



Published in final edited form as:

Am J Addict. 2016 April ; 25(3): 215–220. doi:10.1111/ajad.12363.

Baseline Medical Comorbidities in Adults Randomized in the STRIDE Trial for Psychostimulant Use Disorders

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Abstract

Background and Objectives—Rates of medical illnesses may be higher among individuals with substance use disorders, complicating their care. This study aimed to expand the understanding of other medical conditions in treatment-seeking adults with stimulant use disorder (SUD) using data from Stimulant Reduction Intervention using Dose Exercise (STRIDE), a randomized, multisite trial investigating exercise augmentation of treatment as usual.

Methods—Utilizing STRIDE baseline data, we examined demographic and clinical characteristics based on the number of self-reported diagnosed medical conditions among participants meeting eligibility criteria (passing medical screening exam and maximal exercise test, non-opioid dependent, no concomitant beta blocker or opioid replacement therapy).

Results—The majority (59%) of study participants (N=302, mean age all participants = 39 years) did not report any history of other medical problems. Those with two or more conditions were older (mean age 46 years), reported more pain and worse physical functioning, and more psychiatric disorders (average 1.44). Hypertension was more common among participants with cocaine use disorders only (present in 16%) and liver disease was more common in those with cocaine plus other stimulant use disorders (present in 7%).

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Potential Conflicts of Interest: Dr dela Cruz, Dr Carmody, Dr Rethorst, Dr Warden and Dr Walker have no disclosures to report. The authors alone are responsible for the content and writing of this paper.

Dr. Greer has received research funding from NARSAD and honoraria and/or consultant fees from H. Lundbeck A/S and Takeda Pharmaceuticals International, Inc.

Dr. Trivedi, is or has been an advisor/consultant and received fee from (Lifetime disclosure): Abbott Laboratories, Inc., Abdi Ibrahim, Akzo (Organon Pharmaceuticals Inc.), Alkermes, AstraZeneca, Axon Advisors, Bristol-Myers Squibb Company, Cephalon, Inc., Cerecor, CME Institute of Physicians, Concert Pharmaceuticals, Inc., Eli Lilly & Company, Evotec, Fabre Kramer Pharmaceuticals, Inc., Forest Pharmaceuticals, GlaxoSmithKline, Janssen Global Services, LLC, Janssen Pharmaceutica Products, LP, Johnson & Johnson PRD, Libby, Lundbeck, Meade Johnson, MedAvante, Medtronic, Merck, Mitsubishi Tanabe Pharma Development America, Inc., Naurex, Neuronetics, Otsuka Pharmaceuticals, Pamlab, Parke-Davis Pharmaceuticals, Inc., Pfizer Inc., PgxHealth, Phoenix Marketing Solutions, Rexahn Pharmaceuticals, Ridge Diagnostics, Roche Products Ltd., Sepracor, SHIRE Development, Sierra, SK Life and Science, Sunovion, Takeda, Tal Medical/Puretech Venture, Targacept, Transcept, VantagePoint, Vivus, and Wyeth-Ayerst Laboratories. In addition, he has received grants/research support from: Agency for Healthcare Research and Quality (AHRQ), Concept Therapeutics, Inc., Cyberonics, Inc., Merck, National Alliance for Research in Schizophrenia and Depression, National Institute of Mental Health and National Institute on Drug Abuse.

Conclusion and Scientific Significance—In this sample, patients with SUD were in surprisingly good health. A subpopulation had an overall higher burden of illness with worsened physical and psychiatric functioning. Provision of coordinated care may optimize treatment outcomes for patients based on medical comorbidity burden as well as type of drug abused, although these conclusions should be considered preliminary as they are based on self-reported data.

Introduction

Adults with stimulant (cocaine, amphetamine, methamphetamine) use disorders (SUD) are reported to have higher rates of other medical conditions^{1, 2}. Several aspects of the nature of additional medical conditions among patients with SUD remain uninvestigated. Little has been reported on the health status of users of stimulants other than cocaine. Only two reports have examined differences among stimulants, both demonstrating differences among methamphetamine users compared to cocaine users^{3, 4}. This previous work is limited by focus on one geographical area (rural areas of Ohio, Kentucky, and Arkansas)³⁻⁸ and use of non-standard criteria for determining SUD.

The current study aimed to expand understanding of other medical conditions in treatment-seeking adults with SUD following a maximal cardiac stress test through a secondary analysis of baseline data from the Stimulant Reduction Intervention using Dose Exercise (STRIDE) trial. The first aim examined the relationship between demographic and clinical characteristics with the number of self-reported medical conditions. We then compared the rates of common medical conditions between three different groups of participants: cocaine use disorder only; other stimulant use disorder only; and concurrent cocaine and other stimulant use disorder.

Methods

The multisite STRIDE trial (CTN-0037), conducted within the National Institute on Drug Abuse Clinical Trials Network, tested the efficacy of aerobic exercise compared to health education as augmentation to treatment as usual for SUD⁹. Information pertinent to the current analysis is given below. Data for the present study were collected at baseline, after eligibility was confirmed but prior to randomization into treatment groups.

Participants

STRIDE participants (N=302) were adult men and women admitted to residential substance abuse treatment with use of a stimulant (primarily cocaine, methamphetamine, or amphetamine) in the 30 days prior to treatment entry and meeting DSM IV-TR diagnosis of stimulant abuse or dependence in the 12 months prior to treatment entry. Exclusion criteria included: inability to pass medical clearance or general medical condition that prevented exercise; opioid dependence; psychosis or psychiatric safety risk; pregnancy; or concomitant therapy with beta blockers or opioid replacement therapy. Thus, exclusion criteria ensured participants were healthy enough for moderate exercise yet were lenient enough to allow entry of participants with existing medical conditions. All protocols were approved by the

Institutional Review Boards of the 9 participating sites and participants provided written informed consent.

Assessments

Measures reported in the current manuscript are described briefly below. The STRIDE trial collected additional outcome measures that were not included in this baseline report (e.g., drug use information [TimeLine FollowBack, urine drug screen], psychosocial, physiological, and cognitive measures) that are further described in the study design paper⁹.

Demographic information was collected from all participants. DSM-IV-TR illicit drug use disorders were assessed with the World Health Organization Composite International Diagnostic Interview (CIDI) version 2.1¹⁰.

Physical Health Measures—The Self-Administered Comorbidity Questionnaire (SCQ¹¹) was expanded for STRIDE to determine the presence of fifteen common medical problems. The SCQ is a self-administered health questionnaire that requires participants to answer yes or no for the presence of each condition and includes space for participants to write-in any other medical conditions. Participants indicate if they receive treatment for each condition and if activity is limited by each condition endorsed. The instrument is scored by summing the total number of conditions, treatments, and activity limitations. The Pain Frequency, Intensity, and Burden Scale (P-FIBS)¹² was used to determine pain symptoms in the week prior to study entry.

Mental Health Measures—Major DSM-IV-TR Axis I diagnoses other than drug use disorders were assessed with the MINI International Neuropsychiatric Interview (MINI)¹³. Depressive symptoms were assessed with the Quick Inventory of Depressive Symptomatology-Clinician Rated version (16-item)¹⁴. Anhedonia was assessed with the Snaith-Hamilton Pleasure Scale¹⁵. Suicidal propensity and risk were assessed with the Concise Health Risk Tracking-Self Report (CHRT-SR)¹⁶.

Functional Measures—Measures of functioning were the Massachusetts General Hospital Cognitive and Physical Functioning Questionnaire¹⁷, Quality of Life Enjoyment and Satisfaction Questionnaire Short Form¹⁸, and Short-Form Health Survey (SF-36)¹⁹.

Substance Use Measures—The Addiction Severity Index-Lite (ASI-Lite) assessed multiple aspects of substance use²⁰. The Stimulant Selective Severity Assessment assessed the signs and symptoms of stimulant abstinence²¹. The Stimulant Craving Questionnaire-Brief assessed craving²².

Data Analysis

Analysis of variance and χ^2 tests were used to compare group means and frequencies for continuous and categorical variables, respectively. Demographic and clinical variables were compared among those reporting no comorbid medical conditions on the SCQ, those reporting one comorbid medical condition, and those reporting two or more comorbid medical conditions. No corrections for multiple comparisons were made. Differences were

considered significant if $p < 0.05$, although trends ($0.05 > p > 0.09$) are also discussed. The rates of each of the conditions assessed by the SCQ were then compared between the following groups: cocaine use disorder only; other stimulant use disorder; and concurrent cocaine and other stimulant use disorder.

Results

Data for 299 participants are presented, as 3 participants had incomplete SCQ data. One hundred seventy-five participants (59%) reported no comorbid medical conditions on the SCQ, sixty-seven (22%) reported one comorbid condition, and fifty-seven (19%) reported two or more comorbid conditions. Table 1 presents sample demographic and clinical characteristics. In all cases of significant differences or trends, except where noted, those reporting 2 or more medical conditions were different from those reporting no medical conditions. Age and usual level of employment differed between groups; differences in employment were also significant on the ASI employment subscale. There were no differences between groups in race/ethnicity, current employment status, current employment income, or usual living arrangement (data not shown).

Participants with more comorbid medical conditions reported worse pain (P-FIBS) and physical health (SF-36 physical component and ASI medical subscale). Participants with more medical conditions also demonstrated greater number of current psychiatric disorders (MINI and ASI psychiatric subscale) and trends towards greater depressive symptoms, anhedonia, and suicide propensity. No group differences were observed in suicide risk, overall perception of mental health (SF-36 mental component), or the lifetime number of major depressive episodes. A trend towards group differences was seen on the cognitive and physical functioning measure, with greater impairment in those with more conditions. There were no differences between groups in ratings of life satisfaction (Q-LES-Q) or impact of substance use/severity of addiction other than as discussed above.

Table 2 presents the relative frequency of each of the medical conditions queried on the SCQ based on stimulant use diagnosis. High blood pressure was more prevalent in those with cocaine use disorder only. Liver disease was more common in those with concurrent cocaine and other stimulant use disorders. All other conditions were evenly distributed across use disorder categories.

In order to evaluate individuals who were screened but not cleared to exercise, we assessed the reported rates of medical illnesses for 31 participants excluded from the study for medical reasons and for whom the SCQ was completed (note that 41 participants were excluded for medical reasons, but 10 were excluded prior to completion of the SCQ). High blood pressure ($\chi^2=13.9$, $p < 0.001$) and diabetes ($\chi^2=4.2$, $p < 0.05$) were more common among those who completed the SCQ and who were excluded from the study for medical reasons compared to the enrolled sample.

Discussion

Despite widely held beliefs that adults with SUD face a heavy burden of physical illness, the majority of STRIDE study participants reported no other medical conditions. Participants

with two or more comorbid medical conditions, however, were distinct: older at study entry with worse overall health-related quality of life, higher pain levels, and greater psychiatric disease burden. Rates of comorbid medical illnesses were similar across different classes of stimulant users, with differences only in rates of hypertension and liver disease.

The overall low rate of reported comorbid medical illness may be related to our study population, given the well-documented association between SUD and physical illness²³⁻²⁵. When interpreting our results, the limitations posed by the study sample and study design must be considered. The study sample excluded patients with a serious medical condition that prevented exercise, and therefore may be less representative of the general population of those with SUD. Furthermore, it is possible that those with more serious medical conditions were not interested in or informed of the study and thus did not complete the screening visit. It is also possible that participants had undiagnosed medical conditions that were therefore not self-reported; this suspicion is supported by the observation that the rates of some illness (e.g., hypertension) appear to be lower among the study population than among the general population. Of the 41 participants who were not medically cleared for study participation, we cannot characterize the exact medical reason for exclusion, which further limits the generalizability of our results. Additionally, the exclusion of opioid-dependent patients may account in part for the overall low rate of medical conditions, as opioid use has been associated with higher mortality^{2, 26}. Given the limited sample size of participants with medical conditions as well as alcohol/nicotine/marijuana use, we were not able to examine the potential impact of alcohol or smoking (either tobacco or marijuana)²⁷ on health status.

The strengths of our study are many: multisite design that allowed for inclusion of participants from many different regions of the United States, including urban and rural areas; thorough diagnosis of stimulant use and other psychiatric disorders; and comprehensive assessment of functioning. The inclusion of participants with any SUD allowed for comparison of rates of medical illness among groups of stimulant users. We identified a subset of patients with multiple medical conditions, who were older and also had a greater burden of psychiatric illness. This finding has treatment implications as those patients may require provision of coordinated care to optimize treatment outcomes. Importantly, we observed a subset of individuals with SUD who are in sufficiently good health and therefore may be in a position to adopt strategies, such as a physical activity, that maximize recovery.

Acknowledgments

Research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number U10DA020024 (PI: Trivedi) and NIMH award number K01MH097847 (PI: Rethorst). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. Additional support from the Center for Depression Research and Clinical Care (CDRCC).

We thank Carol A. Tamminga, M.D., Lou and Ellen McGinley Distinguished Chair and the McKenzie Chair in Psychiatry and Chair, Department of Psychiatry, University of Texas Southwestern Medical Center. The authors also wish to thank Savitha Kalidas, PhD., for editorial assistance with manuscript preparation.

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Table 1
Demographic and clinical characteristics of STRIDE participants based on number of reported medical conditions on the SCQ

Baseline Variable	All (n=299) M±SD Or n (%)	No Conditions (n=175) M±SD Or n (%)	One Condition (n=67) M±SD Or n (%)	Two+ Conditions (n=57) M±SD Or n (%)	F/χ ²	p
Demographics						
Age	38.95±10.8	36.87±10.5	40.44±10.6	43.60±10.1	9.8	<0.001
Usual Employment Level					21.2	0.002
Full Time	131 (43.8)	87 (49.7)	25 (37.3)	19 (33.3)		
Part Time	53 (17.7)	30 (17.1)	19 (28.4)	4 (7.0)		
Unemployed	91 (30.4)	48 (27.4)	16 (23.9)	27 (47.4)		
Other	24 (8.0)	10 (5.7)	7 (10.5)	7 (12.3)		
Physical Health Measures						
SCQ Total Score	1.2±1.9	0.00±0.0	1.6±0.6	4.3±2.3	374	<0.001
Pain (P-FIBS) ¹	5.1±6.9	3.1±4.6	5.9±7.7	10.2±8.7	28.6	<0.001
ASI Medical Subscale	0.17±0.3	0.09±0.2	0.20±0.3	0.35±0.3	24.9	<0.001
Mental Health Measures						
Current Disorders	0.97±1.3	0.81±1.2	1.00±1.1	1.44±1.6	5.5	0.005
ASI Psychiatric Subscale	0.27±0.2	0.24±0.2	0.34±0.2	0.31±0.2	5.5	0.005
Current Depressive Symptoms ²	5.4±3.1	5.2±2.9	5.2±2.8	6.2±3.8	2.6	0.074*
Anhedonia ³	1.7±2.1	1.4±1.9	1.8±2.4	2.2±2.3	3.0	0.050*
Suicide Propensity ⁴	8.6±6.9	8.0±6.8	8.7±6.8	10.3±7.2	2.5	0.086*
Suicide Risk ⁵	0.5±1.2	0.5±1.2	0.4±1.1	0.6±1.3	0.2	0.848
Lifetime Major Depressive Episodes ⁶	12.1±13.7	9.7±11.7	15.8±16.3	13.7±15.7	1.1	0.348
Functional Measures						
Cognitive and Physical Functioning ⁷	17.9±6.3	17.5±6.4	17.6±6.0	19.6±6.3	2.5	0.082*
Q-LES-Q ⁸	68.6±16.2	69.8±16.3	67.4±15.5	66.2±16.6	1.3	0.280
SF-36 Physical ⁹	54.9±7.4	56.6±6.1	54.9±7.6	49.8±8.4	20.2	<0.001
SF-36 Mental ⁹	42.4±13.7	43.8±13.2	41.0±14.0	39.7±14.4	2.4	0.090*

Baseline Variable	All (n=299) M±SD Or n (%)	No Conditions (n=175) M±SD Or n (%)	One Condition (n=67) M±SD Or n (%)	Two+ Conditions (n=57) M±SD Or n (%)	F/ χ^2	p
ASI Alcohol Subscale	0.21±0.2	0.22±0.2	0.18±0.2	0.24±0.3	0.9	0.420
ASI Drug Subscale	0.17±0.1	0.17±0.1	0.16±0.1	0.17±0.1	1.0	0.359
ASI Family Subscale	0.22±0.2	0.22±0.2	0.21±0.2	0.26±0.2	1.0	0.360
ASI Legal Subscale	0.14±0.2	0.14±0.2	0.16±0.2	0.12±0.2	0.9	0.413
ASI Employment Subscale	0.70±0.3	0.67±0.3	0.75±0.3	0.76±0.3	3.8	0.024
Lifetime Alcohol Treatments	1.7±4.2	1.4±3.8	1.9±3.8	2.2±5.6	0.8	0.436
Lifetime Drug Treatments	3.3±4.0	3.3±4.0	3.0±2.9	3.8±5.0	0.7	0.521
Stimulant Abstinence ¹⁰	16.6±14.9	15.5±13.7	16.3±12.7	20.1±19.8	2.0	0.137
Stimulant Craving ¹¹	0.78±0.9	0.81±1.0	0.63±0.8	0.85±0.8	1.1	0.330

¹ Pain Frequency, Intensity, and Burden Scale (P-FIBS) score; higher scores indicate greater pain, range: 0-28

² Quick Inventory of Depressive Symptoms-Clinician Rated score; higher scores indicate worse depression; range 0-27

³ Snaith-Hamilton Pleasure scale score; higher scores indicate greater anhedonia; range 0-14

⁴ Concise Health Risk Tracking-Self Report (CHRT-SR) Propensity score; higher scores indicate greater suicidality; range 0-44

⁵ Concise Health Risk Tracking-Self Report (CHRT-SR) Risk score; higher scores indicate greater suicidality; range 0-12

⁶ Average number of depressive episodes is reported only for those participants who reported having at least one episode. All n=52, no conditions n=30, one condition n=16, two or more conditions n=6

⁷ MGH Cognitive and Physical Functioning Questionnaire score; higher scores indicate worse functioning; range 7-42

⁸ Quality of Life Enjoyment and Satisfaction Questionnaire Short Form score; higher scores indicate greater life satisfaction; range 0-100

⁹ Short Form Health Survey (SF-36) score; lower scores indicate worse health-related quality of life, range: 0-100

¹⁰ Stimulant Selective Severity Assessment score; higher scores indicate more symptoms of abstinence; range 0-140

¹¹ Stimulant Craving Questionnaire score; higher scores indicate more severe craving; range 0-6

Table 2
Medical Conditions Reported on the SCQ by Substance Use Disorder

Disease	All (n=298) n (%)	Cocaine Only (n=175) n (%)	Other Stimulant Only (n=91) n (%)	Cocaine Plus Other Stimulant (n=32) n (%)	χ^2	p
Heart Disease	3 (1.0)	2 (1.1)	0 (0)	1 (1.1)	0.4	0.833
High Blood Pressure	34 (11.4)	29 (16.6)	1 (3.1)	4 (4.4)	11.2	0.004
Lung Disease	2 (0.7)	0 (0)	0 (0)	2 (2.2)	4.6	0.101
Diabetes	13 (4.4)	11 (6.3)	0 (0)	2 (2.2)	4.0	0.133
Ulcer/Stomach Disease	11 (3.7)	5 (2.9)	1 (3.1)	5 (5.5)	1.2	0.548
Kidney Disease	1 (0.3)	1 (0.6)	0 (0)	0 (0)	0.7	0.703
Liver Disease	10 (3.4)	3 (1.7)	0 (0)	7 (7.7)	7.8	0.020
Chronic Blood Disease	20 (6.7)	9 (5.1)	4 (12.5)	7 (7.7)	2.5	0.281
Cancer	0	0	0	0	NA	NA
Seizure Disorder	2 (0.7)	1 (0.6)	0	1 (1.1)	0.5	0.782
Other Neurological Disorder	3 (1.0)	3 (1.7)	0	0	2.1	0.345
Thyroid Disease	8 (2.7)	4 (2.3)	0	4 (4.4)	2.0	0.366
Degenerative Arthritis	7 (2.3)	5 (2.9)	1 (3.1)	1 (1.1)	0.9	0.637
Back Pain	39 (13.1)	27 (15.4)	3 (9.4)	9 (9.9)	2.0	0.359
Rheumatoid Arthritis	4 (1.3)	3 (1.7)	0 (0)	1 (1.1)	0.7	0.719
Other Disease	38 (12.8)	19 (10.9)	3 (9.4)	16 (17.6)	2.8	0.246