Beyond the individual: a contextual perspective on mental health in children with mild to borderline intellectual disabilities

Storm, M.M.C.


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Chapter 4

Broad perspective on socio-economic disadvantages in youth with mild to borderline intellectual disabilities in mental health care

Maxine M.C. Storm
Willemijn M. van Eldik
Marianne C. Kasius
Robert R.J.M. Vermeiren
Erik J. Giltay

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Abstract

The objective of this study was to understand how socio-economic disadvantages relate to mental health problems (MHP) among children with mild intellectual disability or borderline intellectual functioning (MID-BIF) in outpatient care by extending beyond traditional economic measures, incorporating cumulative risks, and analyzing variations across clinical subgroups. Using a population-based case-control design, data from Statistics Netherlands and mental health records were analyzed for 1,742 children with MID-BIF receiving mental health care (M_{age} = 9.6, 33.1% girls) and 8,710 age- and sex-matched controls aged 0–17. Logistic regression revealed that children with MID-BIF and MHP were significantly more likely than controls to come from families facing socio-economic disadvantages, such as single parenthood, lower parental education, reliance on social benefits, low income, and subsidized housing. Socio-economic risks were more likely to cluster in the case group, with 15.3% of children exposed to five risk categories and 6.7% to all six, compared to 6.7% and 3.6% in controls, respectively. Children in the internalizing and externalizing symptom-based groups faced more pronounced socio-economic disadvantages than those in the developmental group. Additionally, more extensive care was unexpectedly linked to more favorable socio-economic conditions, suggesting a complex interplay between care needs and socio-economic conditions. Taken together, this study showed that children with MID-BIF receiving outpatient care for their MHP often face greater and more clustered socio-economic disadvantages. Simultaneously, children from socio-economically disadvantaged backgrounds received less specialized mental health care. This underscores the importance of addressing barriers in mental health care and promoting family- and community-based care.

Introduction

Children with mild intellectual disabilities or borderline intellectual functioning (MID-BIF) are among the most vulnerable groups to develop mental health problems (MHP; Einfeld & Tonge, 2007; Emerson, 2003). Research suggests that socio-economic factors, such as poverty, may contribute to this increased risk (Emerson & Hatton, 2007; Emerson et al., 2009). Some studies suggest that children with MID-BIF are disproportionately affected by socio-economic disadvantages, including poverty (Emerson & Hatton, 2007; Hatton et al., 2018; Storm et al., 2025). However, the link between socio-economic disadvantages and MHP in children with MID-BIF remains fragmented. Developing a deeper understanding of this relationship is crucial for identifying the specific needs of these children and their families, ensuring they receive appropriate support and care. This study addresses this gap by moving beyond conventional economic measures, adopting a cumulative perspective–i.e., considering the extent to which families experience multiple, co-occurring socio-economic disadvantages–and examining variations among clinical subgroups.

While some studies identify a connection between lower socio-economic status (SES) and increased behavioral or psychiatric problems, the findings are inconsistent–some report an association, others do not–often depending on how SES is measured (e.g., income alone vs. composite measures; Baker & Blacher, 2021; Emerson & Brigham, 2015) and the type of analysis used (e.g., univariate vs. multivariate; Stewart et al., 2023). Findings from a recent analysis, derived from a subset of the current sample, showed that families of children with MID-BIF were more likely to have lower household incomes, higher rates of single-parent households, and lower parental education levels compared to matched controls and families of children with MHP without MID-BIF (Storm et al., 2025). We aimed to extend these findings in a larger group of children with MID-BIF and MHP and explore additional dimensions of economic vulnerability, such as income sources, reliance on government benefits, and housing conditions, which may independently relate to mental health. In the Netherlands, reliance on government benefits often reflects financial instability and insecurity, as these benefits are typically accessible only to low-income families. Housing tenure, whether owning or renting, reflects economic challenges as well: families in social housing face long waitlists, while private renters struggle with rising costs. Poor housing–characterized by leaky roofs, dampness, and inadequate heating–

has already been linked to higher rates of MHP among low-income populations (Pevalin et al., 2017). For tenants, resolving such deficiencies frequently depends on landlords or housing associations. Broadening the scope beyond traditional SES measures allows for a more comprehensive understanding of how socio-economic disadvantages relate to mental health outcomes in children with MID-BIF and MHP.

Moving beyond individual socio-demographic factors, the clustering of socio-economic disadvantages deserves greater focus, as they contribute substantially to reinforcing cycles of adversity and vulnerability (Emerson, 2021). Evidence from samples of children without MID-BIF demonstrated that interconnected risk factors–such as poverty, low parental education, and family instability–tend to cluster and interact (Afroz et al., 2022), with cumulative socio-economic disadvantages disproportionately affecting individuals with low SES and MHP, often leading to worsened outcomes from childhood into adulthood (Evans-Lacko et al., 2024). Given that children with MID-BIF and MHP are particularly vulnerable to socio-economic disadvantage (Emerson & Hatton, 2007; Storm et al., 2025), we hypothesize that this population will also experience greater clustering of socio-economic disadvantages.

Another approach to understanding the link between socio-economic disadvantage and MHP in children with MID-BIF is to investigate clinical subgroups. Most studies treat this population as homogenous, potentially overlooking important subgroup variations, or focus narrowly on specific syndromes, such as Down syndrome (Dekker & Koot, 2003; Foley et al., 2014) or Fragile X Syndrome (FXS; Hall et al., 2007; Scambler et al., 2007; Smith et al., 2016), limiting generalizability. Examining variations by symptom profiles and care extensiveness could yield valuable insights. Regarding diagnostic subgroups, limited evidence suggests that externalizing problems, such as disruptive behavior, conduct issues, and hyperactivity, are more strongly influenced by direct socio-economic stressors, whereas internalizing problems tend to be less sensitive to these factors in children with MID-BIF (Bailey et al., 2019; Koskentausta et al., 2007; Totsika et al., 2020). However, these studies often considered a narrow range of socio-economic stressors, and their findings are not consistently supported by other research (Avci, 2024; Chadwick et al., 2008; Wallander et al., 2006; Weiss et al., 2016). Similarly, the role of mental health care extensiveness–reflecting the total amount of care received–has

been underexplored in relation to socio-economic factors within the MID-BIF population. Evidence from the general population indicated that lower socio-economic status is linked to higher healthcare utilization and expenditures (Loef et al., 2021). Accordingly, it is hypothesized that families of children with MID-BIF and MHP facing greater socio-economic disadvantages will require more frequent or extensive health care, as such stressors likely worsen mental health outcomes.

Overall, this study examines the socio-economic conditions of children with MID-BIF receiving outpatient care for MHP, aiming to improve our understanding of how socio-economic disadvantages relate to MHP. The objectives are threefold: (1) to compare the socio-economic conditions of children with MID-BIF and MHP to those of age- and sex-matched peers from the general population, hypothesizing greater socio-economic disadvantages in the clinical group; (2) to assess the accumulation of co-occurring socio-economic disadvantages within the clinical group compared to controls; (3) to explore whether socio-economic conditions differ across clinical subgroups within the population of children with MID-BIF receiving mental health care, acknowledging the heterogeneity of this group. Subgroups are defined by symptom profile and the total amount of mental health care received.

Method

Sources of data

The study relied on data derived from the Extramural LUMC (Leiden University Medical Center) Academic Network data warehouse, which served as a comprehensive regional integrative population-based data infrastructure (Ardesch et al., 2023; Kist et al., 2024). Two primary data sources were analyzed: non-public microdata from Statistics Netherlands (SN; the central register agency; Bakker et al., 2014) and patient data from a specialized mental health care institution for children with MID-BIF and MHP. The SN microdata provided demographic and socio-economic indicators at both the individual and family levels. Patient records contributed variables such as age, gender, diagnostic information, duration of care, and registration dates from mental health care services.

Participants

Participants were divided into two groups: a clinical case group and a matched population-based control group. The clinical case group included children with MID or BIF (IQ 55–85 or similar functional levels) receiving outpatient mental health care at a specialized facility. All children in this group resided in The Hague or its surrounding urban and suburban areas. Cases were identified from patient records (2011–2020) and included children aged 17 years or younger who received at least 240 minutes (four hours) of direct or indirect mental health care. A control group of children from the general population was matched by sex and age using the SN database, with five controls selected per case. Controls resided in the same areas, with postal codes randomized for residential comparison.

Ethical Approval and data linkage

This study received an exemption from the Medical Research Involving Human Subjects Act (CEP number: N22.048) by the Medical Ethics Committee. Mental health data routinely collected from patients was securely stored, pseudonymized, and kept anonymous from the researchers, with an opt-out option available to allow patients or guardians to decline participation in data collection. To ensure accurate linkage across three data sources, each participant was assigned a unique record identification number (RIN), allowing for comprehensive data connection while maintaining confidentiality. Parents and children were linked using their RINs to retrieve family-related information. Additionally, SN staff reviewed output results to minimize any risk of disclosing identifiable information. Further details on the data linkage process can be found in Ardesch et al. (2023).

Variables

Child demographics

Child demographics included sex, age, and country of birth. In the case group, sex and age were obtained from mental health care records, while for the control group, sex and age were sourced from SN. For all groups, country of birth data for children were classified based on the SN categorization into Western and Non-Western countries, using the publicly available table accessible (Centraal Bureau voor de Statistiek, 2024).

Social characteristics

Social characteristics were obtained from SN. The selection year of these variables corresponded to the year cases initiated treatment at the mental health care center, capturing social characteristics reflective of the familial context at treatment onset. First, the number of children in a household represented all individuals who share a child-parent relationship with one or both parents living in the same household. This included biological, adopted, and stepchildren, but foster children were excluded. Second, family structure was categorized into three groups: dual-parent households, single-parent households, and other types, which include children in institutional settings. Finally, both maternal and paternal education levels were analyzed and classified as low, middle, or high, based on SN's guidelines (Statistics Netherlands, 2024). The classification was based on the highest level of education achieved, with low representing primary education, middle for specialized vocational training, and high for higher professional education or university degree.

Economic circumstances

Five economic measures were obtained from SN. Again, the selection year of these economic variables aligned with the year cases started treatment. First, standardized disposable household income (percentiles) represented net income adjusted for household size, composition, liabilities, and inflation, using the OECD-modified equivalence scale as applied by SN. For the interpretation of the odds ratio (OR; see Figure 1), the data were pooled, with higher percentiles reflecting relatively lower incomes. Second, household income source identified the main income source, distinguishing between labor and transfer income, and specifying the primary category within the highest income type. Third, benefit dependency measured reliance on social security benefits over four years, expressed as the percentage of household income from benefits. Only households eligible for benefits throughout these four years were included. Fourth, the main benefit type was the largest contributor to household income, categorized into no benefit, unemployment, disability, welfare, or other social provisions. Lastly, household homeownership classified households as owners or non-owners, with non-owners further divided into renters with or without subsidies. The selected variables reflected both data availability and prior research, expanding on earlier work (Storm et al., 2025) by combining multiple SES dimensions to provide a more comprehensive view of disadvantage.

Clinical features

Two clinical features for the case group were extracted from mental health records. First, diagnoses were based on the primary DSM-IV codes assigned by treating clinicians at the end of treatment (American Psychiatric Association, 1998), as this classification system was predominantly used during the study period (2011–2020). If intellectual disability was the primary code, the main secondary diagnosis was selected to reflect the main presenting symptomatology. Comorbidity was not considered; individuals were classified based on the primary diagnosis–or the secondary diagnosis when MID-BIF was primary–to capture the most prominent clinical presentation and ensure consistency in analyses. End-of-treatment diagnoses were prioritized for accuracy; start-of-treatment diagnoses were reviewed when end-of-treatment data were missing but added no additional information. Although based on formal DSM diagnoses, we grouped them into three empirically supported symptom clusters–internalizing, externalizing, and developmental–rather than strictly following DSM chapter divisions. The internalizing group encompassed conditions characterized by inwardly directed symptoms such as anxiety, depression and stress-related disorders. The externalizing group included those marked by outward behaviors, such as ADHD, behavioral disorders and substance use disorders. The developmental group covered autism spectrum disorder (ASD), communication, tic, enuresis, and neurocognitive disorders. We acknowledge that ADHD is classified as a neurodevelopmental disorder in the DSM-5. However, for the purpose of this study, we grouped ADHD within the externalizing domain due to its predominant behavioral expression–impulsivity and hyperactivity–and its empirical clustering with other externalizing conditions such as oppositional defiant disorder and conduct disorder (Cosgrove et al., 2011; Beauchaine et al., 2017). This decision aligns with dimensional and transdiagnostic classification models, such as the Achenbach System of Empirically Based Assessment and early versions of the Hierarchical Taxonomy of Psychopathology, which emphasize symptom profiles over strict diagnostic categories (Kotov et al., 2017). To avoid confusion, we consistently refer to these subgroups as symptom-based rather than diagnostic categories throughout the manuscript.

Secondly, total allocated time for both direct and indirect care activities served as a proxy for the extensiveness of mental health care. Direct care included all face-to-face interactions, such as therapy and diagnostics, while indirect

care covered activities such as interprofessional consultations, administrative tasks, and care coordination (Nanninga et al., 2018; Pouls et al., 2023). The total care time was categorized into five levels, from very low (0–20%) to very high (80–100%). Time allocations for these categories were as follows: very low (240–1,478 minutes, ~4–24.6 hours, *N* = 349), low (1,478–2,780 minutes, ~24.6–46.3 hours, *N* = 349), medium (2,780–4,264 minutes, ~46.3–71.1 hours, *N* = 347), high (4,264–6,899 minutes, ~71.1–115 hours, *N* = 347), and very high (6,899–27,542 minutes, ~115–459 hours, *N* = 349).

Statistical analysis

The analysis followed a multi-step approach. First, descriptive statistics (*M*, *SD*, frequencies, and percentages) were calculated for child demographics, social characteristics, and economic circumstances. These were reported separately for the clinical case group (and subgroups) and the control group.

For our first objective, univariate logistic regression analyses were conducted to compare the socio-economic conditions of children with MID-BIF and MHP to those of age- and sex-matched peers. Standardized odds ratios (ORs), 95% confidence intervals (CIs), and p-values were reported to allow comparison of effect sizes across variables. ORs indicated the likelihood of a variable's association with case vs control group membership. Multivariate models were not conducted due to conceptual overlap between variables (e.g., household income and benefit dependency). Logistic regression models were implemented using the *glm* function (McCullagh & Nelder, 1989), chosen for their suitability with binary outcomes and flexibility with different predictor types. Missing data (0 to 51.2%) were handled through multiple imputation by chained equations (MICE; Azur et al., 2011), generating ten imputed datasets using iterative regression-based predictions conditioned on all other variables.

For our second objective, the accumulation of co-occurring socio-economic disadvantages was assessed through distribution visualizations for the case and control group, with their difference tested using a linear-by-linear Chi-square test (Greenwood & Nikulin, 1996).

For our third objective, univariate analyses were conducted to examine socio-economic similarities and differences across the two clinical subgroups. Continuous variables were analyzed with ANOVA (Fisher, 1925) or the Kruskal–Wallis test (Kruskal & Wallis, 1952) for skewed distributions, while categorical

variables were assessed using Chi-square tests (Greenwood & Nikulin, 1996). A significance threshold of α = .05 was applied. All computations were performed using R (version 4.4.0; R Core Team, 2021), with the packages 'mice' (v3.16.0), "forestplot" (version 3.1.1), 'modelsummary' (v2.2.0), and 'ggplot2' (v3.5.1).

Results

First objective: Socio-economic differences between cases and controls

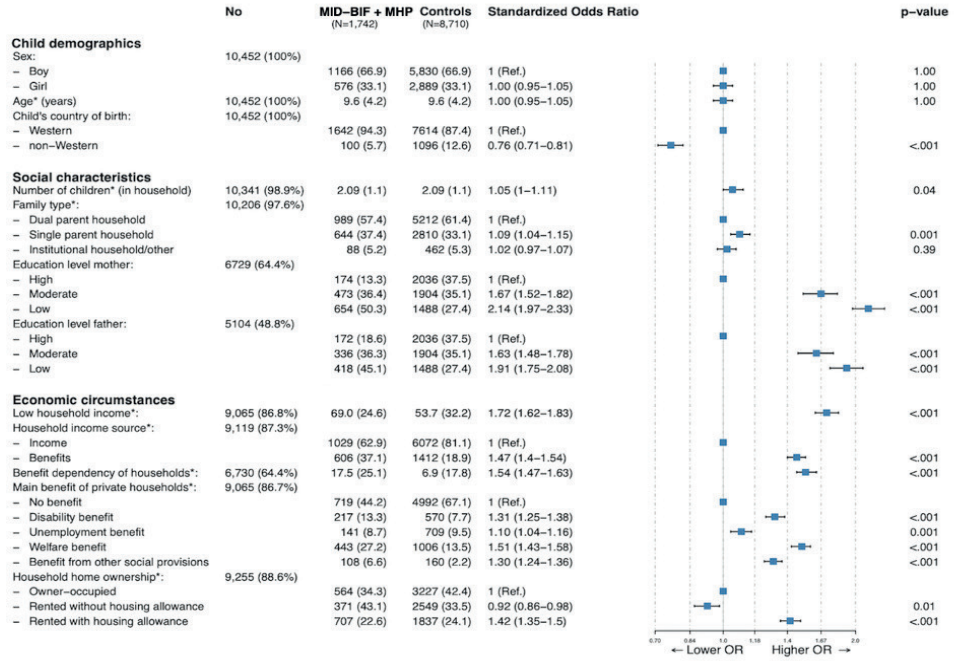
Descriptive statistics

We compared children with MID-BIF and MHP (n = 1,742) to their peers from the general population (n = 8,710), resulting in a total sample of 10,452 children. Since children with MID-BIF and MHP were matched by age and sex, both groups had identical age distributions (*M* = 9.6 years, *SD* = 4.2) and gender proportions (33.1% girls). Differences in country of birth emerged, with children with MID-BIF and MHP having a higher predominance of being born in a Western country, *OR* = 0.76 *p* < .001.

Main findings

Regarding social characteristics, family composition differed notably. Children with MID-BIF and MHP were more likely to live in single-parent households, *OR* = 1.09, *p* = .001. Parental education levels were significantly lower in the MID-BIF and MHP group. Among mothers, 50.3% had low education compared to 27.4% in controls, *OR* = 2.14, *p* < .001. Fathers showed a similar trend, with 45.1% having low education compared to 25.9% in controls, *OR* = 1.91, *p* < .001. Next, differences in economic circumstances were also evident. Families of children with MID-BIF and MHP were more likely to live in low-income households, *OR* = 1.72, *p* < .001, and to rely on benefits as their primary income source (37.1% vs. 18.9%), *OR* = 1.47, *p* < .001. Housing patterns also differed, with families in the MID-BIF and MHP group being more likely to rent with housing allowances (43.1% vs. 24.1%), *OR* = 1.42, *p* < .001, and less likely to own a house (34.3% vs. 42.4%).

Figure 1. Forest plot of demographic and socio-economic characteristics of children with MID-BIF and MHP compared to controls

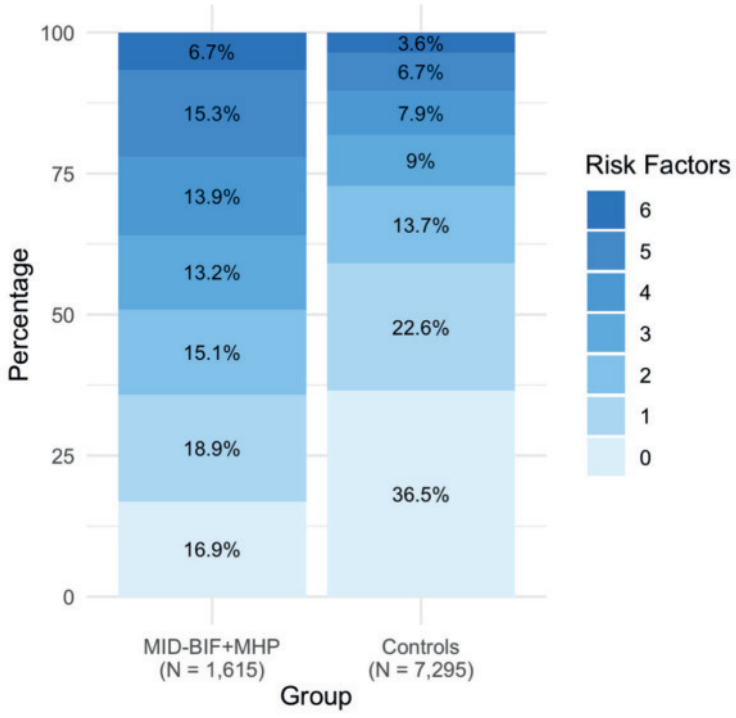


*Note. *at the year of treatment onset for the case group. MID-BIF = mild intellectual disability or borderline intellectual functioning; MHP = mental health problems; No = total number of observations for each variable without missing. For continuous variables, the mean and SD are provided (SD in brackets). For categorical variables, the N and percentages are given. Percentages in parentheses are calculated based on the non-missing (valid) N. The error bars represent the 95% CI of the mean.*

Second objective: Accumulation of disadvantages

The accumulation of co-occurring disadvantages, illustrated by Figure 2, was assessed based on six key risk factors: residing in a single-parent household, low maternal and paternal education levels, a household income below the 25th percentile (first quartile in the control group), reliance on benefits as the primary income source, and living in a rented house supported by a housing allowance. The control group was more likely to have no risk factors (36.5% vs. 16.9%), whereas the case group more frequently faced multiple risks (e.g., 6.7% had all six risk factors compared to 3.6% in the control group). A linear-by-linear association Chi-square test confirmed a highly significant association between group status and risk accumulation, $\chi^2(1) = 370.48$, $p < .001$, indicating that the case group experienced a greater accumulation of socio-economic risks than the control group.

Figure 2. Accumulation of co-occurring socio-economic disadvantages by group



Third objective: Subgroup Analysis Within the Case Group

Descriptive statistics

The case group included 1,742 children, stratified by symptom profile (see Table 1) and care duration (see Table 2). Symptom-based subgroups were derived from diagnostic information and included an externalizing group (n = 362), an internalizing group (n = 287), and a developmental group (n = 478). An additional 27.7% of cases (n = 478) could not be classified into these groups due to diagnoses not aligning with the three profiles. We also stratified the case group by age (<12 and ≥12 years) and sex to verify whether unexpected differences existed (see Appendices A and B); yet none were observed.

Main findings: stratification by symptom-based subgroups

The internalizing subgroup had a balanced gender distribution (51.9% boys) and included the oldest children. Among all subgroups, the internalizing group had the lowest maternal education levels (58.1% classified as low), the highest reliance on disability benefits (19.0%) and rented housing with allowances (46.0%) and received the most extensive mental health care (29.6% very high), particularly compared to the developmental group.

The developmental subgroup, the youngest group, had the highest proportion of boys (74.7%) and was most likely to live in dual-parent households (67.9%). Fathers in this group had the highest levels of education (25.5% with higher education). Economically, these families experienced the least reliance on benefits (29.5%) and had the highest rate of homeownership (42.5%), distinguishing them positively from the other subgroups.

The externalizing subgroup, predominantly boys (71.5%), displayed characteristics that were generally intermediate between the internalizing and developmental subgroups. They were more likely to live in single-parent households (39.3%) than children in the developmental group but less so than those in the internalizing group. A similar pattern was observed for maternal education (52.9%), benefit reliance (35.3%), and homeownership (35.9%), positioning this subgroup between the other two symptom-based groups on these indicators.

Table 1. Demographic and socio-economic characteristics stratified by symptom-based subgroups in children with MID-BIF and MHP

	MID-BIF+MHP N (%) N = 1,127	**Internalizing N = 287**	**Developmental N = 478**	**Externalizing N = 362**	**Test statistic**	**p-value**	**Effect size**
Child demographics							
Sex:	1,127 (100)	-	-	-	χ^2=45.93	*p*<.001	V=.20
- Boy	-	149 (51.9)	357 (74.7)	259 (71.5)	-	-	-
- Girl	-	138 (48.1)	121 (25.3)	103 (28.5)	-	-	-
Age* (years)	1,127 (100)	11.9 (3.64)	8.33 (4.30)	10.4 (3.59)	H=136.36	*p*<.001	η^2=.12
Child's country of birth:	1,127 (100)	-	-	-	χ^2=2.47	*p*=.291	V=.05
- Western	-	267 (93.0)	457 (95.6)	344 (95.0)	-	-	-
- Non-Western	-	20 (7.0)	21 (4.4)	18 (5.0)	-	-	-

Social characteristics							
Number of children* (in household)	1,121 (99.5)	2.13[b] (1.14)	2.04[c] (1.09)	2.15[a] (1.10)	F=1.20	*p*=.305	η^2=.002
Family type*:	1,118 (99.2)	-	-	-	χ^2=15.22	*p*=.004	V=.08
- Dual parent household	-	162 (56.8)	322 (67.9)	204 (56.8)	-	-	
- Single parent household	-	111 (38.9)	133 (28.1)	141 (39.3)	-	-	
- Institutional household/other	-	12 (4.2)	19 (4.0)	14 (3.9)	-	-	
Education level mother:	824 (73.1)	-	-	-	χ^2=25.84	*p*<.001	V=.13
- High	-	19 (9.4)	62 (18.0)	28 (10.1)	-	-	-
- Moderate	-	66 (32.5)	149 (43.2)	102 (37.0)	-	-	-
- Low	-	118 (58.1)	134 (38.8)	146 (52.9)	-	-	-
Education level father:	592 (52.5)	-	-	-	χ^2=13.77	*p*=.008	V=.11
- High	-	16 (11.8)	68 (25.5)	31 (16.4)	-	-	-
- Moderate	-	53 (39.0)	81 (30.3)	74 (39.2)	-	-	-
- Low	-	67 (49.2)	118 (44.2)	84 (44.4)	-	-	-
Economic circumstances							
Household income* (in percentiles)	1,068 (94.8)	31.0 (23.6)	34.1 (25.7)	31.7 (23.7)	H=2.41	*p=.300*	η^2<*.01*
Household Income Source*	1,070 (94.8)	-	*	-	χ^2=6.79	*p*=.034	V=.08
- Income	-	169 (61.5)	315 (70.5)	225 (64.7)	-	-	-
- Benefits	-	106 (38.5)	132 (29.5)	123 (35.3)	-	-	-
Benefit dependency of households*	858 (76.1)	17.6 (25.2)	14.4 (23.8)	17.7 (25.3)	H=4.78	*p=.091*	η^2<*.01*
Main benefit of private households*	1,068 (94.8)	-	-	-	χ^2=20.24	*p=.009*	V=.10
- No benefit	-	109 (39.8)	234 (52.5)	160 (46.0)	-	-	-
- Unemployment benefit	-	25 (9.1)	34 (7.6)	26 (7.5)	-	-	-
- Disability benefit	-	52 (19.0)	57 (12.8)	45 (12.9)	-	-	-
- Welfare benefit	-	66 (24.1)	104 (23.3)	100 (28.7)	-	-	-
- Benefit from other social provisions	-	22 (8.0)	17 (3.8)	17 (4.9)	-	-	-

Household Home Ownership*	1,074 (95.3)	-	-	1,642 (94.3)	χ^2=11.11	*p*=.025	V=.07
- Owner-occupied	-	87 (31.8)	192 (42.5)	125 (35.9)	-	-	-
- Rented without housing allowance	-	61 (22.3)	101 (22.3)	76 (21.8)	-	-	-
- Rented with housing allowance	-	126 (46.0)	159 (35.2)	147 (42.2)	-	-	-
Clinical features							
Amount of mental health care received	1,127 (100)	-	-	-	χ^2=21.30	*p=.009*	V=.10
- Very low	-	42 (14.7)	69 (14.4)	67 (18.5)	-	-	-
- Low	-	48 (16.7)	109 (22.8)	81 (22.4)	-	-	-
- Medium	-	48 (16.7)	106 (22.2)	77 (21.3)	-	-	-
- High	-	64 (22.3)	102 (21.4)	72 (19.8)	-	-	-
- Very high	-	85 (29.6)	92 (19.2)	65 (18.0)	-	-	-

*Note. *at the year of treatment onset. MID-BIF = mild intellectual disability or borderline intellectual functioning; MHP = mental health problems. For continuous variables, the mean and SD are provided (SD in brackets). For categorical variables, the N and percentages are given. Percentages in parentheses are calculated based on the non-missing (valid) N. H = Kruskal-Wallis test statistic. Superscripts indicate statistically significant differences between groups (p < .05). Means with different superscripts differ significantly from one another.*

Main findings: stratification by care duration

Children who received the highest total amount of mental health care were characterized by a higher representation of girls (40.1%), smaller household sizes (1.88 children on average), and higher maternal education levels compared to those who received less care. Economic conditions tended to improve with the amount of care received: families in the group receiving the most care had higher household income percentiles (33.0%) and were more likely to rely on income as their primary source (64.7%) than families in the group receiving the least care (28.7% income percentile, 57.0% income reliance). Homeownership was most common in the high care group (39.1%) but declined slightly in the group receiving the most care (35.7%). Reliance on welfare benefits steadily decreased as the amount of care increased, from 32.1% in the group receiving the least care to 22.6% in the group receiving the most care, though disability benefits remained prevalent in the medium and high care groups (15.7% and 13.3%, respectively).

Table 2. Demographic and socio-economic characteristics stratified by total amount of mental health care received in children with MID-BIF and MHP

	MID-BIF+MHP N (%) N = 1,742	**Very low N = 349**	**Low N = 349**	**Medium N = 347**	**High N = 347**	**Very high N = 349**	**Test statistic**	**p-value**	**Effect size**
Child demographics									
Sex:	1,742 (100)	-	-	-	-	-	χ^2=15.01	*p*=.005	V=.09
- Boy	-	248 (71.1)	235 (67.3)	249 (71.8)	225 (64.7)	209 (59.9)	-	-	-
- Girl	-	101 (28.9)	114 (32.7)	98 (28.2)	123 (35.3)	140 (40.1)	-	-	-
Age* (years)	1,742 (100)	9.95 (4.30)	9.18 (4.20)	9.46 (4.34)	9.46 (4.14)	9.76 (3.78)	F=1.796	*p*=.127	η^2=.004
Child's country of birth:	1,742 (100)	-	-	-	-	-	χ^2=2.75	*p*=.601	V=.04
- Western	-	324 (92.8)	334 (95.7)	328 (94.5)	327 (94.0)	329 (94.3)	-	-	-
- Non-Western	-	25 (7.16)	15 (4.30)	19 (5.48)	21 (6.03)	20 (5.73)	-	-	-
Social characteristics									
Number of children* (in household)	1,734 (99.5)	2.15[a] (1.23)	2.23[b] (1.18)	2.20[c] (1.16)	2.00 (1.02)	1.88[abc] (1.05)	F=5.903	*p*<.001	η^2=.01
Family type*:	1,722 (98.9)	-	-	-	-	-	χ^2=13.05	*p*=.11	V=.06
- Dual parent household	-	177 (51.2)	207 (60)	204 (59.6)	208 (60.6)	193 (55.8)	-	-	
- Single parent household	-	146 (42.2)	122 (35.4)	124 (36.3)	123 (35.9)	129 (37.3)	-	-	
- Institutional household/other	-	23 (6.6)	16 (4.6)	14 (4.1)	12 (3.5)	24 (6.9)	-	-	
Education level mother:	1,301 (74.7)	-	-	-	-	-	χ^2=35.22	*p*<.001	V=.12
- High	-	24 (9.3)	30 (11.3)	39 (14.8)	49 (19.1)	32 (12.5)	-	-	-
- Moderate	-	73 (28.2)	91 (34.2)	98 (37.3)	97 (37.9)	114 (44.4)	-	-	-
- Low	-	162 (62.5)	145 (54.5)	126 (47.9)	110 (43.0)	111 (43.2)	-	-	-
Education level father:	926 (53.2)	-	-	-	-	-	χ^2=9.07	*p*=.34	V=.07
- High	-	30 (18.0)	31 (16.1)	37 (18.6)	45 (22.8)	29 (17.1)	-	-	-
- Moderate	-	64 (38.3)	62 (32.1)	68 (34.2)	71 (36.0)	71 (41.8)	-	-	-
- Low	-	73 (43.7)	100 (51.8)	94 (47.2)	81 (41.1)	70 (41.2)	-	-	-

Economic circumstances									
Household income* (in percentiles)	1,628 (93.5)	28.7[a] (24.4)	30.0[ab] (25.2)	29.1[ab] (24.0)	34.1[c] (24.6)	33.0[bc] (24.2)	H=19.88	*p*<.001	η^2=.01
Household Income Source*	1,635 (93.9)	-	-	-	-	-	χ^2=10.13	*p*=.038	V=.08
- Income	-	184 (57.0)	201 (60.7)	208 (64.0)	227 (68.2)	209 (64.7)	-	-	-
- Benefits	-	139 (43.0)	130 (39.3)	117 (36.0)	106 (31.8)	114 (35.3)	-	-	-
Benefit dependency of households*	1,314 (75.4)	19.3 (25.9)	17.8 (25.1)	18.6 (26.3)	16.2 (24.0)	15.7 (24.5)	H = 2.26	*p*=.688	η^2<.001
Main benefit of private households*	1,628 (93.5)	-	-	-	-	-	χ^2=28.23	*p=.030*	V=.07
- No benefit	-	135 (42.1)	134 (40.7)	140 (43.2)	161 (48.6)	149 (46.1)	-	-	-
- Unemployment benefit	-	25 (7.8)	34 (10.3)	30 (9.3)	28 (8.5)	24 (7.4)	-	-	-
- Disability benefit	-	29 (9.0)	43 (13.1)	51 (15.7)	44 (13.3)	50 (15.5)	-	-	-
- Welfare benefit	-	103 (32.1)	99 (30.1)	90 (27.8)	78 (23.6)	73 (22.6)	-	-	-
- Benefit from other social provisions	-	29 (9.0)	19 (5.8)	13 (4.0)	20 (6.0)	27 (8.4)	-	-	-
Household Home Ownership*	1,642 (94.3)	-	-	-	-	-	χ^2=17.90	*p*=.022	V=.07
- Owner-occupied	-	93 (28.9)	106 (31.7)	112 (34.3)	131 (39.1)	122 (35.7)	-	-	-
- Rented without housing allowance	-	159 (49.4)	156 (46.7)	146 (44.6)	120 (35.8)	126 (38.9)	-	-	-
- Rented with housing allowance	-	70 (21.7)	72 (21.6)	69 (21.1)	84 (25.1)	76 (23.5)	-	-	-

*Note. *at the year of treatment onset. MID-BIF = mild intellectual disability or borderline intellectual functioning; MHP = mental health problems. For continuous variables, the mean and SD are provided (SD in brackets). For categorical variables, the N and percentages are given. Percentages in parentheses are calculated based on the non-missing (valid) N. H = Kruskal-Wallis test statistic. Superscripts indicate statistically significant differences between groups (p < .05). Means with different superscripts differ significantly from one another.*

Discussion

In this study, we aimed to enhance our understanding of the link between socio-economic disadvantages and mental health problems (MHP) in children with MID-BIF receiving outpatient mental health care in three ways: by moving beyond traditional economic indicators, including a cumulative perspective, and examining variations across clinical subgroups. Our findings revealed three key insights. First, families of these children face significant socio-economic disadvantages, with economic vulnerability extending beyond income. Second, these disadvantages were more likely to cluster in these families compared to age- and sex-matched peers from the general population. Third, children in the internalizing and externalizing group exhibited more pronounced socio-economic disadvantages compared to families of children in the developmental group. Notably, families of children who received more hours of care showed somewhat less socio-economic disadvantage, suggesting a complex interplay between care needs and socio-economic conditions.

Regarding our first key insight, our results confirmed that, compared to the general population, families of children with MID-BIF and MHP face multiple socio-economic disadvantages. Using a large, population-based design, this study highlighted higher rates of single-parent households, lower parental education levels, and lower household incomes, providing a detailed perspective on these disparities. These findings align with prior research emphasizing the key role of socio-economic and family risk factors in children's mental health (Emerson & Hatton, 2007). Additionally, previous multivariate analyses conducted on a subset of this population showed that these socio-economic characteristics were independently associated with the likelihood of receiving mental health care (Storm et al., 2025). The current study expanded on commonly recognized socio-economic factors, demonstrating that families of children with MID-BIF also relied more heavily on government benefits and were more likely to live in subsidized rental housing, reflecting broader financial instability and insecure living conditions.

With respect to our second key insight, our results revealed that the clustering of these socio-economic risk factors was evidently more common in children with MID-BIF and MHP compared to their controls, consistent with our hypothesis. Such clustering is especially concerning in light of the adversity accumulation model, which suggests that the combined effects of multiple socio-economic

disadvantages are greater than the sum of individual factors (Kessler et al., 2010; Schilling et al., 2008). Prior research has already shown that exposure to these layered adversities intensifies stress pathways, increasing risks of depression, anxiety, and impaired psychological well-being for children and adolescents in the general population, which can persist into adulthood (Afroz et al., 2022; Nurius et al., 2015; Reiss et al., 2019). Given that raising a child with an intellectual disability already presents significant stressors (Peer & Hillman, 2014), these cumulative socio-economic risks may pose an even greater challenge for affected families.

Concerning our third key insight, the study contributes to the existing literature by demonstrating that socio-economic disadvantages differed across clinical subgroups. Specifically, it highlights that children in the internalizing and externalizing group face more pronounced socio-economic challenges compared to those in the developmental group. Although the cross-sectional design limits causal interpretations, the observed differences between symptom-based groups may indicate distinct mechanisms linking socio-economic disadvantages to specific mental health conditions. While internalizing and externalizing symptom profiles are influenced by both genetic and environmental factors, previous research points to a relatively larger role for environmental stressors, such as economic stress and parenting challenges (Hendriks et al., 2020). Conversely, developmental conditions such as ASD tend to be more strongly associated with genetic predispositions, suggesting that their prevalence might be less immediately sensitive to environmental challenges (Tordjman et al., 2014; Wei et al., 2021). An additional explanation for the observed differences may be that socio-economic contexts influence the way professionals assess and interpret symptoms that children manifest. The presence of clustered socio-economic challenges in families may complicate the distinction between child-specific factors and external influences, with symptoms often attributed to systemic stressors or parenting dynamics (Mathew et al., 2019).

Concerning variation between symptom-based groups, we found that families experiencing greater socio-economic disadvantages tended to receive shorter durations of care. This contrasted with our hypothesis and diverged from findings in the general population, where lower SES is typically associated with higher healthcare utilization (Loef et al., 2021). One possible explanation is that

important clinical variables, such as symptom severity, were not captured in our data. Families from disadvantaged socio-economic backgrounds often face practical and financial barriers that limit sustained care engagement (Bornheimer et al., 2018). These barriers may lead families to deprioritize mental health care when basic needs are unmet (Van Der Draai et al., 2021), for example in households with lower maternal education or single-parent structures, as seen in our sample, where limited time, support, and competing demands might disrupt continuity of care. In contrast, higher-SES families often benefit from greater resources and social capital, enabling them to navigate the system more effectively (Reiss, 2013). Even in systems designed to offer equitable access, such as the Dutch healthcare system, income and referral processes can create substantial disparities (Tordjman et al., 2014). Additionally, mistrust in institutions may further deter engagement, as fears of stigmatization or punitive consequences can outweigh perceived benefits (Giordano & Lindström, 2016; Paquin et al., 2024). Future research should explore the reasons for treatment discontinuation in more detail, including the extent to which early termination may result from non-attendance or other access-related barriers.

This study has several strengths and limitations. Combining microdata from SN with patient records enabled a thorough analysis of the socio-economic characteristics of children with MID-BIF receiving care for MHP, effectively avoiding selection bias by including all children in care. However, this strength is counterbalanced by access-to-care bias, as children unable to access the care they needed could not be included. The large sample size enhanced statistical power and enabled meaningful subgroup analyses, though missing data, such as for paternal education, may affect reliability. Additionally, the study's focus on cumulative socio-economic disadvantage provided a unique perspective on layered risks, marking a novel exploration of accumulated socio-economic factors in families of children with MID-BIF in mental health care. Despite these contributions, the cross-sectional design limits causal interpretations, and the reliance on data from a single specialized institution, as well as the study's focus on the Dutch socio-economic and healthcare context, may reduce the generalizability of findings to other settings or countries. While total treatment time provides a practical and measurable way to assess care extensiveness, facilitating consistent group comparisons, the study does not address qualitative differences in care, which may oversimplify the relationship between socio-economic factors and care provision. Furthermore, it remains unclear whether

these children receive follow-up care after treatment at other facilities. Finally, although our analyses are based on country of birth, this variable is sometimes interpreted as a proxy for ethnicity in Dutch research (Stronks et al., 2009). However, it does not fully capture cultural background or self-identification. Therefore, future research should consider more nuanced measures of ethnicity.

Taken together, the findings of this study have implications for policy and practice as they call for increased attention to socio-economic context in the design and delivery of mental health services. Promoting family- and community-based approaches that prioritize socio-economic well-being is essential, particularly for those facing structural barriers related to income, housing, or access. Integrated, family-centered models–such as co-located care combining mental health support with social services (Hodgkinson et al., 2017) –offer a promising way forward by addressing both clinical and social needs in a holistic manner. From a policy perspective, strengthening cross-sector collaboration could reduce drop-out rates and improve engagement among vulnerable families. For practice, a better understanding of how socio-economic stressors shape the well-being of children with MID-BIF and their care trajectories can support more tailored interventions. To further improve practice and policy, future research should explore (1) why vulnerable families disengage from care, (2) how care characteristics–such as accessibility and service fit–affect outcomes, (3) the mechanisms linking socio-economic disadvantage to a reduced amount of care received, and (4) the long-term impact of cumulative adversity on mental health and service use in this population.

To conclude, this study reveals a concerning pattern: children with MID-BIF receiving mental health care for their MHP often face 1) greater socio-economic disadvantages, especially among children in the internalizing and externalizing groups, and 2) a greater clustering of disadvantages. At the same time, children from socio-economically disadvantaged backgrounds receive less specialized mental health care, suggesting a complex interplay between care needs and socio-economic conditions. These findings underscore the need to better understand how socio-economic disadvantage affects care access, engagement, and outcomes for children with MID-BIF.

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Appendix A. Socio-economic characteristics of the case group stratified by sex

	MID-BIF+MHP N (%) N = 1,742	**Boy N = 1,166**	**Girl N = 576**	**Univariate OR (95% C.I.)**	**p-value**
Child demographics					
Age* (years)	1,742 (100)	9.0 (4.0)	10.8 (4.1)	1.59 (1.43; 1.76)	*p*<.001
Child's country of birth:	1,742 (100)	-	-	-	-
- Western	-	1,098 (94.2)	544 (94.4)	1 (Ref.)	-
- Non-Western	-	68 (5.8)	32 (5.6)	0.99 (0.89; 1.09)	*p*=.82
Social characteristics					
Number of children* (in household)	1,734 (99.5)	2.1 (1.17)	1.99 (1.06)	0.87 (0.79, 0.97)	*p*=.009
Family type*:	1,722 (98.9)	-	-	-	-
- Dual parent household	-	648 (56.2)	341 (59.9)	1 (Ref.)	-
- Single parent household	-	449 (38.9)	195 (34.3)	0.91 (0.82; 1.01)	*p*=.08
- Institutional household/other	-	56 (4.9)	33 (5.8)	1.02 (0.93, 1.13)	*p*=.62
Education level mother:	1,301 (74.7)	-	-	-	-
- High	-	111 (12.7)	63 (14.8)	1 (Ref.)	-
- Moderate	-	322 (36.8)	151 (35.4)	0.91 (0.77; 1.09)	*p*=.30
- Low	-	442 (50.5)	212 (49.8)	0.92 (0.77; 1.10)	*p*=.35
Education level father:	926 (53.2)	-	-	-	-
- High	-	112 (17.8)	60 (20.3)	1 (Ref.)	-
- Moderate	-	238 (37.8)	98 (33.1)	0.88 (0.73; 1.06)	*p*=.19
- Low	-	280 (44.4)	138 (46.6)	0.96 (0.80; 1.16)	*p*=.66
Economic circumstances					
Household income* (in percentiles)	1,628 (93.5)	30.0 (24.1)	33.0 (25.3)	0.89 (0.80; 0.98)	*p=.02*
Household Income Source*	1,635 (93.9)	-	-	-	-
- Income	-	675 (61.6)	354 (65.7)	1 (Ref.)	-
- Benefits	-	421 (38.4)	185 (34.3)	0.92 (0.83; 1.02)	*p*=.11
Benefit dependency of households*	1,314 (75.4)	17.8 (25.0)	16.8 (25.4)	0.96 (0.86; 1.08)	*p*=.51
Main benefit of private households*	1,628 (93.5)	-	-	-	-
- No benefit	-	466 (42.7)	253 (47.1)	1 (Ref.)	-
- Unemployment benefit	-	96 (8.8)	45 (8.4)	0.96 (0.68; 1.07)	*p*=.46
- Disability benefit	-	136 (12.5)	81 (15.1)	1.03 (0.93; 1.15)	*p*=.56
- Welfare benefit	-	319 (29.2)	124 (23.1)	0.86 (0.77; 0.97)	*p*=.01
- Benefit from other social provisions	-	74 (6.8)	34 (6.3)	0.96 (0.68; 1.07)	*p*=.45
Household Home Ownership*	1,642 (94.3)	-	-	-	-
- Owner-occupied	-	352 (32.0)	212 (39.2)	1 (Ref.)	-
- Rented without housing allowance	-	250 (22.7)	121 (22.4)	0.91 (0.81; 1.02)	*p*=.12
- Rented with housing allowance	-	499 (45.3)	208 (38.4)	0.83 (0.74; 0.94)	*p*=.002

*Note. *at the year of treatment onset for the case group. MID-BIF = mild intellectual disability; MHP = mental health problems, GP = general population; N = total number of observations for each variable without missing. For continuous variables, the mean and SD are provided (SD in brackets). For categorical variables, the N and percentages are given. Percentages in parentheses are calculated based on the non-missing (valid) N.*

Appendix B. Socio-economic characteristics of the case group stratified by age

	MID-BIF+MHP N (%) N = 1,742	**< 12 years old N = 1,133**	**12 years and older N = 609**	**Univariate OR (95% C.I.)**	**p-value**
Child demographics					
Sex:	1,742 (100)	-	-	-	-
- Boy	-	840 (74.1)	326 (53.5)	1 (Ref.)	-
- Girl	-	293 (25.9)	283 (46.5)	1.54 (1.39; 1.69)	p<.001
Age* (years)	1,742 (100)	7.04 (2.60)	14.3 (1.72)	-	-
Child's country of birth:	1,742 (100)	-	-	-	-
- Western	-	1,075 (94.9)	567 (93.1)	1 (Ref.)	-
- Non-Western	-	58 (5.1)	42 (6.9)	1.08 (0.98; 1.18)	*p*=.13
Family characteristics					
Number of children* (in household)	1,734 (99.5)	2.1 (1.12)	2.1 (1.17)	0.94 (0.85; 1.04)	*p*=.26
Family type*:	1,722 (98.9)	-	-	-	-
- Dual parent household	-	676 (60.0)	313 (52.5)	1 (Ref.)	-
- Single parent household	-	407 (36.1)	237 (39.8)	1.12 (1.01; 1.24)	*p*=.03
- Institutional household/other	-	43 (3.8)	46 (7.7)	1.20 (1.09, 1.33)	*p*<.001
Education level mother:	1,301 (74.7)	-	-	-	-
- High	-	125 (14.4)	49 (11.4)	1 (Ref.)	-
- Moderate	-	323 (37.1)	150 (34.8)	1.18 (0.99; 1.42)	*p*=.07
- Low	-	422 (48.5)	232 (53.8)	1.08 (0.90; 1.30)	*p*=.39
Education level father:	926 (53.2)	-	-	-	-
- High	-	122 (18.9)	50 (17.8)	1 (Ref.)	-
- Moderate	-	242 (37.5)	94 (33.5)	1.09 (0.90; 1.32)	*p*=.38
- Low	-	281 (43.6)	137 (48.8)	0.96 (0.80; 1.18)	*p*=.80
Economic circumstances					
Household income* (in percentiles)	1,628 (93.5)	29.8 (24.0)	33.4 (25.4)	0.87 (0.78; 0.96)	*p=.005*
Household Income Source*	1,635 (93.9)	-	-	-	-
- Income	-	682 (63.6)	347 (61.6)	1 (Ref.)	-
- Benefits	-	390 (36.4)	216 (38.4)	1.04 (0.94; 1.15)	*p*=.43
Benefit dependency of households*	1,314 (75.4)	17.7 (25.3)	17.0 (25.0)	0.97 (0.87; 1.09)	*p*=.61
Main benefit of private households*	1,628 (93.5)	-	-	-	-
- No benefit	-	467 (43.7)	252 (45.0)	1 (Ref.)	-
- Unemployment benefit	-	90 (8.4)	51 (9.1)	1.01 (0.91; 1.13)	*p*=.80
- Disability benefit	-	129 (12.1)	88 (15.7)	1.08 (0.97; 1.20)	*p*=.14
- Welfare benefit	-	302 (28.3)	141 (25.2)	0.94 (0.84; 1.05)	*p*=.26
- Benefit from other social provisions	-	80 (7.5)	28 (5.0)	0.90 (0.80; 1.01)	*p*=.06
Household Home Ownership*	1,642 (94.3)	-	-	-	-
- Owner-occupied	-	375 (34.9)	189 (33.4)	1 (Ref.)	-
- Rented without housing allowance	-	232 (21.6)	139 (24.6)	1.08 (0.96; 1.21)	*p*=.22
- Rented with housing allowance	-	469 (43.4)	238 (42.0)	1.00 (0.89; 1.13)	*p*=.95

*Note. *at the year of treatment onset for the case group. MID-BIF = mild intellectual disability; MHP = mental health problems, GP = general population; NL = The Netherlands; EU = Europe. N = total number of observations for each variable without missing. For continuous variables, the mean and SD are provided (SD in brackets). For categorical variables, the N and percentages are given. Percentages in parentheses are calculated based on the non-missing (valid) N.*