ORIGINAL ARTICLE

Mental Health Disorders and Psychotropic Medication: Prevalence and Related Characteristics Among Individuals in Foster Care

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Abstract

This study sought to provide prevalence data for mental health (MH) diagnoses and psychotropic medication prescriptions among individuals in foster care and to examine their relationships with physical health status, maltreatment type, placement type, and demographic variables. Data were retrieved from electronic health records for 3,067 patients seen at integrated pediatric primary care clinics serving individuals in care. Descriptive and bivariate statistics for presence of MH diagnoses and psychotropic medication prescription were calculated. Multivariable zero-inflated negative binomial regressions were used to assess relationships. Half (50.0%) of patients had at least one MH diagnosis; trauma and stressor-related (31.5%) and attention deficit hyperactivity (22.6%) disorders were most common. 27.8% of patients were prescribed at least 1 psychotropic medication. Complex chronic physical health, having 1 and 2 or more maltreatment exposures, and being 6–11 and 12–20 years of age had significantly higher rates of having a MH diagnosis while being female, Black, Hispanic, and other race were significantly associated with lower rates. Patients with at least 1 MH diagnosis that had complex chronic physical health status, experienced sexual abuse, and were 6–11 and 12–20 years of age had significantly higher rates of psychotropic medication prescription while shelter and kinship placement and female gender were significantly associated with lower rates. Findings suggest that initial and ongoing MH screening is vital for individuals in care so that appropriate interventions can be offered. Results support implementing strategies designed to increase access to MH services for this population, such as integrated care and child psychiatry consult programs.

Keywords Foster care · Mental health · Mental disorders · Prevalence · Psychotropic medication

Introduction

Approximately 390,000 young people are in foster care in the United States (U.S. Department of Health and Human Services (HHS, 2022). By definition, individuals in substitute care have faced adverse experiences. Among the most common reasons for entry into foster care in 2021 were

neglect (63%), parental drug abuse (36%), and caretaker inability to cope (14%; HHS, 2022). Such negative experiences may not end at removal, as the act of removal itself can be experienced as traumatic (Trivedi, 2019). Following removal, it is not uncommon for individuals in foster care to experience more than one placement while in substitute care, which can further contribute to disruption in a child's life (Konijn et al, 2019).

These exposures put individuals in foster care at an increased risk of poor developmental outcomes, chronic health conditions, and mental health (MH) challenges (Herrenkohl et al, 2003; McGuire et al., 2018; Oswald et al, 2010). A recent systematic review on the mental health of individuals in foster care (Engler et al., 2022) included five U.S.-based empirical studies. These studies (Beal et al., 2018; Bramlett et al., 2017; McMillen et al., 2005; Okpych & Courtney, 2018; Turney & Wildeman, 2016) suggested that the percentage of individuals in care with *any* MH condition ranged from 29.6%-41.6%; with depression,

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14.2–24.5%; with behavior disorders, 17.0–22.2%; with attention deficit/hyperactivity disorder (ADHD), 10.0–21.8%; and with anxiety, 2.6%-14.2%. One study (Beal et al., 2018) examined presence of trauma and stressor-related disorders (TSRD) and found a 9.6% prevalence rate, and another study (McMillen et al., 2005) included presence of a specific disorder within this category – posttraumatic stress disorder – found a prevalence rate of 13.9%. Compared to estimates for general populations, these studies suggest that the prevalence of MH concerns for individuals in foster care are high (Danielson et al., 2018; Ghandour et al., 2019).

Researchers have explored the relationship between a number of factors related to individuals in care and mental health status. One such factor is the type of maltreatment to which an individual was exposed. For example, Maniglio (2010) found a link between sexual abuse and depression; Humphreys et al. (2020) found significant relationship between five types of maltreatment (physical, sexual, and emotional abuse and emotional and physical neglect) and depression; and Romero et al. (2009) found a link between both physical and sexual abuse and bipolar disorder in children. Further, several researchers have explored the relationship between mental health diagnosis and exposure to multiple types of maltreatment, or *polyvictimization* (Finkelhor et al., 2007; Turner et al., 2010) and found it to be a better predictor of mental health challenges than examining individual maltreatment types (e.g., Cyr et al., 2014; Hodgdon et al., 2018; Spinazzola et al., 2014).

In addition to the experiences a young person has prior to and during entry into foster.care, health, placement, and demographic factors may also be associated with greater risk for MH concerns. The physical health and MH status of children have been found to be linked (Aarons et al., 2008; Doherty & Gaughran, 2014) including in studies of young people in foster care (Turney & Wildeman, 2016; Woods et al, 2013). In regard to placement type, McMillen's research (2005) has suggested that being placed with kinship, as opposed to foster caregivers, is related to lower rates of MH diagnoses. For demographic factors, a few studies have shown age, gender, and race/ethnicity to be associated with MH status for young people in care (McMillen et al, 2005; Okpych & Courtney, 2018). For example, rates of MH diagnoses increase as children age, and thus not surprisingly, older youth in foster care have been found to have higher rates of psychiatric disorders (McMillen et al, 2005). Also, in two studies included in Engler et al.'s (2022) review, females were found to be more likely than males to experience depression and in one study, to experience PTSD. Further, McMillen et al.'s (2005) findings suggested that individuals who identified as White were more likely than youths of color to be diagnosed with ADHD while no significant differences along racial or ethnic lines in the presence of a mental health diagnosis were found by Beal and colleagues (2018).

Another area of concern with this population is the use of psychotropic medications to address MH conditions. Indeed, based on concerns raised about overmedication of individuals in care (Keast et al., 2019; U.S. Government Accountability Office, 2017), standards for psychotropic medication prescription were incorporated into the Child and Family Services Improvement and Innovation Act (2011). A study published that same year examining Medicaid-insured youth in six states found that individuals in foster care were prescribed psychotropic medication at rates 2.7 to 4.5 times higher than children not in foster care (Kutz, 2011), lending further support to the need for such prescription standards.

A few studies have explored relationships between psychotropic medication use and various demographic and placement factors, although no studies were identified that examined relationship between psychotropic medication use and physical health status. Leslie et al. (2011) utilized data from the National Survey of Child and Adolescent Well-Being and found increased odds of self-reported psychotropic medication use among individuals involved with the child welfare system who were male and older in age. Type of maltreatment and race/ethnicity were not significantly associated with psychotropic medication use in that study. Another study involving a sample of 17-year-olds involved in substitute care (Park et al., 2019) found that compared to youth living in foster homes, youth in congregate care settings had significantly greater odds of self-reported psychotropic medication use; no significant associations were found for gender or race/ethnicity.

Purpose of the Study

This study of patients aged 3 to 20 years sought to provide prevalence data for MH diagnoses and psychotropic medication prescription among individuals in foster care and to examine their relationships with physical health status, maltreatment type, placement type, and demographic variables. In light of existing literature, we hypothesized that the following would be associated with higher numbers of MH diagnoses and more classes of psychotropic medication prescription: having a maltreatment exposure, more maltreatment exposure types, shelter placement, and older age. We further hypothesized that greater physical health complexity would be associated with higher numbers of MH diagnoses. No additional hypotheses were made related to demographic variables given the lack of consistent findings within the literature.

Methods

Participants

Data for this retrospective chart review study were collected from two integrated primary care clinics exclusively serving individuals in foster care. The clinics are affiliated with a children's hospital system located in the southwestern United States with campuses located in an urban and a suburban city. Both clinics offer initial comprehensive intake visits, well-child visits, sick visits, psychiatry visits, and MH services including consultation, therapy, and assessments. Providers at the clinics include pediatricians, nurse practitioners, a psychiatrist, psychologists, and therapists. All patients who attended at least one visit between January 01, 2017 and December 31, 2020 and were at least 3 years of age (n = 3,067) were included in the study.

Measures

The main outcome measures for this study were number of MH diagnoses and number of psychotropic medication class categories prescribed. MH diagnoses were selected based on prevalence among pediatric populations. The *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edition, was used to determine which codes should be included for each diagnosis. The corresponding International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes were pulled from EHRs. (See Supplemental Table 1 for a listing of all included codes.) To describe prevalence of the diagnoses and to examine possible associations, variables were created to indicate the presence (yes/no) of at least one diagnosis within the included categories and to provide a count of the number of diagnoses (Range: 0–6).

To examine usage of psychotropic medication, relevant medications listed in patients' EHRs were grouped into the following classes: antidepressant/anxiolytic, benzodiazepine, hypnotic, mood stabilizer, stimulant, non-stimulant, and other. Medication prescription information was gathered from the initial patient visit. A composite score was created indicating the number of different classifications of psychotropic medications prescribed (0–5).

Exposure variables included health status, placement and maltreatment types, and demographic factors. The Pediatric Medical Complexity Algorithm (PMCA) was used to determine the chronicity and complexity of patients' health conditions. The PMCA is a validated tool that categorizes children's health status into three mutually exclusive groups (non-chronic, non-complex chronic, and complex chronic) based on clinical diagnoses (Simon

et al., 2017). For this study, we excluded MH codes (F01-F99) from the PMCA to focus only on physical health conditions. This adjustment allowed for the examination of associations between physical health status and MH conditions and psychotropic medication prescriptions.

Placement and maltreatment types, along with demographic information, were also pulled from the patients' EHRs. Placement types included foster parent, kinship, shelter, biological parent, and unknown. Categories of maltreatment exposure included physical abuse, sexual abuse, neglect, and other. Maltreatment exposure was pulled from provider notes and ICD-10 codes found within the EHRs. (See Supplemental Table 2 for a list of included codes.) Additionally, a variable was created to indicate presence of maltreatment exposure (yes/no), and a further composite score indicating the number of maltreatment types experienced (0, 1, 2 +) was used in later analysis. Demographic information collected for this study included age (3–5, 6–11,12–20), gender (male, female), race/ethnicity (White non-Hispanic, Black non-Hispanic, Hispanic, other, unknown). Finally, the number of months patients spent in the care of the hospital system was included.

Analyses

Data from all visits occurring between January 2017 and December 2020 were extracted from EHRs. Once variables were coded, univariate and bivariate statistics were examined for all predictors and outcome variables in Stata version 16.1 (2019). Frequencies of MH conditions, chronic medical conditions, and psychotropic medications were examined. To inform model development, patterns of categorical predictors with each health outcome were examined using chi-square analyses. Multivariable zero-inflated negative binomial regression models were conducted to examine associations among multiple predictors and the number of MH diagnosis categories and number of psychotropic medication classes. The model exploring number of psychotropic medication classes was restricted to only those patients who had been diagnosed with at least one MH condition. Age, gender, and race/ethnicity were included as clinically relevant characteristics in all models. Time in cohort was included to account for varying time in the dataset. Approval for this study was granted by the medical university's Institutional Review Board.

Results

Table 1 provides demographic and health characteristics of the sample. The average age of patients was 8.3 (*SD* = 4.4), and 6- to 11-year-olds was the largest age group (39.9%). The sample was evenly divided between males and females

Table 1 Demographic and Health Characteristics

	All	3 to 5	6 to 11	12 to 20
No. (%)	3067 (100.0)	1072 (35.0)	1225 (39.9)	770 (25.1)
Gender, n(%)				
Male	1598 (52.1)	588 (54.9)	678 (55.4)	332 (43.1)
Female	1469 (47.9)	484 (45.2)	547 (44.7)	438 (56.9)
Race/Ethnicity				
White or Caucasian	829 (27.0)	301 (28.1)	328 (26.8)	200 (26.0)
Black or African American	971 (31.7)	343 (32.0)	383 (31.4)	245 (31.8)
Hispanic	647 (21.1)	211 (19.7)	270 (22.0)	166 (21.6)
Other	41 (1.3)	17 (1.6)	14 (1.1)	10 (1.3)
Unknown	578 (18.9)	200 (18.7)	229 (18.7)	149 (19.4)
Placement Type				
Foster parent	2373 (77.4)	896 (83.4)	948 (77.4)	529 (68.7)
Kinship caregiver	401 (13.1)	122 (11.4)	169 (13.8)	110 (14.3)
Shelter	225 (7.3)	25 (3.3)	74 (6.0)	116 (15.1)
Biological Parent	46 (1.5)	13 (1.2)	25 (2.0)	8 (1.0)
Unknown	22 (0.7)	6 (0.6)	9 (0.7)	7 (0.9)
Maltreatment Exposure, n(%)				
Any exposure	2372 (77.3)	844 (78.7)	941 (76.8)	587 (76.2)
Neglect	2,254 (73.5)	813 (75.8)	907 (74.0)	534 (69.4)
Physical Abuse	564 (18.4)	163 (15.2)	207 (16.9)	194 (25.2)
Sexual Abuse	307 (10.0)	40 (3.7)	113 (9.2)	154 (20.0)
Other	176 (5.7)	60 (5.6)	59 (4.8)	57 (7.4)
Unknown/Not available	695 (22.7)	228 (21.3)	284 (23.2)	183 (23.8)
Number of Maltreatment Exposure Types				
1	1597 (52.1)	631 (58.9)	645 (52.7)	321 (41.7)
2+	775 (25.3)	213 (19.9)	296 (24.2)	266 (34.6)
Overall Health (Physical and Mental)[a]				
Non- Chronic	895 (29.2)	353 (32.9)	377 (30.8)	165 (21.4)
Non-complex Chronic	1107 (36.1)	370 (34.5)	445 (36.3)	292 (37.9)
Complex Chronic	1065 (34.7)	349 (32.6)	403 (32.9)	313 (40.7)
Physical Health Status[a]				
Non-Chronic	1389 (45.3)	438 (40.9)	607 (49.6)	344 (44.7)
Non-complex Chronic	1042 (34.0)	394 (36.8)	386 (31.5)	262 (34.0)
Complex Chronic	636 (20.7)	240 (22.4)	232 (18.9)	164 (21.3)
Time in cohort in months, mean (SD)	6.6 (9.4)	7.1 (9.6)	6.6 (9.6)	5.9 (8.8)

SD Standard Deviation

[a]Derived using the Pediatric Medical Complexity Algorithm

(52.1% and 47.9%, respectively). The majority of patients were non-Hispanic (60.7%) and English-speaking (98.3%). Most patients were placed with foster caregivers (77.4%), and neglect (73.5%) was the most common maltreatment exposure type. The percentage of patients with and without chronic conditions was similar (54.7% and 45.3%, respectively), with 20.7% having complex chronic conditions. On average, children spent 6.6 months ($SD = 9.4$) in the cohort.

Table 2 presents data related to patients' MH status. Half (50.0%) of the patients were diagnosed with at least one of the MH condition categories explored in this study, and 25.0% had a MH condition in more than one category. The most common diagnosis was TSRD (31.5%), followed by ADHD (22.5%). About a quarter (27.8%) of the patients had been prescribed at least one psychotropic medication, and 12.7% of patients had been prescribed psychotropic medications of more than one classification. The most prescribed psychotropic medications were mood stabilizers (12.9%), non-stimulant ADHD medications (12.6%) and stimulants (10.3%).

All variables had a significant relationship with having a MH diagnosis. All variables except for other maltreatment exposure and caregiver type were associated with having a psychotropic medication prescription in bivariate analyses. These results are shown in Tables 3 and 4.

Table 2 Mental Health Conditions and Medications

	All	3 to 5	6 to 11	12 to 20
No. (%)	3067 (100.0)	1072 (35.0)	1225 (39.9)	770 (25.1)
Any Mental Health Diagnosis	1535 (50.0)	347 (32.4)	670 (54.7)	518 (67.3)
Number of Diagnoses				
0	1532 (50.0)	725 (67.6)	555 (45.3)	252 (32.7)
1	769 (25.1)	218 (20.3)	319 (26.0)	232 (30.1)
2	406 (13.2)	86 (8.0)	189 (15.4)	131 (17.0)
3	233 (7.6)	34 (3.2)	114 (9.3)	85 (11.0)
4	88 (2.9)	7 (0.7)	35 (2.9)	46 (6.0)
5	35 (1.1)	2 (0.2)	11 (0.9)	22 (2.9)
6	4 (0.1)	0 (0.0)	2 (0.2)	2 (0.3)
ADHD[a]	692 (22.6)	125 (11.7)	373 (30.5)	194 (25.2)
Anxiety	295 (9.6)	41 (3.8)	115 (9.4)	139 (18.1)
Bipolar	37 (1.2)	2 (0.2)	4 (0.3)	31 (4.0)
Depression	413 (13.5)	34 (3.2)	157 (12.8)	222 (28.8)
Dissociative	0 (0)	0 (0)	0 (0)	0 (0)
Disruptive, Impulse Control, Conflict	314 (10.2)	88 (8.2)	142 (11.6)	84 (10.9)
Gender Dysphoria	5 (0.2)	0 (0)	0 (0)	5 (0.7)
Obsessive Compulsive & Related	38 (1.2)	2 (0.2)	28 (2.3)	9 (1.0)
Personality	1 (0)	0 (0)	0 (0)	1 (0.1)
Somatic	9 (0.3)	5 (0.5)	1 (0.1)	3 (0.4)
Substance-related and addictive	60 (2.0)	6 (0.6)	8 (0.7)	46 (6.0)
Trauma and Stressor Related	967 (31.5)	227 (21.2)	418 (34.1)	322 (41.8)
Any Psychotropic Medication	851 (27.8)	98 (9.1)	426 (34.8)	327 (42.5)
Number of Medications				
0	2216 (72.3)	974 (90.9)	799 (65.2)	443 (57.5)
1	463 (15.1)	79 (7.4)	221 (18.0)	163 (21.2)
2	252 (8.2)	14 (1.3)	144 (11.8)	94 (12.2)
3	115 (3.8)	5 (0.5)	51 (4.2)	59 (7.7)
4	15 (0.5)	0 (0.0)	9 (0.7)	6 (0.8)
5	6 (0.2)	0 (0.0)	1 (0.1)	5 (0.7)
Medication Classification				
Anti-Depressant/Anxiolytic	116 (3.8)	2 (0.2)	40 (3.3)	74 (9.6)
Mood Stabilizer	395 (12.9)	23 (2.2)	181 (14.8)	191 (24.8)
Stimulant	315 (10.3)	43 (4.0)	203 (16.6)	69 (9.0)
Non-Stimulant	386 (12.6)	35 (3.3)	236 (19.3)	115 (14.9)
Hypnotic	59 (1.9)	0 (0.0)	9 (0.7)	50 (6.5)
Benzodiazepine	15 (0.5)	5 (0.5)	4 (0.3)	6 (0.8)
Other	116 (3.8)	14 (1.3)	30 (2.5)	72 (9.4)

[a]Attention deficit/hyperactivity disorder

Patients identified as belonging to the complex chronic category for physical health status had higher rates of MH diagnoses (Incidence Rate Ratio [IRR]: 1.26; 95% CI: 1.13–1.41–1.24) compared to those in the non-chronic category when controlling for other variables. For composite number of exposures, those with one exposure had 1.63(95% CI: 1.24–2.14) times the rate of MH conditions compared to those with no known exposures, and those with two or more composite exposures had a higher rate compared to those with no known exposure (IRR: 1.96; 95% CI: 1.28–2.99) (See Table 5 for more detailed information).

Females had a lower rate of MH diagnosis (IRR: 0.86, 95% CI: 0.78–0.94) compared to males. The rate of MH diagnoses also increased with age such that 6- to 11-year-olds had 2.10 times (95% CI: 1.87–2.35) the rate of MH diagnosis and 12- to 20-year-old 2.81 times (95% CI:2.49–3.18) the rate of MH diagnosis than 3- to 5-year-olds. Being Black (IRR: 0.88, 95%CI: 0.79–0.98), Hispanic (IRR: 0.81, 95%CI: 0.72–092) and other race (IRR: 0.2, 95%CI: 0.39–0.97) were associated with lower rates of MH conditions compared to White children. For each additional

Table 3 Bivariate Associations with Mental Health Diagnosi

	No Mental Health Diagnosis	Mental Health Diagnosis	X^2; p-value
Number of Maltreatment Exposure Types			
0	469 (30.6)	226 (14.7)	177.2; <.001
1	809 (52.8)	788 (51.3)	
2+	254 (16.6)	521 (33.9)	
Any Exposure			
No	469 (30.6)	226 (14.7)	110.5; <.001
Yes	1063 (69.4)	1309 (85.3)	
Sexual Abuse			
No	1456 (95.0)	1304 (85.0)	86.6; <.001
Yes	76 (5.0)	231 (15.1)	
Physical Abuse			
No	1335 (87.1)	1168 (76.1)	62.4; <.001
Yes	197 (12.9)	367 (23.9)	
Neglect			
No	516 (33.7)	297 (19.4)	80.9; <.001
Yes	1,016 (66.3)	1238 (80.7)	
Other			
No	1472 (96.1)	1419 (92.4)	18.8; <.001
Yes	60 (3.9)	116 (7.6)	
Caregiver Type			
Biological Parent	25 (1.6)	21 (1.4)	24.4; <.001
Shelter	85 (5.6)	140 (9.1)	
Foster Parent(s)	1235 (80.6)	1138 (74.1)	
Kinship Caregiver	175 (11.4)	226 (14.7)	
Unknown	12 (0.8)	10 (0.7)	
Physical Health Status[a]			
Non-Chronic	751 (49.0)	638 (41.6)	22.6; p <.001
Non-Complex Chronic	508 (33.2)	534 (34.8)	
Complex Chronic	273 (17.8)	363 (23.7)	
Time in Cohort in months, mean(SD)	5.1 (0.2)	8.0 (0.3)	-8.8; p <.001*

SD Standard Deviation

[*]analyzed using *t*-test

[a]Derived using the Pediatric Medical Complexity Algorithm

month in the cohort, the rate of having a MH diagnosis increased by 2% (95%CI: 1.02–1.02).

Among patients with a MH condition, patients who had a complex chronic condition had a higher rate of psychotropic medication prescription compared to those who had non-chronic conditions in the multivariable analysis (IRR: 1.21 [95%CI: 1.03–1.42]). Those who experienced sexual abuse had a higher rate of psychotropic medication prescription (IRR: 1.34, 95%CI: 1.06–1.69). Those placed with a kinship caregiver (IRR: 0.82, 95%CI 0.68–0.98) or in a shelter (IRR: 0.62, 95%CI: 0.48–0.80) had lower rates of psychotropic medications compared to those placed with a foster parent. Similar to MH diagnosis, the rate of having a psychotropic medication increased with age, with 6- to 11-year-olds having 4.07 times (95% CI: 3.23–5.12) the rate of prescription and

12- to 20-year-olds having 4.70 times the rate of prescription (95% CI: 3.70–5.98) compared to 3- to 5-year-olds. Females were less likely to be prescribed psychotropic medications than males (IRR: 0.75 [95%CI: 0.66–0.86]). For each additional month in the cohort, rate of psychotropic medication prescription increased by 1% (95%CI: 1.00–1.01).

Discussion

This cross-sectional study examined prevalence rates and factors associated with MH disorders and psychotropic medication prescription among individuals aged 3–20 seen at two integrated primary care clinics exclusively serving individuals involved in the child welfare system. Results of this

Table 4 Bivariate Associations with Psychotropic Medication

	No Psychotropic Medication	Psychotropic Medication	X^2; p-value
Number of Maltreatment Exposure Types			
0	540 (24.4)	155 (18.2)	90.0; <.001
1	1218 (55.0)	379 (44.5)	
2+	458 (20.7)	317 (37.3)	
Any Exposure			
No	540 (24.4)	155 (18.2)	13.3; <.001
Yes	1676 (75.6)	696 (81.8)	
Sexual Abuse			
No	2060 (93.0)	700 (82.3)	78.2; <.001
Yes	156 (7.0)	151 (17.7)	
Physical Abuse			
No	1876 (84.6)	627 (73.7)	49.4; <.001
Yes	340 (15.3)	224 (26.3)	
Neglect			
No	618 (27.9)	195 (22.9)	7.8; .005
Yes	1598 (72.1)	656 (77.1)	
Other			
No	2097 (94.6)	794 (93.3)	2.0; .157
Yes	119 (5.4)	57 (6.7)	
Caregiver Type			
Biological Parent	34 (1.5)	12 (1.4)	.460**
Shelter	172 (7.8)	53 (6.2)	
Foster Parent(s)	1698 (76.6)	675 (79.3)	
Kinship Caregiver	294 (13.3)	107 (12.6)	
Unknown	18 (0.8)	4 (0.5)	
Physical Health Status[a]			
Non-Chronic	1053 (47.5)	336 (39.5)	30.5; p<.001
Non-Complex Chronic	756 (34.1)	286 (33.6)	
Complex Chronic	407 (18.3)	229 (26.9)	
Time in Cohort in months, mean(SD)	5.6 (8.5)	9.2 (11.0)	-9.5; p<.001*

SD Standard Deviation

[*]analyzed using *t*-test; [**]analyzed using fishers exact test

[a]Derived using the Pediatric Medical Complexity Algorithm

study provide further evidence that individuals in care have higher rates of MH concerns than the general population (e.g., 9.4% for ADHD, 7.1% for anxiety, 7.4% for behavioral/conduct problems, 3.2% for depression; Danielson et al, 2018; Ghandour et al., 2019) and contribute to understanding of the types of behavioral concerns seen in this population. In this study, the most prevalent MH diagnosis was TSRD (31.5%). This TSRD prevalence rate was much higher than what was found by Beal and colleagues (7.7%). It is possible that higher rates of TSRD diagnosis in this study result from higher levels of recognition of trauma symptoms among providers because of the exclusive focus on individuals involved with child welfare. Indeed, the symptoms of trauma can be similar to those of other MH disorders, and it has been recommended that individuals with child welfare

involvement not be diagnosed with a mental health disorder without first addressing the impact of trauma (Griffin et al., 2011). This study draws attention to the importance of health care providers recognizing trauma's potential impact, how it can complicate the diagnosis of MH disorders, and implementation of trauma-informed care. In particular, these results lend further support to the need for increased training in performing trauma-informed assessments as well as awareness of trauma's contribution to MH presentations (John et al., 2019).

This study also found that psychotropic medication prescription (27.8%) was higher than reported proportions of psychotropic medication use found in the general population (Jonas et al, 2013) and comparable to the reported prevalence rate from 2019 state foster care

Table 5 Incidence Rate Ratios of Multivariate Associations with Mental Health Diagnoses and Psychotropic Medication

	Any Mental Health Diagnosis IRR (95% CI) N = 3,067	p-value	Any Psychotropic Medication OR (95%CI) N = 1,567*	p-value
Physical Health Condition Complexity[a]				
Non-chronic	Ref	Ref	Ref	Ref
Non-complex chronic	1.08 (0.98–1.20)	0.113	1.10 (0.96–1.28)	0.179
Complex chronic	1.26 (1.13–1.41)	<0.001	1.21 (1.03–1.42)	0.021
Maltreatment exposures				
Neglect (yes)	0.90 (0.70–1.16)	0.430	1.03 (0.72–1.45)	0.888
Physical abuse (yes)	1.08 (0.90–1.31)	0.413	1.10 (0.86–1.41)	0.458
Sexual abuse (yes)	1.16 (0.97–1.39)	0.097	1.34 (1.06–1.69)	0.015
Other maltreatment (yes)	1.07 (0.86–1.32)	0.536	0.97 (0.54–1.68)	0.869
Composite exposures				
0	Ref	Ref	Ref	Ref
1	1.63 (1.24–2.14)	<0.001	0.90 (0.62–1.31)	0.590
2+	1.96 (1.28–2.99)	0.002	0.95 (0.54–1.68)	0.869
Placement type				
Foster parent	Ref	Ref	Ref	Ref
Shelter	1.06 (0.91–1.24)	0.473	0.62 (0.48–0.80)	<0.001
Biological parent	0.81 (0.54–1.20)	0.290	0.73 (0.40–1.34)	0.314
Kinship caregiver	1.06 (0.93–1.20)	0.376	0.82 (0.68–0.98)	0.032
Unknown	0.75 (0.44–1.28)	0.296	0.54 (0.22–1.3)	0.200
Age Category				
3–5	Ref	Ref	Ref	Ref
6–11	2.10 (1.87–2.35)	<0.001	4.07 (3.23–5.12)	<0.001
12–20	2.81 (2.49–3.18)	<0.001	4.70 (3.70–5.98)	<0.001
Gender				
Male	Ref	Ref	Ref	Ref
Female	0.86 (0.78–0.94)	0.001	0.75 (0.66–0.86)	<0.001
Race/Ethnicity				
White	Ref	Ref	Ref	Ref
Black/African American	0.88 (0.79–0.98)	0.020	1.11 (0.95–1.30)	0.197
Hispanic	0.81 (0.72–0.92)	0.001	0.91 (0.76–1.09)	0.318
Other	0.62 (0.39–0.97)	0.037	0.72 (0.37–1.42)	0.343
Unknown	0.89 (0.78–1.01)	0.080	0.87 (0.72–1.07)	0.182
Time in cohort in months	1.02 (1.02–1.02)	<0.001	1.01 (1.00–1.01)	<0.001

*Restricted to those with a mental health condition

[a]Derived from the Pediatric Medical Complexity Algorithm

Medicaid claims data (23.4%; Texas Health & Human Services, 2021). Explanations given for high rates of psychotropic medication prescription include trends toward symptoms-based prescribing, reluctance to discontinue medications, and limitations in access to evidence-based psychosocial treatments (Fontanella et al., 2014). In this regard, programs such as the Massachusetts Child Psychiatry Access Program (MCPAP) (2014), which provides primary care providers with access to psychiatric consultation and referral facilitation, could be helpful. Perhaps, such programs could be expanded to include access to psychiatrists with experience working with individuals in care. Such a resource could prove helpful in developing strategies and guidelines for deprescribing and reducing reliance on psychotropic medications. Lastly, the Academy of Child and Adolescent Psychiatry has published guidelines with recommendations for clinicians to be familiar with common problems, psychiatric medications, and evidence-based psychosocial interventions, while also identifying that failure with effective psychosocial interventions can lead to inappropriate emphasis on psychotropic medications (Lee et al., 2015).

This study further explored associations between number of MH diagnoses and physical health status, maltreatment exposure, placement type, and demographics. It was hypothesized that having a more complex health status would be associated with increased rates of MH diagnoses, and the data suggest that was the case with this sample. This finding is in keeping with prior literature (Nabi et al., 2008; Surtees et al., 2008) and suggests individuals coming into care with complex, chronic physical health status might benefit from an interdisciplinary model of care that incorporates MH care into the primary care setting (Horwitz et al, 2000; Miller et al., 2020; Szilagyi et al., 2015).

Although prior literature has shown child maltreatment to be associated with risk of MH concerns (Cecil et al., 2017; Lippard & Nemeroff, 2020), this study found no significant multivariable associations with neglect or with physical, sexual, or other abuse. Findings from prior studies have been mixed. Beal and colleagues also found no significant relationships between maltreatment type and MH concerns. Okpych and Courtney (2018), however, found a significant relationship between sexual abuse and depression, though no significant relationships between neglect or physical abuse and MH diagnosis. McMillan and colleagues found physical abuse to be significantly associated with having a disruptive behavioral disorder, but no significant relationship between MH diagnoses and sexual abuse or neglect. These disparate findings may relate to the different ways in which MH status was examined (e.g., number of diagnoses, a particular diagnosis, any diagnosis). More research is needed to better understand whether knowledge of maltreatment exposure can help providers better understand and treat MH needs in this population.

As hypothesized, having one and having two or more maltreatment exposure types was associated with higher rates of MH concerns. Research has suggested that polyvictimization is associated with psychopathology in both childhood and adulthood (Cyr et al., 2014; Guerra et al., 2016; Haahr-Pedersen et al., 2020). A recent systematic review found not only a positive association between polyvictimization and mental health but also that polyvictimization was a stronger risk factor for psychopathology than individual types of victimization (Haahr-Pedersen et al., 2020).

None of the placement types was significantly associated with higher rates of MH diagnoses, after adjusting for other factors. To our knowledge, this study is the first to look at the relationship between shelter placements and number of MH diagnoses. Of the studies included in Engler et al.'s review, three included shelter placements, but within the broader umbrella of congregate care settings. Of those three studies, only one (McMillen) found a significant association in multivariate analysis between placement type and MH diagnosis. Specifically, they found that being in a congregant care setting increased the odds of having a MH diagnosis by

2.34. It is possible that the inclusion of in-patient psychiatric units and residential treatment programs among congregate care settings led to the significant association. We hypothesized higher rates of MH diagnoses among individuals in shelters because by definition such placement involves a heightened level of placement insecurity and separation from community supports. It is also possible, however, that the short-term nature of these placements means that there has not been time for thorough psychological assessment.

Findings related to demographic factors were somewhat consistent with existing literature. Similar to other studies and consistent with our hypothesis, MH diagnosis increased as age increased. Regarding gender, the finding that females were less likely to have a MH diagnosis than males ran counter to findings in other studies, but those studies only found greater likelihood of a MH diagnosis for internalizing diagnoses (e.g., depression, PTSD). The fact that this study included externalizing diagnoses may have been why our findings differed, as studies suggest that females are more likely to have internalizing diagnoses while males are more likely to have externalizing diagnoses (Hoffmann et al., 2004). Finally, patients whose race/ethnicity was Black, Hispanic, and other had higher rates of MH diagnoses than patients as identified as White. Beal et al. (2018) categorized race/ethnicity into White or minority status and found no significant association between these two groupings and the odds of having a mental health condition. McMillen et al. (2005) also grouped participants into the categories of White and youths of color, but they found increased odds of having a mental health disorder in the past year for White participants. Our findings align with those of McMillen et al. (2005) and add to the literature by suggesting an association between race and the rate of MH diagnoses.

In regard to the prescription of psychotropic medication, we did not formulate a hypothesis about the relationship between physical health status and rates of psychotropic medication prescription given the lack of literature on this topic. Thus, the finding that more complex physical health was related to higher rates of psychotropic medication prescription is novel. Future studies should seek to confirm this finding.

Of the maltreatment exposure types, sexual abuse was related to higher rates of psychotropic medication prescription. This finding is consistent with that of a study by Keeshin and colleagues (2014) which found a positive relationship between sexual abuse, but not physical abuse, and psychotropic medication use among young people requiring psychiatric hospitalization. Contrary to our hypotheses, this study found that any maltreatment exposure and exposure to two or more maltreatment types was not associated with higher odds of psychotropic medication prescription. Most of the research identified for this study focused on the relationship between psychotropic medication use and presence or absence of maltreatment (e.g., Burcu et al.,

2014) or specific types of maltreatment (e.g., Keeshin et al., 2014) as opposed to utilizing count of maltreatment types as a measure of maltreatment severity. An exception, however, is a study by Raghavan et al. (2016) which examined relationships between a variety of child maltreatment severity measures and expenditures on psychotropic drugs among children with child welfare involvement. The researchers found that counts of different types of maltreatment were not significantly associated with increases in expenditures on psychotropic medications. The finding from our study, coupled with Raghavan et al.'s findings, suggest that polyvictimization may not be associated with higher rates of psychotropic medication prescription. More research is needed on this issue.

Shelter and kinship placement were significantly associated with lower rates of psychotropic medication prescription. Similar to our interpretation of findings related to rates of MH diagnoses among individuals in shelters, although we anticipated higher rates of psychotropic medication prescription among individuals in shelter placements because by definition such placements involve heightened placement insecurity and separation from community supports, it is possible that the short-term nature of these placements means that there has not been time for evaluation and prescribing of psychotropic medications. Sakai et al. (2011), in a three-year prospective cohort study, also found that young people in kinship care had significantly lower risk of psychotropic medication use. For kinship placements, it is possible that being placed with family and thus maintaining connection serves as a protective factor, but it is also possible that kinship caregivers are less amenable to using psychotropic medications. More research, such as qualitative work with kinship caregivers, is needed to better understand this relationship.

Several demographic factors were also found to have a significant association with psychotropic medication prescription. As hypothesized, increased age was associated with higher rates of psychotropic medication prescription, in keeping with prior studies (e.g., Breland-Noble et al., 2004; Leslie et al., 2011; Raghavan et al., 2005). Similar to the relationship between gender and number of MH diagnoses, females had lower rates of prescription. This finding mirrors that of Leslie et al. (2011), who found that males had higher odds of psychotropic medication use. No races/ethnicities had a significant relationship with psychotropic medication prescription. Our finding aligns with that of Leslie et al. (2011) but runs counter to Park et al. (2019), who found that Black race was associated with psychotropic medication use.

In general, the difference between our findings related to psychotropic medication prescription and those of other studies could be the fact that we examined a count outcome (number of psychotropic medication classes), and other studies examined a bivariate outcome (the presence of any psychotropic medication prescription vs. no psychotropic medication prescription). Also, our study examined psychotropic

medication prescription while others examined self-reported psychotropic medication use. The discrepancy in findings warrants more research.

Limitations

Although this study had a large sample size, all patients were seen in clinics located in one large, southwestern metropolitan area. This could potentially limit generalizability of the findings. Also, although using EHR data has benefits, it should be acknowledged that challenges exist in using administrative data, including inaccuracies resulting in misclassification errors. Additional misclassification bias could be present if a patient was diagnosed with a MH condition or prescribed a psychotropic medication at another clinic that was not captured in the EHR. Further, it was found that some portions of intake data, particularly race, ethnicity, and exposure type, were missing from patient records. In addition, the data used in this study were cross-sectional, which means causality cannot be assessed. However, because this study aimed to describe the MH status and related characteristics of individuals in care, this is a minor limitation. Finally, information regarding number of previous placements for children was not available.

Conclusion

This study has several implications for policy, practice and future research. First, the findings suggest that early and regular trauma-informed screening and assessment is vital for individuals in foster care to identify MH concerns. Second, given the high rate of trauma diagnoses, policies and practices should be implemented that promote training in trauma-informed care across child-serving agencies and organizations. Relatedly, increased understanding of the effects of trauma is needed among healthcare professionals to ensure appropriate diagnosis of individuals, particularly those in care. Third, there is a general need for coordinated services to address MH concerns of individuals involved in child welfare, with particular attention to individuals with complex chronic physical health status and who have experienced sexual abuse. Possible strategies for providing this level of care are integrated primary care and psychiatry consult programs. Given the growing body of evidence supporting the high-level of MH need among this population, policymakers should leverage Medicaid funding to encourage development and expansion of these types of programs. Indeed, this study provides further evidence of the for integrated care settings for individuals in foster care, per the American Academy of Pediatrics' recommendation in *Fostering Health*.[46] Fourth, researchers should continue to explore the relationship between maltreatment type and MH outcomes given mixed findings to date.

Declarations

Conflict of Interest The authors have no conflicts of interest to disclose.

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