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Treatment outcomes for substance use disorder among women of reproductive age in Massachusetts: A population-based approach

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ABSTRACT

Introduction: Longitudinal patterns of treatment utilization and relapse among women of reproductive age with substance use disorder (SUD) are not well known. In this statewide report spanning seven years we describe SUD prevalence, SUD treatment utilization, and differences in subsequent emergency department (ED) use and post-treatment relapse rates by type of treatment: none, 'acute only' (detoxification/stabilization), or 'ongoing' services.

Methods: We linked a statewide dataset of hospital discharge, observation stay and ED records with SUD treatment admission records from hospitals and freestanding facilities, and birth/fetal death certificates, in Massachusetts, 2002–2008. We aggregated episodes into individual woman records, identified evidence of SUD and treatment, and tested post-treatment outcomes.

Results: Nearly 150,000 (8.5%) of 1.7 million Massachusetts women aged 15–49 were identified as SUD-positive. Nearly half of SUD-positive women (71,533 or 48.3%) had evidence of hospital or facility-based SUD treatment; among these, 12% received acute care/detoxification *only* while 88% obtained 'ongoing' treatment. Treatment varied by substance type; women with dual diagnosis and those with opiate use were least likely to receive 'ongoing' treatment. Treated women were older and less likely to have a psychiatric history or chronic illness. Women who received 'acute only' services were more likely to relapse (12.4% vs. 9.6%) and had a 10% higher rate of ED visits post-treatment than women receiving 'ongoing' treatment.

Conclusions: Many Massachusetts women of reproductive age need but do not receive adequate SUD treatment. 'Ongoing' services beyond detoxification/stabilization may reduce the likelihood of post-treatment relapse and/or reliance on the ED for subsequent medical care.

1. Introduction

Gender differences in patterns of development of substance use disorder (SUD) and barriers to treatment entry are well established (Choo et al., 2014; Greenfield et al., 2010). In general, women progress more rapidly than men from onset to problem use, a phenomenon called telescoping (Randall et al., 1999; Hernandez-Avila et al., 2004). Women also have a higher prevalence of mental health disorders and experiences of victimization (Pinchevsky et al., 2013), and more health and social consequences (Bradley et al., 1998), yet face specific barriers to treatment entry (Greenfield et al., 2007). Commonly encountered obstacles for women of reproductive age include unavailability of services for pregnant women, lack of child care, and fear of losing custody of children (Chen, 2004; Nolen-Hoeksema, 2004; Zilberman et al., 2003).

SUD among women of reproductive age affects the health of women, their children, their larger family circles and their communities (Fox et al., 2013). Women in general experience treatment effects similar to those of men; when differences have been identified, they are generally in a positive direction. For example, there is

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some data to suggest that when women enter treatment, they are likely to complete and three times more likely to be alcohol abstinent than men, post-treatment, and equally likely to be cocaine abstinent (Kosten et al., 1993). These positive treatment outcomes (Marsh et al., 2004) suggest that it is critical to improve SUD treatment access for women in this age group.

Information about statewide treatment utilization for women in this age group is currently limited to national survey data (SAMHSA, 2013) and to admission records for single episodes, found either in State Profiles of Treatment Facilities in the National Survey of Substance Abuse Treatment Services (N-SSATS) data (Center for Behavioral Health Statistics and Quality, 2013b) or in the Treatment Episode Data Set (TEDS; Center for Behavioral Health Statistics and Quality, 2013b). These data systems are cross-sectional, not longitudinal, and lack the capacity to follow individuals over time. Moreover, most clinical trials are limited to women who present for treatment, representing only a minority of women with SUD in this age group (Babor et al., 2000; Colon et al., 2002).

For these reasons, we created a statewide, multi-source data set that links women's emergency department (ED) visits, hospital inpatient admissions, birth certificate data, and substance abuse treatment system admissions occurring between 2002 and 2008 in Massachusetts. We used these linked data to identify longitudinal outcomes associated with SUD treatment or lack of treatment for women seeking medical and/or SUD treatment services in the state.

The purpose of this study was to estimate statewide rates of relapse and subsequent hospital and emergency department admissions associated with evidence of SUD treatment, examining type of treatment received ('acute only' versus 'ongoing'). We analyzed longitudinal data across episodes of treatment using a population that included women with SUD who did not access SUD treatment as well as women with no SUD at all.

2. Methods

2.1. Design

The study was a collaborative effort between Boston University and the Massachusetts Department of Public Health, and approved by Institutional Review Boards at both institutions, with special attention paid to protection of confidentiality. Data sets from all sources contained identifiable information. Once linkage was achieved, cases were de-identified for analysis. Because of the size of the sample, small cell suppression was not indicated.

This population-based, longitudinal analysis was designed to compare rates of admission to acute services (relapse) by treatment modality received and describe subsequent medical health care utilization rates (ED and inpatient) by receipt of 'acute only' vs. 'ongoing' treatment system services.

2.2. Data sources

We linked three major data sources: (1) statewide hospital discharge data from the Massachusetts Center for Health Information and Analysis (CHIA) which provided ICD-9 diagnostic codes for all inpatient, observational stay, and ED discharges including inpatient substance abuse treatment services situated within general hospitals; (2) the Massachusetts Pregnancy to Early Life Longitudinal (PELL) data system which links birth certificates and fetal death records to hospital discharge data for delivering women and their infants, providing evidence of SUD from both maternal and infant records; (3) the Massachusetts Bureau of Substance Abuse Services (BSAS) Treatment Dataset which includes discharge data containing information about SUD treatment utilization in all specialty programs that contract with the state for public funding. All women in Massachusetts who utilized hospital based medical or SUD services, delivered a child and registered a birth certificate, or received care at a free-standing SUD treatment facility reporting admissions to the state during the study period were thus included.

2.3. Study population

The study population included all women who were (1) aged 15–49 at the time of their first appearance in the linked dataset and (2) received an inpatient hospital admission, observational stay, ED visit or SUD specialty treatment in Massachusetts hospitals or MA SUD treatment programs from January 1, 2002 to December 31, 2008, and any neonates. Information from neonates born to women in the sample during 2003–2007 was used to identify women with SUD in the absence of indicators in their own records. The neonates themselves were not included in the analysis, but were considered to be part of the sample in both Institutional Review Board determinations. There were no exclusions other than male gender and age less than 15 or greater than 45.

2.4. Data linkage: identification of individual women from incident-level data

A multi-step linkage algorithm was developed to identify multiple treatment records belonging to individual women in the CHIA dataset (see Fig. 1). The CHIA hospital utilization data contained 6,347,310 discharge records from 2002 to 2008 for the study population. The patient's encrypted social security number, date of birth (DOB), and hospital medical record number were used to link together hospital records belonging to the same woman and match them to BSAS treatment system records. All records from women who were aged 15–49 at first encounter were included in the study.

2.5. SUD identification

Gender-neutral SUD identification tools have known limitations (Bao and Sturm, 2001; Chisolm and Kelleher, 2006; Elixhauser et al., 2012; Merrick et al., 2011; Saleh and Szebenyi, 2005). This study employs a new SUD identification algorithm, the Explicit Mention Substance Abuse Need for Treatment in Women (EMSANT-W), adapted from the Substance Need Index (McAuliffe et al., 1999a,b, 2002) to enhance capture of SUD from women's own substance-related health conditions and those of their neonates. We classified women as affected by SUD based on (1) specific ICD-9 codes for women or their neonates included in EMSANT-W (code list available on request), (2) birth certificate/fetal death record mention of a positive toxicology screen, or (3) a BSAS treatment system record. Women who appeared in the hospital case mix dataset for reasons unrelated to SUDs, and having no other evidence of SUD, were classified as "non-SUD."

2.6. Independent predictors

2.6.1. Medical and psychiatric history variables. The complex/chronic illness variable was derived from CHIA data using the schema developed by Mertens et al. (2003) for tracking alcohol and drug related conditions and tested using matched controls in a Kaiser HMO system database. The psychiatric history variable included codes for mood disorders, psychoses, paranoid and anxiety states, personality disorders, adjustment disorders, PTSD and stress reactions, and suicide gesture, attempt or suicidal ideation. It excluded codes from either end of the age spectrum (developmental disorders at one end and delirium, dementia, and organic brain disease at the other), drug related conditions (alcohol abuse and dependence, drug abuse and dependence, because these codes were included in the definition of SUD) and unspecified disorders.

2.6.2. Substance type. Use of specific substances was aggregated from several potential sources: (1) discharge ICD-9-CM codes from hospital admissions, ED visits, observation stays, and newborn hospital admissions, (2) the substance type data entry field from the substance abuse treatment system admissions data set, and (3) the substance type data field from birth and fetal death records. For example, opiates, defined by codes 96,500, 96,501, 96,502, 96,509, 9701x, E8500, E8501, E8502, E9350, E9800. Codes 3041x, 3054x, 9670x, 9671x, 9672x, 9673x, 9674x, 9675x, 9676x, 9678x, 9679x, 9682x, 9683x, E851x, E852x, E8551, E9801 were grouped as 'Sedatives, Barbiturates, Hypnotics, Anesthetics.' The Cannabis category included 3043x, 3052x, and E8541. Alcohol abuse or dependence was defined by the 303 (dependence), 305 (abuse) and 291 (alcohol induced disorders) code series, with the exception of code 303.3 (in remission), which was excluded.

2.7. Characterization of episodes of treatment

Treatment is defined as (1) professional services received in a substance abuse specialty treatment program, (2) inpatient or outpatient services as characterized by either ICD-9 codes for a hospital admission for detoxification, or (3) a record of admission for substance abuse specialty treatment in the BSAS data set. BSAS admission data available for this study included date of admission and date of discharge, reason for discharge, drug of choice, and treatment modality. Modalities listed in this data set included detoxification, outpatient treatment, residential treatment, medication-assisted treatment (methadone/buprenorphine), transitional services, and a range of support services. Treatment records at Veterans' Administration facilities and private facilities that did not contract with BSAS were not available for this study.

Multiple treatment strategies can be utilized concurrently, in an order selected by service providers, or in accordance with patient preference. We therefore grouped types of treatment into two categories: 'acute only', and 'ongoing' treatment program services. The 'acute only' category represents admission for inpatient detoxification and stabilization, either as a hospital inpatient or in a treatment system facility, for generally five or fewer days. 'Ongoing' treatment program services includes documented provision of treatment services (outpatient counseling, residential admission, methadone/suboxone program, transitional treatment and other support services). For example, an admission for transitional services might precede