job, etc. Sum all these monthly incomes up and then tell which income group your household belongs to. Response alternatives ranged from $<$ CZK 5,000 to $>$ CZK 60,001. Household net income was treated as a continuous variable in the statistical analysis (HLS-EU Consortium, 2012; Rolová, 2020).

Housing condition was measured using the question: What living conditions do you live in?; response alternatives were: family house, apartment, dormitory (categorized as "stable housing"), squatting, without a home (categorized as "without a home"). *Household size* was measured using the question: How many people (including you) live in your household; numerical responses were categorized as single-person or multi-person. *Debt situation* was measured using the question: Do you have any debts?; response alternatives were either yes or no. *Size of the place of residence* was measured using the question: What is the size of your place of residence?; response alternatives were: $>$ 100,000, 50–100,000, 20–49,999, 5–19,999, $<$ 5,000 inhabitants (Rolová, 2020).

Self-reported health indicators and quality of life

Self-reported health indicators of *general health status*, *mental health status*, *physical condition*, and *quality of life* were measured using the question: How would you assess your current general health status/mental health status/physical condition/quality of life?; responses were recorded on a 5-point Likert scale with response alternatives: 1 – bad, 2 – rather bad, 3 – neither bad nor good, 4 – rather good, 5 – good. Self-reported health indicators were treated as continuous variables in the statistical analysis (Rolová, 2020).

Psychiatric comorbidity was measured using the question: Have you ever been diagnosed with any mental illness except for substance use disorders or addictive behaviors?; response alternatives were either yes or no. Participants who reported having psychiatric comorbidity were asked to state their psychiatric diagnoses. Individual psychiatric diagnoses were then classified into six categories: anxiety disorders, mood disorders, psychotic disorders, personality disorders, eating disorders, and developmental disorders, according to the ICD-10 (Rolová, 2020).

Substance use behavior

Cigarette smoking was measured using the question: Do you smoke cigarettes?; response alternatives were: smoker, occasional smoker (categorized as "smoker"), non-smoker, former smoker (categorized as "non-smoker"). Smokers were asked to state the number of cigarettes they smoke per day (Rolová, 2020).

Past-year frequency of alcohol use was measured using the question: How often have you drunk any alcoholic beverage (at least 500 ml of beer, 2 dl of wine, or 4 cl of distillate) in the past 12 months? *Past-year frequency of heavy episodic drinking (HED)* was measured using the question: How often have you drunk 5 or more glasses of alcohol (1 glass is equal to 500 ml of beer, 2 dl of wine, or 4 cl of distillate) on one occasion in the past 12 months? *Past-year frequency of alcohol intoxication* was measured with the question: How often have you been so drunk that you had trouble walking or talking, vomited, or did not remember what happened in the past 12 months? The response alternatives were in all three items as follows: daily or almost daily, 3–4x per week, 1–2x per week, 1–3x per month, 1–6x per year, never. The frequencies of various patterns of alcohol use were considered continuous variables in statistical analysis (Rolová, 2020).

Lifetime illicit drug use was measured using the question: Indicate if you have ever used any of these illicit drugs—cannabis, MDMA/ecstasy, methamphetamine and other amphetamines, cocaine, heroin and other opioids, buphrenorphine and methadone, hallucinogens, inhalants, psychoactive medicine, new psychoactive substances (NPS), other—at least once in your life. *Past-year frequency of illicit drug use* was measured using the question: Indicate how often have you used the given illicit drugs in the past 12 months; response alternatives were: daily or almost daily, 3–4x per week, 1–2x per week, 1–3x per month, 1–6x per year, never. The use of at least one illicit drug at least once in the past year was categorized as "past-year any illicit drug use". In addition to illicit drug use, lifetime and past-year gambling were also monitored (Rolová, 2020).

Primary drug of the participants was measured using the question: Indicate, what is your primary drug (the most commonly used licit or illicit drug) or addictive behavior. List one or more substances (e.g., alcohol, cannabis, methamphetamine, etc.) or addictive behavior; participants' responses were classified into three categories: "alcohol", "illicit drugs", and "addictive behavior" (Rolová, 2020).

Variables related to participants' *age at onset of alcohol use*, *age at onset of alcohol intoxication*, *age at onset of cannabis use*, *age at onset of other illicit drug use*, and *age at onset of injecting drug use* were measured using the question: Indicate the age of first use of the listed addictive substances (Rolová, 2020).

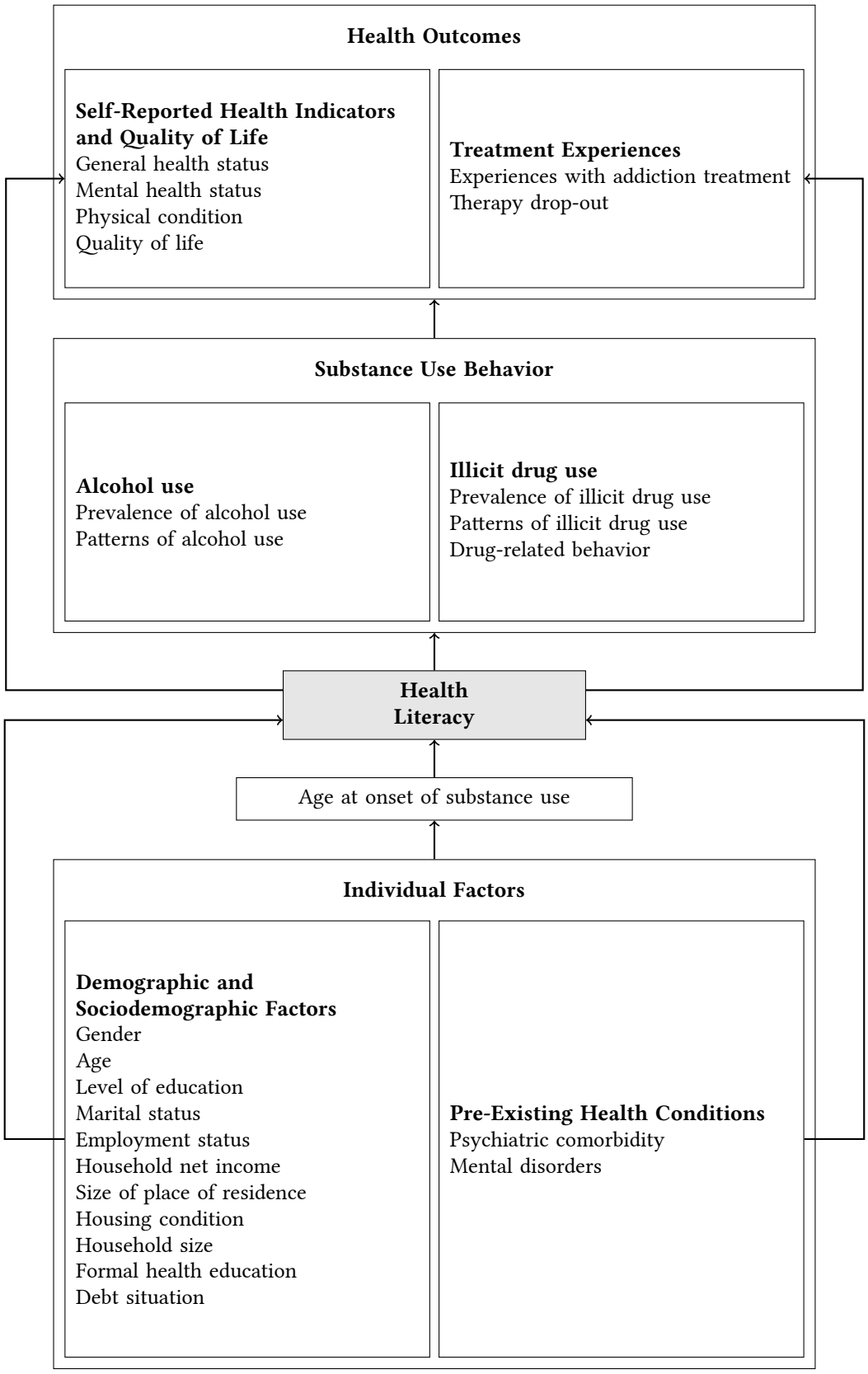
Preferred route of drug administration was measured using the question: How do you usually apply your drug of the first choice?; response alternatives were: injecting (categorized as "injecting"), oral, sniffing, smoking, inhaling (categorized as "other"), none of the options. *Needle sharing* was measured using the question: Have you ever used a needle or syringe to inject a drug after another person/s used it?; response alternatives were either yes, no, or I do not use intravenous drug administration method. *Drug-related infectious diseases* were measured using the question: Have you ever been diagnosed with hepatitis or any other infectious disease that are related to substance use?; response alternatives were: hepatitis (A, B, or C), sexually transmitted diseases (AIDS/HIV, gonorrhea, syphilis, etc.), other infectious diseases (categorized as "yes"), no (categorized as "no") (Rolová, 2020).

Treatment experiences

Treatment experiences were measured using the question: Indicate the number of times you have received addiction treatment (including current treatment) in the following addiction treatment programs—detoxification, outpatient treatment, outpatient daycare, opioid substitution therapy, short-/medium-term inpatient care, therapeutic community, aftercare programs, other; response alternatives were: never, 1x, 2x, 3x, 4x, 5x or more times. *Therapy drop-out* was measured using the question: How many of the reported treatment attempts have you not completed?; numerical responses were categorized as "first treatment/all completed" and "1x or more times terminated" (Rolová, 2020).

Figure 2.1 shows the proposed model of the relationship between health literacy and independent variables studied.

Figure 2.1: Proposed model of the relationship between health literacy and independent variables studied



2.5 Statistical Analysis

We analyzed the data using descriptive statistics, correlation analyses, and regression analyses. Statistical analysis was performed as follows:

(1) Description of the study sample in terms of its socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences.

Descriptive statistics, including frequency distribution, a measure of central tendency (mean), and a measure of dispersion (standard deviation), were calculated to describe the characteristics of the participants. Descriptive statistics were calculated for the general sample as well as both subsamples.

(2) Description of health literacy of the study sample in terms of distribution of health literacy and descriptive results in HLS-EU-Q47.

The general health literacy index and specific subindices for subdomains and dimensions of health literacy were calculated and categorized into four levels described above. Descriptive statistics (frequency distribution, mean, and standard deviation) were used to describe the distribution of health literacy in the study sample and participants' scores in HLS-EU-Q47.

(3) Comparison of background characteristics and health literacy outcomes between the AUD and SUD subsamples.

Pearson's chi-square test (for categorical variables) and Mann-Whitney U test (for continuous variables) were used to determine the statistical differences in characteristics between the AUD and SUD subsamples. Alternatively, Fisher's exact test was used for categorical variables when the expected count for more than 20% of cells was less than 5. One-Way ANOVA was used to test whether there are any statistically significant differences between the mean scores of AUD and SUD subsamples in health literacy.

(4) Identifying health literacy correlates.

Simple linear regression was used to estimate the relationship between general health literacy (dependent variable) and socioeconomic characteristics, self-reported health indicators and quality of life, substance use behavior, and treatment experiences of participants. The preliminary analysis included testing for linearity and homoscedasticity using scatterplots, multicollinearity using variance inflation factor (VIF), residue independence using Durbin-Watson statistic, and residue normality using normal probability plots. VIF values lower than 10 were considered to show a low degree of multicollinearity (Vittinghoff et al., 2012).

(5) Studying health literacy as a predictor of self-reported health indicators and quality of life.

Hierarchical logistic regression was used to investigate whether health literacy is an independent predictor of self-assessed health indicators and quality of life when the model is adjusted for other relevant covariates. Ordinal regression models were estimated with general health status, mental health status, physical condition, and quality of life as dependent variables using the generalized linear model (GLM). Independent variables entering the regression model were socioeconomic, health-related, and substance use-related factors selected based on a priori theoretical knowledge. The likelihood-ratio test was used to compare the fit of competing models.

In all levels, the variables with the alpha level of .05 were considered as statistically significant outcomes. Data were prepared and analyzed using the IBM SPSS Statistics 26.

2.6 Ethical Consideration

The research protocol was reviewed and approved by the Ethics Committee of the General University Hospital in Prague (Ref. 88/18 Grant GA UK 1. LF UK).

Prior to data collection, all potential participants were thoroughly informed about the objectives, methods, institutional affiliation of the researchers, research process and potential risk of harm therein, right to withdraw from the research process, data processing and storage, and other relevant aspects of the study, both orally and in writing. Informed consent to participate in the survey consisted of completing and submitting the questionnaire to the researcher. In order to protect their anonymity and confidentiality, participants were not invited to sign an informed consent form; the main justification for the ethics committee on this matter was as follows:

(a) involvement in the anonymous questionnaire survey did not pose more than minimal risk of harm to the participants;

(b) informed consent requiring disclosure of participant's personal data and signature would be the only record linking the participant to the study and therefore the main risk of harm to the participants would be a confidentiality breach.

Participants had the right to withdraw from the study at any time of the research process. Involvement in the questionnaire survey has not been honored or otherwise favored.

This study was carried out with respect to the seventh revision of the World Medical Association Declaration of Helsinki—ethical principles for medical research involving human subjects (World Medical Association [WMA], 2013).

3. Results

In this chapter, we describe the data and present the findings of the statistical analysis.

First, we present the characteristics of the study sample and the results describing the health literacy of the participants. We then present the results of a simple linear regression for the health literacy and participants' characteristics. Finally, we present the results of a hierarchical logistic regression for self-reported health indicators and quality of life.

In addition, we briefly present the results of the extended analysis of HLS-EU-Q47. Complete results of the bivariate analysis of health literacy subdomains (healthcare, disease prevention, and health promotion) and information processing dimensions (accessing, understanding, appraising, and applying health information) are shown in Attachment A.1.

3.1 Sample Characteristics

In total, 661 individuals were recruited for this study. Forty-two questionnaires of participants with another primary diagnosis than F10-F19 (ICD-10) were excluded from the statistical analysis. Six questionnaires were excluded for more than 20% of missing answers in HLS-EU-Q47. Therefore, the final study sample consisted of 613 participants.

Of these, 388 participants were included in the AUD subsample for the diagnosis of AUDs (F10) and 225 in the SUD subsample for the diagnosis of SUDs (F11-F19).

Most participants (63.0%) were recruited in short-/medium-term inpatient care; 19.7% were recruited in detoxification units and 17.3% in therapeutic communities. Participants diagnosed with AUDs were more likely to be recruited in short-/medium-term inpatient care (67.5% vs. 55.1%; p = .002). Participants diagnosed with SUDs were more likely to be recruited in therapeutic communities (28.9% vs. 10.6%; $p < .001$) (Table 3.1).

The overall response rate (the proportion of those surveyed from all eligible individuals) to the recruitment process was 92.2%.

Table 3.1: Types of residential addiction treatment programs where participants were recruited for this study

	Total (n = 613)		AUD (n = 388)		SUD (n = 225)		
	n	%	n	%	n	%	p^a
Recruitment							
Detoxification	121	19.7	85	21.9	36	16.0	.092
Short-/medium-term inpatient care	486	63.0	262	67.5	124	55.1	.002
Therapeutic community	106	17.3	41	10.6	65	28.9	$< .001$

n = number of cases; p = p-value

[a] Pearson's chi-square test was used to determine the statistical differences between the AUD and SUD subsamples.

3.1.1 Demographic and socioeconomic characteristics

The demographic and socioeconomic characteristics of the participants and the differences between the AUD and SUD subsamples are presented in Table 3.2.

Men predominated in the study sample (74.1%). Participants' ages ranged from 15 to 72 years with a mean of 39.8 ± 11.2 years. Nearly half of all participants were aged between 31–45 years. Most participants were not married (58.2%), did have stable housing (82.5%), completed at least secondary education (ISCED 3) (76.8%), were unemployed (49.1%), had a household net income of less than CZK 35,000 (56.3%), were debt-free (61.2%), and lived in cities with 5,000–100,000 inhabitants (41.8%). Forty-three participants (7%) were healthcare professionals; most often, they were qualified as general nurses, enrolled nurses, or hospital attendants. Moravian-Silesian Region (19.1%), Prague (13.7%), and Central Bohemian Region (9.8%) were the most frequently reported regions of living. Vysočina (0.7%) and Zlín (2.0%), and Karlovy Vary Region (3.4%) were the less frequently reported regions of living.

Significant differences were observed in the demographic and socioeconomic characteristics of the AUD and SUD subsamples. Participants diagnosed with AUDs were significantly older (44.1 vs. 32.6 years; $p < .001$), more likely reported being married (21.6% vs. 4.9%; $p < .001$), having stable housing (87.6% vs. 73.8%; $p = .001$), being secondary educated (71.6% vs. 57.3%; $p < .001$) and tertiary educated (16% vs. 0.9%; $p < .001$), employed (56.4% vs. 34.2%; $p < .001$), and debt-free (69.3% vs. 47.1%; $p < .001$). No significant differences were found in gender, household size, formal health education, household net income, and size of the place of residence between the AUD and SUD subsamples.

3.1.2 Self-reported health indicators and quality of life

An overview of ratings of self-reported health indicators and quality of life of the participants are summarized in Table 3.3.

In terms of psychiatric comorbidity, 23.2% of all participants reported having one or more mental disorders in addition to mental and behavioral disorders due to psychoactive substance use. Mood disorders (8.6%) and anxiety disorders (5.5%) were the most commonly reported psychiatric comorbidities. Other types of mental disorders reported by participants were psychotic disorders (4.2%), personality disorders (2.4%), eating disorders (1%), and developmental disorders (0.5%). Most participants rated their general health status (56%), mental health status (50.3%), and physical condition (49.9%) as good or rather good. Quality of life was rated as good or rather good by 34.8% of participants.

Participants diagnosed with SUDs were significantly more likely to report psychotic disorders (9.8% vs. 1%; $p < .001$) and developmental disorders (1.3% vs. 0.0%; $p = .048$). No significant differences were found in psychiatric comorbidity and overall ratings of self-reported general health status, mental health status, physical condition, and quality of life between the AUD and SUD subsamples.

Table 3.2: Demographic and socioeconomic characteristics of the participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Gender							.056
Male	454	74.1	277	71.4	177	78.2	
Female	158	25.8	110	28.4	48	21.3	
Age, years							
Mean (SD)	39.8	11.2	44.1	10.3	32.6	8.9	$< .001$
15–18	4	0.7	0	0.0	4	1.8	
19–30	135	22.0	40	10.3	95	42.2	
31–45	384	46.3	181	46.6	103	45.8	
46–60	139	22.7	125	32.2	14	6.2	
61–75	26	4.2	23	5.9	3	1.3	
Marital status							
Married	95	15.5	84	21.6	11	4.9	$< .001$
Non-married	357	58.2	167	43.0	190	84.4	$< .001$
Divorced/widowed	155	25.3	132	34.0	23	10.2	$< .001$
Housing conditions							.001
Stable housing	506	82.5	340	87.6	166	73.8	
Without a home	62	10.1	28	7.2	34	15.1	
Household size							
Mean (SD)	2.4	1.4	2.3	1.3	2.6	1.5	.091
Single-person	193	31.5	125	32.2	68	30.2	
Multi-person	351	57.3	224	57.7	127	56.4	
Educational attainment							
Primary	135	22.0	43	11.1	92	40.9	$< .001$
Secondary	407	66.4	278	71.6	129	57.3	$< .001$
Tertiary	64	10.4	62	16.0	2	0.9	$< .001$
Employment status							$< .001$
Employed	296	48.3	219	56.4	77	34.2	
Unemployed	301	49.1	161	41.5	140	62.2	
Length of unemployment							
Mean (SD)	12.2	19.6	9.7	15.7	14.9	22.7	.016
Formal health education							.252
Health education	43	7.0	31	8.0	12	5.3	
No health education	557	90.9	348	89.7	209	92.9	
Household net income							.149
$<$ CZK 15,000 ($<$ EUR 585)	136	22.2	81	20.9	55	24.4	
CZK 15,001–35,000 (EUR 585–1,365)	209	34.1	143	36.9	66	29.3	
CZK 35,001–60,000 (EUR 1,365–2,340)	150	24.5	100	25.8	50	22.2	
$>$ CZK 60,001 ($>$ EUR 2,340)	63	10.3	35	9.0	28	12.4	
Debt situation							$< .001$
Debts	230	37.5	113	29.1	117	52.0	
No debts	375	61.2	269	69.3	106	47.1	
Size of place of residence							.426
$>$ 100,000 inhabitants	187	30.5	113	29.1	74	32.9	
5,000–100,000 inhabitants	256	41.8	170	43.8	86	38.2	
$<$ 5,000 inhabitants	136	22.2	85	21.9	51	22.7	

n = number of cases; SD = standard deviation; p = p-value

[a] Pearson's chi-square test (for categorical variables) and Mann-Whitney U test (for continuous variables) were used to determine the statistical differences between the AUD and SUD subsamples.

Table 3.3: Overview of ratings of self-reported health indicators and quality of life of the participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Psychiatric comorbidity							.058
Yes	143	23.3	81	20.9	62	27.6	
No	454	74.1	298	76.8	156	69.3	
Comorbid psychiatric disorder							
Anxiety disorders	34	5.5	24	6.2	10	4.4	.464
Mood disorders	53	8.6	39	10.1	14	6.2	.134
Psychotic disorders	26	4.2	4	1.0	22	9.8	$< .001$
Personality disorders	15	2.4	8	2.1	7	3.1	.424
Eating disorders	6	1.0	2	0.5	4	1.8	.197
Developmental disorders	3	0.5	0	0.0	3	1.3	.048
General health status							.399
Bad	19	3.1	14	3.6	5	2.2	
Rather bad	67	10.9	41	10.6	26	11.6	
Neither bad nor good	177	28.9	121	31.2	56	24.9	
Rather good	191	31.2	114	29.4	77	34.2	
Good	152	24.8	95	24.5	57	25.3	
Mental health status							.799
Bad	21	3.4	13	3.4	8	3.6	
Rather bad	90	14.7	59	15.2	31	13.8	
Neither bad nor good	186	30.3	121	31.2	65	28.9	
Rather good	193	31.5	116	29.9	77	34.2	
Good	115	18.8	76	19.6	39	17.3	
Physical condition							.170
Bad	26	4.2	17	4.4	9	4.0	
Rather bad	93	15.2	64	16.5	29	12.9	
Neither bad nor good	183	29.9	122	31.4	61	27.1	
Rather good	293	31.5	121	31.2	72	32.0	
Good	113	18.4	61	15.7	52	23.1	
Quality of life							.600
Bad	37	6.0	22	5.7	15	6.7	
Rather bad	138	22.5	88	22.7	50	22.2	
Neither bad nor good	220	35.9	137	35.3	83	36.9	
Rather good	168	27.4	104	26.8	664	28.4	
Good	43	7.0	32	8.2	11	4.9	

n = number of cases; p = p-value

[a] Pearson's chi-square test or Fisher's exact test (where the expected number of frequencies in any cell was less than 5) were used to determine the statistical differences between the AUD and SUD subsamples.

3.1.3 Substance use behavior

Tobacco and alcohol use. The past-year prevalence of cigarette smoking and alcohol use among the participants is presented in Table 3.4.

Overall, 75% of all participants were current smokers. Current smokers reported smoking 1 to 60 cigarettes a day with a mean of 17.5 ± 7.5 cigarettes. Significantly more smokers were in the SUD subsample than the AUD subsample (80.4% vs. 71.9%; p = .018).

In terms of patterns of alcohol use, 90.1% of all participants reported using alcohol at least once in the past year; 44.7% reported daily or almost daily alcohol consumption. Past-year HED was reported by 86.4% of participants; 32.6% reported daily or almost daily binge drinking. Past-year alcohol intoxication was reported by 76.8% of participants; 8.3% reported being drunk daily or almost daily in the past year.

The frequency of alcohol use, HED, and alcohol intoxication in the past year was significantly higher in the AUD subsample ($p < .001$ for all variables).

Table 3.4: Past-year prevalence of cigarette smoking and alcohol use among participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Cigarette smoking							.018
Current smoker	460	75.0	279	71.9	181	80.4	
Non-smoker	148	24.1	106	27.3	42	18.7	
Number of cigarettes							
Mean (SD)	17.5	7.5	11.6	10.5	17.6	6.8	.629
Past-year alcohol use							$< .001$
Daily or almost daily	274	44.7	210	54.1	64	28.4	
3–4x per week	138	22.5	103	26.5	35	15.6	
1–2x per week	52	8.5	28	7.2	24	10.7	
1–3x per month	39	6.4	13	3.4	26	11.6	
1–6x per year	49	8.0	14	3.6	35	15.6	
Never	40	6.5	5	1.3	35	15.6	
Past-year HED							$< .001$
Daily or almost daily	200	32.6	157	40.5	43	19.1	
3–4x per week	160	26.1	130	33.5	30	13.3	
1–2x per week	83	13.5	45	11.6	38	16.9	
1–3x per month	42	6.9	21	5.4	21	9.3	
1–6x per year	45	7.3	14	3.6	31	13.8	
Never	59	9.6	5	1.3	54	24.0	
Past-year alcohol intoxication							$< .001$
Daily or almost daily	51	8.3	40	10.3	11	4.9	
3–4x per week	75	12.2	61	15.7	14	6.2	
1–2x per week	103	16.8	80	20.6	23	10.2	
1–3x per month	108	17.6	74	19.1	34	15.1	
1–6x per year	134	21.9	71	18.3	63	28.0	
Never	121	19.7	47	12.1	74	32.9	

n = number of cases; p = p-value; HED = heavy episodic drinking

[a] Pearson's chi-square test was used to determine the statistical differences between the AUD and SUD subsamples.

Lifetime prevalence of illicit drug use and gambling. The lifetime prevalence of any illicit drug use and gambling among participants is presented in Table 3.5.

In total, 75.7% of all participants reported using illicit drugs at least once in their lifetime. Cannabis was the most frequently used illicit drug in the study sample; 67.5% of participants reported using cannabis at least once in their lifetime. The use of methamphetamine and other amphetamines, ecstasy, and psychoactive medicines were also frequent in the study sample; 49.4% of all participants reported at least one experience with methamphetamine and other amphetamines, 41.4% with ecstasy, and 41.6% with psychoactive medicines.

The lifetime prevalence of any illicit drug use was 62.9% for participants diagnosed with AUDs and 97.8% for participants diagnosed with SUDs. The lifetime prevalence of any illicit drug use, as well as the lifetime prevalence of illicit drug use in terms of individual substances, was significantly higher in the SUD subsample ($p < .001$ for all variables).

Figure 3.1 shows the lifetime prevalence of illicit drug use in terms of individual substances and gambling among the participants.

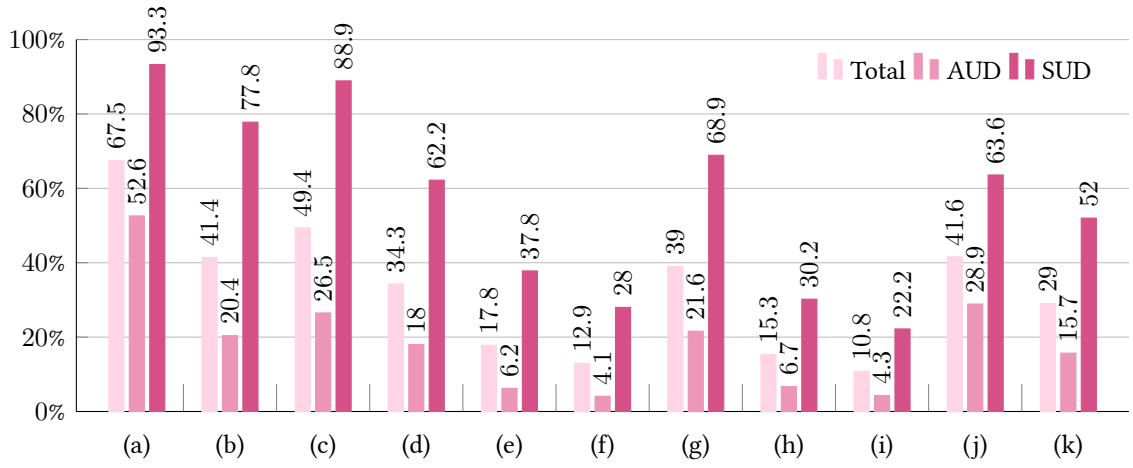
Table 3.5: Lifetime prevalence of illicit drug use and gambling among participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	*n*	%	*n*	%	p^a
Lifetime illicit drug use							< .001
Yes	464	75.7	244	62.9	220	97.8	
No	132	21.5	132	34.0	0	0.0	

n = number of cases; *p* = p-value

[a] Pearson's chi-square test was used to determine the statistical differences between the AUD and SUD subsamples.

Figure 3.1: Lifetime prevalence of illicit drug use and gambling among participants



(a) cannabis; (b) MDMA; (c) methamphetamine and other amphetamines; (d) cocaine; (e) heroin and other opioids; (f) buphrenorphine and methadone; (g) hallucinogens; (h) inhalants; (i) NPS; (j) psychoactive medicine; (k) gambling

Past-year prevalence of illicit drug use and gambling. The past-year prevalence of any illicit drug use and gambling among participants is presented in Table 3.6.

In total, 56.4% of all participants reported using illicit drugs at least once in the past year. Cannabis (43.2%), methamphetamine and other amphetamines (35.7%), psychoactive medicines (28.4%), and ecstasy (23%) were the most frequently used illicit drugs. On the contrary, inhalants (5.2%), NPS (6%), buphrenorphine and methadone (7.2%), and heroin and other opioids (7.3%) were the least frequently used illicit drugs in the study sample.

Participants diagnosed with AUDs reported illicit drug use three times less frequently than participants diagnosed with SUDs in the past year (26.5% vs. 90.2%). They most frequently reported at least one experience with the use of cannabis (23.7%), psychoactive medicines (18.8%), methamphetamine and other amphetamines (11.1%), ecstasy (6.2%), and cocaine (5.9%). The use of other illicit drugs was less frequent. A total of 5.9% of participants diagnosed with AUDs reported gambling in the past year.

In total, 90.2% of participants diagnosed with SUDs reported using illicit drugs in the past year; the remaining 9.8% did not provide answers on the frequency of illicit drug use in the past year. They most frequently reported the use of methamphetamine and other amphetamines (78.2%), cannabis (76.9%), ecstasy (52%), and psychoactive medicines (44.9%) in the past year. Overall, 57.8% of participants diagnosed with SUDs were weekly users of methamphetamine and other amphetamines, 48.5% weekly users of cannabis, 24.9% weekly users of psychoactive medicines, 5.8% weekly users of buphrenorphine and methadone, and 5.7% weekly users of cocaine. A total of 15.5% of participants diagnosed with SUDs reported weekly gambling in the past year.

The past-year prevalence of any illicit drug use, as well as the past-year prevalence of illicit drug use in terms of individual substances, was significantly higher in the SUD subsample ($p < .001$ for all variables).

Figure 3.2 shows the past-year prevalence of illicit drug use in terms of individual substances and gambling among the participants. Figure 3.3 shows the past-year frequency of illicit drug use in terms of individual substances and gambling among participants diagnosed with SUDs.

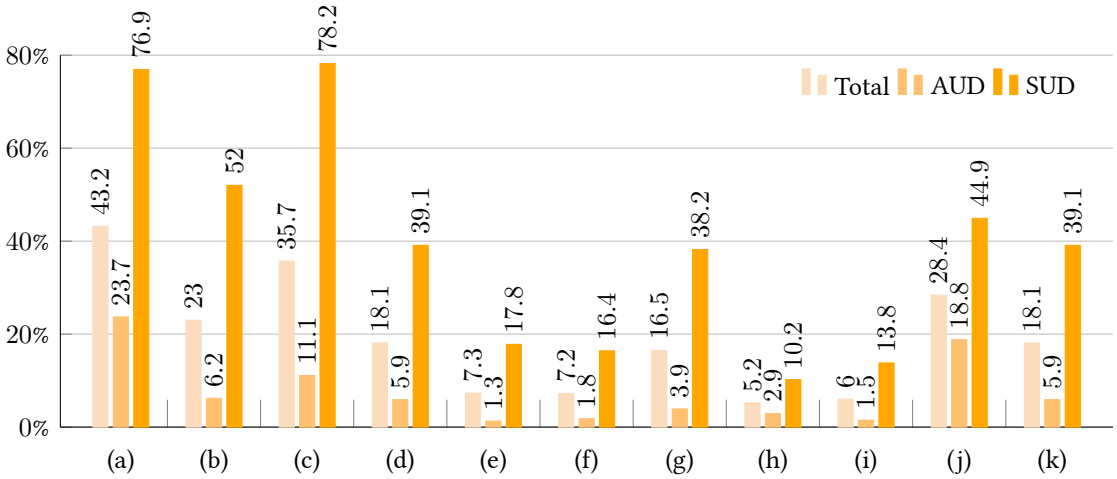
Table 3.6: Past-year prevalence of illicit drug use and gambling among participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Past-year any illicit drug use							$< .001$
Yes	346	56.4	103	26.5	203	90.2	
No	241	39.3	272	70.1	10	4.4	

n = number of cases; p = p-value

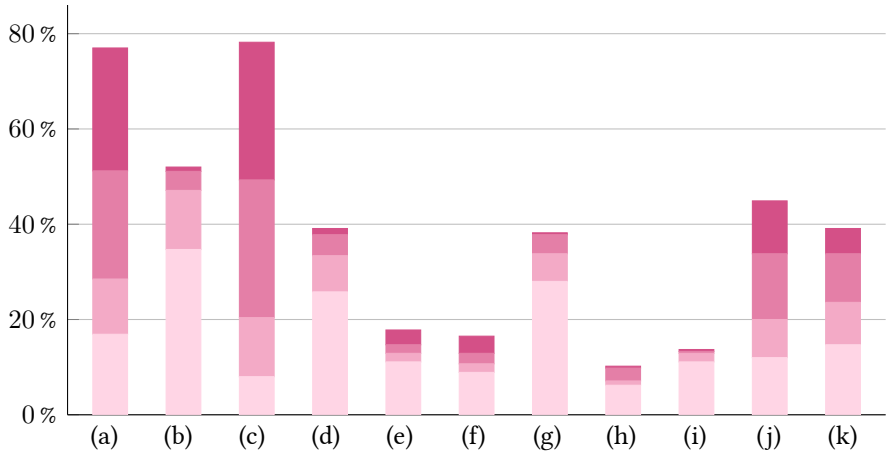
[a] Pearson's chi-square test was used to determine the statistical differences between the AUD and SUD subsamples.

Figure 3.2: Past-year prevalence of illicit drug use and gambling among participants



(a) cannabis; (b) MDMA; (c) methamphetamine and other amphetamines; (d) cocaine; (e) heroin and other opioids; (f) buphrenorphine and methadone; (g) hallucinogens; (h) inhalants; (i) NPS; (j) psychoactive medicine; (k) gambling

Figure 3.3: Past-year frequency of illicit drug use and gambling among participants diagnosed with SUDs



	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
Daily or almost daily	25.8	0.9	28.9	1.3	3.1	3.6	0.4	0.4	0.4	11.1	5.3
1–4x per week	22.7	4.0	28.9	4.4	1.8	2.2	4.0	2.7	0.4	13.8	10.2
1–3x per month	11.6	12.4	12.4	7.6	1.8	1.8	5.8	0.9	1.8	8.0	8.9
1–6x per year	16.9	34.7	8.0	25.8	11.1	8.9	28.0	6.2	11.1	12.0	14.7

(a) cannabis; (b) MDMA; (c) methamphetamine and other amphetamines; (d) cocaine; (e) heroin and other opioids; (f) buphrenorphine and methadone; (g) hallucinogens; (h) inhalants; (i) NPS; (j) psychoactive medicine; (k) gambling

Age at onset of alcohol and other drug use. An overview of the mean age at the onset of alcohol use, alcohol intoxication, cannabis use, and other illicit drug use of the participants is presented in Table 3.7.

Overall, the mean age of the participants was 15 ± 3.6 at the onset of alcohol use, 16.2 ± 4.7 at the onset of alcohol intoxication, 17.4 ± 6.3 at the onset of cannabis use, and 18.7 ± 4.8 at the onset of other illicit drug use. The first experience of alcohol use before the age of 18 was reported by 78.8% of participants. The first experience of alcohol intoxication before the age of 18 was reported by 67% of participants. The first experience of cannabis use before the age of 18 was reported by 45.2% of participants. The first experience of any other illicit drug use before the age of 18 was reported by 25.4 % of participants.

Participants diagnosed with SUDs reported a significantly lower age at the onset of alcohol use, alcohol intoxication, cannabis use, and other illicit drug use than participants diagnosed with AUDs ($p < .001$ for all variables).

Table 3.7: Overview of the age at the onset of alcohol use, alcohol intoxication, cannabis use, and other illicit drug use of the participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Age at onset of alcohol use							
Mean (SD)	15.0	3.6	15.9	4.0	13.8	2.5	$< .001$
< 18 years	483	78.8	287	74.0	196	87.1	
≥ 18 years	85	13.9	70	18.0	15	6.7	
Age at onset of alcohol intoxication							
Mean (SD)	16.2	4.7	17.4	5.3	14.4	2.7	$< .001$
< 18 years	411	67.0	221	57.0	190	84.4	
≥ 18 years	134	21.9	113	29.1	21	9.3	
Age at onset of cannabis use							
Mean (SD)	17.4	6.3	19.6	7.3	15.4	4.3	$< .001$
< 18 years	277	45.2	102	26.3	175	77.8	
≥ 18 years	126	20.6	91	23.0	35	15.6	
Age at onset of illicit drug use							
Mean (SD)	18.7	4.8	20.1	5.5	18.0	4.3	$< .001$
< 18 years	156	25.4	40	10.3	116	51.6	
≥ 18 years	166	27.1	72	18.6	94	41.8	

n = number of cases; SD = standard deviation; p = p-value

[a] Mann-Whitney U test was used to determine the statistical differences between the AUD and SUD subsamples.

Drug-related characteristics of participants diagnosed with SUDs. The characteristics of participants diagnosed with SUDs are presented in Table 3.8.

In terms of route of drug administration, injecting was the most preferred route among participants diagnosed with SUDs (38.2%), followed by oral administration (28.9%), sniffing (15.6%), and smoking (15.1%). Inhalation and rectal routes of administration have rarely

been reported (0.4% for both). Participants who reported injecting had a mean age at the onset of injecting drug use of 19.3 ± 4.3 years.

Overall, 35.1% of all participants diagnosed with SUDs reported sharing needles with other people at least once in their lifetime. One-quarter (24.9%) of participants reported that they suffered from drug-related infectious diseases. While hepatitis (23.1%) was the most frequently reported infectious disease, STDs were much less frequent (1.8%).

Table 3.8: Drug-related characteristics of participants diagnosed with SUDs

	n	%
Preferred route of illicit drug administration		
Injecting	86	38.2
Per oral	65	28.9
Sniffing	35	15.6
Smoking	34	15.1
Inhaling	1	0.4
Per rectum	1	0.4
Age at onset of injecting drug use		
Mean (SD)	19.3	4.3
Needle sharing		
Yes	79	35.1
No	44	19.6
Not applicable	79	35.1
Drug-related infectious diseases		
Hepatitis	52	23.1
STD	4	1.8
None	163	72.4

n = number of cases; SD = standard deviation; STD = sexually transmitted disease

3.1.4 Treatment experiences

The treatment experiences of participants are presented in Table 3.9.

Of all participants, 45.8% underwent detoxification, 31.2% outpatient treatment, 2.8% outpatient daycare, 3.4% opioid substitution therapy, 69.6% short-/medium-term inpatient care, 26.4% therapeutic community, and 12.8% aftercare programs for once or more times. Of all participants, 22.5% reported early termination of addiction treatment 1 to 3 times and 7.7% reported early termination of addiction treatment 4 times and more times.

Significant differences were observed in the treatment experiences of the participants. Participants diagnosed with SUDs were significantly more likely to have experiences with detoxification (p = .001), outpatient daycare (p = .049), opioid substitution therapy ($p <$ .001), and therapeutic community ($p <$ .001). Therapy drop-out was significantly more frequently reported by participants diagnosed with SUDs ($p <$ .001).

Table 3.9: Treatment experiences of the participants and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	n	%	n	%	n	%	p^a
Detoxification							.001
Never	263	42.9	178	45.9	85	37.8	
Once/first treatment	135	22.0	82	21.1	53	23.6	
$\geq$ 2x	146	23.8	72	18.6	74	32.9	
Outpatient treatment							.752
Never	357	58.2	221	57.0	136	60.4	
Once	98	16.0	58	14.9	40	17.8	
$\geq$ 2x	93	15.2	54	13.9	39	17.3	
Outpatient daycare							.049
Never	530	86.5	327	84.3	203	90.2	
Once	6	1.0	3	0.8	3	1.3	
$\geq$ 2x	11	1.8	3	0.8	8	3.6	
Opioid substitution therapy							$<$ .001
Never	526	85.8	332	85.6	194	86.2	
Once	14	2.3	1	0.3	13	5.8	
$\geq$ 2x	7	1.1	0	0.0	7	3.1	
Short-/medium-term inpatient care							.098
Never	118	19.2	64	16.5	54	24.0	
Once/first treatment	227	37.0	149	38.4	78	34.7	
$\geq$ 2x	200	32.6	118	30.4	82	36.4	
Therapeutic community							$<$ .001
Never	384	62.6	270	69.6	114	50.7	
Once/first treatment	102	16.6	43	11.1	59	26.2	
$\geq$ 2x	60	9.8	20	5.2	40	17.8	
Aftercare programs							.341
Never	468	76.3	291	75.0	177	78.7	
Once	50	8.2	26	6.7	24	10.7	
$\geq$ 2x	28	4.6	16	4.1	12	5.3	
Therapy drop-out							$<$ .001
First treatment/all completed	344	56.1	229	59.0	115	51.1	
1–3x terminated	138	22.5	71	18.3	67	29.8	
$\geq$ 4x terminated	47	7.7	18	4.6	29	12.9	

n = number of cases; p = p-value

[a] Pearson's chi-square test, Fisher's exact test (for categorical variables), and Mann-Whitney U test (for continuous variables) were used to determine the statistical differences between the AUD and SUD subsamples.

3.2 Outcomes of Health Literacy Assessment

3.2.1 Descriptive results of HLS-EU-Q47

The mean scores of participants in general health literacy and specific subscales of HLS-EU-Q47 and differences between the AUD and SUD subsamples are presented in Table 3.10.

Overall, participants achieved a mean score of 34.7 ± 6.7 out of 50 in *general health literacy*, as measured by HLS-EU-Q47. In terms of health literacy subdomains, participants achieved a mean score of 37.3 ± 6.5 in healthcare, 34.6 ± 7.8 in disease prevention, and 32.1 ± 8.4 in health promotion. Regarding the information processing dimensions, participants achieved a mean score of 34.8 ± 7.3 in accessing, 37.2 ± 7.1 in understanding, 32.5 ± 8.2 in appraising, and 34.4 ± 7.7 in applying health information.

The mean general health literacy score was 34.8 ± 6.6 for the AUD subsample and 34.4 ± 6.8 for the SUD subsample. Both subsamples achieved comparable results in general health literacy as well as specific subscales of HLS-EU-Q47.

Table 3.10: The mean scores (0–50) of participants in general health literacy and specific subscales of HLS-EU-Q47 and differences between the AUD and SUD subsamples

	Total		AUD		SUD		
	M	SD	M	SD	M	SD	p^a
General health literacy	34.7	6.7	34.8	6.6	34.4	6.8	.411
Health literacy subdomains							
Healthcare	37.3	6.5	37.6	6.4	36.7	6.5	.110
Disease prevention	34.6	7.8	34.9	7.7	34.1	8.0	.218
Health promotion	32.1	8.4	32.0	8.4	32.3	8.5	.698
Dimensions of health information processing							
Access health information	34.8	7.3	35.2	7.2	34.3	7.3	.148
Understand health information	37.2	7.1	37.4	7.0	36.8	7.3	.307
Appraise health information	32.5	8.2	32.7	8.1	32.1	8.4	.395
Apply health information	34.4	7.7	34.2	7.6	34.6	8.0	.607

M = mean; SD = standard deviation; p = p-value

[a] One-way ANOVA was used to determine the statistical differences between the AUD and SUD subsamples.

3.2.2 Distribution of health literacy

Figure 3.4 shows the distribution of four levels of health literacy in general health literacy among the participants. In *general health literacy*, 15.3% had an excellent level, 44.2% a sufficient level, 32.5% a problematic level, and 8% an inadequate level of health literacy; the prevalence of limited health literacy was 40.5% in the general sample.

The prevalence of limited health literacy was 38.9% for the AUD subsample and 43.1% for the SUD subsample. No difference was found in the prevalence of limited health literacy in general health literacy between the AUD and SUD subsamples.

Figure 3.4: Distribution of four levels of health literacy in general health literacy

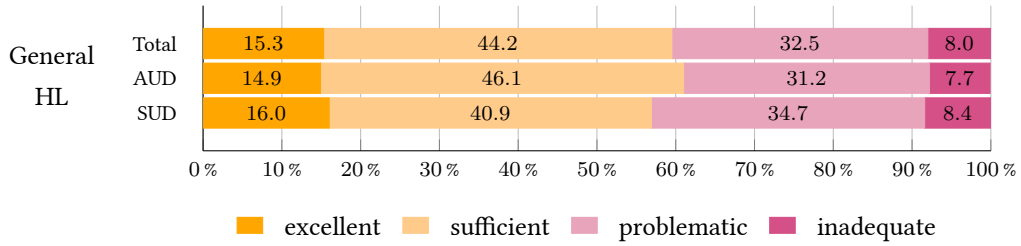


Figure 3.5 shows the distribution of four levels of health literacy in health literacy subdomains among the participants. In the *healthcare domain*, 22.5% had an excellent level, 52.5% a sufficient level, 20.9% a problematic level, and 4.1% an inadequate level of health literacy; the prevalence of limited health literacy in healthcare was 25% in the general sample. In the *disease prevention domain*, 19.2% had an excellent level, 41.1% a sufficient level, 27.4% a problematic level, and 12.2% an inadequate level of health literacy; the prevalence of limited health literacy in disease prevention was 38.7% in the general sample. In the *health promotion domain*, 12.2% had an excellent level, 33.8% a sufficient level, 32% a problematic level, and 22% an inadequate level of health literacy; the prevalence of limited health literacy in health promotion was 54.9% in the general sample.

In participants diagnosed with AUDs, 21.9% had a limited health literacy in healthcare, 38.7% in disease prevention, and 54.9% in health promotion. In participants with SUDs, 30.2% had a limited health literacy in healthcare, 41.3% in disease prevention, and 52.4% in health promotion.

Participants diagnosed with SUDs were more likely to have limited health literacy in healthcare (p = .026). Otherwise, differences in the prevalence of limited health literacy in health literacy subdomains were not significant between AUD and SUD subsamples.

Figure 3.5: Distribution of four levels of health literacy in health literacy subdomains

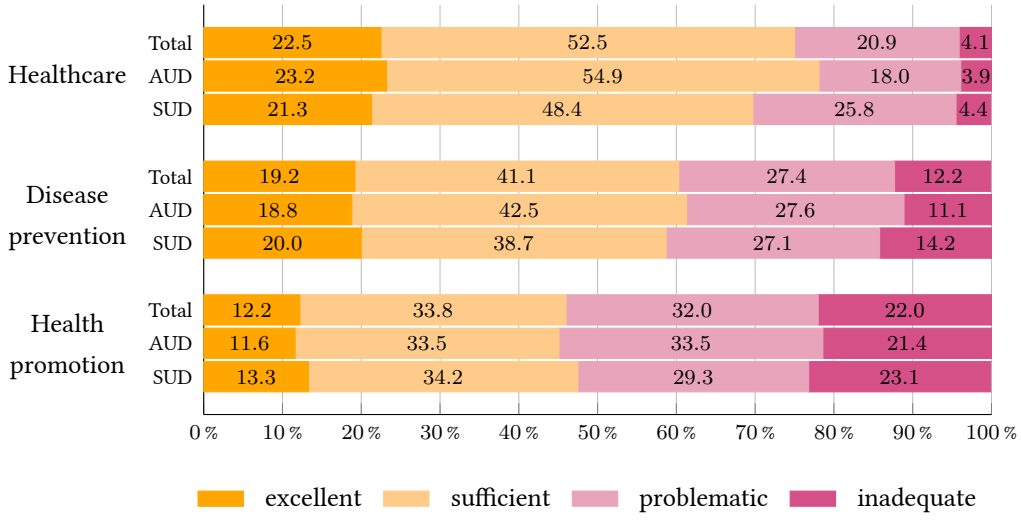
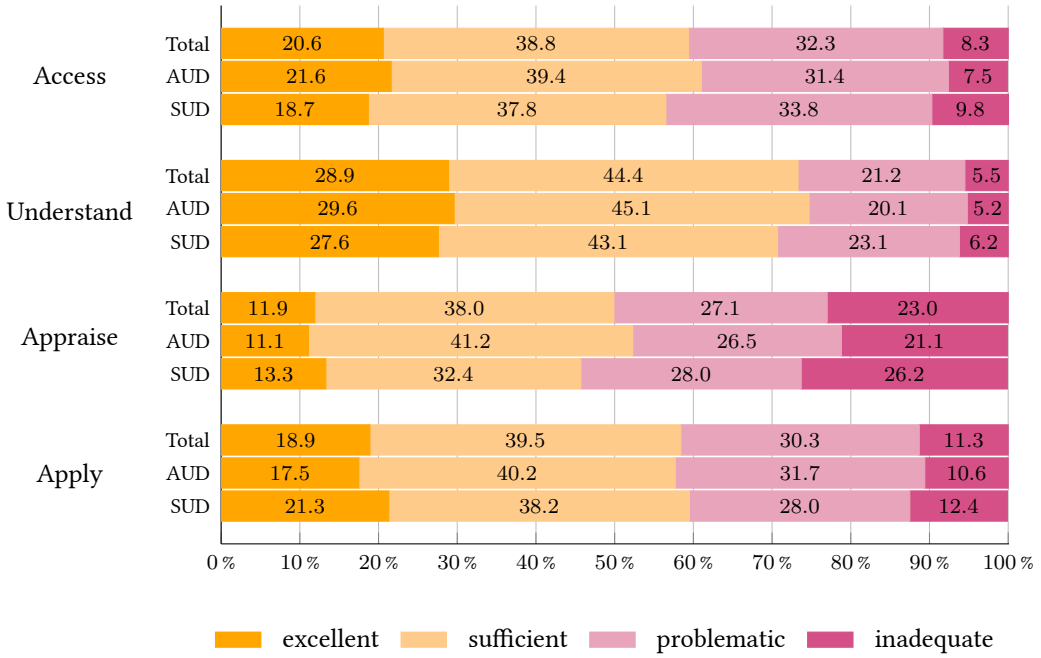


Figure 3.6 shows the distribution of four levels of health literacy in information processing dimensions among the participants. In *accessing health information*, 20.6% had an excellent level, 38.8% a sufficient level, 32.3% a problematic level, and 8.3% an inadequate level of health literacy; the prevalence of limited health literacy in accessing health information was 40.6% in the general sample. In *understanding health information*, 28.9% had an excellent level, 44.4% a sufficient level, 21.2% a problematic level, and 5.5% an inadequate level of health literacy; the prevalence of limited health literacy in understanding health information was 26.7% in the general sample. In *appraising health information*, 11.9% had an excellent level, 38% a sufficient level, 27.1% a problematic level, and 23% an inadequate level of health literacy; the prevalence of limited health literacy in appraising health information was 50.1% in the general sample. In *applying health information*, 18.9% had an excellent level, 39.5% a sufficient level, 30.3% a problematic level, and 11.3% an inadequate level of health literacy; the prevalence of limited health literacy in applying health information was 41.6% in the general sample.

In participants diagnosed with AUDs, 38.9% had a limited health literacy in accessing, 25.3% in understanding, 47.6% in appraising, and 42.3% in applying health information. In participants diagnosed with SUDs, 43.6% had a limited health literacy in accessing, 29.3% in understanding, 54.2% in appraising, and 40.4% in applying health information. No differences were found in the prevalence of limited health literacy in information processing dimensions between the AUD and SUD subsamples.

Figure 3.6: Distribution of four levels of health literacy in information processing dimensions



3.3 Health Literacy Correlates

3.3.1 Socioeconomic characteristics and health literacy

Simple linear regression was used to estimate the relationship between general health literacy and socioeconomic characteristics of the participants (Table 3.11).

In the general sample, general health literacy was significantly and positively associated with formal health education (b = 3.84, 95% CI [1.78, 5.89], $p < .001$) and household net income (b = 0.16, 95% CI [0.01, 0.31], p = .037) and negatively with homelessness (b = -1.93, 95% CI [-3.69, -0.17], p = .031) and unemployment (b = -1.20, 95% CI [-2.27, -0.13], p = .028). Healthcare professionals scored, on average, 3.84 points higher in HLS-EU-Q47. An increase in one category of household net income corresponded to a 0.16 point increase in general health literacy. Homeless participants scored 1.93 points lower in HLS-EU-Q47. Unemployed participants scored 1.20 points lower in HLS-EU-Q47. No significant relationship was found between general health literacy and gender, age, marital status, household size, level of education, length of unemployment, debt situation, and size of place of residence.

In the AUD subsample, general health literacy was significantly and positively associated with formal health education (b = 3.35, 95% CI [0.93, 5.58], p = .007) and negatively with homelessness (b = -3.19, 95% CI [-5.73, -0.64], p = .014) and unemployment (b = -1.36, 95% CI [-2.71, -0.01], p = .048). No significant relationship was found between general health literacy and gender, age, marital status, household size, level of education, length of unemployment, household net income, debt situation, and size of place of residence.

In the SUD subsample, general health literacy was significantly and positively associated only with formal health education (b = 4.95, 95% CI [1.03, 8.87], p = .014). No significant relationship was found between general health literacy and gender, age, marital status, housing conditions, household size, level of education, employment status, length of unemployment, household net income, debt situation, and size of place of residence.

Bivariate analysis of health literacy subdomains and information processing dimensions and socioeconomic factors for the general sample is presented in Tables A.2 and A.4.

Household size was positively associated with higher scores in the health promotion subdomain (p = .040) and in applying health information (p = .025). Homeless participants scored lower in healthcare (p = .031) and health promotion subdomains (p = .012). They also scored lower in understanding (p = .038), appraising (p = .031), and applying health information (p = .040). Unemployed participants scored lower in disease prevention (p = .026) and health promotion subdomains (p = .042), and in understanding (p = .041) and applying health information (p = .015). Those who reported lower household net income and debts scored lower in health promotion (p = .014 and p = .044, respectively) and in understanding health information (p = .004 and p = .045, respectively). Scores of healthcare professionals were consistently higher in all subscales ($p < .05$).

Table 3.11: Simple linear regression for general health literacy (dependent variable) and socioeconomic factors for the general sample and the AUD and SUD subsamples

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Gender												
Male	-1.07	[-2.54, 0.40]	0.75	.152	-0.02	[-0.12, 0.09]	1.10	.753	-0.04	[-1.25, 1.18]	0.62	.952
Female (Ref.)												
Age	-0.02	[-0.08, 0.05]	0.03	.607	-0.02	[-0.12, 0.09]	0.05	.753	-0.01	[-0.05, 0.04]	0.03	.835
Marital status												
Married	1.19	[-0.42, 2.79]	0.82	.147	1.47	[-2.66, 5.61]	2.10	.783	1.28	[-0.18, 2.75]	0.75	.086
Non-married	-0.40	[-1.74, 0.95]	0.68	.560	0.05	[-2.44, 2.55]	1.27	.967	-0.40	[-1.48, 0.68]	0.55	.468
Divorced/widowed	-0.47	[-1.87, 0.94]	0.71	.514	-0.82	[-3.77, 2.12]	1.50	.583	-0.38	[-1.60, 0.84]	0.62	.541
Housing conditions												
Without a home	-3.19	[-5.73, -0.64]	1.29	.014	-0.65	[-3.17, 1.87]	1.28	.610	-1.93	[-3.69, -0.17]	0.90	.031
Stable housing (Ref.)												
Household size	0.43	[-0.10, 0.97]	0.27	.110	0.34	[-0.28, 0.96]	0.34	.278	0.37	[-0.03, 0.77]	0.20	.072
Level of education	-0.34	[-0.89, 0.23]	0.28	.240	0.95	[-1.14, 2.03]	0.55	.086	0.02	[-0.44, 0.49]	0.24	.920
Employment status												
Unemployed	-1.36	[-2.71, -0.01]	0.69	.048	-0.86	[-2.76, 1.04]	0.96	.373	-1.20	[-2.27, -0.13]	0.55	.028
Employed (Ref.)												
Length of unemployment	0.01	[-0.07, 0.08]	0.04	.835	-0.00	[-0.06, 0.05]	0.03	.933	0.00	[-0.04, 0.05]	0.02	.944
Formal health education												
Yes	3.35	[0.93, 5.58]	1.23	.007	4.95	[1.03, 8.87]	1.99	.014	3.84	[1.78, 5.89]	1.05	$< .001$
No (Ref.)												
Household net income	0.15	[-0.04, 0.34]	0.10	.127	0.18	[-0.07, 0.42]	0.12	.157	0.16	[0.01, 0.31]	0.08	.037
Debt situation												
Debts	-0.35	[-1.81, 1.11]	0.74	.637	-1.47	[-3.25, 0.32]	0.91	.107	-0.87	[-1.97, 0.23]	0.56	.119
No debts (Ref.)												
Size of place of residence												
$>$ 100,000 inhabitants	0.06	[-1.42, 1.53]	0.75	.937	-0.76	[-2.69, 1.17]	0.98	.439	-0.27	[-1.44, 0.90]	0.59	.650
5,000–100,000 inhabitants	0.68	[-0.68, 2.05]	0.69	.322	0.91	[-0.97, 2.78]	0.95	.341	0.78	[-0.31, 1.88]	0.56	.161
$<$ 5,000 inhabitants	-1.04	[-2.64, 0.58]	0.82	.208	-0.25	[-2.41, 1.90]	1.09	.818	-0.75	[-2.03, 0.54]	0.66	.254

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

3.3.2 Self-reported health indicators and quality of life and health literacy

Simple linear regression was used to estimate the relationship between general health literacy and self-reported health indicators and quality of life of the participants (Table 3.12).

In the general sample, general health literacy was significantly and positively associated with general health status (b = 1.26, 95% CI [0.77, 1.75], $p < .001$), mental health status (b = 1.28, 95% CI [0.79, 1.77], $p < .001$), physical condition (b = 1.31, 95% CI [0.83, 1.79], $p < .001$), and quality of life (b = 1.35, 95% CI [0.84, 1.87], $p < .001$). Participants who reported having better general health status, mental health status, physical condition, and quality of life scored, on average, higher in HLS-EU-Q47. An increase in one category of general health status corresponded to a 1.26 point increase in general health literacy. An increase in one category of mental health status corresponded to a 1.28 point increase in general health literacy. An increase in one category of physical condition corresponded to a 1.31 point increase in general health literacy. An increase in one category of quality of life corresponded to a 1.35 point increase in general health literacy. No significant relationship was found between general health literacy and psychiatric comorbidity or specific types of mental disorders.

Figure 3.7 shows the distribution of health literacy according to self-reported health indicators and quality of life for the general sample.

In the AUD subsample, general health literacy was significantly and positively associated with mood disorders (b = 2.21, 95% CI [0.01, 4.41], p = .049), general health status (b = 1.21, 95% CI [0.61, 1.82], $p < .001$), mental health status (b = 1.03, 95% CI [0.42, 1.64], p = .001), physical condition (b = 1.40, 95% CI [0.79, 2.00], $p < .001$), and quality of life (b = 1.39, 95% CI [0.75, 2.02], $p < .001$). Participants who reported living with mood disorders scored 2.21 points higher in HLS-EU-Q47. No significant relationship was found between general health literacy and psychiatric comorbidity or other specific types of mental disorders.

In the SUD subsample, general health literacy was significantly and positively associated with general health status (b = 1.39, 95% CI [0.55, 2.23], p = .001), mental health status (b = 1.76, 95% CI [0.93, 2.58], $p < .001$), physical condition (b = 1.25, 95% CI [0.46, 2.05], p = .002), and quality of life (b = 1.27, 95% CI [0.37, 2.16], p = .006). No significant relationship was found between general health literacy and psychiatric comorbidity or specific types of mental disorders.

Bivariate analysis of health literacy subdomains and information processing dimensions and health-related factors for the general sample is shown in Tables A.3 and A.4.

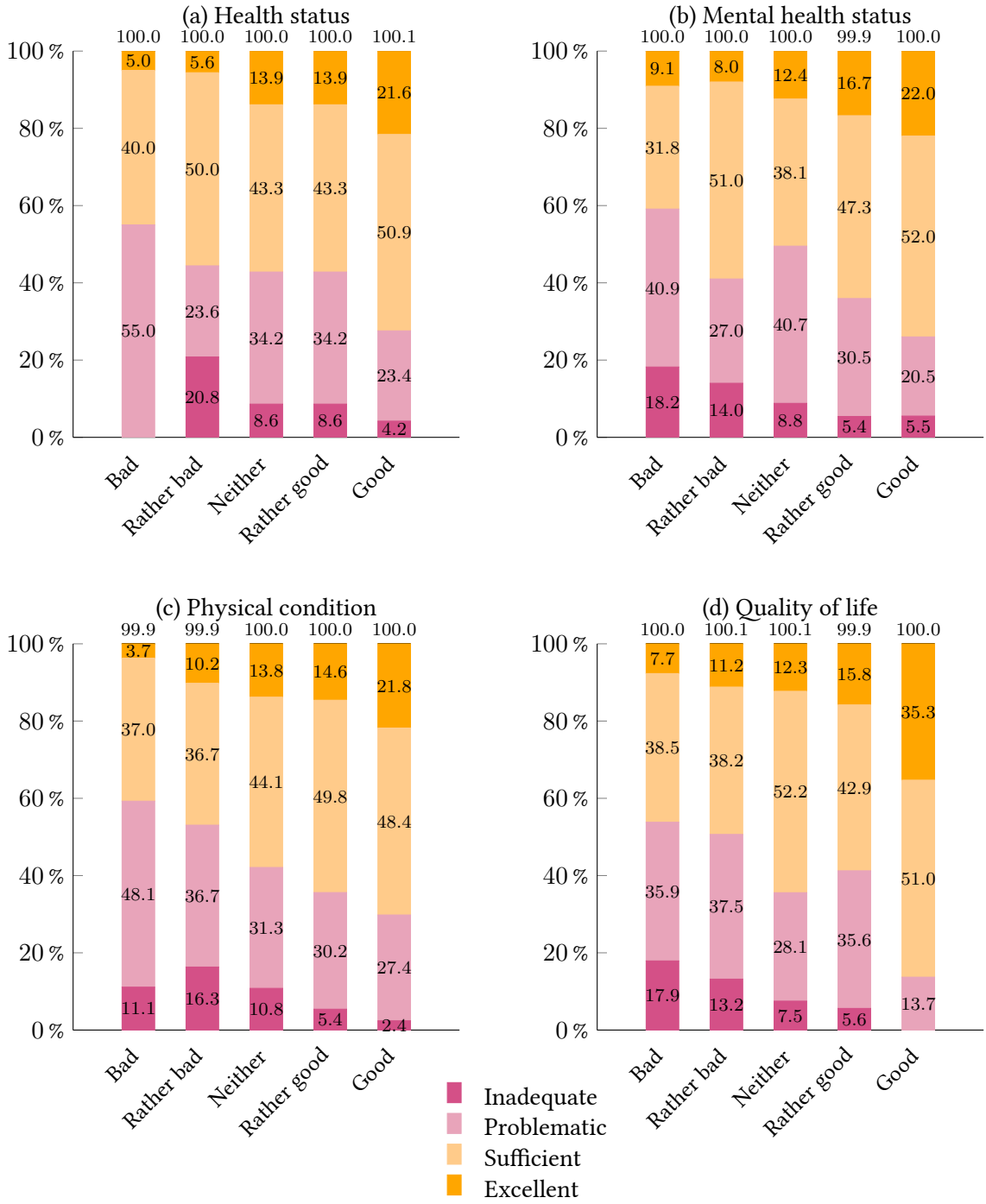
Participants with mood disorders scored higher in the disease prevention subdomain (p = .045) and in appraising health information (p = .023). Self-reported general health status, mental health status, physical condition, and quality of life were associated with all subdomains and information processing dimensions ($p < .01$).

Table 3.12: Simple linear regression for general health literacy (dependent variable) and self-reported health indicators and quality of life for the general sample and the AUD and SUD subsamples

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Psychiatric comorbidity												
Yes	0.40	[-1.23, 2.04]	0.83	.627	1.24	[-0.77, 3.24]	1.02	.226	0.70	[-0.56, 1.96]	0.64	.276
No (Ref.)												
Comorbid disorder (Ref. = None)												
Anxiety disorders	0.55	[-2.21, 3.30]	1.40	.697	3.75	[-0.56, 8.06]	2.19	.088	1.53	[-0.79, 3.85]	1.18	.195
Mood disorders	2.21	[0.01, 4.41]	1.12	.049	-0.49	[-4.19, 3.21]	1.88	.794	1.53	[-0.36, 3.42]	0.96	.112
Psychotic disorders					1.91	[-1.09, 4.92]	1.53	.211	0.78	[-1.86, 3.41]	1.34	.564
Personality disorders	-1.53	[-6.19, 3.13]	2.37	.519	2.14	[-3.01, 7.28]	2.61	.414	0.11	[-3.33, 3.54]	1.75	.951
Health status	1.21	[0.61, 1.82]	0.31	$< .001$	1.39	[0.55, 2.23]	0.43	.001	1.26	[0.77, 1.75]	0.25	$< .001$
Mental health status	1.03	[0.42, 1.64]	0.31	.001	1.76	[0.93, 2.58]	0.42	$< .001$	1.28	[0.79, 1.77]	0.25	$< .001$
Physical condition	1.40	[0.79, 2.00]	0.31	$< .001$	1.25	[0.46, 2.05]	0.40	.002	1.31	[0.83, 1.79]	0.24	$< .001$
Quality of life	1.39	[0.75, 2.02]	0.32	$< .001$	1.27	[0.37, 2.16]	0.45	.006	1.35	[0.84, 1.87]	0.26	$< .001$

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Figure 3.7: Health literacy according to self-reported health indicators for the general sample



3.3.3 Substance use behavior and health literacy

Simple linear regression was used to estimate the relationship between general health literacy and substance use behavior of the participants (Table 3.13).

In the general sample, general health literacy was significantly and negatively associated with daily alcohol use (b = -1.26, 95% CI [-2.34, -0.18], p = .022), daily HED (b = -1.37, 95% CI [-2.50, -0.23], p = .019), and weekly alcohol intoxication (b = -1.14, 95% CI [-2.24, -0.03], p = .044). Participants who reported daily alcohol use scored, on average, 1.26 points lower in HLS-EU-Q47. Participants who reported daily HED scored 1.37 points lower in HLS-EU-Q47. Participants who reported weekly alcohol intoxication scored 1.14 points lower in HLS-EU-Q47. No significant relationship was found between general health literacy and other substance use-related factors.

In the AUD subsample, general health literacy was significantly and negatively associated with past-year frequency of alcohol use (b = -0.87, 95% CI [-1.47, -0.28], p = .004), frequency of HED (b = -0.86, 95% CI [-1.44, -0.28], p = .004), frequency of alcohol intoxication (b = -0.58, 95% CI [-1.02, -015], p = .009), daily alcohol use (b = -2.05, 95% CI [-3.39, -0.70], p = .003), daily HED (b = -1.70, 95% CI [-3.06, -0.34], p = .015), weekly alcohol intoxication (b = -1.40, 95% CI [-2.74, -0.05], p = .041) and past-year gambling (b = -4.96, 95% CI [-7.72, -2.20], $p < .001$). An increase in one category of past-year frequency of alcohol use corresponded to a 0.87 point decrease in general health literacy on average. An increase in one category of past-year frequency of HED corresponded to 0.86 point decrease in general health literacy. An increase in one category of past-year frequency of alcohol intoxication corresponded to a 0.58 point decrease in general health literacy. Participants who reported gambling in the past year scored, on average, 4.96 points lower in HLS-EU-Q47.

In the SUD subsample, no significant relationship was found between general health literacy and substance use-related factors.

Bivariate analysis for health literacy subdomains and information processing dimensions and substance use-related and treatment-related factors for the general sample is shown in Tables A.5 and A.6.

Participants who reported higher frequency of alcohol use, HED, and alcohol intoxication scored lower in health promotion ($p < .01$ for all variables) and in applying health information ($p < .01$ for all variables). Moreover, the higher frequency of alcohol intoxication was associated with lower scoring in understanding ($p = .017$) and appraising health information ($p = .039$). Past-year daily alcohol use was associated with lower scores in disease prevention ($p = .046$) and in understanding health information ($p = .017$). Those with lower age at the onset of alcohol intoxication scored lower in disease prevention ($p = .030$) and in appraising health information ($p = .020$). Lifetime gambling was associated with lower scores in disease prevention ($p = .016$) and in appraising health information ($p = .020$).

Table 3.13: Simple linear regression for general health literacy (dependent variable) and substance use-related factors for the general sample and the AUD and SUD subsamples

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Cigarette smoking												
Current smoker	1.31	[-0.18, 2.79]	0.75	.084	0.30	[-1.99, 2.59]	1.16	.798	0.93	[-0.31, 2.17]	0.63	.140
Non-smoker (Ref.)												
Frequency of alcohol use	-0.87	[-1.47, -0.28]	0.30	.004	0.01	[-0.48, 0.49]	0.25	.977	-0.21	[-0.55, 0.12]	0.17	.215
Frequency of HED	-0.86	[-1.44, -0.28]	0.30	.004	0.11	[-0.38, 0.59]	0.25	.670	-0.26	[-0.59, 0.07]	0.17	.118
Frequency of alcohol intoxication	-0.58	[-1.02, -0.15]	0.22	.009	0.33	[-0.29, 0.95]	0.32	.291	-0.42	[-0.76, -0.08]	0.17	.016
Past-year alcohol use												
Daily	-2.05	[-3.39, -0.70]	0.69	.003	-0.33	[-2.32, 1.66]	1.01	.747	-1.26	[-2.34, -0.18]	0.55	.022
Less than daily (Ref.)												
Past-year HED												
Daily	-1.70	[-3.06, -0.34]	0.69	.015	-1.10	[-3.38, 1.17]	1.16	.340	-1.37	[-2.50, -0.23]	0.58	.019
Less than daily (Ref.)												
Past-year alcohol intoxication												
Weekly	-1.40	[-2.74, -0.05]	0.68	.041	-1.13	[-3.31, 1.05]	1.11	.308	-1.14	[-2.24, -0.03]	0.56	.044
Less than weekly (Ref.)												
Lifetime any illicit drug use												
Yes	0.35	[-1.06, 1.76]	0.72	.624					0.04	[-1.26, 1.33]	0.66	.956
No (Ref.)												
Past-year any illicit drug use												
Yes	0.56	[-0.83, 1.94]	0.71	.432					-0.00	[-1.10, 1.10]	0.56	.996
No												
Lifetime illicit drug use (Ref. = No)												
Cannabis	-0.14	[-1.49, 1.21]	0.69	.841	1.13	[-2.70, 4.95]	1.94	.562	-0.18	[-1.34, 0.99]	0.59	.768

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Simple linear regression for general health literacy (dependent variable) and substance use-related factors for the general sample and the AUD and SUD subsamples (Continued)

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Ecstasy	1.01	[-0.64, 2.66]	0.84	.231	0.22	[-1.98, 2.42]	1.12	.847	0.24	[-0.85, 1.33]	0.55	.665
Methamphetamine and other amp.	0.12	[-1.38, 1.63]	0.77	.871	-0.15	[-3.09, 2.80]	1.50	.922	-0.20	[-1.27, 0.88]	0.55	.719
Cocaine	-0.86	[-2.59, 0.87]	0.88	.327	-0.02	[-1.89, 1.85]	0.95	.987	-0.59	[-1.71, 0.54]	0.57	.304
Heroin and other opioids	1.34	[-1.41, 4.09]	1.40	.338	-0.74	[-2.58, 1.11]	0.94	.434	-0.32	[-1.71, 1.07]	0.71	.653
Buprenorphine and methadon	2.17	[-1.15, 5.50]	1.69	.200	1.11	[-0.88, 3.10]	1.01	.271	0.98	[-0.61, 2.56]	0.81	.226
Hallucinogens	0.10	[-1.51, 1.72]	0.82	.900	1.18	[-0.79, 3.14]	1.00	.239	0.20	[-0.90, 1.30]	0.56	.720
Inhalants	0.80	[-1.85, 3.45]	1.35	.554	-0.60	[-2.55, 1.35]	0.99	.548	-0.31	[-1.79, 1.16]	0.75	.677
New psychoactive substances	2.04	[-1.29, 5.37]	1.69	.229	0.13	[-2.03, 2.28]	1.09	.906	0.38	[-1.33, 2.09]	0.87	.663
Psychoactive medicine	0.15	[-1.32, 1.62]	0.75	.840	0.81	[-1.07, 2.70]	0.96	.395	0.20	[-0.89, 1.29]	0.55	.718
Lifetime gambling												
Yes	-1.55	[-3.37, 0.27]	0.93	.094	-0.32	[-2.12, 1.49]	0.92	.731	-0.97	[-2.15, 0.20]	0.60	.104
No (Ref.)												
Past-year illicit drug use (Ref. = No)												
Cannabis	-0.69	[-2.25, 0.88]	0.80	.390	0.14	[-2.10, 2.38]	1.14	.900	-0.52	[-1.60, 0.57]	0.55	.349
Ecstasy	1.00	[-1.75, 3.75]	1.40	.474	1.27	[-0.55, 3.09]	0.92	.169	0.57	[-0.70, 1.83]	0.65	.381
Methamphetamine and other amp.	1.08	[-1.60, 2.63]	0.57	.634	-0.51	[-2.83, 1.82]	1.18	.668	-0.27	[-1.38, 0.85]	0.57	.641
Cocaine	-2.31	[-5.11, 0.49]	1.42	.106	1.33	[-0.51, 3.17]	0.93	.155	-0.02	[-1.40, 1.37]	0.70	.980
Heroin and other opioids	2.00	[-3.87, 7.87]	2.99	.503	-0.56	[-2.91, 1.78]	1.19	.635	-0.47	[-2.51, 1.57]	1.04	.651
Buprenorphine and methadon	5.15	[0.20, 10.11]	2.52	.041	0.82	[-1.59, 3.23]	1.23	.504	1.25	[-0.81, 3.31]	1.05	.233
Hallucinogens	0.65	[-2.79, 4.09]	1.75	.711	1.57	[-0.28, 3.42]	0.94	.095	0.84	[-0.59, 2.27]	0.73	.250
Inhalants	0.45	[-3.95, 4.85]	2.24	.841	1.04	[-1.90, 3.99]	1.50	.486	0.68	[-1.70, 3.07]	1.22	.574
New psychoactive substances	-0.41	[-5.78, 4.96]	2.73	.881	-1.16	[-2.76, 2.44]	1.32	.904	-0.43	[-2.65, 1.81]	1.14	.708
Psychoactive medicine	1.61	[-0.09, 3.30]	0.86	.063	-0.55	[-2.37, 1.27]	0.92	.552	0.37	[.0.81, 1.55]	0.60	.540

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Simple linear regression for general health literacy (dependent variable) and substance use-related factors for the general sample and the AUD and SUD subsamples (Continued)

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Past-year gambling												
Yes	-4.96	[-7.72, -2.20]	1.41	$< .001$	0.96	[-0.89, 2.80]	0.94	.309	-0.86	[-2.24, 0.52]	0.70	.223
No (Ref.)												
First alcohol use	0.11	[-0.07, 0.28]	0.09	.233	0.05	[-0.32, 0.43]	0.19	.782	0.10	[-0.05, 0.25]	0.08	.190
First alcohol intoxication	0.11	[-0.02, 0.25]	0.07	.103	0.09	[-0.26, 0.43]	0.17	.614	0.10	[-0.02, 0.22]	0.06	.088
First cannabis use	-0.07	[-0.20, 0.06]	0.07	.278	0.05	[-0.16, 0.27]	0.11	.620	-0.03	[-0.13, 0.08]	0.05	.593
First illicit drug use	-0.04	[-0.27, 0.18]	0.12	.705	0.11	[-0.11, 0.33]	0.11	.311	0.04	[-0.12, 0.19]	0.08	.630
Injecting drug use												
Yes					-0.62	[-2.46, 1.22]	0.94	.508				
No (Ref.)												
First injecting drug use					-0.13	[-0.43, 0.17]	0.15	.377				
Needle sharing												
Yes					-2.36	[-4.77, 0.05]	1.22	.054				
No (Ref.)												
Drug-related infectious diseases												
Yes					-0.28	[-2.35, 1.80]	1.05	.793				
No (Ref.)												

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

3.3.4 Treatment experiences and health literacy

Simple linear regression was used to estimate the relationship between general health literacy and treatment experiences of the participants (Table 3.14).

Overall, no statistically significant relationship was found between general health literacy and treatment-related factors for the general sample nor the AUD and SUD subsamples.

For bivariate analysis of health literacy subdomains and information processing dimensions and treatment-related factors for the general sample, see Tables A.5 and A.6.

Participants who reported higher one or more therapy drop-outs scored significantly lower in the disease prevention domain ($p = .049$) and in understanding health information ($p = .015$).

Table 3.14: Simple linear regression for general health literacy (dependent variable) and treatment experiences for the general sample and the AUD and SUD subsamples

	AUD				SUD				Total			
	b	[95% CI]	SE	p	b	[95% CI]	SE	p	b	[95% CI]	SE	p
Recruitment												
Detoxification	0.13	[-1.47, 1.73]	0.81	.875	0.29	[-2.15, 2.72]	1.24	.818	0.22	[-1.12, 1.55]	0.68	.750
Short-/medium-term inpatient care	0.18	[-1.23, 1.60]	0.72	.798	-0.29	[-2.08, 1.50]	0.91	.750	0.05	[-1.05, 1.15]	0.56	.924
Therapeutic community	-0.66	[-2.81, 1.49]	1.10	.547	0.16	[-1.81, 2.13]	1.00	.871	-0.33	[-1.73, 1.08]	0.71	.647
Detoxification												
Once/first treatment (Ref.)												
2x or more times	0.51	[-1.61, 2.63]	1.07	.634	0.85	[-1.56, 3.27]	1.22	.486	0.60	[-0.98, 2.17]	0.80	.457
Short-/medium-term inpatient care												
Once/first treatment (Ref.)												
2x or more times	-0.24	[-1.85, 1.37]	0.82	.772	-1.03	[-3.15, 1.09]	1.07	.337	-0.58	[-1.85, 0.70]	0.65	.374
Therapeutic community												
Once/first treatment (Ref.)												
2x or more times	1.87	[-1.72, 5.45]	1.79	.302	-1.65	[-4.40, 1.10]	1.39	.237	-0.37	[-2.53, 1.78]	1.09	.733
Therapy drop-out												
First treatment/all completed (Ref.)												
1x or more times terminated	-1.17	[-2.79, 0.46]	0.83	.159	-0.94	[-2.78, 0.91]	0.94	.319	-1.13	[-2.35, 0.06]	0.61	.063

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

3.4 Health Literacy as a Predictor of Self-Reported Health Indicators and Quality of Life

Simple linear regression showed a significant relationship between general health literacy and self-reported general health status, mental health status, physical condition, and quality of life. Hierarchical logistic regression has been used to determine whether general health literacy is an independent predictor of self-reported health indicators and quality of life when the regression model is adjusted for socioeconomic, health-related, and substance use-related factors.

3.4.1 Hierarchical model of self-reported general health status

The hierarchical logistic regression model of self-reported general health status is presented in Table 3.15.

A four-stage hierarchical logistic regression was performed with the self-reported general health status as a dependent variable and gender, age, level of education, household net income (Model 1), past-year frequency of alcohol use, past-year any illicit drug use (Model 2), physical condition (Model 3), and general health literacy (Model 4) as predictors.

In the first model, age (OR = 0.97, 95% CI [0.96, 0.99], p = .001) and household net income (OR = 1.08, 95% CI [1.04, 1.13], p = .001) contributed significantly to the regression model, while gender and level of education did not have a significant predictive effect on self-reported general health status. Model 1 containing sociodemographic factors was significant ($\chi^2(4) = 31.41$, $p < .001$). In the second model, past-year frequency of alcohol use contributed significantly to the regression model (OR = 0.87, 95% CI [0.79, 0.97], p = .013). Past-year any illicit drug use did not have a significant predictive effect on self-reported general health status. Age and household net income remained to be associated with self-reported general health status. Introducing substance use-related factors to the regression resulted in a significant model ($\chi^2(6) = 38.79$, $p < .001$). In the third model, physical condition (OR = 3.37, 95% CI [2.78, 4.09], $p < .001$) contributed significantly to the regression model. While age, household net income, and past-year frequency of alcohol use dropped out of significance in the third model, level of education start to be of predictive value (OR = 1.22, 95% CI [1.04, 1.44], p = .016). Introducing the physical condition to the regression resulted in a significant model ($\chi^2(7) = 215.68$, $p < .001$). Finally, in the fourth model, general health literacy was significantly associated with self-reported general health status (OR = 1.03, 95% CI [1.00, 1.06], p = .030). Level of education and physical condition remained significant. Final model containing all variables was significant ($\chi^2(8) = 220.40$, $p < .001$).

In the final model, VIFs ranged from 1.04 to 1.60, indicating a low degree of multicollinearity between the independent variables in the regression model.

Table 3.15: Hierarchical logistic regression of general health status for the general sample

	b	SE	OR	[95% CI]	p	VIF
Model 1						
Gender						1.04
Male (Ref.)						
Female	-0.06	0.18	0.94	[0.66, 1.34]	.740	
Age	-0.03	0.01	0.97	[0.96, 0.99]	.001	1.23
Level of education	0.12	0.08	1.12	[0.97, 1.31]	.125	1.25
Household net income	0.08	0.02	1.08	[1.04, 1.13]	.001	1.09
Model 2						
Gender						1.07
Male (Ref.)						
Female	-0.14	0.19	0.87	[0.60, 1.27]	.468	
Age	-0.03	0.01	0.97	[0.96, 0.99]	.003	1.59
Level of education	0.16	0.08	1.17	[1.00, 1.37]	.051	1.27
Household net income	0.08	0.02	1.08	[1.03, 1.14]	.001	1.14
Frequency of alcohol use	-0.14	0.05	0.87	[0.79, 0.97]	.013	1.11
Past-year any illicit drug use						1.36
Yes (Ref.)						
No	0.26	0.19	1.30	[0.89, 1.90]	.169	
Model 3						
Gender						1.07
Male (Ref.)						
Female	-0.07	0.20	0.94	[0.64, 1.38]	.741	
Age	-0.01	0.01	0.99	[0.97, 1.01]	.169	1.59
Level of education	0.20	0.08	1.22	[1.04, 1.44]	.016	1.27
Household net income	0.03	0.02	1.03	[0.98, 1.08]	.246	1.14
Frequency of alcohol use	-0.10	0.06	0.91	[0.81, 1.01]	.085	1.11
Past-year any illicit drug use						1.36
Yes (Ref.)						
No	0.16	0.20	1.17	[0.79, 1.73]	.425	
Physical condition	1.22	0.10	3.37	[2.78, 4.09]	$<$ .001	1.12
Model 4						
Gender						1.08
Male (Ref.)						
Female	-0.09	0.20	0.91	[0.62, 1.34]	.635	
Age	-0.01	0.01	0.99	[0.97, 1.00]	.133	1.60
Level of education	0.21	0.08	1.23	[1.05, 1.45]	.013	1.27
Household net income	0.03	0.03	1.03	[0.98, 1.08]	.323	1.15
Frequency of alcohol use	-0.09	0.06	0.91	[0.82, 1.02]	.096	1.11
Past-year any illicit drug use						1.36
Yes (Ref.)						
No	0.17	0.20	1.19	[0.80, 1.76]	.387	
Physical condition	1.19	0.10	3.30	[2.72, 4.00]	$<$ .001	1.15
General health literacy	0.03	0.01	1.03	[1.00, 1.06]	.030	1.04

Ref. = reference group; b = unstandardized coefficient; SE = standard error of b; OR = odds ratio; CI = confidence interval; p = p-value; VIF = variance inflation factor

3.4.2 Hierarchical model of self-reported mental health status

The hierarchical logistic regression model of self-reported mental health status is presented in Table 3.16.

A four-stage hierarchical logistic regression was performed with the self-reported mental health status as a dependent variable and gender, age, level of education, employment status (Model 1), past-year frequency of alcohol use, past-year any illicit drug use (Model 2), psychiatric comorbidity (Model 3), and general health literacy (Model 4) as predictors.

In the first model, gender (OR = 0.70, 95% CI [0.49, 0.98], p = .040) and employment status (OR = 1.73, 95% CI [1.27, 2.35], $p < .001$) contributed significantly to the regression model. Age and level of education did not have a significant predictive effect on mental health status. Model 1 containing sociodemographic factors was significant ($\chi^2(4) = 20.22$, $p < .001$). In the second model, past-year frequency of alcohol use (OR = 0.90, 95% CI [0.81, 0.99], p = .035) and past-year any illicit drug use (OR = 1.50, 95% CI [1.04, 2.15], p = .029) contributed significantly to the regression model. Gender and employment status remained to be significant in the second model. Introducing substance use-related factors to the regression resulted in a significant model ($\chi^2(6) = 30.22$, $p < .001$). In the third model, psychiatric comorbidity (OR = 2.07, 95% CI [1.42, 3.00], $p < .001$) contributed significantly to the regression model. Gender, employment status, past-year frequency of alcohol use, and past-year any illicit drug use remained significant. Introducing psychiatric comorbidity to the regression resulted in a significant model ($\chi^2(7) = 43.95$, $p < .001$). In the fourth model, general health literacy was significantly associated with self-reported mental health status (OR = 1.06, 95% CI [1.04, 1.09], $p < .001$). Gender, employment status, past-year frequency of alcohol use, past-year any illicit drug use, and psychiatric comorbidity remained significant. Final model containing all variables was significant ($\chi^2(8) = 67.61$, $p < .001$).

In the final model, VIFs ranged from 1.02 to 1.50, indicating a low degree of multicollinearity between the independent variables in the regression model.

Table 3.16: Hierarchical logistic regression of self-reported mental health status for the general sample

	b	SE	OR	[95% CI]	p	VIF
Model 1						
Gender						1.04
Male (Ref.)						
Female	-0.36	0.18	0.70	[0.49, 0.98]	.040	
Age	-0.01	0.01	0.99	[0.98, 1.00]	.151	1.19
Level of education	0.07	0.07	1.07	[0.93, 1.24]	.341	1.22
Employment status						1.06
Unemployed (Ref.)						
Employed	0.55	0.16	1.73	[1.27, 2.35]	$< .001$	

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Hierarchical logistic regression of self-reported mental health status for the general sample (Continued)

	b	SE	OR	[95% CI]	p	VIF
Model 2						
Gender						1.07
Male (Ref.)						
Female	-0.45	0.18	0.64	[0.45, 0.92]	.016	
Age	-0.01	0.01	0.99	[0.97, 1.00]	.096	1.50
Level of education	0.08	0.08	1.09	[0.93, 1.26]	.285	1.22
Employment status						1.07
Unemployed (Ref.)						
Employed	0.60	0.16	1.83	[1.33, 2.51]	$< .001$	
Frequency of alcohol use	-0.11	0.05	0.90	[0.81, 0.99]	.035	1.08
Past-year any illicit drug use						1.35
Yes (Ref.)						
No	0.40	0.18	1.50	[1.04, 2.15]	.029	
Model 3						
Gender						1.07
Male (Ref.)						
Female	-0.40	0.18	0.67	[0.46, 0.97]	.032	
Age	-0.02	0.01	0.98	[0.97, 1.00]	.064	1.50
Level of education	0.09	0.08	1.10	[0.94, 1.28]	.230	1.23
Employment status						1.08
Unemployed (Ref.)						
Employed	0.54	0.16	1.71	[1.24, 2.36]	.001	
Frequency of alcohol use	-0.11	0.05	0.89	[0.81, 0.99]	.031	1.09
Past-year any illicit drug use						1.37
Yes (Ref.)						
No	0.41	0.19	1.50	[1.04, 2.17]	.031	
Psychiatric comorbidity						1.04
Yes (Ref.)						
No	0.73	0.19	2.07	[1.42, 3.00]	$< .001$	
Model 4						
Gender						1.08
Male (Ref.)						
Female	-0.48	0.19	0.62	[0.43, 0.90]	.012	
Age	-0.02	0.01	0.99	[0.97, 1.00]	.079	1.50
Level of education	0.11	0.08	1.12	[0.96, 1.30]	.156	1.23
Employment status						1.09
Unemployed (Ref.)						
Employed	0.47	0.17	1.60	[1.15, 2.21]	.005	
Frequency of alcohol use	-0.10	0.05	0.90	[0.81, 1.00]	.046	1.09
Past-year any illicit drug use						1.37
Yes (Ref.)						

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Hierarchical logistic regression of self-reported mental health status for the general sample (Continued)

	b	SE	OR	[95% CI]	p	VIF
No	0.42	0.19	1.53	[1.05, 2.21]	.025	
Psychiatric comorbidity						1.05
Yes (Ref.)						
No	0.79	0.19	2.21	[1.52, 3.22]	$< .001$	
General health literacy	0.06	0.01	1.06	[1.04, 1.09]	$< .001$	1.02

Ref. = reference group; b = unstandardized coefficient; SE = standard error of b; OR = odds ratio; CI = confidence interval; p = p-value; VIF = variance inflation factor

3.4.3 Hierarchical model of self-reported physical condition

The hierarchical logistic regression model of self-reported physical condition is presented in Table 3.17.

A four-stage hierarchical logistic regression was performed with the self-reported physical condition as a dependent variable and gender, age, marital status, level of education, household net income (Model 1), past-year frequency of alcohol use, past-year any illicit drug use (Model 2), self-reported general health status, self-reported mental health status (Model 3), and general health literacy (Model 4) as predictors.

In the first model, age (OR = 0.96, 95% CI [0.95, 0.98], $p < .001$) and household net income (OR = 1.12, 95% CI [1.07, 1.17], $p < .001$) contributed significantly to the regression model. Gender, marital status, and level of education did not have a significant predictive effect on physical condition. Model 1 containing sociodemographic factors was significant ($\chi^2(4) = 57.86$, $p < .001$). In the second model, neither past-year frequency of alcohol use or past-year any illicit drug use contributed significantly to the regression model. Age and household net income remained to be significant in the second model. Introducing substance use-related factors to the regression resulted in a significant model ($\chi^2(7) = 60.57$, $p < .001$). In the third model, general health status (OR = 2.86, 95% CI [2.30, 3.56], $p < .001$) and mental health status (OR = 1.37, 95% CI [1.12, 2.66], $p = .002$) contributed significantly to the regression model. Age and household net income remained significant. Introducing general health status and mental health status to the regression resulted in a significant model ($\chi^2(9) = 239.31$, $p < .001$). In the fourth model, general health literacy did not have a significant predictive effect on physical condition. Age, household net income, general health status, and mental health status remained significant. Final model containing all variables was significant ($\chi^2(10) = 240.21$, $p < .001$).

In the final model, VIFs ranged from 1.07 to 1.67, indicating a low degree of multicollinearity between the independent variables.

Table 3.17: Hierarchical logistic regression of self-reported physical condition for the general sample

	b	SE	OR	[95% CI]	p	VIF
Model 1						
Gender						1.05
Male (Ref.)						
Female	-0.06	0.18	0.94	[0.66, 1.35]	.739	
Age	-0.04	0.01	0.96	[0.95, 0.98]	$< .001$	1.35
Marital status						1.21
Married (Ref.)						
Other	0.31	0.23	1.36	[0.86, 2.14]	.186	
Level of education	0.05	0.08	1.05	[0.90, 1.23]	.509	1.25
Household net income	0.11	0.02	1.12	[1.07, 1.17]	$< .001$	1.16
Model 2						
Gender						1.09
Male (Ref.)						
Female	-0.06	0.19	0.94	[0.65, 1.38]	.760	
Age	-0.04	0.01	0.97	[0.95, 0.98]	$< .001$	1.63
Marital status						1.22
Married (Ref.)						
Other	0.34	0.24	1.40	[0.88, 2.24]	.155	
Level of education	0.04	0.08	1.04	[0.88, 1.22]	.667	1.26
Household net income	0.12	0.02	1.13	[1.08, 1.19]	$< .001$	1.18
Frequency of alcohol use	-0.09	0.05	0.91	[0.82, 1.01]	.087	1.11
Past-year any illicit drug use						1.36
Yes (Ref.)						
No	0.18	0.19	1.19	[0.82, 1.73]	.355	
Model 3						
Gender						1.10
Male (Ref.)						
Female	0.07	0.20	1.07	[0.73, 1.58]	.732	
Age	-0.02	0.01	0.98	[0.96, 1.00]	.020	1.67
Marital status						1.22
Married (Ref.)						
Other	0.41	0.24	1.50	[0.93, 2.43]	.100	
Level of education	-0.07	0.08	0.94	[0.79, 1.11]	.441	1.28
Household net income	0.10	0.03	1.10	[1.05, 1.16]	$< .001$	1.20
Frequency of alcohol use	-0.03	0.06	0.98	[0.88, 1.09]	.677	1.12
Past-year any illicit drug use						1.38
Yes (Ref.)						
No	-0.03	0.20	0.97	[0.66, 1.44]	.886	
Health status	1.05	0.11	2.86	[2.30, 3.56]	$< .001$	1.56
Mental health status	0.31	0.10	1.37	[1.12, 2.66]	.002	1.50

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Hierarchical logistic regression of self-reported physical condition for the general sample (Continued)

	b	SE	OR	[95% CI]	p	VIF
Model 4						
Gender						1.10
Male (Ref.)						
Female	0.06	0.20	1.06	[0.72, 1.57]	.778	
Age	-0.02	0.01	0.98	[0.96, 1.00]	.019	1.67
Marital status						1.22
Married (Ref.)						
Other	0.42	0.25	1.52	[0.94, 2.46]	.091	
Level of education	-0.06	0.08	0.94	[0.80, 1.11]	.478	1.28
Household net income	0.09	0.03	1.10	[1.05, 1.16]	$<$ .001	1.21
Frequency of alcohol use	-0.02	0.06	0.98	[0.88, 1.09]	.689	1.12
Past-year any illicit drug use						1.38
Yes (Ref.)						
No	-0.02	0.20	0.98	[0.66, 1.45]	.927	
Health status	1.04	0.11	2.84	[2.28, 3.53]	$<$ .001	1.57
Mental health status	0.30	0.10	1.35	[1.11, 1.65]	.003	1.52
General health literacy	0.01	0.01	1.01	[0.99, 1.04]	.341	1.07

Ref. = reference group; b = unstandardized coefficient; SE = standard error of b; OR = odds ratio; CI = confidence interval; p = p-value; VIF = variance inflation factor

3.4.4 Hierarchical model of self-reported quality of life

The hierarchical logistic regression model of self-reported quality of life is presented in Table 3.18.

A four-stage hierarchical logistic regression was performed with the self-reported quality of life as a dependent variable and gender, age, marital status, level of education, household net income (Model 1), past-year frequency of alcohol use, past-year any illicit drug use (Model 2), mental health status, physical condition (Model 3), and general health literacy (Model 4) as predictors.

In the first model, household net income (OR = 1.10, 95% CI [1.05, 1.15], $p < .001$) contributed significantly to the regression model, while gender, age, marital status, and level of education did not have a significant predictive effect on the quality of life. Model 1 containing sociodemographic factors was significant ($\chi^2(5) = 29.43$, $p < .001$). In the second model, both past-year frequency of alcohol use (OR = 0.78, 95% CI [0.70, 0.87], $p < .001$) and past-year any illicit drug use (OR = 2.01, 95% CI [1.37, 2.95], $p < .001$) contributed significantly to the regression model. Household net income remained to be associated with quality of life in the second model. Introducing substance use-related factors to the regression resulted in a significant model ($\chi^2(7) = 64.57$, $p < .001$). In the third model,

mental health status (OR = 2.05, 95% CI [1.69, 2.47], $p < .001$) and physical condition (OR = 1.94, 95% CI [1.60, 2.34], $p < .001$) contributed significantly to the regression model. Household net income, past-year frequency of alcohol use, and past-year illicit drug use remained to be significant with quality of life. Marital status became to be of predictive value (OR = 0.54, 95% CI [0.33, 0.87], p = .012) after introducing mental health status and physical condition to the regression model. Introducing mental health status and physical condition to the regression resulted in a significant model ($\chi^2(9)$ = 225.75, $p < .001$). In the fourth model, general health literacy was significantly associated with self-reported general health status (OR = 1.03, 95% CI [1.01, 1.06], p = .019). Marital status, household net income, past-year frequency of alcohol use, past-year illicit drug use, mental health status, and physical condition remained to be associated with the quality of life. Final model containing all variables was significant ($\chi^2(10)$ = 231.23, $p < .001$).

In the final model, VIFs ranged from 1.07 to 1.68, indicating a low degree of multicollinearity between the independent variables in the regression model.

Table 3.18: Hierarchical logistic regression of self-reported quality of life for the general sample

	b	SE	OR	[95% CI]	p	VIF
Model 1						
Gender						1.05
Male (Ref.)						
Female	0.10	0.18	1.11	[0.76, 1.59]	.573	
Age	-0.00	0.01	0.99	[0.98, 1.01]	.861	1.35
Marital status						1.21
Married (Ref.)						
Other	-0.40	0.23	0.67	[0.42, 1.06]	.085	
Level of education	0.09	0.08	1.09	[0.94, 1.28]	.254	1.25
Household net income	0.09	0.02	1.10	[1.05, 1.15]	< .001	1.16
Model 2						
Gender						1.09
Male (Ref.)						
Female	-0.03	0.19	0.97	[0.66, 1.42]	.873	
Age	-0.01	0.01	0.99	[0.98, 1.01]	.492	1.63
Marital status					1.22	
Married (Ref.)						
Other	-0.42	0.24	0.66	[0.41, 1.06]	.083	
Level of education	0.12	0.08	1.13	[0.96, 1.32]	.151	1.26
Household net income	0.10	0.02	1.10	[1.05, 1.16]	< .001	1.18
Frequency of alcohol use	-0.25	0.07	0.78	[0.70, 0.87]	< .001	1.11
Past-year any illicit drug use						1.36
Yes (Ref.)						
No	0.70	0.19	2.01	[1.37, 2.95]	< .001	

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Hierarchical logistic regression of self-reported quality of life for the general sample (Continued)

	b	SE	OR	[95% CI]	p	VIF
Model 3						
Gender						1.10
Male (Ref.)						
Female	0.15	0.20	1.17	[0.79, 1.73]	.447	
Age	0.01	0.01	1.01	[0.99, 1.03]	.336	1.68
Marital status						1.22
Married (Ref.)						
Other	-0.63	0.25	0.54	[0.33, 0.87]	.012	
Level of education	0.09	0.08	1.10	[0.93, 1.29]	.266	1.27
Household net income	0.06	0.03	1.06	[1.01, 1.11]	.031	1.23
Frequency of alcohol use	-0.24	0.06	0.79	[0.70, 0.88]	$< .001$	1.12
Past-year any illicit drug use						1.38
Yes (Ref.)						
No	0.65	0.20	1.92	[1.29, 2.84]	$< .001$	
Mental health status	0.72	0.10	2.05	[1.69, 2.47]	$< .001$	1.25
Physical condition	0.66	0.10	1.94	[1.60, 2.34]	$< .001$	1.34
Model 4						
Gender						1.10
Male (Ref.)						
Female	0.13	0.20	1.14	[0.77, 1.68]	.529	
Age	0.01	0.01	1.01	[0.99, 1.03]	.336	1.68
Marital status						1.23
Married (Ref.)						
Other	-0.59	0.25	0.56	[0.34, 0.91]	.019	
Level of education	0.11	0.08	1.11	[0.94, 1.31]	.205	1.27
Household net income	0.05	0.03	1.05	[1.00, 1.11]	.042	1.23
Frequency of alcohol use	-0.24	0.06	0.79	[0.70, 0.88]	$< .001$	1.12
Past-year any illicit drug use						1.38
Yes (Ref.)						
No	0.67	0.20	1.96	[1.32, 2.90]	.001	
Mental health status	0.70	0.10	2.00	[1.66, 2.42]	$< .001$	1.27
Physical condition	0.64	0.10	1.90	[1.57, 2.30]	$< .001$	1.35
General health literacy	0.03	0.01	1.03	[1.01, 1.06]	.019	1.07

Ref. = reference group; b = unstandardized coefficient; SE = standard error of b; OR = odds ratio; CI = confidence interval; p = p-value; VIF = variance inflation factor

4. Discussion

This chapter is based on the article "Health Literacy in People Undergoing Treatment for Alcohol Abuse – A Pilot Study" published in Kontakt by Rolová, G., Barták, M., Rogalewicz, V., and Gavurová, B. and "Health Literacy, Self-Perceived Health, and Substance Use Behavior among Young People with Alcohol and Substance Use Disorders" published in IJERPH by Rolová, G., Gavurová, B., and Petruželka, B.

In this thesis, we examined health literacy and a wide range of its correlates in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use. Moreover, we investigated health literacy as an independent predictor of self-reported health indicators and quality of life.

Little attention has been paid to multidimensional health literacy in vulnerable, marginalized, and hard-to-reach people at risk of low health literacy. This is one of the first studies examining health literacy in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use in the Czech Republic as well as Central Europe. This study contributes to the growing field of research in disadvantaged populations by providing evidence on the distribution of health literacy and its direct impact on self-reported health indicators and quality of life in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use. In line with the current approach to health literacy, the strength of the study is the use of a standardized multidimensional measuring tool to assess health literacy. The study sample was relatively large and well-defined.

4.1 Outcomes of Health Literacy Assessment

Overall, the participants achieved a mean score of 34.7 (out of 50) in HLS-EU-Q47. The prevalence of limited health literacy was 40.5% for the general sample. Of those, 8.0% of participants had inadequate health literacy and 32.5% problematic health literacy.

In line with previous studies (Degan et al., 2018; Rolová et al., 2018), the prevalence of low health literacy is high in this study population. Rolová et al. (2018) found low health literacy of 46.9% among Czech patients treated for AUDs using the HLS-EU-Q47. One abroad study measuring multidimensional health literacy in patients with SUDs reported a much higher prevalence of low health literacy (87%) (Degan et al., 2018). This discrepancy in the prevalence of low health literacy is likely due to the use of different measuring tools. The lack of agreement on the definition of health literacy resulted in various interpretations of health literacy being projected into measuring tools, which makes comparisons across studies challenging (Nguyen et al., 2017; Pleasant & McKinney, 2011). Therefore, the comparisons with previous studies must be interpreted with caution.

Furthermore, Dahlman et al. (2020) recently examined health literacy in patients in opioid substitution treatment using the HLS-EU-Q47, detecting the prevalence of low health literacy in only 22% of patients. However, the prevalence of low health literacy was calculated by including invalid questionnaires in the computation. If invalid questionnaires were excluded from the calculation of prevalence according to standard practice, the reported prevalence would be higher.

Interestingly, compared with the reported results from the national population-based study of health literacy (Kučera et al., 2016), our study sample scored at least two points higher across all scales of HLS-EU-Q47. The reported prevalence of limited health literacy in the general Czech population was 59.4% compared to 40.5% in our study population. Moreover, inadequate level in general health literacy was more than twice as common in the general Czech population than in our sample. This comparison suggests that patients with addiction could have higher health literacy than the general population. It can be expected that increased medical attention may reflect higher health literacy in our study population (Rolová et al., 2018).

Some studies showed that healthcare professionals are one of the key sources of health information for many patients (Gutierrez et al., 2014; Oedekoven et al., 2019). Intensive interaction with healthcare professionals and obligatory participation in health-related educational activities during the residential addiction treatment provides patients the opportunity to acquire knowledge and skills on how to navigate the healthcare system, finding healthcare providers, engage in health-promoting activities, communicate effectively with healthcare professionals, etc. Future studies should explore the potential of residential addiction treatment programs to increase health literacy in patients treated with addiction. The long-term setting of residential addiction treatment programs provides an excellent opportunity to promote health literacy in a large number of patients.

However, the case for higher health literacy in the clinical population has not yet been demonstrated in the literature. Mantell et al. (2020) compared the health literacy of people living with mental illness and the general German population and found a higher prevalence of low health literacy in people with mental illness. Furthermore, no strong conclusion can be drawn from this finding as we did not compare health literacy directly between the two populations.

Motivation to abstain from using substances and promote health might be another aspect contributing to the increased health literacy in our study population (Rolová et al., 2018). Unlike average persons, individuals undergoing addiction treatment voluntarily are usually highly motivated by internal and external factors to change certain health-related habits (Opsal et al., 2019). Therefore, they could be more susceptible to receiving recommendations regarding their health.

In addition to examining health literacy in the general sample, health literacy has been studied separately in two subsamples of patients diagnosed with AUDs and patients diag-

nosed with SUDs. The prevalence of limited health literacy was 38.9% for the AUD subsample and 43.1% for the SUD subsample. Despite their different socioeconomic backgrounds, we have not found any significant differences in the health literacy scores of the two subsamples. In the Czech Republic, patients enrolled in residential addiction treatment usually follow the same treatment plan regardless of the type of SUD or addictive behavior. Therefore, an explanation could be that receiving addiction treatment contributes to an increase in health literacy to the extent that differences in the health-related skills of patients with different diagnoses and socioeconomic characteristics are eliminated (Rolova et al., 2021).

In this study, we also focused on the health literacy of patients in the three health literacy subdomains and four information processing dimensions, which are specific subscales of HLS-EU-Q47. Similar to the study of Rolová et al. (2018), the highest prevalence of limited health literacy for the general sample and both subsamples was found in the health promotion domain. In other words, our findings showed that more than half of patients treated in residential addiction treatment programs might not have adequate health literacy skills and abilities to update, interpret, evaluate information, and make informed decisions on determinants of health in the social and physical environment (Sørensen et al., 2013). However, it is not only people with addiction who have been found to have a high prevalence of limited health literacy in health promotion. Similar findings from the national population-based study of health literacy suggest that this is probably the case for the majority of the Czech population (Kučera et al., 2016).

In terms of information processing dimensions, participants reported the least difficulty in understanding health information, while appraising health information was perceived as the most challenging in addressing health information in the general sample and both subsamples. Similar findings have been reported in a study on the health literacy of people living with mental illnesses (Mantell et al., 2020). Diviani (2019) argues that the ability to appraise health information is critical for making appropriate health decisions. Health decision-making is fundamental to function in a modern society characterized by a patient-centered approach to medical care and the wide availability of health information for everyone. Hence, poor ability to critically evaluate the quality, reliability, and relevance of health information could pose one at risk of developing health problems by making bad health decisions.

4.2 Socioeconomic Predictors of Health Literacy

In terms of demographic and socioeconomic factors, we found a relationship between general health literacy and formal health education, household net income, housing conditions, and employment status.

Unlike previous population-based studies (Levin-Zamir et al., 2016; Sørensen et al., 2015; Svendsen et al., 2020; von Wagner et al., 2007), we did not find health literacy to be asso-

ciated with age or level of education, the two of most important and consistent predictors of health literacy. On the other hand, our findings are consistent with previous studies in people with addiction, which also found no relationship between these factors (Dahlman et al., 2020; Degan et al., 2018). We can agree with Degan et al. (2018) who suggested that this could be on account of the non-proportional distribution of the study sample in terms of their age and educational attainment. Our study sample lacks older and university-educated people, which are the two groups of people in whom differences in health literacy are most pronounced; therefore, the differences in health literacy may not have been evident. Furthermore, it is likely that for the same reason, we did not observe any differences in the health literacy of participants in terms of their marital status, as we had a small number of married and divorced/widowed participants.

In our study, health literacy was positively associated with household net income in the general sample; the higher the household net income, the higher the health literacy. Similarly, HLS-EU found that financial deprivation is one of the strongest predictors of lower health literacy. Other population-based studies also confirmed the association between health literacy and income (Levin-Zamir et al., 2016). Phelan et al. (2010) and Stormacq et al. (2019) argue that this relationship could be explained by the fact that individuals with low socioeconomic status are disadvantaged in access to material resources and health information. In other words, they may not have sufficient financial resources to make healthier choices, such as to buy healthy food, attend sport or educational courses, or purchase health-related educational literature, etc.

In addition, we found low health literacy to be associated with homelessness and unemployment in the general sample and the AUD subsample. Both of these factors are linked to poverty and financial deprivation, which further support the assumption of socioeconomically disadvantaged having low health literacy. On the other hand, health literacy was not associated with debt situation, which could also indicate low socioeconomic status.

In line with HLS-EU, our finding that low-income individuals are more likely to have low health literacy supports the presence of a social gradient in health literacy (Rowlands et al., 2015; Sørensen et al., 2015). That is, socioeconomically disadvantaged people have worse health outcomes and lower life expectancy (Donkin, 2014). Increasing health literacy in socioeconomically disadvantaged people may contribute to reducing disparities in health (Gibney et al., 2020; Stormacq et al., 2019). On the other hand, it can be expected that increasing health literacy may not be possible without improving the socioeconomic situation of disadvantaged people. It is therefore likely to be necessary to focus on socioeconomic status and health literacy in this population to achieve optimal results.

Higher health literacy scores were also associated with having formal health education, such as nurses, physicians, pharmacologists, etc. Healthcare professionals achieved consistently higher scores in all subscales of HLS-EU-Q47. This finding is not surprising given that healthcare professionals have both health education and practical experience.

4.3 Health Literacy as a Predictor of Self-Reported Health Indicators and Quality of Life

One of the primary objectives of this study was to study health literacy as a predictor of self-reported health indicators and quality of life in order to investigate whether health literacy has a direct effect on those health-related factors.

In this study, health literacy was associated with self-reported general health status, mental health status, and quality of life even after adjusting for relevant socioeconomic, health-related, and substance use-related factors, suggesting that health literacy could be an independent predictor of these health-related factors. On the contrary, the association between health literacy and physical condition was significant only in the bivariate analysis but not after adjusting for other factors.

Our findings support those of population-based studies that found multidimensional health literacy to be independently associated with self-reported health status (Sørensen et al., 2015; Toçi et al., 2015; van der Heide et al., 2013). Increasing health literacy should gradually improve health in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use.

Health literacy influences health outcomes both directly and indirectly (Berkman et al., 2011; Osborn et al., 2011; Paasche-Orlow & Wolf, 2007; Sørensen et al., 2015; Suka et al., 2015). However, the mechanism linking health literacy to health outcomes is not fully understood yet.

Causal pathway models suggest that health literacy is determined by demographic, socioeconomic, cognitive, and other personal factors (Paasche-Orlow & Wolf, 2007). The social determinants of health, especially socioeconomic status, are regarded as key underlying factors affecting health indirectly through related mediators of the relationship (Adler & Newman, 2002). Health literacy has been identified as one of the mediators explaining the relationship between socioeconomic status and variety of health outcomes (Stormacq et al., 2019). Other theoretical frameworks and pathway analyses indicated that the relationship between health literacy and health outcomes is likely to be intermediated by a range of other factors. Specifically, access and use of healthcare, patient-provider interaction, self-care/self-efficacy, health-related knowledge, and health behaviors have been identified as possible mediators of the relationship (Osborn et al., 2011; Paasche-Orlow & Wolf, 2007; Suka et al., 2015).

In terms of mental health status, our findings are in line with those of Degan et al. (2018) and Lincoln et al. (2006) who found that low health literacy is associated with poorer mental health and higher levels of psychological distress in people with addiction. Other clinical and population-based studies have also reported a relationship between multidimensional health literacy and mental health (Jayasinghe et al., 2016; van der Heide et al., 2013). Furthermore, Mantell et al. (2020) found that low health literacy is associated with

having anxiety disorders, mood disorders, and psychiatric comorbidity in people living with mental illness, but this could not be confirmed in our study.

In view of the current evidence on causal pathways, we hypothesize that the association of health literacy and mental health status could be potentially explained by deficits in self-care and poor access to specialized health services for people with mental illness (Jayasinghe et al., 2016; Vandenbosch et al., 2016). People with low health literacy may not have the knowledge and skills to access, understand, appraise, and apply information on how to improve their well-being or where to find professional help with mental health problems. This may be partly a reflection of the attitudes of people towards people with mental health problems.

In the Czech Republic, stigmatizing and discriminatory attitudes towards people with mental health problems remain prevalent in the general population as well as among healthcare professionals despite various destigmatization and educational campaigns that have been launched in recent years (Winkler et al., 2015; Winkler et al., 2016). Perceived stigma and discrimination can contribute to reducing the willingness of people with mental illness to seek information about mental health problems, approach healthcare professionals, and access specialized health services in general (Corrigan et al., 2014). Consequently, a lack of information and skills to manage mental health problems may reflect in the health literacy of people with poor mental health status. Increasing health literacy could lead to an improvement in the mental health status of people with addiction, but a greater effect is unlikely to be achieved unless the stigmatizing attitudes of the general public and healthcare professionals towards people with mental health problems are significantly improved.

In terms of physical condition, a recent systematic review found low health literacy to be consistently associated with physical inactivity and a sedentary lifestyle. It is hypothesized that people with adequate health literacy may have certain knowledge and skills that help them to adopt healthy habits and exercising more easily (Buja et al., 2020). In this study, we also found an association between health literacy and physical condition; the better the physical condition, the higher the health literacy. However, physical condition dropped out of significance in the adjusted model, indicating that health literacy may not be an independent predictor of self-reported physical condition in our study population.

Unlike the previous studies (Buja et al., 2020), we adjusted the model also for self-reported general health status and mental health status, as these factors could be both outcomes and predictors of physical condition. For example, people with long-term illness of the musculoskeletal system or serious mental illness may not be be able to involve in exercise and other physical activities, therefore their physical condition may decline. We assume that the predictive effect of health literacy may significantly decrease when these other health indicators are accounted for in the model for physical condition.

It must be noted that previous studies focused directly on physical activity measured by the number of exercise days per week. Instead, we chose to focus on self-reported physical

condition because measuring the number of exercise days per week may not accurately reflect the average physical activity in our study population. That is because patients in addiction treatment are usually obliged to involve in exercise activities as a part of addiction treatment; therefore, we would be unlikely to observe any differences in their health literacy performance in terms of their physical activity. Unlike exercising, physical condition is rather one of the indicators of physical activity. However, these two factors have been shown to have similar effects (Haapanen-Niemi et al., 2000). Hence, limited comparison with previous studies is possible, but its interpretation should be treated with caution.

Given the fact that lack of physical activity is one of the major risk factors of non-communicable diseases worldwide (Lee et al., 2012), the relationship between health literacy and physical condition is worthy of further examination. Literature suggests that physical inactivity could be one of the pathways mediating the relationship between health literacy and health status. Improving health literacy could lead to greater interest in physical activities, and therefore to reduce the prevalence of non-communicable diseases in population Suka et al. (2015).

Finally, we found health literacy to be independently associated with self-perceived quality of life; the higher the health literacy, the better the quality of life of participants. Our findings support those of Degan et al. (2018) who also found an association between low multidimensional health literacy and low quality of life in people treated for addiction. One other study examining the quality of life in people treated for addiction found no association with health literacy, but this study was focused on functional health literacy only (Lincoln et al., 2006).

Quality of life, often described as a state of subjective well-being or overall satisfaction with life, is strongly linked to health (Theofilou, 2013). If health is reflected in the quality of life, it may be one reason why individuals with low health literacy and impaired health perceive their quality of life as low.

One other explanation could be that individuals with low health literacy are self-aware of their own incompetence to control and change their social determinants of health and health in general as well as aware of the barriers they have to overcome due to low health literacy skills. Overcoming barriers to access to health-related knowledge and healthcare, poor understanding of health information, inability to make health-related decisions, and to use knowledge and skills to improve health may be exhausting both physically and mentally, which may be one reason why those affected have a lower quality of life as low.

Interestingly, all self-reported health indicators and quality of life were associated with all health literacy subdomains and information processing dimensions, as shown by the extended analysis of HLS-EU-Q47. This suggests that patients with poor health indicators and quality of life have overall poor health-related skills and may need greater support to improve their skills. They also need to upgrade their knowledge, skills, and motivation on how to navigate healthcare, manage disease prevention, and promote their health.

4.4 Substance Use Behavior and Health Literacy

In terms of substance use behavior and treatment experience, we found only a small number of those factors to be associated with health literacy; those were mostly various patterns of alcohol use.

It had been suggested that risky health behavior, including alcohol and other substance use, could be one of the pathways mediating the relationship between health literacy and health outcomes (Suka et al., 2015). Our findings, however, do not support this hypothesis for patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use.

Our original hypothesis was that lower health literacy would lead to riskier patterns of substance use and substance use behavior in our study sample. We assumed that people with lower health literacy may not have adequate health-related knowledge, skills, and motivation to control their substance use behavior. However, we were unable to establish a relationship between health literacy and most substance use-related factors. It seems that other factors than health literacy are likely to play a role in the substance use behavior of our study population. In agreement with Wolf et al. (2007), those will likely be psychosocial factors, such as self-esteem, attitudes, positive expectancies, parental and peer attitudes and norms, social pressure, lifestyle factors, and environmental factors that are established predictors of the onset of substance use and established predictors of the onset of substance use and subsequent substance use disorders (Donovan, 2004; Tyas & Pederson, 1998).

In this study, we found that daily alcohol use, daily HED, and weekly alcohol intoxication in the past year were associated with lower scores in general health literacy in the general sample and AUD subsample. Participants who reported consumption of any or risky amounts of alcohol daily or drunkenness at least weekly a year before the treatment had lower health literacy than those who drank alcohol less frequently. Moreover, in the AUD subsample, we found an association between general health literacy and past-year frequency of alcohol use, frequency of HED, and frequency of alcohol intoxication; the higher the health literacy, the lower the frequency of alcohol drinking and intoxication. We assume that this may indicate alcohol-induced cognitive impairment in those who are regular or very heavy alcohol users.

Alcohol-related cognitive functioning deficits of varying severity have long been linked to AUDs. Cognitive deficiencies in people with AUDs include, among others, impaired reasoning, problem-solving, and decision-making, which are among the basic skills of health literacy indirectly measured by the multidimensional measuring tools (Bernardin et al., 2014; Evert & Oscar-Berman, 1995). Previous literature described the impact of age-related decline in cognitive functioning on health literacy in older adults. The reasoning behind this is that cognitive impairment influences the ability to perform certain health-related tasks (Chesser et al., 2016; Federman et al., 2009; Kobayashi et al., 2015). We hypothesize

that the relationship between alcohol-related cognitive deficits and low health literacy may be explained in a similar manner.

In any of the cases, health literacy was not associated with cigarette smoking nor any variables related to illicit drug use. Interestingly, in participants diagnosed with SUDs, health literacy was also not associated with any of the risky substance use behaviors and its outcomes (injecting drug use, needle sharing, drug-related infectious disease). Only a few studies have investigated the relationship between health literacy and substance use behavior in substance-using populations. Prior studies did not find any association between health literacy and cigarette smoking (Rolová et al., 2018), illicit drug use (Drainoni et al., 2008), nor the severity of alcohol and other drug use (Lincoln et al., 2006). In people with other mental illnesses, one study found low functional health literacy to be associated with higher illicit drug use (Farrell et al., 2019), while another study found the opposite (Lincoln et al., 2008). One study examined the relationship between health literacy and cigarette smoking in people with mental illness but found no association (Degan et al., 2019).

In terms of nonclinical populations, previous findings are contradictory; while several studies have associated low health literacy with smoking and risky alcohol consumption, others have found the opposite, and most have found no relationship at all Aaby et al., 2017; Adams et al., 2013; Duong et al., 2015; Geboers et al., 2016; Husson et al., 2015; Jayasinghe et al., 2016; Levin-Zamir et al., 2016; Stewart et al., 2015; Suka et al., 2015; von Wagner et al., 2007; Wolf et al., 2007.

It is interesting to note that the extended analysis of HLS-EU-Q47 showed a significant relationship between therapy drop-out and understanding health information, suggesting that difficulties in understanding either oral communication or written text could contribute to premature termination of addiction treatment. Conversely, simplifying communication and written educational materials could contribute to greater retention in residential addiction treatment programs.

4.5 Limitations

This study has some limitations that need to be acknowledged.

First, this study is cross-sectional, which does not allow to establish causality (Levin, 2006). Longitudinal studies could provide a better understanding of this issue by studying causal relationships but often take enormous amounts of time. On the other hand, the exploratory nature of this study benefited from the cross-sectional design by providing descriptive evidence on health literacy in the given population and identifying potential risk factors of low health literacy.

Second, we used a self-report tool with a Likert-type scale to measure health literacy. One of the drawbacks of those kinds of measures is that they are prone to response biases such as socially desirable responding, acquiescence response style, careless responding, and

extreme response style (Wetzel et al., 2016). That is, participants may have been less likely to report certain behaviors that they perceive to be socially undesirable (e.g., needle sharing, the burden of drug-related infectious diseases) and may have tended to select extreme response options. Therefore, there is a possibility that the results may not reflect the actual level of health literacy of the participants, but rather their beliefs.

When it comes to HLS-EU-Q47, Finbråten (2018) recently pointed out some psychometric shortcomings of this questionnaire in the Norwegian population, specifically the response dependence and violation of multidimensionality. On the other hand, other European studies have confirmed its good psychometric properties in terms of face validity, concurrent validity, external validity, construct validity, internal consistency, and test-retest reliability (Sørensen et al., 2013; Toçi et al., 2015). Rolová et al. (2018) demonstrated high internal consistency of the questionnaire for patients with AUD.

In addition, although the HLS-EU-Q47 was tested for comprehensibility (Sørensen et al., 2013; Storms et al., 2017), our participants repeatedly spontaneously pointed out difficulties with understanding certain items in the questionnaire. More specifically, some participants complained about the repeatability of the items in the questionnaire which might indicate the lack of sensitivity of the participants to distinguish subtle changes in the context of the questions. Other participants reported difficulties in understanding the questions related to appraising media-based health information (Q12 and Q28). Similarly, Storms et al. (2017) mentioned the difficulties with understanding media-based questions when examining the suitability of the short version of the questionnaire (HLS-EU-Q16) in low literate individuals. Therefore, the question arises as to whether HLS-EU-Q47 is sufficiently comprehensible even for those at high risk of low literacy.

Currently, no gold-standard measuring tool exists. Objective measures, such as REALM and TOFHLA focus on functional health literacy, which is considered only one dimension of health literacy and their further use in research has recently been criticized (Nguyen et al., 2017; Pleasant & McKinney, 2011). In recent years, the use of HLS-EU-Q has gained popularity for its comprehensive nature not only in European countries (Okan et al., 2019). Moreover, the questionnaire is easy to administer to a large number of persons. In view of its advantages, we found this questionnaire to be suitable for our study.

Third, the use of the non-probability sampling method to select study participants limits the representativeness of the study sample and may have led to a biased sample (Kakinaki & Conner, 2010). However, the institutions of residential addiction treatment that served as a sampling frame were well defined and the proportion of individuals enrolled in the study was high (90.2%). Self-selection of participants was minimized by their mass recruitment in a pre-agreed time frame.

Fourth, sample characteristics were measured by using single-item scales, which may not fully represent the complexity of the given constructs. However, as this is primarily an exploratory study, the use of single-item scales is suitable for estimating a large num-

ber of variables that could explain the health literacy of participants. Future studies using validated multi-item scales are needed to support our findings (Rolova et al., 2021).

Last, the health indicators and quality of life were measured by self-report. Therefore, it is possible that participants' rating does not reflect their actual status of health. However, measuring health indicators by self-report is common in health literacy research (e.g., Sørensen et al. (2015)), as objective health indicators are difficult to measure.

4.6 Implications for Practice

Our findings have shown that low health literacy may be the case for four out of ten patients in residential addiction treatment programs and that increasing health literacy should gradually improve the patients' health outcomes. We, therefore, recommend that healthcare professionals pay attention to health literacy and adopt techniques that can be effective in increasing the health literacy of patients.

Alcohol and drug addiction treatment is a demanding process and some therapeutic practices require adequate health-related skills. It is recommended that healthcare professionals routinely assess the health literacy of patients to identify potential gaps in their health-related skills (Degan et al., 2018; Lincoln et al., 2008).

One effective way to increase the health literacy of patients in residential addiction treatment programs may be to adopt specific health literacy-promoting programs tailored to both the patient and service needs. However, to our knowledge, no such programs have been introduced to date. Universal health literacy-promoting programs intended for the general public are unlikely to be suitable for use in such specific services as residential addiction treatment programs. In Europe, most of the proposed health literacy interventions focus solely on increasing functional health literacy, i.e., comprehension and numeracy, while only a few address multidimensional health literacy. So far, the effectiveness of these interventions is mostly weak or at least questionable (Visscher et al., 2018).

On the patient-provider level, special attention should be paid to the communication skills of healthcare professionals. It is recommended to avoid advanced communication techniques and medical jargon are avoided. Instead, healthcare professionals should routinely adopt language and communication techniques that are effective also for those with low health literacy, such as using plain language, matching the vocabulary of patients, using a teach-back technique, and using multiple sources of health information (written materials, pictures, infographics, etc.) (Sudore & Schillinger, 2009).

In terms of written materials, healthcare professionals must ensure that patient handout materials are not overly complex and are comprehensible to most patients in addiction treatment. If health information and written materials are to have an educational effect, they must be adapted to the literacy skills of those for whom they are intended (Greenfield et al., 2005). However, as previous studies have shown, this is not always the case.

Greenfield et al. (2005) examined patient handout materials used in alcohol and drugs abuse treatment programs and found that the average readability level of these materials was way beyond the reading skills of an average American (11th vs. 8th-grade level). They also found that the estimates of healthcare professionals about the readability of those materials were significantly lower than their actual readability levels. Similarly, McHugh et al. (2014) identified possible difficulties with comprehension of self-report measures of alcohol-related disorders. They found that the average readability level for both instructions and items of these screening tests exceeds the 8th grade instead of recommended 6th to 7th grades.

The presented interventions are to be effective in increasing the functional health literacy skills of patients. Healthcare professionals should be aware that health literacy also includes more advanced skills such as decision-making, problem-solving, and critical thinking, which should also be taken into account (Okan et al., 2019; Visscher et al., 2018).

Finally, we need to pay attention to those who have not made it to the treatment for possible barriers in accessing health services due to low health literacy.

Conclusions

In this thesis, we examined health literacy and its correlates in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use. Most importantly, we investigated health literacy as an independent predictor of self-reported health indicators and quality of life.

Our findings suggest that a considerable number of patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use (40.5%) may have difficulties with navigating the healthcare system and managing self-care to maintain and improve their health. Most patients may benefit from strengthening their competencies in health promotion and in appraising health information to make appropriate health decisions.

In terms of risk factors of low health literacy, patients who have a low household net income, do not have stable housing, are unemployed, and have daily patterns of alcohol use are likely at risk of having low health literacy. Otherwise, it seems that various substance use behaviors do not have significant effects on health literacy in this population.

Finally, in this study, health literacy was independently associated with self-reported general health status, mental health status, and quality of life even after adjusting for relevant socioeconomic, health-related, and substance use-related factors. Our findings indicate that increasing health literacy in patients treated in residential addiction treatment programs for mental and behavioral disorders due to psychoactive substance use should gradually improve their general health status, mental health status, and quality of life. However, in order to achieve more significant effects, it will also likely be necessary to focus on improving the socioeconomic determinants, reducing stigma and discrimination, and improving the overall well-being of patients with addiction.

This thesis contributes to the discussion about health literacy in patients with addiction. Our findings provide the basis for an understanding of health literacy in patients with addiction as well as in other disadvantaged, marginalized, and hard-to-reach populations at risk of low health literacy. Future studies may build on our findings and investigate to what extent promoting health literacy in this population may impact health and treatment outcomes in this population.

List of Figures

List of Tables

List of References

Aaby, A., Friis, K., Christensen, B., Rowlands, G., & Maindal, H. T. (2017). Health literacy is associated with health behaviour and self-reported health: A large population-based study in individuals with cardiovascular disease. *European Journal of Preventive Cardiology*, *24*(17), 1880–1888. https://doi.org/10.1177/2047487317729538

Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, American Medical Association. (1999). Health literacy: Report of the Council on Scientific Affairs. *JAMA*, *281*(6), 552–557. https://doi.org/10.1001/jama.281.6.552

Adams, R. J., Piantadosi, C., Ettridge, K., Miller, C., Wilson, C., Tucker, G., & Hill, C. L. (2013). Functional health literacy mediates the relationship between socio-economic status, perceptions and lifestyle behaviors related to cancer risk in an Australian population. *Patient Education and Counseling*, *91*(2), 206–212. https://doi.org/10.1016/j.pec.2012.12.001

Adler, N. E., & Newman, K. (2002). Socioeconomic disparities in health: Pathways and policies. *Health Affairs*, *21*(2), 60–76. https://doi.org/10.1377/hlthaff.21.2.60

Altin, S. V., Finke, I., Kautz-Freimuth, S., & Stock, S. (2014). The evolution of health literacy assessment tools: A systematic review. *BMC Public Health*, *14*(1), 1–13. https://doi.org/10.1186/1471-2458-14-1207

Andrus, M. R., & Roth, M. T. (2002). Health literacy: A review. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, *22*(3), 282–302. https://doi.org/10.1592/phco.22.5.282.33191

Bacon, O., Vandenberg, A., & May, M. E. (2017). Provider and patient perception of psychiatry patient health literacy. *Pharmacy Practice (Granada)*, *15*(2). http://doi.org/10.18549/pharmpract.2017.02.908

Batterham, R. W., Hawkins, M., Collins, P., Buchbinder, R., & Osborne, R. H. (2016). Health literacy: Applying current concepts to improve health services and reduce health inequalities. *Public Health*, *132*, 3–12. https://doi.org/10.1016/j.puhe.2016.01.001

Bazm, S., Bazm, R., & Sardari, F. (2019). Growth of health literacy research activity in three Middle Eastern countries. *BMJ Health & Care Informatics*, *26*(1). https://doi.org/10.1136/bmjhci-2019-000027

Bennett, I. M., Chen, J., Soroui, J. S., & White, S. (2009). The contribution of health literacy to disparities in self-rated health status and preventive health behaviors in older adults. *The Annals of Family Medicine*, *7*(3), 204–211. https://doi.org/10.1370/afm.940

Berkman, N. D., Sheridan, S. L., Donahue, K. E., Halpern, D. J., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*, *155*(2), 97–107. https://doi.org/10.7326/0003-4819-155-2-201107190-00005

Berkman, N. D., Davis, T. C., & McCormack, L. (2010). Health literacy: What is it? *Journal of Health Communication*, *15*(S2), 9–19. https://doi.org/10.1080/10810730.2010.499985

Bernardin, F., Maheut-Bosser, A., & Paille, F. (2014). Cognitive impairments in alcohol-dependent subjects. *Frontiers in Psychiatry*, *5*, 78. https://doi.org/10.3389/fpsyt.2014.00078

Bostock, S., & Steptoe, A. (2012). Association between low functional health literacy and mortality in older adults: Longitudinal cohort study. *BMJ*, *344*. https://doi.org/10.1136/bmj.e1602

Brosnan, S., Barron, E., & Sahm, L. (2012). Health literacy and the clozapine patient. *Perspectives in Public Health*, *132*(1), 39–42. https://doi.org/10.1177/1757913911431038

Buja, A., Rabensteiner, A., Sperotto, M., Grotto, G., Bertoncello, C., Cocchio, S., Baldovin, T., Contu, P., Lorini, C., & Baldo, V. (2020). Health Literacy and Physical Activity: A systematic review. *Journal of Physical Activity and Health*, *17*(12), 1259–1274. https://doi.org/10.1123/jpah.2020-0161

Chesser, A. K., Keene Woods, N., Smothers, K., & Rogers, N. (2016). Health literacy and older adults: A systematic review. *Gerontology and Geriatric Medicine*, *2*, 1–13. https://doi.org/10.1177/2333721416630492

Chinn, D. (2011). Critical health literacy: A review and critical analysis. *Social Science & Medicine*, *73*(1), 60–67. https://doi.org/10.1016/j.socscimed.2011.04.004

Christensen, R. C., & Grace, G. D. (1999). The prevalence of low literacy in an indigent psychiatric population. *Psychiatric Services*, *50*(2), 262–263. https://doi.org/10.1176/ps.50.2.262

Clausen, W., Watanabe-Galloway, S., Baerentzen, M. B., & Britigan, D. H. (2016). Health literacy among people with serious mental illness. *Community Mental Health Journal*, *52*(4), 399–405. https://doi.org/10.1007/s10597-015-9951-8

Corrigan, P. W., Druss, B. G., & Perlick, D. A. (2014). The impact of mental illness stigma on seeking and participating in mental health care. *Psychological Science in the Public Interest*, *15*(2), 37–70. https://doi.org/10.1016/j.eurpsy.2019.04.003

Csémy, L., Dvořáková, Z., Fialová, A., Kodl, M., Malý, M., & Skývová, M. (2020). *Užívání tabáku a alkoholu v České republice 2019 [Tobacco and alcohol use in the Czech Republic 2019]*. Státní zdravotní ústav. http://www.szu.cz/tema/podpora-zdravi/uzivani-tabaku-a-alkoholu-v-ceske-republice-2019?lang=1

Český statistický úřad. (2016). *Zařazení českých vzdělávacích programů do Klasifikace vzdělávání (CZ-ISCED 2011)* (tech. rep.). Český statistický úřad. https://www.czso.cz/csu/czso/klasifikace_vzdelani_cz_isced_2011

Dahlman, D., Ekefäll, M., & Garpenhag, L. (2020). Health literacy among Swedish patients in opioid substitution treatment: A mixed-methods study. *Drug and Alcohol Dependence*, *214*, 108186. https://doi.org/10.1016/j.drugalcdep.2020.108186

Davis, T. C., Long, S. W., Jackson, R. H., Mayeaux, E., George, R. B., Murphy, P. W., & Crouch, M. A. (1993). Rapid Estimate of Adult Literacy in Medicine: A shortened screening instrument. *Family Medicine*, *25*(6), 391–395.

Degan, T. J., Kelly, P. J., Robinson, L. D., & Deane, F. P. (2018). Health literacy in substance use disorder treatment: A latent profile analysis. *Journal of Substance Abuse Treatment*, *96*, 46–52. https://doi.org/10.1016/j.jsat.2018.10.009

Degan, T. J., Kelly, P. J., Robinson, L. D., Deane, F. P., & Smith, A. M. (2020). Health literacy of people living with mental illness or substance use disorders: A systematic review. *Early Intervention in Psychiatry*, 1–16. https://doi.org/10.1111/eip.13090

Degan, T. J., Kelly, P. J., Robinson, L. D., Deane, F. P., Wolstencroft, K., Turut, S., & Meldrum, R. (2019). Health literacy in people living with mental illness: A latent profile analysis. *Psychiatry Research*, *280*, 112499. https://doi.org/10.1016/j.psychres.2019.112499

Degenhardt, L., Charlson, F., Ferrari, A., Santomauro, D., Erskine, H., Mantilla-Herrara, A., Whiteford, H., Leung, J., Naghavi, M., Griswold, M., Rehm, J., Hall, W., Sartorius, B., Scott, J., Vollset, S. E., Knudsen, A. K., Haro, J. M., Patton, G., Kopec, J., … Vos, T. (2018). The global burden of disease attributable to alcohol and drug use in 195 countries and territories, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet Psychiatry*, *5*(12), 987–1012. https://doi.org/10.1016/S2215-0366(18)30337-7

Dermota, P., Wang, J., Dey, M., Gmel, G., Studer, J., & Mohler-Kuo, M. (2013). Health literacy and substance use in young Swiss men. *International Journal of Public Health*, *58*(6), 939–948. https://doi.org/10.1007/s00038-013-0487-9

DeWalt, D. A., Berkman, N. D., Sheridan, S., Lohr, K. N., & Pignone, M. P. (2004). Literacy and health outcomes: A systematic review of the literature. *Journal of General Internal Medicine*, *19*(12), 1228–1239. https://doi.org/10.1111/j.1525-1497.2004.40153.x

Diviani, N. (2019). On the centrality of information appraisal in health literacy research. *Health Literacy Research and Practice*, *3*(1), e21–e24. https://doi.org/10.3928/24748307-20181214-01

Donkin, A. J. (2014). Social gradient. *The Wiley Blackwell Encyclopedia of Health, Illness, Behavior, and Society*, 2172–2178. https://doi.org/10.1002/9781118410868.wbehibs530

Donovan, J. E. (2004). Adolescent alcohol initiation: A review of psychosocial risk factors. *Journal of Adolescent Health*, *35*(6), 529–e7. https://doi.org/10.1016/j.jadohealth.2004.02.003

Drainoni, M.-L., Rajabiun, S., Rumptz, M., Welles, S. L., Relf, M., Rebholz, C., Holmes, L., Dyl, A., Lovejoy, T., Dekker, D., & Frye, A. (2008). Health literacy of HIV-positive individuals enrolled in an outreach intervention: Results of a cross-site analysis. *Journal of Health Communication*, *13*(3), 287–302. https://doi.org/10.1080/10810730801985442

Duong, V. T., Lin, I., Sørensen, K., Pelikan, J. M., Van den Broucke, S., Lin, Y., & Chang, P. W. (2015). Health literacy in Taiwan: A population-based study. *Asia-Pacific Journal of Public Health*, *27*(8), 871–880. https://doi.org/10.1177/1010539515607962

Eichler, K., Wieser, S., & Brügger, U. (2009). The costs of limited health literacy: A systematic review. *International Journal of Public Health*, *54*(5), 313–324. http://doi.org/10.1136/jech-2015-206910

Evert, D. L., & Oscar-Berman, M. (1995). Alcohol-related cognitive impairments: An overview of how alcoholism may affect the workings of the brain. *Alcohol Health and Research World*, *19*(2), 89. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6875727/pdf/arhw-19-2-89.pdf

Farrell, S. J., Dunn, M., & Huff, J. (2019). Examining health literacy levels in homeless persons and vulnerably housed persons with mental health disorders. *Community Mental Health Journal*, 1–7. https://doi.org/10.1007/s10597-019-00525-2

Federman, A. D., Sano, M., Wolf, M. S., Siu, A. L., & Halm, E. A. (2009). Health literacy and cognitive performance in older adults. *Journal of the American Geriatrics Society*, *57*(8), 1475–1480. https://doi.org/10.1111/j.1532-5415.2009.02347.x

Finbråten, H. S. (2018). *Measuring health literacy: Evaluating psychometric properties of the HLS-EU-Q47 and the FCCHL, suggesting instrument refinements and exploring health literacy in people with type 2 diabetes and in the general Norwegian population* (Doctoral dissertation). Karlstads universitet.

Freedman, D. A., Bess, K. D., Tucker, H. A., Boyd, D. L., Tuchman, A. M., & Wallston, K. A. (2009). Public health literacy defined. *American Journal of preventive medicine*, *36*(5), 446–451. https://doi.org/10.1016/j.amepre.2009.02.001

Friis, K., Lasgaard, M., Rowlands, G., Osborne, R. H., & Maindal, H. T. (2016). Health literacy mediates the relationship between educational attainment and health behavior: A Danish population-based study. *Journal of Health Communication*, *21*(Suppl. 2), 54–60. https://doi.org/10.1080/10810730.2016.1201175

Friis, K., Vind, B. D., Simmons, R. K., & Maindal, H. T. (2016). The relationship between health literacy and health behaviour in people with diabetes: A Danish population-based study. *Journal of Diabetes Research*, *2016*. https://doi.org/10.1155/2016/7823130

Frisch, A.-L., Camerini, L., Diviani, N., & Schulz, P. J. (2012). Defining and measuring health literacy: How can we profit from other literacy domains? *Health Promotion International*, *27*(1), 117–126. https://doi.org/10.1093/heapro/dar043

Galletly, C., Neaves, A., Burton, C., Liu, D., & Denson, L. A. (2012). Evaluating health literacy in people with mental illness using the Test of Functional Health Literacy in Adults. *Nursing Outlook*, *60*(5), 316–321. https://doi.org/10.1016/j.outlook.2012.01.003

Gavurová, B., Ivanková, V., & Rigelský, M. (2020). Does alcohol consumption affect life expectancy in OECD countries? *Adiktologie*, 115–123. https://doi.org/10.35198/01-2020-002-0001

Gazmararian, J. A., Williams, M. V., Peel, J., & Baker, D. W. (2003). Health literacy and knowledge of chronic disease. *Patient Education and Counseling*, *51*(3), 267–275. https://doi.org/10.1016/S0738-3991(02)00239-2

Geboers, B., Reijneveld, S. A., Jansen, C. J. M., & de Winter, A. F. (2016). Health literacy is associated with health behaviors and social factors among older adults: Results from the LifeLines cohort study. *Journal of Health Communication*, *21*, 45–53. https://doi.org/10.1080/10810730.2016.1201174

Gibney, S., Bruton, L., Ryan, C., Doyle, G., & Rowlands, G. (2020). Increasing health literacy may reduce health inequalities: Evidence from a national population survey in Ireland. *International Journal of Environmental Research and Public Health*, *17*(16), 5891. https://doi.org/10.3390/ijerph17165891

Green, M. F. (2006). Cognitive impairment and functional outcome in schizophrenia and bipolar disorder. *Journal of Clinical Psychiatry*, *67*, 3–8. https://www.psychiatrist.com/wp-content/uploads/2021/02/11862_cognitive-impairment-functional-outcome-schizophrenia-bipolar-endophenotype-MATRICS.pdf

Greenfield, S. F., Sugarman, D. E., Nargiso, J., & Weiss, R. D. (2005). Readability of patient handout materials in a nationwide sample of alcohol and drug abuse treatment programs. *American Journal on Addictions*, *14*(4), 339–345. https://doi.org/10.1080/10550490591003666

Gutierrez, N., Kindratt, T. B., Pagels, P., Foster, B., & Gimpel, N. E. (2014). Health literacy, health information seeking behaviors and internet use among patients attending a private and public clinic in the same geographic area. *Journal of Community Health*, *39*(1), 83–89. https://doi.org/10.1007/s10900-013-9742-5

Haapanen-Niemi, N., Miilunpalo, S., Pasanen, M., Vuori, I., Oja, P., & Malmberg, J. (2000). Body mass index, physical inactivity and low level of physical fitness as determinants of all-cause and cardiovascular disease mortality—16 y follow-up of middle-aged and elderly men and women. *International journal of obesity*, *24*(11), 1465–1474. https://doi.org/10.1038/sj.ijo.0801426

HLS-EU Consortium. (2012). *HLS-EU-Q. Measurement of health literacy in Europe: HLS-EU-Q47; HLS-EU-Q16; and HLS-EU-Q86* (tech. rep.). HLS-EU Consortium.

Howard, D. H., Sentell, T., & Gazmararian, J. A. (2006). Impact of health literacy on socioeconomic and racial differences in health in an elderly population. *Journal of General Internal Medicine*, *21*(8), 857–861. https://doi.org/10.1111/j.1525-1497.2006.00530.x

Hudson, C. G. (2005). Socioeconomic status and mental illness: Tests of the social causation and selection hypotheses. *American journal of Orthopsychiatry*, *75*(1), 3–18. https://doi.org/10.1037/0002-9432.75.1.3

Husson, O., Mols, F., Fransen, M. P., Van De Poll-Franse, L. V., & Ezendam, N. P. M. (2015). Low subjective health literacy is associated with adverse health behaviors and worse

health-related quality of life among colorectal cancer survivors: Results from the profiles registry. *Psycho-Oncology*, *24*(4), 478–486. https://doi.org/10.1002/pon.3678

Jayasinghe, U. W., Harris, M. F., Parker, S. M., Litt, J., van Driel, M., Mazza, D., Del Mar, C., Lloyd, J., Smith, J., Zwar, N., Taylor, R., Harris, M., Russell, G., Denney-Wilson, E., Laws, R., Snowdon, T., Bolger-Harris, H., Groombridge, S., Goldstein, S., … Wilson, J. (2016). The impact of health literacy and life style risk factors on health-related quality of life of Australian patients. *Health and Quality of Life Outcomes*, *14*(1). https://doi.org/10.1186/s12955-016-0471-1

Jorm, A. F. (2000). Mental health literacy: Public knowledge and beliefs about mental disorders. *The British Journal of Psychiatry*, *177*(5), 396–401. https://doi.org/10.1192/bjp.177.5.396

Kagstrom, A., Alexova, A., Tuskova, E., Csajbók, Z., Schomerus, G., Formanek, T., Mladá, K., Winkler, P., & Cermakova, P. (2019). The treatment gap for mental disorders and associated factors in the Czech Republic. *European Psychiatry*, *59*, 37–43. https://doi.org/10.1016/j.eurpsy.2019.04.003

Kakinaki, L., & Conner, K. (2010). Sampling strategies for addiction research. In P. G. Miller, J. Strang, & P. M. Miller (Eds.), *Addiction research methods* (pp. 349–363). Blackwell Publishing.

Kickbusch, I., Pelikan, J. M., Apfel, F., & Tsouros, A. D. (2013). *Health literacy: The solid facts*. World Health Organization.

Kickbusch, I. (2001). Health literacy: Addressing the health and education divide. *Health Promotion International*, *16*(3), 289–297. https://doi.org/10.1093/heapro/16.3.289

Kobayashi, L. C., Wardle, J., Wolf, M. S., & von Wagner, C. (2015). Cognitive function and health literacy decline in a cohort of aging English adults. *Journal of General Internal Medicine*, *30*(7), 958–964. https://doi.org/10.1007/s11606-015-3206-9

Kondilis, B. K., Kiriaze, I. J., Athanasoulia, A. P., & Falagas, M. E. (2008). Mapping health literacy research in the European Union: A bibliometric analysis. *PLoS One*, *3*(6), e2519. https://doi.org/10.1371/journal.pone.0002519

Kreps, G. L., & Sparks, L. (2008). Meeting the health literacy needs of immigrant populations. *Patient Education and Counseling*, *71*(3), 328–332. https://doi.org/10.1016/j.pec.2008.03.001

Kučera, Z., Pelikan, J., & Šteflová, A. (2016). Zdravotní gramotnost obyvatel ČR – výsledky komparativního reprezentativního šetření [Health literacy in Czech population – results of the comparative representative research]. *Časopis lékařů českých*, *155*, 233–241.

Lee, I.-M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., & Lancet Physical Activity Series Working Group and others. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease

and life expectancy. *The Lancet*, *380*(9838), 219–229. https://doi.org/10.1016/S0140-6736(12)61031-9

Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-Based Dentistry*, *7*(1), 24–25. https://doi.org/10.1038/sj.ebd.6400375

Levin-Zamir, D., Baron-Epel, O. B., Cohen, V., & Elhayany, A. (2016). The association of health literacy with health behavior, socioeconomic indicators, and self-assessed health from a national adult survey in Israel. *Journal of Health Communication*, *21*, 61–68. https://doi.org/10.1080/10810730.2016.1207115

Levy, H., & Janke, A. (2016). Health literacy and access to care. *Journal of Health Communication*, *21*(Suppl. 1), 43–50. https://doi.org/10.1080/10810730.2015.1131776

Lincoln, A. K., Arford, T., Doran, M. V., Guyer, M., & Hopper, K. (2015). A preliminary examination of the meaning and effect of limited literacy in the lives of people with serious mental illness. *Journal of Community Psychology*, *43*(3), 315–320. https://doi.org/10.1002/jcop.21680

Lincoln, A. K., Espejo, D., Johnson, P., Paasche-Orlow, M., Speckman, J. L., Webber, T. L., & White, R. F. (2008). Limited literacy and psychiatric disorders among users of an urban safety-net hospital's mental health outpatient clinic. *The Journal of Nervous and Mental Disease*, *196*(9), 687–693. https://doi.org/10.1097/NMD.0b013e31817d0181

Lincoln, A. K., Paasche-Orlow, M. K., Cheng, D. M., Lloyd-Travaglini, C., Caruso, C., Saitz, R., & Samet, J. H. (2006). Impact of health literacy on depressive symptoms and mental health-related: Quality of life among adults with addiction. *Journal of General Internal Medicine*, *21*(8), 818–822. https://doi.org/10.1111/j.1525-1497.2006.00533.x

Mantell, P. K., Baumeister, A., Christ, H., Ruhrmann, S., & Woopen, C. (2020). Peculiarities of health literacy in people with mental disorders: A cross-sectional study. *International Journal of Social Psychiatry*, *66*(1), 10–22. https://doi.org/10.1177/0020764019873683

McHugh, R. K., Sugarman, D. E., Kaufman, J. S., Park, S., Weiss, R. D., & Greenfield, S. F. (2014). Readability of self-report alcohol misuse measures. *Journal of Studies on Alcohol and Drugs*, *75*(2), 328–334. https://doi.org/10.15288/jsad.2014.75.328

Miller, T. A. (2016). Health literacy and adherence to medical treatment in chronic and acute illness: A meta-analysis. *Patient Education and Counseling*, *99*(7), 1079–1086. https://doi.org/10.1016/j.pec.2016.01.020

Ministerstvo zdravotnictví České republiky. (2020). *Strategický rámec rozvoje péče o zdraví v České republice do roku 2030 [Strategic Framework for Health Care Development in the Czech Republic by 2030]*. https://zdravi2030.mzcr.cz/zdravi-2030-strategicky-ramec.pdf

Mravčík, V., Chomynová, P., Grohmannová, K., Janíková, B., Černíková, T., Rous, Z., Cibulka, J., Fidesová, H., & Vopravil, J. (2020). *Výroční zpráva o stavu ve věcech drog v České republice v roce 2019 [Annual Report on Drug Situation in the Czech Republic in*

2020]. Úřad vlády České republiky. https://www.drogy-info.cz/publikace/vyrocni-zpravy/vyrocni-zprava-o-stavu-ve-vecech-drog-v-ceske-republice-v-roce-2019/

Murray, C. J. L., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasi-Kangevari, M., Abd-Allah, F., Abdollahi, M., Abedi, P., Abedi, A., Abolhassani, H., Aboyans, V., Abreu, L. G., Abrigo, M. R. M., Abu-Gharbieh, E., Haimed, A., Abushouk, A. I., Acebedo, A., Ackerman, I. N., Adabi, M., … Lim, S. S. (2020). Five insights from the global burden of disease study 2019. *The Lancet*, *396*(10258), 1135–1159. https://doi.org/10.1016/S0140-6736(20)31404-5

MZ ČR & ÚZIS ČR. (2021). *Národní zdravotnický informační portál*. https://www.nzip.cz/

Nguyen, T. H., Paasche-Orlow, M. K., & McCormack, L. A. (2017). The state of the science of health literacy measurement. *Information Services & Use*, *37*(2), 189–203. https://doi.org/10.3233/ISU-170827

Nielsen-Bohlman, L., Panzer, A. M., & Kindig, D. A. (2004). *Health literacy: A prescription to end confusion*. National Academies Press.

Nutbeam, D. (1998). Health promotion glossary. *Health Promotion International*, *13*(4), 349–364. https://doi.org/10.1093/heapro/1.1.113

Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, *15*(3), 259–267. https://doi.org/10.1093/heapro/15.3.259

Nutbeam, D. (2008). The evolving concept of health literacy. *Social Science & Medicine*, *67*(12), 2072–2078. https://doi.org/10.1016/j.socscimed.2008.09.050

Nutbeam, D. (2017). *Discussion paper on promoting, measuring and implementing health literacy-implications for policy and practice in non-communicable disease prevention and control* (tech. rep.). World Health Organization. https://www.who.int/global-coordination-mechanism/working-groups/background.pdf

Nutbeam, D., McGill, B., & Premkumar, P. (2018). Improving health literacy in community populations: A review of progress. *Health Promotion International*, *33*(5), 901–911. https://doi.org/10.1093/heapro/dax015

Oedekoven, M., Herrmann, W. J., Ernsting, C., Schnitzer, S., Kanzler, M., Kuhlmey, A., & Gellert, P. (2019). Patients' health literacy in relation to the preference for a general practitioner as the source of health information. *BMC Fmily Practice*, *20*(1), 1–10. https://doi.org/10.1186/s12875-019-0975-y

Okan, O., Bauer, U., Levin-Zamir, D., Pinheiro, P., & Sørensen, K. (2019). *International handbook of health literacy. Research, practice and policy across the lifespan*. Policy Press. https://library.oapen.org/handle/20.500.12657/24879

Okan, O., Rowlands, G., Sykes, S., & Wills, J. (2020). Shaping alcohol health literacy: A systematic concept analysis and review. *Health Literacy Research and Practice*, *4*(1), e3–e20. https://doi.org/10.3928/24748307-20191104-01

Opsal, A., Kristensen, Ø., & Clausen, T. (2019). Readiness to change among involuntarily and voluntarily admitted patients with substance use disorders. *Substance Abuse Treatment, Prevention, and Policy*, *14*(1), 1–10. https://doi.org/10.1186/s13011-019-0237-y

Osborn, C. Y., Paasche-Orlow, M. K., Bailey, S. C., & Wolf, M. S. (2011). The mechanisms linking health literacy to behavior and health status. *American Journal of Health Behavior*, *35*(1), 118–128. https://doi.org/10.5993/AJHB.35.1.11

Paasche-Orlow, M. K., Parker, R. M., Gazmararian, J. A., Nielsen-Bohlman, L. T., & Rudd, R. R. (2005). The prevalence of limited health literacy. *Journal of General Internal Medicine*, *20*(2), 175–184. https://doi.org/10.1111/j.1525-1497.2005.40245.x

Paasche-Orlow, M. K., & Wolf, M. S. (2007). The causal pathways linking health literacy to health outcomes. *American Journal of Health Behavior*, *31*(1), S19–S26. https://doi.org/10.5993/AJHB.31.s1.4

Palepu, A., Gadermann, A., Hubley, A. M., Farrell, S., Gogosis, E., Aubry, T., & Hwang, S. W. (2013). Substance use and access to health care and addiction treatment among homeless and vulnerably housed persons in three Canadian cities. *PloS One*, *8*(10), e75133. https://doi.org/10.1371/journal.pone.0075133

Parker, R. M. (2009). Measuring health literacy: What? So what? Now what. In Institute of Medicine (Ed.), *Measures of health literacy: Workshop summary* (pp. 91–98). National Academies Press. https://www.ncbi.nlm.nih.gov/books/NBK45386/

Parker, R. M., Baker, D. W., Williams, M. V., & Nurss, J. R. (1995). The test of functional health literacy in adults. a new instrument for measuring patients' literacy skills. *Journal of General Internal Medicine*, *10*(10), 537–541. https://doi.org/10.1007/BF02640361

Peerson, A., & Saunders, M. (2009). Health literacy revisited: What do we mean and why does it matter? *Health Promotion International*, *24*(3), 285–296. https://doi.org/10.1093/heapro/dap014

Pelikan, J. M., Röthlin, F., & Ganahl, K. (2014). *Comparative report of health literacy in eight EU member states* (tech. rep.). European Health Literacy Consortium. https://cdn1.sph.harvard.edu/wp-content/uploads/sites/135/2015/09/neu_rev_hls-eu_report_2015_05_13_lit.pdf

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: Theory, evidence, and policy implications. *Journal of Health and Social Behavior*, *51*(Suppl. 1), S28–S40. https://doi.org/10.1177/0022146510383498

Pleasant, A., & Kuruvilla, S. (2008). A tale of two health literacies: Public health and clinical approaches to health literacy. *Health Promotion International*, *23*(2), 152–159. https://doi.org/10.1093/heapro/dan0011

Pleasant, A., & McKinney, J. (2011). Coming to consensus on health literacy measurement: An online discussion and consensus-gauging process. *Nursing outlook*, *59*(2), 95–106. https://doi.org/10.1016/j.outlook.2010.12.006

Ratzan, S. C., & Parker, R. M. (2000). Introduction. In C. R. Selden, M. Zorn, S. C. Ratzan, & R. M. Parker (Eds.), *National Library of Medicine current bibliographies in medicine: Health literacy*. National Institutes of Health, US Department of Health and Human Services.

Rehm, J., Taylor, B., & Room, R. (2006). Global burden of disease from alcohol, illicit drugs and tobacco. *Drug and Alcohol Review*, *25*(6), 503–513. https://doi.org/10.1080/09595230600944453

Reisi, M., Javadzade, S. H., Heydarabadi, A. B., Mostafavi, F., Tavassoli, E., & Sharifirad, G. (2014). The relationship between functional health literacy and health promoting behaviors among older adults. *Journal of Education and Health Promotion*, *3*. https://doi.org/10.4103/2277-9531.145925

Rock, P., Roiser, J., Riedel, W., & Blackwell, A. (2014). Cognitive impairment in depression: A systematic review and meta-analysis. *Psychological Medicine*, *44*(10), 2029–2040. https://doi.org/10.1017/S0033291713002535

Rolova, G., Gavurova, B., & Petruzelka, B. (2021). Health literacy, self-perceived health, and substance use behavior among young people with alcohol and substance use disorders. *International Journal of Environmental Research and Public Health*, *18*(8), 4337. https://doi.org/10.3390/ijerph18084337

Rolová, G. (2020). Health Literacy in residential addiction treatment programs: Study protocol of a cross-sectional study in people with substance use disorders. *Adiktologie*, *20*(3–4), 145–150. https://doi.org/10.35198/01-2020-002-0009

Rolová, G., Barták, M., Rogalewicz, V., & Gavurová, B. (2018). Health literacy in people undergoing treatment for alcohol abuse – a pilot study. *Kontakt*, *20*(4), e394–e400. http://doi.org/10.1016/j.kontakt.2018.09.003

Room, R., Babor, T., & Rehm, J. (2005). Alcohol and public health. *The Lancet*, *365*(9458), 519–530. https://doi.org/10.1016/S0140-6736(05)17870-2

Rose, L. E., Sawyer, A. L., & Everett, A. (2014). Cardiovascular health literacy and treatment adherence in persons with serious mental illness. *Issues in Mental Health Nursing*, *35*(2), 88–99. https://doi.org/10.3109/01612840.2013.843622

Rowlands, G., Protheroe, J., Winkley, J., Richardson, M., Seed, P. T., & Rudd, R. (2015). A mismatch between population health literacy and the complexity of health information: An observational study. *British Journal of General Practice*, *65*(635), e379–e386. https://doi.org/10.3399/bjgp15X685285

Rudd, R. E. (2015). The evolving concept of health literacy: New directions for health literacy studies. *Journal of Communication in Healthcare*, *8*(1), 7–9. https://doi.org/10.1179/1753806815Z.000000000105

Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., Palacios, J., Sullivan, G. D., & Bindman, A. B. (2002). Association of health literacy with diabetes outcomes. *JAMA*, *288*(4), 475–482. https://doi.org/10.1001/jama.288.4.475

Schulz, P. J., & Nakamoto, K. (2013). Health literacy and patient empowerment in health communication: The importance of separating conjoined twins. *Patient Education and Counseling*, *90*(1), 4–11. https://doi.org/10.1016/j.pec.2012.09.006

Simonds, S. K. (1974). Health education as social policy. *Health Education Monographs*, *2*(Suppl. 1), 1–10. https://doi.org/10.1177/10901981740020S102

Sørensen, K., Pelikan, J. M., Röthlin, F., Ganahl, K., Slonska, Z., Doyle, G., Fullam, J., Kondilis, B., Agrafiotis, D., Uiters, E., Falcon, M., Mensing, M., Tchamov, K., Van den Broucke, S., & Brand, H. (2015). Health literacy in Europe: Comparative results of the European Health Literacy Survey (HLS-EU). *European Journal of Public Health*, *25*(6), 1053–1058. https://doi.org/10.1093/eurpub/ckv043

Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012). Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, *12*(1). https://doi.org/10.1186/1471-2458-12-80

Sørensen, K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., Kondilis, B., Stoffels, V., Osborne, R. H., & Brand, H. (2013). Measuring health literacy in populations: Illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). *BMC Public Health*, *13*(1), 1–10. https://doi.org/10.1186/1471-2458-13-948

Stewart, D. W., Adams, C. E., Cano, M. A., Correa-Fernández, V., Li, Y., Waters, A. J., Wetter, D. W., & Vidrine, J. I. (2013). Associations between health literacy and established predictors of smoking cessation. *American Journal of Public Health*, *103*(7), e43–e49. https://doi.org/10.2105/AJPH.2012.301062

Stewart, D. W., Cano, M. Á., Correa-Fernández, V., Spears, C. A., Li, Y., Waters, A. J., Wetter, D. W., & Vidrine, J. I. (2014). Lower health literacy predicts smoking relapse among racially/ethnically diverse smokers with low socioeconomic status. *BMC Public Health*, *14*(1), 1–6. https://doi.org/10.1186/1471-2458-14-716

Stewart, D. W., Vidrine, J. I., Shete, S., Spears, C. A., Cano, M. A., Correa-Fernández, V., Wetter, D. W., & McNeill, L. H. (2015). Health literacy, smoking, and health indicators in African American adults. *Journal of Health Communication*, *20*(sup2), 24–33. https://doi.org/10.1080/10810730.2015.1066465

Stormacq, C., Van den Broucke, S., & Wosinski, J. (2019). Does health literacy mediate the relationship between socioeconomic status and health disparities? Integrative review. *Health Promotion International*, *34*(5), e1–e17. https://doi.org/10.1093/heapro/day062

Stormacq, C., Wosinski, J., Boillat, E., & Van den Broucke, S. (2020). Effects of health literacy interventions on health-related outcomes in socioeconomically disadvantaged adults living in the community: A systematic review. *JBI Evidence Synthesis*, *18*(7), 1389–1469. https://doi.org/10.11124/JBISRIR-D-18-00023

Storms, H., Claes, N., Aertgeerts, B., & Van den Broucke, S. (2017). Measuring health literacy among low literate people: An exploratory feasibility study with the HLS-EU questionnaire. *BMC Public Health*, *17*(1), 475. https://doi.org/10.1186/s12889-017-4391-8

Sudore, R. L., & Schillinger, D. (2009). Interventions to improve care for patients with limited health literacy. *Journal of Clinical Outcomes Management*, *16*(1), 20. https://doi.org/10.1186/s12889-018-6331-7

Suka, M., Odajima, T., Okamoto, M., Sumitani, M., Igarashi, A., Ishikawa, H., Kusama, M., Yamamoto, M., Nakayama, T., & Sugimori, H. (2015). Relationship between health literacy, health information access, health behavior, and health status in Japanese people. *Patient Education and Counseling*, *98*(5), 660–668. https://doi.org/10.1016/j.pec.2015.02.013

Svendsen, M. T., Bak, C. K., Sørensen, K., Pelikan, J., Riddersholm, S. J., Skals, R. K., Mortensen, R. N., Maindal, H. T., Bøggild, H., Nielsen, G., & Torp-Pedersen, C. (2020). Associations of health literacy with socioeconomic position, health risk behavior, and health status: a large national population-based survey among Danish adults. *BMC Public Health*, *20*(1), 1–12. https://doi.org/10.1186/s12889-020-08498-8

Sykes, S., Wills, J., Rowlands, G., & Popple, K. (2013). Understanding critical health literacy: A concept analysis. *BMC public health*, *13*(1), 1–10. https://doi.org/10.1186/1471-2458-13-150

Theofilou, P. (2013). Quality of life: Definition and measurement. *Europe's Journal of Psychology*, *9*(1). https://doi.org/10.5964/ejop.v9i1.337

Tiller, D., Herzog, B., Kluttig, A., & Haerting, J. (2015). Health literacy in an urban elderly East-German population – results from the population-based CARLA study. *BMC Public Health*, *15*(1), 1–9. https://doi.org/10.1186/s12889-015-2210-7

Toçi, E., Burazeri, G., Sørensen, K., Kamberi, H., & Brand, H. (2015). Concurrent validation of two key health literacy instruments in a South Eastern European population. *European Journal of Public Health*, *25*(3), 482–486. https://doi.org/10.1093/eurpub/cku190

Torrens, M., Mestre-Pintó, J.-I., & Domingo-Salvany, A. (2015). *Comorbidity of substance use and mental disorders in Europe*. European Monitoring Centre for Drugs and Drug Addiction.

Tyas, S. L., & Pederson, L. L. (1998). Psychosocial factors related to adolescent smoking: a critical review of the literature. *Tobacco Control*, *7*(4), 409–420. http://doi.org/10.1136/tc.7.4.409

United Nations Office on Drugs and Crime. (2020). *World drug report 2020*. United Nations Office on Drugs; Crime. https://wdr.unodc.org/wdr2020/index.html

Ústav pro zdravotní gramotnost. (2017a). *Návrh závěrů 1. národní konference o zdravotní gramotnosti [Draft conclusions of the 1st National Conference on Health Literacy]*. http://www.uzg.cz/wp-content/uploads/2021/06/Zavery_doporuceni.pdf

Ústav pro zdravotní gramotnost. (2017b). *Zdravotní gramotnost a zdravotní politika. Sborník textů pro kolokvium [Health literacy and health policy. Proceedings of texts for the colloquium.]* http://www.uzg.cz/wp-content/uploads/2021/06/Kolokvium_Sbornik.pdf

Ústav pro zdravotní gramotnost. (2021). *Ústav pro zdravotní gramotnost, z.ú.* http://www.uzg.cz/

Vamos, S., & Rootman, I. (2013). Health literacy as a lens for understanding noncommunicable diseases and health promotion. In D. V. McQueen (Ed.), *Global handbook on noncommunicable diseases and health promotion* (pp. 169–187). Springer. https://doi.org/10.1007/978-1-4614-7594-1

van der Heide, I., Wang, J., Droomers, M., Spreeuwenberg, P., Rademakers, J., & Uiters, E. (2013). The relationship between health, education, and health literacy: Results from the Dutch Adult Literacy and Life Skills Survey. *Journal of Health Communication*, *18*(Suppl. 1), 172–184. https://doi.org/10.1080/10810730.2013.825668

van Boekel, L. C., Brouwers, E. P., Van Weeghel, J., & Garretsen, H. F. (2013). Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: Systematic review. *Drug and Alcohol Dependence*, *131*(1–2), 23–35. https://doi.org/10.1016/j.drugalcdep.2013.02.018

Vandenbosch, J., Van den Broucke, S., Vancorenland, S., Avalosse, H., Verniest, R., & Callens, M. (2016). Health literacy and the use of healthcare services in Belgium. *Journal of Epidemiology and Community Health*, *70*(10), 1032–1038. http://doi.org/10.1136/jech-2015-206910

Visscher, B. B., Steunenberg, B., Heijmans, M., Hofstede, J. M., Devillé, W., van der Heide, I., & Rademakers, J. (2018). Evidence on the effectiveness of health literacy interventions in the EU: A systematic review. *BMC Public Health*, *18*(1), 1–12. https://doi.org/10.1186/s12889-018-6331-7

Vittinghoff, E., Glidden, D. V., Shiboski, S. C., & McCulloch, C. E. (2012). *Regression methods in biostatistics: Linear, logistic, survival, and repeated measures models*. Springer.

von Wagner, C., Knight, K., Steptoe, A., & Wardle, J. (2007). Functional health literacy and health-promoting behaviour in a national sample of British adults. *Journal of Epidemiology and Community Health*, *61*(12), 1086–1090. https://doi.org/10.1136/jech.2006.053967

Wetzel, E., Böhnke, J. R., & Brown, A. (2016). Response biases. In F. Leong, D. Bartram, F. Cheung, K. Geisinger, & C. Iliescu (Eds.), *The ITC international handbook of testing and assessment* (pp. 349–363). Oxford University Press.

Williams, M. V., Parker, R. M., Baker, D. W., Parikh, N. S., Pitkin, K., Coates, W. C., & Nurss, J. R. (1995). Inadequate functional health literacy among patients at two public hospitals. *JAMA*, *274*(21), 1677–1682. https://doi.org/10.1001/jama.1995.03530210031026

Winkler, P., Csémy, L., Janoušková, M., Mladá, K., Motlová, L. B., & Evans-Lacko, S. (2015). Reported and intended behaviour towards those with mental health problems in the Czech Republic and England. *European Psychiatry*, *30*(6), 801–806. https://doi.org/10.1016/j.eurpsy.2015.05.003

Winkler, P., Mladá, K., Janoušková, M., Weissová, A., Tušková, E., Csémy, L., & Evans-Lacko, S. (2016). Attitudes towards the people with mental illness: Comparison between Czech medical doctors and general population. *Social psychiatry and psychiatric epidemiology*, *51*(9), 1265–1273. https://doi.org/10.1016/j.eurpsy.2015.05.003

Wolf, M. S., Gazmararian, J. A., & Baker, D. W. (2005). Health literacy and functional health status among older adults. *Archives of Internal Medicine*, *165*(17), 1946–1952. https://doi.org/10.1001/archinte.165.17.1946

Wolf, M. S., Gazmararian, J. A., & Baker, D. W. (2007). Health literacy and health risk behaviors among older adults. *American Journal of Preventive Medicine*, *32*(1), 19–24. https://doi.org/10.1016/j.amepre.2006.08.024

World Health Organization. (1992). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical descriptions and diagnostic guidelines*. World Health Organization. https://www.who.int/classifications/icd/en/bluebook.pdf

World Health Organization. (1998). *Health promotion glossary*. World Health Organization. https://www.who.int/healthpromotion/about/HPG/en/

World Health Organization. (2019). *Global status report on alcohol and health 2018*. World Health Organization. https://www.who.int/publications/i/item/9789241565639

World Medical Association. (2013). World Medical Association Declaration of Helsinki – Ethical principles for medical research involving human subjects. https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/

A. Attachments

A.1 Extended analysis of HLS-EU-Q47

Table A.1: Simple linear regression for health literacy subdomains and socioeconomic characteristics for the general sample

	Healthcare				Disease prevention				Health promotion			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Gender												
Men	0.36	0.60	[-0.81, 1.53]	.547	-0.78	0.72	[-2.19, 0.64]	.282	0.24	0.78	[-1.29, 1.76]	.760
Women (Ref.)												
Age	0.00	0.02	[-0.04, 0.05]	.906	0.03	0.03	[-0.03, 0.08]	.380	-0.04	0.03	[-0.10, 0.02]	.178
Marital status												
Married	1.41	0.72	[-0.01, 2.83]	.051	1.63	0.87	[-0.07, 3.34]	.061	0.81	0.94	[-1.03, 2.65]	.388
Non-married	-0.74	0.53	[-1.79, 0.31]	.166	-0.71	0.64	[-1.97, 0.55]	.271	0.24	0.69	[-1.12, 1.60]	.727
Divorced/widowed	-0.04	0.60	[-1.22, 1.15]	.952	-0.23	0.73	[-1.66, 1.20]	.750	-0.87	0.78	[-2.41, 0.66]	.266
Housing conditions												
Without a home	-1.87	0.87	[-3.58, -0.17]	.031	-1.05	1.05	[-3.11, 1.01]	.319	-2.83	1.12	[-5.04, -0.62]	.012
Stable housing (Ref.)												
Household size	0.23	0.20	[-0.16, 0.62]	.245	0.34	0.23	[-0.13, 0.81]	.151	0.53	0.56	[0.02, 1.03]	.040
Level of education	0.12	0.23	[-0.33, 0.56]	.613	0.10	0.27	[-0.44, 0.64]	.721	-0.14	0.30	[-0.72, 0.44]	.640
Employment status												
Unemployed	-0.78	0.53	[-1.82, 0.26]	.140	-1.42	0.64	[-2.67, -1.17]	.026	-1.40	0.69	[-2.74, -0.05]	.042
Employed (Ref.)												
Length of unemployment	-0.01	0.02	[-0.05, 0.03]	.607	0.00	0.03	[-0.05, 0.06]	.879	0.01	0.03	[-0.04, 0.07]	.677
Formal health education												
Yes	4.16	1.01	[2.18, 6.15]	$< .001$	4.53	1.22	[2.14, 6.93]	$< .001$	2.84	1.33	[0.24, 5.44]	.033
No (Ref.)												
Household net income	0.13	0.07	[-0.01, 0.28]	.075	0.11	0.09	[-0.07, 0.29]	.216	0.24	0.10	[0.05, 0.42]	.014
Debt situation												
Debts	0.02	0.54	[-1.05, 1.09]	.971	-1.23	0.65	[-2.51, 0.05]	.059	-1.42	0.70	[-2.79, -0.04]	.044
No debts (Ref.)												
Size of place of residence												
$>$ 100,000 inhabitants	-0.42	0.58	[-1.55, 0.71]	.465	-0.56	0.69	[-1.92, 0.80]	.417	0.16	0.75	[-1.31, 1.62]	.835
5,000–100,000 inhabitants	0.74	0.54	[-0.32, 1.80]	.171	1.19	0.65	[-0.09, 2.47]	.068	0.47	0.70	[-0.92, 1.85]	.508
$<$ 5,000 inhabitants	-0.51	0.63	[-1.75, 0.74]	.426	-0.95	0.76	[-2.45, 0.55]	.215	-0.83	0.82	[-2.45, 0.79]	.315

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Table A.2: Simple linear regression for dimensions of health information processing and socioeconomic characteristics for the general sample

	Access				Understand				Appraise				Apply			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Gender																
Male	0.12	0.67	[-1.21, 1.44]	.865	-0.11	0.66	[-1.41, 1.18]	.866	-0.47	0.76	[-1.96, 1.01]	.531	0.33	0.71	[-1.07, 1.73]	.643
Female (Ref.)																
Age	-0.03	0.03	[-0.08, 0.02]	.277	-0.01	0.03	[-0.06, 0.05]	.844	0.04	0.03	[-0.02, 0.10]	.217	-0.02	0.03	[-0.08, 0.33]	.431
Marital status																
Married	1.11	0.81	[-0.49, 2.70]	.174	1.18	0.80	[-0.38, 2.75]	.138	1.40	0.91	[-0.40, 3.19]	.127	1.48	0.86	[-0.21, 3.17]	.087
Non-married	-0.21	0.60	[-1.40, 0.97]	.721	-0.39	0.59	[-1.55, 0.77]	.508	-0.97	0.68	[-2.29, 0.36]	.153	-0.03	0.64	[-1.28, 1.22]	.959
Divorced/widowed	-0.50	0.68	[-1.93, 0.84]	.465	-0.32	0.67	[-1.63, 0.98]	.626	0.26	0.76	[-1.24, 1.76]	.732	-0.98	0.72	[-2.39, 0.43]	.171
Housing conditions																
Without a home	-1.33	0.98	[-3.25, 0.59]	.175	-1.99	0.96	[-3.87, -0.11]	.038	-2.38	1.10	[-4.53, -0.22]	.031	-2.13	1.04	[-4.16, -0.09]	.040
Stable housing (Ref.)																
Household size	0.34	0.22	[-0.09, 0.78]	.124	0.30	0.22	[-0.13, 0.73]	.166	0.30	0.25	[-0.19, 0.79]	.234	0.53	0.24	[0.07, 0.99]	.025
Level of education	-0.05	0.26	[-0.56, 0.45]	.840	0.44	0.25	[-0.05, 0.93]	.081	0.14	0.29	[-0.43, 0.70]	.634	-0.43	0.27	[-0.96, 0.10]	.113
Employment status																
Unemployed	-0.81	0.60	[-1.98, 0.36]	.173	-1.19	0.58	[-2.34, -0.05]	.041	-1.63	0.68	[-2.94, -0.32]	.015	-1.20	0.63	[-2.44, 0.04]	.057
Employed (Ref.)																
Length of unemployment	-0.01	0.02	[-0.06, 0.04]	.596	-0.01	0.02	[-0.05, 0.04]	.834	0.01	0.03	[-0.04, 0.07]	.642	0.01	0.03	[-0.04, 0.07]	.579
Formal health education																
Yes	2.90	1.15	[0.65, 5.16]	.012	4.09	1.12	[1.90, 6.29]	$< .001$	5.37	1.28	[2.86, 7.88]	$< .001$	3.03	1.22	[0.65, 5.42]	.013
No (Ref.)																
Household net income	0.15	0.08	[-0.01, 0.31]	.070	0.23	0.08	[0.07, 0.39]	.004	0.09	0.09	[-0.09, 0.28]	.330	0.17	0.09	[-0.00, 0.34]	.055
Debt situation																
Debts	-0.71	0.61	[-1.91, 0.49]	.245	-1.20	0.60	[-2.37, -0.03]	.045	-0.68	0.69	[-0.03, 0.67]	.323	-0.93	0.65	[-2.20, 0.33]	.149
No debts (Ref.)																
Size of place of residence																
$>$ 100,000 inhabitants	-0.24	0.65	[-1.51, 1.04]	.714	-0.19	0.64	[-1.43, 1.06]	.769	-0.63	0.73	[-2.06, 0.80]	.386	0.01	0.69	[-1.34, 1.36]	.986
5,000–100,000 inhabitants	0.81	0.61	[-0.39, 2.01]	.148	0.43	0.60	[-0.75, 1.60]	.476	1.18	0.68	[-0.16, 2.53]	.084	0.67	0.65	[-0.60, 1.94]	.297
$<$ 5,000 inhabitants	-0.82	0.71	[-2.22, 0.58]	.250	-0.36	0.70	[-1.73, 1.02]	.610	-0.86	0.80	[-2.43, 0.72]	.287	-0.94	0.76	[-2.43, 0.55]	.214

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Table A.3: Simple linear regression for health literacy subdomains and self-reported health indicators and quality of life for the general sample

	Healthcare				Disease prevention				Health promotion			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Psychiatric comorbidity												
Yes	0.42	0.62	[-0.80, 1.63]	.504	0.60	0.75	[-0.87, 2.07]	.426	1.09	0.80	[-0.49, 2.67]	.177
No (Ref.)												
Comorbid d/o (Ref. = None)												
Anxiety disorders	0.47	1.14	[-1.77, 2.72]	.679	1.52	1.38	[-1.18, 4.23]	.270	2.59	1.48	[-0.23, 5.50]	.081
Mood disorders	1.62	0.93	[-0.21, 3.45]	.082	2.25	1.12	[0.05, 4.45]	.045	0.75	1.21	[-1.63, 3.13]	.537
Psychotic disorders	-0.23	1.30	[-2.78, 2.32]	.861	0.70	1.57	[-2.38, 3.77]	.657	1.86	1.68	[-1.45, 5.17]	.269
Personality disorders	0.65	1.69	[-2.68, 3.98]	.702	0.59	2.04	[-3.42, 4.60]	.774	-0.91	2.20	[-5.23, 3.40]	.678
General health status	0.89	0.24	[0.41, 1.36]	$< .001$	1.20	0.29	[0.63, 1.78]	$< .001$	1.70	0.31	[1.08, 2.31]	$< .001$
Mental health status	0.70	0.25	[0.21, 1.17]	.005	1.43	0.29	[0.86, 2.00]	$< .001$	1.74	0.31	[1.12, 2.35]	$< .001$
Physical condition	0.75	0.24	[0.28, 1.22]	.002	1.11	0.29	[0.54, 1.67]	$< .001$	2.06	0.30	[1.46, 2.65]	$< .001$
Quality of life	0.72	0.26	[0.22, 1.23]	.005	1.43	0.31	[0.82, 2.03]	$< .001$	1.90	0.33	[1.26, 2.55]	$< .001$

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Table A.4: Simple linear regression for dimensions of health information processing and self-reported health indicators and quality of life for the general sample

	Access				Understand				Appraise				Apply			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Psychiatric comorbidity																
Yes	0.94	0.70	[-0.44, 2.31]	.181	0.93	0.68	[-0.41, 2.28]	.173	0.61	0.79	[-0.93, 2.16]	.463	0.28	0.74	[-1.18, 1.74]	.706
No (Ref.)																
Comorbid d/o. (Ref. = None)																
Anxiety disorders	2.14	1.29	[-0.39, 4.66]	.097	2.19	1.26	[-0.29, 4.66]	.083	1.16	1.45	[-1.69, 4.00]	.425	0.58	1.37	[-2.11, 3.26]	.763
Mood disorders	1.30	1.05	[-0.76, 3.36]	.217	1.39	1.03	[-0.63, 3.41]	.176	2.68	1.18	[0.37, 4.98]	.023	0.67	1.11	[-1.52, 2.85]	.549
Psychotic disorders	1.13	1.46	[-1.75, 4.00]	.442	1.01	1.43	[-1.81, 3.82]	.482	-0.22	1.65	[-3.45, 3.01]	.894	1.20	1.55	[-1.85, 4.24]	.441
Personality disorders	-0.23	1.91	[-3.98, 3.52]	.904	-0.84	1.87	[-4.51, 2.84]	.655	1.35	2.14	[-2.86, 5.56]	.528	0.07	2.02	[-3.90, 4.04]	.972
General health status	1.13	0.27	[0.59, 1.67]	$< .001$	1.24	0.27	[0.71, 1.76]	$< .001$	1.10	0.31	[0.50, 1.71]	$< .001$	1.63	0.29	[1.06, 2.19]	$< .001$
Mental health status	1.27	0.27	[0.73, 1.81]	$< .001$	0.99	0.27	[0.46, 1.52]	$< .001$	1.28	0.31	[0.67, 1.88]	$< .001$	1.62	0.29	[1.05, 2.18]	$< .001$
Physical condition	1.17	0.27	[0.64, 1.69]	$< .001$	1.18	0.26	[0.67, 1.70]	$< .001$	1.02	0.30	[0.43, 1.62]	.001	1.92	0.28	[1.37, 2.46]	$< .001$
Quality of life	1.15	0.29	[0.58, 1.72]	$< .001$	0.97	0.28	[0.41, 1.52]	.001	1.35	0.32	[0.71, 1.98]	$< .001$	1.97	0.30	[1.38, 2.59]	$< .001$

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Table A.5: Simple linear regression for health literacy subdomains and substance use behavior and treatment experiences for the general sample

	Healthcare				Disease prevention				Health promotion			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Recruitment												
Detoxification	0.09	0.66	[-1.20, 1.38]	.891	0.54	0.79	[-1.02, 2.09]	.498	0.04	0.85	[-1.63, 1.72]	.960
Short-/medium-term inpatient care	-0.29	0.54	[-1.35, 0.78]	.596	0.24	0.65	[-1.04, 1.52]	.711	0.21	0.70	[-1.17, 1.59]	.761
Therapeutic community	0.37	0.69	[-0.99, 1.73]	.594	-0.99	0.83	[-2.62, 0.65]	.236	-0.40	0.90	[-2.16, 1.37]	.659
Cigarette smoking												
Current smoker	0.78	0.61	[-0.42, 1.98]	.201	0.86	0.73	[-0.59, 2.30]	.246	1.16	0.79	[-0.39, 2.72]	.143
Non-smoker (Ref.)												
Frequency of alcohol use	0.07	0.17	[-0.26, 0.40]	.678	-0.10	0.20	[-0.49, 0.30]	.636	-0.60	0.21	[-1.02, -0.18]	.005
Frequency of HED	0.03	0.16	[-0.29, 0.35]	.845	-1.15	0.20	[-0.53, 0.23]	.443	-0.66	0.21	[-1.06, -0.25]	.002
Frequency of alcohol intoxication	-0.18	0.17	[-0.51, 0.15]	.290	-0.31	0.20	[0.13, -0.71]	.130	-0.76	0.22	[-1.18, -0.33]	.001
Past-year alcohol use												
Daily	-0.40	0.53	[-1.45, 0.65]	.456	-1.29	0.64	[-2.54, -0.03]	.046	-2.09	0.69	[-3.44, -0.74]	.002
Less than daily (Ref.)												
Past-year HED												
Daily	-0.52	0.56	[-1.62, 0.59]	.358	-1.29	0.68	[-2.61, 0.05]	.058	-2.27	0.73	[-3.70, -0.85]	.002
Less than daily (Ref.)												
Past-year alcohol intoxication												
Weekly	-0.34	0.55	[-1.42, 0.73]	.530	-1.01	0.66	[-2.30, 0.29]	.126	-2.04	0.70	[-3.42, -0.66]	.004
Less than weekly (Ref.)												
Lifetime any illicit drug use												
Yes	1.11	0.64	[-0.14, 2.36]	.082	-0.44	0.77	[-1.95, 1.08]	.572	-0.59	0.83	[-2.21, 1.04]	.479
No (Ref.)												
Lifetime illicit drug use (Ref. = No)												
Cannabis	0.66	0.57	[-0.46, 1.79]	.248	-0.84	0.69	[-2.20, 0.51]	.222	-0.38	0.74	[-1.84, 1.08]	.612
Ecstasy	0.33	0.54	[-0.72, 1.38]	.538	-0.53	0.65	[-1.80, 0.74]	.410	0.87	0.69	[-0.49, 2.24]	.209
Methamphetamine and other amp.	0.10	0.53	[-0.94, 1.14]	.851	-0.89	0.64	[-2.14, 0.36]	.161	0.17	0.69	[-1.18, 1.51]	.808
Cocaine	-0.18	0.56	[-1.27, 0.91]	.741	-1.12	0.67	[-2.43, 0.19]	.095	-0.50	0.70	[-1.91, 0.92]	.489
Heroin and other opioids	0.25	0.69	[-1.09, 1.60]	.713	-0.65	0.83	[-2.27, 0.97]	.432	-0.57	0.89	[-2.32, 1.17]	.519
Buprenorphine and methadon	1.43	0.78	[-0.10, 2.96]	.068	0.76	0.94	[-1.09, 2.61]	.419	0.72	1.01	[-1.27, 2.71]	.479
Hallucinogens	0.66	0.54	[-0.40, 1.72]	.224	-0.73	0.65	[-2.01, 0.55]	.264	0.63	0.70	[-0.75, 2.01]	.371
Inhalants	-0.19	0.73	[-1.62, 1.24]	.790	-0.78	0.88	[-2.50, 0.94]	.374	0.01	0.94	[-1.85, 1.86]	.994

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Simple linear regression for health literacy subdomains and substance use behavior and treatment experiences for the general sample (Continued)

	Healthcare				Disease prevention				Health promotion			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
New psychoactive substances	0.96	0.84	[-0.70, 2.62]	.255	-0.26	1.01	[-2.26, 1.74]	.800	0.36	1.10	[-1.79, 2.52]	.741
Psychoactive medicine	0.62	0.54	[-0.43, 1.67]	.247	0.00	0.65	[-1.27, 1.27]	.998	-0.03	0.70	[-1.39, 1.34]	.967
Lifetime gambling												
Yes	-0.72	0.58	[-1.85, 0.42]	.215	-1.69	0.70	[-3.05, -0.32]	.016	-0.55	0.75	[-2.03, 0.92]	.461
No (Ref.)												
Past-year any illicit drug use												
Yes	0.38	0.54	[-0.69, 1.44]	.488	-0.01	0.66	[-1.30, 1.28]	.990	-0.39	0.71	[-1.77, 1.00]	.583
No												
Past-year illicit drug use (Ref. = No)												
Cannabis	-0.35	0.54	[-1.40, 0.70]	.509	-0.76	0.64	[-2.02, 0.51]	.238	-0.46	0.69	[-1.82, 0.91]	.511
Ecstasy	0.50	0.62	[-0.72, 1.73]	.422	-0.02	0.75	[-1.49, 1.46]	.984	1.17	0.81	[-0.41, 2.76]	.148
Methamphetamine and other amp.	-0.36	0.55	[-1.44, 0.72]	.514	-0.61	0.66	[-1.91, 0.70]	.360	0.16	0.71	[-1.25, 1.56]	.828
Cocaine	-0.23	0.68	[-1.57, 1.11]	.734	-0.45	0.82	[-2.06, 1.16]	.584	0.60	0.88	[-1.14, 2.34]	.498
Heroin and other opioids	-0.47	1.00	[-2.45, 1.50]	.637	-0.25	1.21	[-2.63, 2.13]	.836	-0.68	1.30	[-3.23, 1.88]	.604
Buprenorphine and methadon	1.19	1.01	[-0.80, 3.18]	.239	1.67	1.22	[-0.73, 4.07]	.171	0.89	1.32	[-1.69, 3.47]	.499
Hallucinogens	0.70	0.71	[-0.68, 2.09]	.320	-0.04	0.85	[-1.71, 1.64]	.964	1.81	0.92	[0.01, 3.60]	.049
Inhalants	-0.03	1.18	[-2.34, 2.28]	.978	0.51	1.42	[-2.27, 3.30]	.718	1.56	1.53	[-1.44, 4.55]	.308
New psychoactive substances	-0.15	1.10	[-2.31, 2.01]	.893	-0.96	1.32	[-3.46, 1.74]	.518	-0.33	1.43	[-3.13, 2.48]	.820
Psychoactive medicine	0.53	0.58	[-0.62, 1.67]	.368	0.53	0.70	[-0.85, 1.92]	.449	0.05	0.76	[-1.44, 1.54]	.946
Past-year gambling												
Yes	-0.95	0.68	[-2.29, 0.39]	.164	-1.74	0.82	[-3.35, -0.13]	.034	0.05	0.88	[-1.69, 1.79]	956
No (Ref.)												
First alcohol use	0.06	0.08	[-0.09, 0.21]	.437	0.10	0.09	[-0.08, 0.27]	.288	0.15	0.1	[-0.04, 0.34]	.118
First alcohol intoxication	0.09	0.06	[-0.03, 0.20]	.131	0.15	0.07	[0.02, 0.29]	.030	0.07	0.08	[-0.08, 0.22]	.337
First cannabis use	0.01	0.05	[-0.09, 0.11]	.879	0.01	0.06	[-0.11, 0.13]	.843	-0.11	0.07	[-0.24, 0.03]	.114
First illicit drug use	0.03	0.08	[-0.11, 0.18]	.649	0.06	0.09	[-0.12, 0.24]	.504	0.02	0.10	[-0.17, 0.21]	.859
Detoxification												
Once/first treatment (Ref.)												
2x or more times	0.27	0.77	[-1.25, 1.79]	.728	0.69	0.93	[-1.14, 2.53]	.457	0.82	1.00	[-1.15, 2.79]	.414
Short-/medium-term inpatient care												

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Simple linear regression for health literacy subdomains and substance use behavior and treatment experiences for the general sample (Continued)

	Healthcare				Disease prevention				Health promotion			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Once/first treatment (Ref.)												
2x or more times	-0.47	0.63	[-1.70, 0.76]	.454	-0.22	0.76	[-0.71, 1.27]	.773	-1.04	0.81	[-2.63, 0.56]	.204
Therapeutic community												
Once/first treatment (Ref.)												
2x or more times	0.06	1.06	[-2.02, 2.15]	.954	-0.37	1.27	[-2.88, 2.15]	.773	-0.81	1.37	[-3.51, 1.90]	.556
Therapy drop-out												
First treatment/all completed (Ref.)												
1x or more times terminated	-0.56	0.59	[-1.72, 0.60]	.344	-1.40	0.71	[-2.79, -0.00]	.049	-1.47	0.76	[-2.97, 0.03]	.054

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

Table A.6: Simple linear regression for dimensions of health information processing and substance use behavior and treatment experiences for the general sample

	Access				Understand				Appraise				Apply			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Recruitment																
Detoxification	-0.26	0.74	[-1.71, 1.20]	.728	0.24	0.73	[-1.18, 1.67]	.739	0.38	0.83	[-1.26, 2.01]	.650	0.59	0.78	[-0.95, 2.12]	.456
Short-/medium-term inpatient care	0.35	0.61	[-0.85, 1.55]	.565	-0.15	0.60	[-1.32, 1.02]	.802	0.25	0.69	[-1.10, 1.60]	.716	-0.32	0.65	[-1.59, 0.95]	.619
Therapeutic community	-0.29	0.78	[-1.82, 1.24]	.712	-0.02	0.76	[-1.52, 1.48]	.975	-0.82	0.88	[-2.54, 0.89]	.346	-0.12	0.83	[-1.74, 1.50]	.881
Cigarette smoking																
Current smoker	1.02	0.69	[-0.33, 2.37]	.137	1.05	0.67	[-0.27, 2.38]	.119	0.76	0.77	[-0.76, 2.28]	.328	0.87	0.73	[-0.57, 2.30]	.236
Non-smoker (Ref.)																
Frequency of alcohol use	0.02	0.19	[-0.35, 0.38]	.932	-0.23	0.18	[-0.59, 0.14]	.220	-0.16	0.21	[-0.58, 0.25]	.439	-0.53	0.20	[-0.92, -0.14]	.008
Frequency of HED	-0.01	0.18	[-0.36, 0.35]	.972	-0.29	0.18	[-0.63, 0.06]	.110	-0.21	0.20	[-0.61, 0.20]	.314	-0.60	0.19	[-0.97, -0.22]	.002
Frequency of alcohol intoxication	-0.07	0.19	[-0.44, 0.31]	.731	-0.44	0.19	[-0.81, -0.08]	.017	-0.44	0.21	[-0.86, -0.02]	.039	-0.78	0.20	[-1.17, -0.39]	$< .001$
Past-year alcohol use																
Daily	-0.69	0.60	[-1.87, 0.48]	.248	-1.40	0.59	[-2.55, -0.25]	.017	-0.94	0.67	[-2.27, 0.38]	.163	-2.15	0.63	[-3.38, -0.91]	.001
Less than daily (Ref.)																
Past-year HED																
Daily	-0.74	0.63	[-1.99, 0.50]	.241	-1.38	0.62	[-2.59, -0.16]	.026	-0.96	0.71	[-2.36, 0.44]	.179	-2.52	0.66	[-3.82, -1.21]	$< .001$
Less than daily (Ref.)																
Past-year alcohol intoxication																
Weekly	-0.46	0.62	[-1.67, 0.75]	.453	-0.98	0.60	[-2.16, 0.21]	.105	-1.14	0.69	[-2.50, 0.21]	.098	-2.09	0.65	[-3.36, -0.82]	.001
Less than weekly (Ref.)																
Lifetime any illicit drug use																
Yes	0.91	0.72	[-0.50, 2.32]	.205	0.33	0.71	[-1.05, 1.72]	.636	-0.60	0.81	[-2.18, 0.99]	.460	-0.60	0.76	[-2.10, 0.90]	.430
No (Ref.)																
Lifetime illicit drug use (Ref. = No)																
Cannabis	0.60	0.64	[-0.67, 1.86]	.355	-0.19	0.63	[-1.43, 1.05]	.763	-0.71	0.72	[-2.14, 0.71]	.325	-0.50	0.68	[-1.84, 0.85]	.469
Ecstasy	0.62	0.60	[-0.57, 1.80]	.307	0.29	0.59	[-0.87, 1.45]	.623	-0.25	0.68	[-1.58, 1.08]	.711	0.27	0.64	[-0.99, 1.52]	.676
Methamphetamine and other amp.	0.55	0.60	[-0.62, 1.72]	.356	-0.11	0.58	[-1.26, 1.04]	.852	-0.79	0.67	[-2.11, 0.52]	.235	-0.52	0.63	[-1.76, 0.72]	.411
Cocaine	-0.25	0.63	[-1.48, 0.98]	.688	-0.48	0.61	[-1.69, 0.72]	.430	-0.87	0.70	[-2.25, 0.51]	.217	-0.81	0.66	[-2.11, 0.49]	.220
Heroin and other opioids	-0.44	0.77	[-1.95, 1.08]	.571	-0.06	0.58	[-1.55, 1.43]	.937	-0.43	0.87	[-2.14, 1.27]	.617	-0.31	0.82	[-1.91, 1.30]	.708
Buprenorphine and methadon	0.89	0.88	[-0.83, 2.62]	.310	1.34	0.86	[-0.35, 3.03]	.120	0.95	0.99	[-0.99, 2.89]	.336	0.74	0.93	[-1.09, 2.57]	.427
Hallucinogens	0.80	0.61	[-0.40, 1.99]	.191	0.29	0.60	[-0.87, 1.46]	.631	-0.35	0.68	[-1.70, 0.99]	.608	-0.01	0.65	[-1.28, 1.26]	.986

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Simple linear regression for dimensions of health information processing and substance use behavior and treatment experiences for the general sample (Continued)

	Access				Understand				Appraise				Apply			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Inhalants	0.44	0.82	[-1.17, 2.05]	.592	-0.57	0.80	[-2.14, 1.01]	.480	-0.83	0.92	[-2.64, 0.98]	.367	-0.38	0.87	[-2.08, 1.33]	.664
New psychoactive substances	1.07	0.95	[-0.80, 2.93]	.263	0.72	0.93	[-1.11, 2.55]	.439	-0.10	1.07	[-2.20, 2.00]	.924	-0.23	1.01	[-2.21, 1.75]	.823
Psychoactive medicine	0.72	0.60	[-0.46, 1.90]	.232	0.76	0.59	[-0.40, 1.92]	.200	-1.19	0.68	[-1.52, 1.14]	.782	-0.56	0.64	[-1.82, 0.69]	.378
Lifetime gambling																
Yes	-0.84	0.65	[-2.12, 0.44]	.199	-0.78	0.64	[-2.03, 0.48]	.223	-1.70	0.73	[-3.14, 0.27]	.020	-0.53	0.69	[-1.88, 0.83]	.446
No (Ref.)																
Past-year any illicit drug use																
Yes	0.59	0.61	[-0.61, 1.79]	.333	0.32	0.60	[-0.86, 1.50]	.592	-0.61	0.69	[-1.96, 0.74]	.374	-0.37	0.65	[-1.64, 0.91]	.571
No																
Past-year illicit drug use (Ref. = No)																
Cannabis	0.04	0.60	[-1.14, 1.22]	.949	-0.50	0.59	[-1.66, 0.66]	.396	-1.21	0.68	[-2.54, 0.11]	.073	-0.43	0.64	[-1.68, 0.83]	.505
Ecstasy	0.60	0.70	[-0.78, 1.98]	.392	0.55	0.69	[-0.81, 1.90]	.429	0.14	0.79	[-1.41, 1.70]	.857	1.01	0.74	[-0.45, 2.47]	.174
Methamphetamine and other amp.	0.22	0.62	[-1.00, 1.44]	.724	-0.48	0.61	[-1.67, 0.71]	.429	-0.77	0.70	[-2.13, 0.60]	.271	-0.07	0.66	[-1.36, 1.22]	.915
Cocaine	0.29	0.77	[-1.22, 1.80]	.707	-0.15	0.75	[-1.63, 1.32]	.837	-0.52	0.86	[-2.21, 1.18]	.550	0.29	0.81	[-1.31, 1.88]	.725
Heroin and other opioids	-0.22	1.13	[-2.44, 2.00]	.845	-0.17	1.11	[-2.34, 2.01]	.881	-0.85	1.27	[-3.35, 1.64]	.502	-0.64	1.20	[-3.00, 1.71]	.591
Buprenorphine and methadon	1.27	1.14	[-0.97, 3.51]	.265	1.25	1.12	[-0.95, 3.45]	.264	1.15	1.28	[-1.37, 3.67]	.370	1.33	1.21	[-1.05, 3.70]	.274
Hallucinogens	0.89	0.80	[-0.68, 2.45]	.266	0.71	0.78	[-0.82, 2.25]	.361	0.52	0.90	[-1.24, 2.28]	.562	1.27	0.84	[-0.39, 2.92]	.133
Inhalants	2.31	1.32	[-0.29, 4.90]	.082	0.18	1.30	[-2.37, 2.73]	.892	-0.40	1.49	[-3.33, 2.52]	.786	0.47	1.40	[-2.29, 3.23]	.739
New psychoactive substances	0.04	1.24	[-2.39, 2.47]	.976	-0.39	1.21	[-2.77, 2.00]	.750	-0.24	1.39	[-2.97, 2.49]	.863	-1.18	1.31	[-3.75, 1.40]	.370
Psychoactive medicine	0.76	0.66	[-0.53, 2.05]	.248	0.92	0.64	[-0.35, 2.18]	.154	0.04	0.74	[-1.41, 1.49]	.957	-0.31	0.70	[-1.68, 1.06]	.658
Past-year gambling																
Yes	-1.08	0.77	[-2.58, 0.43]	.159	-0.76	0.75	[-2.23, 0.72]	.315	-1.39	0.86	[-3.08, 0.30]	.106	-0.11	0.81	[-1.71, 1.49]	.891
No (Ref.)																
First alcohol use	0.05	0.09	[-0.11, 0.22]	.524	0.09	0.08	[-0.08, 0.25]	.303	0.15	0.10	[-0.04, 0.33]	.123	0.13	0.09	[-0.05, 0.30]	.156
First alcohol intoxication	0.08	0.67	[-0.05, 0.21]	.221	0.08	0.07	[-0.05, 0.21]	.230	0.17	0.74	[0.03, 0.32]	.020	0.08	0.07	[-0.05, 0.22]	.234
First cannabis use	-0.07	0.06	[-0.18, 0.05]	.232	0.03	0.06	[-0.08, 0.14]	.575	0.01	0.07	[-0.12, 0.14]	.854	-0.08	0.06	[-0.20, 0.04]	.178
First illicit drug use	0.02	0.08	[-0.14, 0.19]	.799	0.14	0.08	[-0.03, 0.30]	.098	0.03	0.10	[-0.16, 0.22]	.767	-0.04	0.09	[-0.21, 0.14]	.679
Detoxification																
Once/first treatment (Ref.)																
2x or more times	0.78	0.87	[-0.93, 2.49]	.370	0.36	0.85	[-1.32, 2.04]	.677	0.73	0.98	[-1.20, 2.65]	.459	0.45	0.92	[-1.37, 2.27]	.625

Continued on the next page

Simple linear regression for dimensions of health information processing and substance use behavior and treatment experiences for the general sample (Continued)

	Access				Understand				Appraise				Apply			
	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p	b	SE	[95% CI]	p
Short-/medium-term inpatient care																
Once/first treatment (Ref.)																
2x or more times	-0.84	0.71	[-0.22, 0.55]	.238	-0.86	0.69	[-2.22, 0.50]	.216	-0.18	0.80	[-1.74, 1.38]	.822	-0.40	0.75	[-1.87, 1.07]	.597
Therapeutic community																
Once/first treatment (Ref.)																
2x or more times	-0.03	1.19	[-2.38, 2.32]	.979	-1.75	1.16	[-4.03, 0.54]	.133	-0.31	1.34	[-2.95, 2.33]	.819	0.49	1.26	[-2.00, 2.97]	.700
Therapy drop-out																
First treatment/all completed (Ref.)																
1x or more times terminated	-0.65	0.66	[-1.95, 0.66]	.330	-1.58	0.65	[-2.85, -0.31]	.015	-1.24	0.75	[-2.71, 0.22]	.097	-1.11	0.70	[-2.49, 0.27]	.115

Ref. = reference group; b = unstandardized coefficient; CI = confidence interval; SE = standard error; p = p-value

A.2 Questionnaire for the participants of this study

ČÁST 1: DOTAZNÍK ZDRAVOTNÍ GRAMOTNOSTI *(pouze jedna odpověď pro každý řádek)*

JAK TĚŽKÉ PRO VÁS JE…

Zaškrtněte prosím odpověď pro každý jednotlivý řádek. Pokud je to možné, nenechávejte žádnou otázku bez odpovědi.

		Velmi snadné	Docela snadné	Docela těžké	Velmi těžké
1	…nalézt informace o příznacích nemocí, které se vás týkají?				
2	…nalézt informace o léčbě nemocí, které se vás týkají?				
3	…zjistit, co udělat v případě potřeby naléhavé lékařské pomoci?				
4	…zjistit, kde je možné dostat profesionální pomoc, když jste nemocný *(jako je lékař, lékárník, psycholog)*				
5	…pochopit, co vám říká váš lékař?				
6	…pochopit příbalový leták, který je přiložen k vašemu léku?				
7	…pochopit co udělat, když je potřeba naléhavé lékařské pomoci?				
8	…pochopit návod vašeho lékaře či lékárníka, jak užívat předepsaný lék?				
9	…posoudit, jak se informace od vašeho lékaře vztahují na vás?				
10	…zhodnotit výhody a nevýhody různých možností léčby?				
11	…posoudit, kdy byste mohl/a potřebovat názor od jiného lékaře?				
12	…zhodnotit, zda je informace o nějaké nemoci v médiích spolehlivá *(např. TV, internet nebo jiná média)*				
13	…využít informace, které vám podává lékař k rozhodování, pokud jde o vaši nemoc?				
14	…pochopit doporučení, jak užívat léky?				
15	…zavolat záchrannou službu, když se něco stane?				
16	…pochopit poučení/doporučení od vašeho lékaře nebo lékárníka?				
17	…získat informace o tom, jak zvládat nezdravé návyky, jako je kouření, nízká tělesná aktivita a nadměrné pití?				
18	…získat informace o tom, jak zvládat psychické problémy, jako je stres nebo deprese?				
19	…získat informace o očkování a preventivních vyšetřeních (screeningy), která byste měl(a) absolvovat? *(např. vyšetření prsou, vyšetření hladiny cukru v krvi, krevní tlak)*				
20	…nalézt informace, jak předejít nebo jak zvládat problémy, jako je nadváha, vysoký krevní tlak nebo vysoká hladina cholesterolu?				
21	…pochopit zdravotní varování týkající se např. kouření, nízké tělesné aktivity a nadměrného pití?				
22	…pochopit, proč potřebujete očkování?				
23	…pochopit, proč potřebujete absolvovat preventivní prohlídky? *(např. vyšetření prsou, vyšetření hladiny cukru v krvi, krevního tlaku)*				

24	…posoudit, jak důvěryhodné jsou zdravotní varování, týkající se kouření, malé tělesné aktivity a nadměrné pití?				
25	…posoudit, kdy je třeba, abyste šel/šla k lékaři na vyšetření?				
26	…posoudit, která očkování byste potřeboval?				
27	…posoudit, jaké preventivní prohlídky byste měl podstoupit? *(např. vyšetření prsou, vyšetření hladiny cukru v krvi, krevní tlak)*				
28	…posoudit, zda jsou informace o zdravotních rizicích v médiích hodnověrné? *(např. TV, internet nebo jiná média)*				
29	…rozhodnout se, zda byste se měl(a) nechat očkovat proti chřipce?				
30	…rozhodnout se, jak se můžete chránit před nemocemi na základě rady od vaší rodiny nebo od přátel?				
31	… rozhodnout se, jak se můžete chránit před nemocemi na základě informací z médií? *(např. noviny, letáky, internet nebo jiná média)*				
32	…nalézt informace o aktivitách podporujících zdraví, jako je cvičení, zdravé potraviny a výživa?				
33	…nalézt informace o aktivitách, které jsou dobré pro vaši duševní pohodu? *(např. meditace, cvičení, procházky, pilates apod..)*				
34	…nalézt informace o tom, jak byste mohli s vašimi sousedy usilovat o zdravější prostředí? *(např. snížení hluku a znečištění ovzduší, rozšiřování zeleně, budování zařízení pro trávení volného času)*				
35	…dozvědět se o politických změnách, které mohou ovlivnit zdraví? *(např. legislativa, program nových preventivních prohlídek, změna vlády, změny v organizaci zdravotnických služeb)*				
36	…dozvědět se o opatřeních k podpoře zdraví na pracovišti?				
37	…pochopit rady týkající se zdraví od členů rodiny nebo od přátel?				
38	…pochopit informaci na obalech potravin?				
39	…pochopit informaci, jak být zdravější z médií? *(např. internet, noviny, časopisy)*				
40	…porozumět informacím o tom, jak si udržet duševní zdraví?				
41	…posoudit, jak to, kde žijete, ovlivňuje vaše zdraví a vaši pohodu? *(např. vaše obec, vaše bezprostřední okolí)*				
42	…posoudit, jak vám vaše bytové poměry pomáhají udržovat si zdraví?				
43	…posoudit, co z vašeho každodenního jednání je spojeno s vaším zdravím? *(např. pitný režim, stravovací návyky, cvičení)*				
44	…udělat rozhodnutí zlepšit vaše zdraví?				
45	…vstoupit do sportovního klubu nebo se zapojit do skupinového cvičení, pokud byste chtěl(a)?				
46	…ovlivnit vaše životní podmínky, které mají vliv na vaše zdraví a vaši pohodu? *(např. pitný režim, stravovací návyky, cvičení atp.)*				
47	…podílet se na aktivitách, které zlepšují zdraví a pohodu ve vaší obci?				

ČÁST 2: SOCIODEMOGRAFICKÉ OTÁZKY *(pouze jedna odpověď)*

D1 **Pohlaví**

Muž	1
Žena	2

D2 **Kolik je Vám let?** *(doplňte číslici)*

	let

D3 **Jaký je Váš rodinný stav?**

Svobodný	1
Ženatý/vdaná	2
Rozvedený/rozvedená/odloučen/odloučená	3
Vdovec/vdova	4

D4 **V jakém prostředí žijete?**

V rodinném domě	1
V bytě	2
Na ubytovně	3
Squat	4
Bez domova, na ulici	5
Jiné *(specifikujte)*	6

D5 **Kolik osob celkem (včetně Vás) žije ve Vaší domácnosti?** *(doplňte číslici)*

D6 **Jaké je Vaše nejvyšší dokončené vzdělání?**

Nedokončené základní vzdělání	1
Základní	2
Vyučen, středoškolské vzdělání bez maturity	3
Středoškolské vzdělání s maturitou	4
Vyšší odborné vzdělání *(Dis.)*	5
Vysokoškolské vzdělání *(Bc., Mgr., Ing., MUDr., JUDr.)*	6
Akademická kvalifikace *(Ph.D., Doc., Prof.)*	7

D7 **Jaký je Váš zaměstnanecký status?**

Zaměstnanec na plný úvazek	1
Zaměstnanec na částečný úvazek	2
Podnikatel/OSVČ	3
Bez zaměstnání	4
Jiné *(specifikujte)*	5

D7.1 **Pokud jste uvedl/a, že jste bez zaměstnání, jak dlouho jste aktuálně nezaměstnaný/á?** *(doplňte číslici)*

	měsíců

D8 **Máte nějaké zdravotnické vzdělání, nebo jste pracoval/a ve zdravotnictví, např. jako sestra, lékař, farmaceut?**

Ano, uveďte prosím povolání:		1
Ne		2

D9 **Sečtěte prosím všechny čisté příjmy všech osob ve Vaší domácnosti v průměru za měsíc. Jedná se nám o mzdu, důchod, různé dávky od státu i o to, co si vyděláte jen tak, třeba na brigádě apod. Všechny tyto měsíční příjmy sečtěte a pak řekněte, do které příjmové skupiny Vaše domácnost patří.**

Do 5.000,- Kč		1
5.001,- až 7.000,- Kč		2
7.001, - až 10.000,- Kč		3
10.001,- až 15.000,- Kč		4
15.001,- až 20.000,- Kč		5
20.001,- až 25.000,- Kč		6
25.001,- až 30.000,- Kč		7
30.001,- až 35.000,- Kč		8
35.001,- až 40.000,- Kč		9
40.001,- až 45.000,- Kč		10
45.001,- až 50.000,- Kč		11
50.001,- až 60.000,- Kč		12
60.001 a více		13

D10 **Máte aktuálně nějaké exekuce?**

Ano		1
Ne		2

D11 **Uveďte prosím kraj a okres Vašeho aktuálního bydliště.**

Kraj bydliště	
Okres bydliště	

D12 **Uveďte prosím velikost místa Vašeho bydliště.**

Nad 100 000 obyvatel		1
50 000 – 100 000 obyvatel		2
20 000 – 49 999 obyvatel		3
5 000 – 19 999 obyvatel		4
Do 5 000 obyvatel		5

ČÁST 2: ZDRAVOTNÍ STAV *(pouze jedna odpověď)*

Z1 **Bylo Vám někdy diagnostikováno nějaké psychiatrické/duševní onemocnění** *(kromě závislosti)?*

Ano, uveďte prosím jaké		1
Ne		2

Z2 **Jak hodnotíte Váš aktuální celkový zdravotní stav?**

špatný	spíše špatný	ani dobrý ani špatný	spíše dobrý	dobrý
1	2	3	4	5

Z3 **Jak hodnotíte Váš aktuální psychický/duševní stav?**

špatný	spíše špatný	ani dobrý ani špatný	spíše dobrý	dobrý
1	2	3	4	5

Z4 **Jak hodnotíte Vaši aktuální fyzickou zdatnost?**

špatná	spíše špatná	ani dobrá ani špatná	spíše dobrá	dobrá
1	2	3	4	5

Z5 **Jak byste ohodnotil/a celkovou kvalitu svého života?**

špatná	spíše špatná	ani dobrá ani špatná	spíše dobrá	dobrá
1	2	3	4	5

ČÁST 3: UŽÍVÁNÍ NÁVYKOVÝCH LÁTEK *(pouze jedna odpověď)*

N1 **Kouříte cigarety?**

Ano, v současné době kouřím		1
Ano, kouřím příležitostně		2
Ne, nikdy jsem nekouřil/a		3
Ne, přestal/a jsem kouřit		4

N1.1 **Pokud jste uvedl/a, že v současné době kouříte, kolik cigaret průměrně denně vykouříte?** *(doplňte číslici)*

	cigaret

N2 **Jak často jste se za posledních 12 měsíců napil/a nějakého alkoholického nápoje** *(alespoň 500 ml piva nebo 2 dcl vína nebo 4 cl destilátu)* **?**

Denně nebo téměř denně		1
3-4x týdně		2
1-2x týdně		3
1-3x měsíčně		4
1-6x ročně		5
Nikdy		6

N3 **Jak často jste za posledních 12 měsíců vypil/a 5 a více sklenic alkoholu při jedné příležitosti** *(1 sklenice se rovná 500 ml piva nebo 2 dcl vína nebo 4 cl destilátu)* ?

Denně nebo téměř denně		1
3-4x týdně		2
1-2x týdně		3
1-3x měsíčně		4
1-6x ročně		5
Nikdy		6

N4 **Kolikrát jste byl/a za posledních 12 měsíců opilý/á tak, že jste měl/a problémy s chůzí, s mluvením, zvracel/a jste nebo jste si nepamatoval/a, co se stalo?**

Denně nebo téměř denně		1
3-4x týdně		2
1-2x týdně		3
1-3x měsíčně		4
1-6x ročně		5
Nikdy		6

N5 **Označte, zda jste někdy v životě alespoň jednou užil/a některou z uvedených návykových látek** *(uveďte odpověď pro každý řádek)* .

	Ne, nikdy v životě	Ano, alespoň jednou v životě
Konopné drogy *(marihuana, hašiš)*		
Extáze *(MDMA)*		
Pervitin a jiné amfetaminy		
Kokain		
Heroin a jiné opiáty		
Subutex, suboxon, metadon		
Halucinogeny *(houbičky, LSD, aj.)*		
Inhalační látky, ředidla		
Návykové medikamenty, léky *(rivotril, hypnotika, aj.)*		
Nové psychoaktivní látky *(spice, funky, mňau mňau,..)*		
Gambling, gaming		
Jiné *(specifikujte)*		
	1	2

N6 **Zaškrtněte, jak často jste za posledních 12 měsíců užíval/a návykové látky** *(uveďte odpověď pro každou z uvedených návykových látek)* .

	nikdy	denně	3-4x týdně	1-2x týdně	1-3x měsíčně	1-6x ročně
Konopné drogy *(marihuana, hašiš)*						
Extáze *(MDMA)*						
Pervitin a jiné amfetaminy						
Kokain						
Heroin a jiné opiáty						
Subutex, suboxon, metadon						
Halucinogeny *(houbičky, LSD, aj.)*						
Inhalační látky, ředidla						
Návykové medikamenty, léky *(rivotril, hypnotika, aj.)*						
Nové psychoaktivní látky *(spice, funky, mňau mňau, aj.)*						
Gambling, gaming						
Jiné *(specifikujte)*						
	1	2	3	4	5	6

N7 **Uveďte věk prvního užití uvedených návykových látek. Pokud jste některou z uvedených drog nikdy neužil/a, proškrtněte.**

Věk prvního užití alkoholu		let
Věk první opilosti		let
Věk prvního užití marihuany		let
Věk prvního užití ostatních návykových látek *(pervitin, heroin, halucinogeny apod.)*		let

ČÁST 4: ZÁVISLOST NA ALKOHOLU, DALŠÍCH NÁVYKOVÝCH LÁTKÁCH A NÁVYKOVÉ CHOVÁNÍ

N8 **Napište prosím, jaká je Vaše primární droga (nejčastěji užívaná návyková látky) nebo návykové chování. Uveďte jednu či více látek/návykové chování** *(např. alkohol, marihuana, pervitin, gambling, apod.).*

N9 **Jakým způsobem si Vaši primární drogu nejčastěji aplikujete?**

Injekčně *(injekční stříkačka)*		1
Ústně		2
Šňupáním		3
Kouřením		4
Inhalací *(rozpouštědla)*		5
Žádný ze způsobů *(gambling, hráčství apod.)*		6

N9.1 **Pokud jste uvedl/a, že používáte injekční způsob aplikace drog, kolik Vám bylo let, když jste drogu pomocí injekční stříkačky užil/a poprvé?** *(doplňte číslici)*

let

N10 **Použil/a jste někdy injekční náčiní k aplikaci drog po jiné osobě?**

Ano, alespoň jednou		1
Ne, nikdy		2
Nepoužívám injekční způsob aplikace drog		3

N11 **Zaškrtněte, kolikrát jste ve svém životě, včetně nynější léčby, absolvoval/a léčbu závislosti nebo závislostního chování v uvedených zařízeních** *(uveďte odpověď pro každý řádek)* .

	nikdy	1x	2x	3x	4x	5x a vícekrát
Detoxifikace na detoxifikační jednotce						
Ambulantní léčba *(adiktologická/psychiatrická ambulance)*						
Denní stacionář pro uživatele drog						
Substituční program						
Pobyt na lůžkovém oddělení pro léčbu závislostí						
Terapeutická komunita						
Doléčovací program						
Jiné (specifikujte)						
	1	2	3	4	5	6

N12 **Kolik z těchto uvedených léčebných pokusů jste nedokončil?** *(doplňte číslici)*

N13 **Byla Vám někdy diagnostikována hepatitida** *(žloutenka)* **nebo jiné infekční onemocnění** *(např. HIV)* **v souvislosti s užíváním drog?**

Ano, žloutenka *(typ A, B, C)*		1
Ano, sexuálně přenosná onemocnění *(AIDS/HIV, kapavka, syfilis aj.)*		2
Ano, jiné infekční onemocnění *(specifikujte)*		3
Ne		4

Je ještě něco, co byste nám chtěli sdělit? Zde je prostor pro Vaše připomínky…

Velice Vám děkujeme za čas, který jste věnoval/a vyplnění dotazníku!