

Dataset Integrity Check for Improvement  
in Gastrointestinal Symptoms After  
Cognitive Behavior Therapy for  
Refractory Irritable Bowel Syndrome  
(Lackner, J.)

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## **1 Standard Disclaimer**

The intent of this DSIC is to provide confidence that the data distributed by the NIDDK repository is a true copy of the study data. Our intent is not to assess the integrity of the statistical analyses reported by study investigators. As with all statistical analyses of complex datasets, complete replication of a set of statistical results should not be expected in secondary analysis. This occurs for a number of reasons including differences in the handling of missing data, restrictions on cases included in samples for a particular analysis, software coding used to define complex variables, etc. Experience suggests that most discrepancies can ordinarily be resolved by consultation with the study data coordinating center (DCC), however this process is labor-intensive for both DCC and Repository staff. It is thus not our policy to resolve every discrepancy that is observed in an integrity check. Specifically, we do not attempt to resolve minor or inconsequential discrepancies with published results or discrepancies that involve complex analyses, unless NIDDK Repository staff suspect that the observed discrepancy suggests that the dataset may have been corrupted in storage, transmission, or processing by repository staff. We do, however, document in footnotes to the integrity check those instances in which our secondary analyses produced results that were not fully consistent with those reported in the target publication.

## **2 Study Background**

Irritable bowel syndrome (IBS) is a condition which affects the large intestine, with symptoms that include varying degrees of abdominal pain, bloating, constipation and diarrhea. Medications and lifestyle changes are generally prescribed for IBS, but medical treatments for the full range of symptoms are inadequate. Cognitive behavior therapy (CBT), a psychological treatment where therapists teach patients how to use behavioral skills to manage IBS and relieve unresolved symptoms, has been associated with improvements in symptom severity and quality of life in other clinical trials. However, CBT has certain economic and feasibility limitations that prevent the therapy from being incorporated into routine clinical settings.

The Irritable Bowel Syndrome Outcome Study (IBSOS) sought to address the limitations of standard therapist-administered CBT by developing an effective self-administered version of the treatment method. IBSOS participants were randomized into one of three treatment groups and underwent four weeks of symptom monitoring. One group received the standard ten sessions of clinic-based CBT, one group received four sessions of minimal-contact CBT, and the remaining group received four sessions of supportive counseling and education without any prescribed behavior changes. Following the symptom monitoring phase, patients underwent treatment and follow-up phases. Assessments were regularly conducted during the study and the results were evaluated between the groups.

## **3 Archived Datasets**

All the SAS data files, as provided by the Data Coordinating Center (DCC), are located in the IBSOS folder in the data package. For this replication, variables were taken from the “ibsos\_primary\_outcome\_manu\_data.sas7bdat” dataset.

## 4 Statistical Methods

Analyses were performed to duplicate results for the data published by Lackner et al [1]. To verify the integrity of the dataset, descriptive statistics were computed.

## 5 Results

For Table 1 in the publication [1], **Baseline Sociodemographic and Clinical Characteristics by Treatment Condition**, Table A lists the variables that were used in the replication and Table B compares the results calculated from the archived data files to the results published in Table 1. The results of the replication are almost an exact match.

## 6 Conclusions

The NIDDK repository is confident that the IBSOS data files to be distributed are a true copy of the study data.

## 7 References

[1] Lackner et al. Improvement in Gastrointestinal Symptoms After Cognitive Behavior Therapy for Refractory Irritable Bowel Syndrome. *Gastroenterology* 2018; 155:47–57

**Table A: Variables used to replicate Table 1**

<b>Table Variable</b>	<b>dataset.variable</b>
Sex	ibsos_primary_outcome_manu_data.sex
White - Race/Ethnicity	ibsos_primary_outcome_manu_data.white_race
African American -Race/Ethnicity	ibsos_primary_outcome_manu_data.african_american_race
Other - Race/Ethnicity	ibsos_primary_outcome_manu_data.other_race
Marital status - recoded	ibsos_primary_outcome_manu_data.marital_status_recoded
Income, \$	ibsos_primary_outcome_manu_data.income_continuous
Education level completed -recoded	ibsos_primary_outcome_manu_data.education_recoded
Employment status -recoded	ibsos_primary_outcome_manu_data.employment_recoded
MD Rated Subtype - Pre-tx	ibsos_primary_outcome_manu_data.md_rated_subtype_pre
Years with IBS	ibsos_primary_outcome_manu_data.duration_ibs_sxs
Describe IBS medical care history - Treated vs Never Treated - Pre-tx	ibsos_primary_outcome_manu_data.ibs_medical_care_history_recode
Any IBS care at all (medical or otherwise) - Pre-tx	ibsos_primary_outcome_manu_data.any_ibs_care_at_all_pre
IBS-SSS Total Score Pre-tx	ibsos_primary_outcome_manu_data.ibs_sss_total_pre
Brief Symptom Inventory - Anxiety - Pre-tx	ibsos_primary_outcome_manu_data.bsanx_pre
Brief Symptom Inventory - Depression - Pre-tx	ibsos_primary_outcome_manu_data.bsidep_pre
Brief Symptom Inventory - Somatization - Pre-tx	ibsos_primary_outcome_manu_data.bsisom_pre
Brief Symptom Inventory – Global Severity Index - Pre-tx	ibsos_primary_outcome_manu_data.bsigsi_pre
Total Number of Medical Comorbidities - Pre-tx	ibsos_primary_outcome_manu_data.numb_medical_comorbid_p
Total Number of Psych Comorbidities - Pre-tx	ibsos_primary_outcome_manu_data.numb_psych_comorbid_p
Any Concomitant IBS Medication? - Pre-tx	ibsos_primary_outcome_manu_data.any_ibs_con_meds_pre
Concomitant Medication - Bowel (for IBS) - Pre-tx	ibsos_primary_outcome_manu_data.con_meds_pain_pre
Concomitant Medication - Pain (for IBS) - Pre-tx	ibsos_primary_outcome_manu_data.con_meds_bowel_pre
Concomitant Medication - MultiSymptom IBS - Pre-tx	ibsos_primary_outcome_manu_data.con_meds_multisymptom_pre
Concomitant Medication -Psychiatric (for IBS) - Pre-tx	ibsos_primary_outcome_manu_data.con_meds_psychiatric_pre

**Table B:** Comparison of values computed in integrity check to reference article Table 1 values.

Field	Overall Manuscript	MC-CBT Manuscript	S-CBT Manuscript	EDU Manuscript	Overall DSIC	MC-CBT DSIC	S-CBT DSIC	EDU DSIC	Overall Diff	MC-CBT Diff	S-CBT Diff	EDU Diff
Age, mean (SD)	41.4 (14.8)	40.9 (14.6)	41.1 (14.4)	42.2 (15.4)	41.4 (14.8)	40.91 (14.6)	41.1 (14.4)	42.2 (15.4)	0 (0)	0 (0)	0 (0)	0 (0)
Women, N (%)	350 (80.3)	124 (85.5)	112 (76.7)	114 (79.2)	350 (80.3)	124 (85.5)	112 (76.7)	114 (78.6)	0 (0)	0 (0)	0 (0)	0 (0.6)
Race/Ethnicity N (%)	390 (89.4)	133 (91.7)	128 (87.7)	129 (89.0)	390 (89.4)	133 (91.7)	128 (87.7)	129 (89.0)	0 (0)	0 (0)	0 (0)	0 (0)
• Non-Hispanic White	28 (6.4)	8 (5.5)	9 (6.2)	11 (7.6)	28 (6.4)	8 (5.5)	9 (6.2)	11 (7.6)	0 (0)	0 (0)	0 (0)	0 (0)
• African-American	18 (4.2)	4 (2.8)	9 (6.2)	5 (3.5)	18 (4.1)	4 (2.8)	9 (6.2)	5 (3.4)	0 (0.1)	0 (0)	0 (0)	0 (0.1)
• Other or missing												
Marital Status N (%)	185 (42.4)	61 (44.1)	60 (41.1)	64 (44.1)	185 (42.4)	61 (42.1)	60 (41.1)	64 (44.1)	0 (0)	0 (2)	0 (0)	0 (0)
• Never married	185 (42.4)	68 (46.9)	58 (39.7)	59 (40.7)	185 (42.4)	68 (46.9)	58 (39.7)	59 (40.7)	0 (0)	0 (0)	0 (0)	0 (0)
• Married	57 (13.1)	11 (7.6)	26 (17.8)	20 (13.8)	57 (13.1)	11 (7.6)	26 (17.8)	20 (13.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Separated/Divorced	9 (2.1)	5 (3.4)	2 (1.4)	2 (1.4)	9 (2.1)	5 (3.4)	2 (1.4)	2 (1.4)	0 (0)	0 (0)	0 (0)	0 (0)
• Widowed												
Income (\$), mean (SD)	74.0 (54.2)	77.9 (56.4)	73.1 (52.2)	71.3 (54)	74.0 (54.2)	77.9 (56.4)	73.1 (52.2)	71.3 (54.0)	0 (0)	0 (0)	0 (0)	0 (0)
Education, N (%)	99 (22.7)	31 (21.4)	30 (20.5)	38 (26.2)	99 (22.7)	31 (21.4)	30 (20.5)	38 (26.2)	0 (0)	0 (0)	0 (0)	0 (0)
• High school or less	65 (14.9)	25 (17.2)	22 (15.1)	18 (12.4)	65 (14.9)	25 (17.2)	22 (15.1)	18 (12.4)	0 (0)	0 (0)	0 (0)	0 (0)
• Associate or Vo-tech	142 (32.6)	54 (37.2)	41 (28.1)	47 (33.1)	142 (32.6)	54 (37.2)	41 (28.1)	47 (32.4)	0 (0)	0 (0)	0 (0)	0 (0.7)
• College Degree	127 (29.1)	35 (24.1)	52 (35.6)	40 (27.6)	127 (29.1)	35 (24.1)	52 (35.6)	40 (27.6)	0 (0)	0 (0)	0 (0)	0 (0)
• Post-grad degree	3 (0.7)	0 (0.0)	1 (0.7)	2 (1.4)	3 (0.7)	0 (0.0)	1 (0.7)	2 (1.4)	0 (0)	0 (0)	0 (0)	0 (0)
• Missing												
Employment status, N (%)	277 (63.5)	92 (63.4)	91 (62.3)	94 (64.8)	277 (63.5)	92 (63.4)	91 (62.3)	94 (64.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Employed full or part time	109 (25.0)	38 (26.2)	40 (27.4)	31 (21.4)	109 (25.0)	38 (26.2)	40 (27.4)	31 (21.4)	0 (0)	0 (0)	0 (0)	0 (0)
• Unemployed	13 (3.0)	4 (2.8)	5 (3.4)	4 (2.8)	13 (3.0)	4 (2.8)	5 (3.4)	4 (2.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Homemaker	33 (7.6)	9 (6.2)	9 (6.2)	15 (10.3)	33 (7.6)	9 (6.2)	9 (6.2)	15 (10.3)	0 (0)	0 (0)	0 (0)	0 (0)
• Retired	4 (0.9)	2 (1.4)	1 (0.7)	1 (0.7)	4 (0.9)	2 (1.4)	1 (0.7)	1 (0.7)	0 (0)	0 (0)	0 (0)	0 (0)

Field	Overall Manuscript	MC-CBT Manuscript	S-CBT Manuscript	EDU Manuscript	Overall DSIC	MC-CBT DSIC	S-CBT DSIC	EDU DSIC	Overall Diff	MC-CBT Diff	S-CBT Diff	EDU Diff
• Missing												
Predominant bowel type	130 (29.8)	43 (29.7)	40 (27.4)	47 (32.4)	130 (29.8)	43 (29.7)	40 (27.4)	47 (32.4)	0 (0)	0 (0)	0 (0)	0 (0)
• Constipation	188 (43.1)	59 (40.7)	67 (45.9)	62 (42.8)	188 (43.1)	59 (40.7)	67 (45.9)	62 (42.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Diarrhea	98 (22.5)	33 (22.8)	35 (24.0)	30 (20.7)	98 (22.5)	33 (22.8)	35 (24.0)	30 (20.7)	0 (0)	0 (0)	0 (0)	0 (0)
• Mixed	20 (4.6)	10 (6.9)	4 (2.7)	6 (4.1)	20 (4.6)	10 (6.9)	4 (2.7)	6 (4.1)	0 (0)	0 (0)	0 (0)	0 (0)
• Undifferentiated												
Years with IBS, mean (SD)	17.1 (14.4)	15.7 (13.3)	17.7 (13.3)	17.7 (16.4)	17.1 (14.4)	15.7 (13.3)	17.7 (13.3)	17.7 (16.4)	0 (0)	0 (0)	0 (0)	0 (0)
Medical care for IBS, N(%)	328 (75.2)	107 (73.8)	116 (79.5)	105 (72.4)	328 (75.2)	107 (73.8)	116 (79.5)	105 (72.4)	0 (0)	0 (0)	0 (0)	0 (0)
IBS treatment-naïve, N (%)	10 (2.2)	4 (2.6)	3 (1.9)	3 (1.9)	10 (2.3)	4 (2.8)	3 (2.1)	3 (2.1)	0 (0.1)	0 (0.2)	0 (0.2)	0 (0.2)
Assessment scores:												
• IBS SSS	281.9 (72.1)	278.0 (68.6)	285.1 (76.7)	282.4 (71.0)	281.9 (72.1)	278.0 (68.6)	285.1 (76.7)	282.4 (71.0)	0 (0)	0 (0)	0 (0)	0 (0)
• Brief Symptom Inventory												
• Anxiety	4.5 (4.5)	4.22 (4.26)	4.27 (4.41)	5.02 (4.81)	4.5 (4.5)	4.22 (4.26)	4.27 (4.41)	5.02 (4.81)	0 (0)	0 (0)	0 (0)	0 (0)
• Depression	3.97 (4.29)	4.07 (4.47)	3.82 (4.33)	4.03 (4.09)	3.97 (4.29)	4.07 (4.47)	3.82 (4.33)	4.03 (4.09)	0 (0)	0 (0)	0 (0)	0 (0)
• Somatization	4.22 (3.93)	4.16 (4.31)	4.00 (3.56)	4.54 (3.91)	4.22 (3.94)	4.16 (4.31)	4.00 (3.56)	4.54 (3.91)	0 (0.01)	0 (0)	0 (0)	0 (0)
• Global Severity Index	12.7 (11.0)	12.4 (11.6)	12.1 (10.5)	13.6 (10.8)	12.7 (11.0)	12.4 (11.6)	12.1 (10.5)	13.6 (10.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Medical comorbidities	4.6 (4.9)	4.8 (5.2)	4.3 (4.7)	4.8 (5.0)	4.6 (4.9)	4.8 (5.2)	4.3 (4.7)	4.8 (5.0)	0 (0)	0 (0)	0 (0)	0 (0)
• Psychiatric comorbidities	1.2 (1.6)	1.1 (1.5)	1.3 (1.7)	1.2 (1.7)	1.2 (1.6)	1.1 (1.5)	1.3 (1.7)	1.2 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)
Medication use for IBS symptoms	292 (67.0)	94 (64.8)	95 (65.1)	103 (71.0)	292 (67.0)	94 (64.8)	95 (65.1)	103 (71.0)	0 (0)	0 (0)	0 (0)	0 (0)
• Pain medication	35 (8.0)	9 (6.2)	13 (8.9)	13 (9.0)	35 (8.0)	9 (6.2)	13 (8.9)	13 (9.0)	0 (0)	0 (0)	0 (0)	0 (0)
• Bowel medication	271 (62.2)	86 (59.3)	87 (59.6)	98 (67.6)	271 (62.2)	86 (59.3)	87 (59.6)	98 (67.6)	0 (0)	0 (0)	0 (0)	0 (0)
• Multi-symptom meds	20 (4.6)	6 (4.1)	7 (4.8)	7 (4.8)	20 (4.6)	6 (4.1)	7 (4.8)	7 (4.8)	0 (0)	0 (0)	0 (0)	0 (0)
• Psychiatric meds	26 (6.0)	8 (5.5)	12 (8.2)	6 (4.1)	26 (6.0)	8 (5.5)	12 (8.2)	6 (4.1)	0 (0)	0 (0)	0 (0)	0 (0)

## Attachment A: SAS Code

```
options nocenter validvarname=uppercase ls=180;

title 'prj/niddk/ims_analysis/IBSOS/prog_initial_analysis/dsic.ibsos.sas';
run;

/* DSIC for Lackner et al in Gastroenterology Vol. 155, No. 1, Table 1 */

libname pcsas '/prj/niddk/ims_analysis/IBSOS/private_orig_data/';

proc format;
  value novalue
    . = "No Value"
  other = " Value"
  ;

  ** where are the formats?? these are best guesses;
  value yesno
    0 = "No"
    1 = "Yes"
  ;

  value sexf
    1 = "Male"
    2 = "Female"
  ;

  value racef
    1 = "Non-Hispanic White"
    2 = "African American"
    3 = "Other or Missiing"
  ;

  value maritalf
    . = "Missing"
    1 = "Married"
    4 = "Never Married"
    2 = "Seperated/Divorced"
    3 = "Widowed"
  ;

  value educf
    . = "Missing"
    1 = "High school or less"
```

```

2 = "Associate or vocational technical"
3 = "College degree"
4 = "Postgraduate degree"
;

value employf
. = "Missing"
1 = "Employed full- or part-time"
2 = "Unemployed"
3 = "Homemaker"
4 = "Retired"
;

value bowelf
. = "Missing"
1 = "Constipation"
2 = "Diarrhea"
3 = "Mixed"
4 = "Undifferentiated"
;
run;

*****;
* MACROS ;
*****;

* produce n and %;
%macro tbl1all(rownum, var, varf, txgp, txgpname);
proc freq data=prim noprint;
  where included_primary_analysis=1 and tx_group in(&txgp);
  tables &var/list missing out=tbl1&txgpname;
run;

data tbl1&txgpname;
  length covar covarf $100;
  set tbl1&txgpname;
  covar = "&var";
  covarf = put(&var,&varf.);
  rownum = &rownum;
run;

data prnt&txgpname;
  set prnt&txgpname tbl1&txgpname;
run;

%mend;

* produce means and sd;
%macro tbl1means(rownum, var, txgp, txgpname);

```

```

proc means data=prim noprint;
  where included_primary_analysis=1 and tx_group in(&txgp);
  var &var;
  output out= means&txgpname (drop=_type_ _freq_) mean= std= / autoname;
run;

data means&txgpname;
  length covar $100;
  set means&txgpname;
  covar = "&var";
  rownum = &rownum;
run;

data prntmeans&txgpname;
  set prntmeans&txgpname means&txgpname (rename=(&var._mean = count &var._stddev = percent));
run;

%mend;

proc contents data=pcsas.ibsos_primary_outcome_manu_data;
run;

data prim (rename=(numb_medical_comorbid_pre = numb_medical_comorbid_p
  numb_psych_comorbid_pre = numb_psych_comorbid_p));
  set pcsas.ibsos_primary_outcome_manu_data;

  * create race group;
  if white_race = 1 then race=1;
  else if african_american_race = 1 then race = 2;
  else if other_race=1 or dont_know_or_want_report_race=1 then race =3;

  * create IBS severe group ?;
  if 0 < ibs_sss_total_pre < 300 then ibs_sss_total_pre_gp = 0;
  else if 300 <= ibs_sss_total_pre then ibs_sss_total_pre_gp = 1;

run;

proc freq data=prim;
  tables race*white_race*african_american_race*other_race* dont_know_or_want_report_race/list missing;
  tables ibs_sss_total_pre_gp* ibs_sss_total_pre/missing list;
run;

proc freq data=prim;
  where included_primary_analysis=1;
  tables tx_group/missing;
title3 "Table 1 overall counts";
run;

```

```

** Table 1 Overall;
data prntall;
  set _null_;
run;

%tbl1all(2, sex, sexf , 1 2 3, all);
%tbl1all(3, race, racef , 1 2 3, all);
%tbl1all(4, marital_status_recoded, maritalf, 1 2 3, all);
%tbl1all(6, education_recoded, educf , 1 2 3, all);
%tbl1all(7, employment_recoded, employf , 1 2 3, all);
%tbl1all(8, md_rated_subtype_pre, bowelf , 1 2 3, all);
%tbl1all(10, ibs_medical_care_history_recoded, yesno , 1 2 3, all);
%tbl1all(11, any_ibs_care_at_all_pre, yesno , 1 2 3, all);
%tbl1all(19, any_ibs_con_meds_pre, yesno , 1 2 3, all);
%tbl1all(20, con_meds_pain_pre , yesno , 1 2 3, all);
%tbl1all(21, con_meds_bowel_pre , yesno , 1 2 3, all);
%tbl1all(22, con_meds_multisymptom_pre , yesno , 1 2 3, all);
%tbl1all(23, con_meds_psychiatric_pre , yesno , 1 2 3, all);

proc print data=prntall;
  var rownum covar covarf count percent;
  title3 'Table 1 Overall - n(%)';
run;

data prntmeansall;
  set _null_;
run;

%tbl1means(1, age , 1 2 3, all);
%tbl1means(9, duration_ibs_sxs , 1 2 3, all);
%tbl1means(5, income_continuous , 1 2 3, all);
%tbl1means(12, ibs_sss_total_pre , 1 2 3, all);
%tbl1means(13, bsianx_pre , 1 2 3, all);
%tbl1means(14, bsidep_pre , 1 2 3, all);
%tbl1means(15, bsisom_pre , 1 2 3, all);
%tbl1means(16, bsigsi_pre , 1 2 3, all);
%tbl1means(17, numb_medical_comorbid_p , 1 2 3, all);
%tbl1means(18, numb_psych_comorbid_p , 1 2 3, all);

proc print data=prntmeansall;
  title3 "Table 1 Overall - mean(SD)";
run;

data table1all;
  set prntmeansall prntall;
  ** delete rows not on the table;
  if covar="sex" and covarf="Male" then delete;

```

```

if covar = "ibs_medical_care_history_recode_" and covarf ne "Yes" then delete;
if covar = "any_ibs_care_at_all_pre" and covarf ne "No" then delete;
if covar = "any_ibs_con_meds_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_pain_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_bowel_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_multisymptom_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_psychiatric_pre" and covarf ne "Yes" then delete;
run;

```

```

proc sort data=table1all;
  by rownum covar covarf;
run;

```

```

proc print data=table1all;
  var rownum covar covarf count percent;
  title3 'Table 1 Overall';
run;

```

```

*** Table 1 MC-CBT;
data prntmccbt;
  set _null_;
run;

```

```

%tbl1all(2, sex, sexf , 1, mccbt);
%tbl1all(3, race, racef , 1, mccbt);
%tbl1all(4, marital_status_recoded, maritalf, 1, mccbt);
%tbl1all(6, education_recoded, educf , 1, mccbt);
%tbl1all(7, employment_recoded, employf , 1, mccbt);
%tbl1all(8, md_rated_subtype_pre, bowelf , 1, mccbt);
%tbl1all(10, ibs_medical_care_history_recode_, yesno , 1, mccbt);
%tbl1all(11, any_ibs_care_at_all_pre, yesno , 1, mccbt);
%tbl1all(19, any_ibs_con_meds_pre, yesno , 1, mccbt);
%tbl1all(20, con_meds_pain_pre , yesno , 1, mccbt);
%tbl1all(21, con_meds_bowel_pre , yesno , 1, mccbt);
%tbl1all(22, con_meds_multisymptom_pre , yesno , 1, mccbt);
%tbl1all(23, con_meds_psychiatric_pre , yesno , 1, mccbt);

```

```

proc print data=prntmccbt;
  var rownum covar covarf count percent;
  title3 'Table 1 MC-CBT - n(%)';
run;

```

```

data prntmeansmccbt;
  set _null_;
run;

```

```

%tbl1means(1, age , 1, mccbt);

```

```

%tbllmeans(9, duration_ibs_sxs , 1, mccbt);
%tbllmeans(5, income_continuous , 1, mccbt);
%tbllmeans(12, ibs_sss_total_pre , 1, mccbt);
%tbllmeans(13, bsianx_pre , 1, mccbt);
%tbllmeans(14, bsidep_pre , 1, mccbt);
%tbllmeans(15, bsisom_pre , 1, mccbt);
%tbllmeans(16, bsigsi_pre , 1, mccbt);
%tbllmeans(17, numb_medical_comorbid_p , 1, mccbt);
%tbllmeans(18, numb_psych_comorbid_p , 1, mccbt);

```

```

proc print data=prntmeansmccbt;
title3 "Table 1 MC-CBT - mean(SD)";
run;

```

```

data table1mccbt;
set prntmeansmccbt prntmccbt;
** delete rows not on the table;
if covar="sex" and covarf="Male" then delete;
if covar = "ibs_medical_care_history_recode_" and covarf ne "Yes" then delete;
if covar = "any_ibs_care_at_all_pre" and covarf ne "No" then delete;
if covar = "any_ibs_con_meds_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_pain_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_bowel_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_multisymptom_pre" and covarf ne "Yes" then delete;
if covar = "con_meds_psychiatric_pre" and covarf ne "Yes" then delete;
run;

```

```

proc sort data=table1mccbt;
by rownum covar covarf;
run;

```

```

proc print data=table1mccbt;
var rownum covar covarf count percent;
title3 'Table 1 MC-CBT';
run;

```

```

*** Table 1 S-CBT;
data prntscbt;
set _null_;
run;

```

```

%tbl1all(2, sex, sexf , 2, scbt);
%tbl1all(3, race, racef , 2, scbt);
%tbl1all(4, marital_status_recoded, maritalf, 2, scbt);
%tbl1all(6, education_recoded, educf , 2, scbt);
%tbl1all(7, employment_recoded, employf , 2, scbt);
%tbl1all(8, md_rated_subtype_pre, bowelf , 2, scbt);

```

```

%tbl1all(10, ibs_medical_care_history_recode_,      yesno  , 2, scbt);
%tbl1all(11, any_ibs_care_at_all_pre,              yesno  , 2, scbt);
%tbl1all(19, any_ibs_con_meds_pre,                  yesno  , 2, scbt);
%tbl1all(20, con_meds_pain_pre                      ,      yesno  , 2, scbt);
%tbl1all(21, con_meds_bowel_pre                    ,      yesno  , 2, scbt);
%tbl1all(22, con_meds_multisymptom_pre            ,      yesno  , 2, scbt);
%tbl1all(23, con_meds_psychiatric_pre              ,      yesno  , 2, scbt);

proc print data=prntscbt;
  var rownum covar covarf count percent;
  title3 'Table 1 S-CBT - n(%)';
run;

data prntmeansscbt;
  set _null_;
run;

%tbl1means(1,  age                      , 2, scbt);
%tbl1means(9,  duration_ibs_sxs          , 2, scbt);
%tbl1means(5,  income_continuous         , 2, scbt);
%tbl1means(12, ibs_sss_total_pre         , 2, scbt);
%tbl1means(13, bsianx_pre                , 2, scbt);
%tbl1means(14, bsidep_pre                , 2, scbt);
%tbl1means(15, bsisom_pre                , 2, scbt);
%tbl1means(16, bsigsi_pre                , 2, scbt);
%tbl1means(17, numb_medical_comorbid_p   , 2, scbt);
%tbl1means(18, numb_psych_comorbid_p     , 2, scbt);

proc print data=prntmeansscbt;
  title3 "Table 1 S-CBT - mean(SD)";
run;

data table1scbt;
  set prntmeansscbt prntscbt;
  ** delete rows not on the table;
  if covar="sex" and covarf="Male" then delete;
  if covar = "ibs_medical_care_history_recode_" and covarf ne "Yes" then delete;
  if covar = "any_ibs_care_at_all_pre" and covarf ne "No" then delete;
  if covar = "any_ibs_con_meds_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_pain_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_bowel_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_multisymptom_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_psychiatric_pre" and covarf ne "Yes" then delete;
run;

proc sort data=table1scbt;
  by rownum covar covarf;
run;

```

```

proc print data=tablelscbt;
  var rownum covar covarf count percent;
  title3 'Table 1 S-CBT';
run;

*** Table 1 EDU;
data prntedu;
  set _null_;
run;

%tbl1all(2, sex, sexf , 3, edu);
%tbl1all(3, race, racef , 3, edu);
%tbl1all(4, marital_status_recoded, maritalf, 3, edu);
%tbl1all(6, education_recoded, educf , 3, edu);
%tbl1all(7, employment_recoded, employf , 3, edu);
%tbl1all(8, md_rated_subtype_pre, bowelf , 3, edu);
%tbl1all(10, ibs_medical_care_history_recode_, yesno , 3, edu);
%tbl1all(11, any_ibs_care_at_all_pre, yesno , 3, edu);
%tbl1all(19, any_ibs_con_meds_pre, yesno , 3, edu);
%tbl1all(20, con_meds_pain_pre , yesno , 3, edu);
%tbl1all(21, con_meds_bowel_pre , yesno , 3, edu);
%tbl1all(22, con_meds_multisymptom_pre , yesno , 3, edu);
%tbl1all(23, con_meds_psychiatric_pre , yesno , 3, edu);

proc print data=prntedu;
  var rownum covar covarf count percent;
  title3 'Table 1 EDU - n(%)';
run;

data prntmeansedu;
  set _null_;
run;

%tbl1means(1, age , 3, edu);
%tbl1means(9, duration_ibs_sxs , 3, edu);
%tbl1means(5, income_continuous , 3, edu);
%tbl1means(12, ibs_sss_total_pre , 3, edu);
%tbl1means(13, bsianx_pre , 3, edu);
%tbl1means(14, bsidep_pre , 3, edu);
%tbl1means(15, bsisom_pre , 3, edu);
%tbl1means(16, bsigsi_pre , 3, edu);
%tbl1means(17, numb_medical_comorbid_p , 3, edu);
%tbl1means(18, numb_psych_comorbid_p , 3, edu);

proc print data=prntmeansedu;
title3 "Table 1 EDU - mean(SD)";
run;

```

```

data tableledu;
  set prntmeansedu prntedu;
  ** delete rows not on the table;
  if covar="sex" and covarf="Male" then delete;
  if covar = "ibs_medical_care_history_recode_" and covarf ne "Yes" then delete;
  if covar = "any_ibs_care_at_all_pre" and covarf ne "No" then delete;
  if covar = "any_ibs_con_meds_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_pain_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_bowel_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_multisymptom_pre" and covarf ne "Yes" then delete;
  if covar = "con_meds_psychiatric_pre" and covarf ne "Yes" then delete;
run;

proc sort data=tableledu;
  by rownum covar covarf;
run;

proc print data=tableledu;
  var rownum covar covarf count percent;
  title3 'Table 1 EDU';
run;

** merge all cols together;
data combinetb11;
  merge tablelall (in=in1)
        tablelmccbt (in=in2 rename=(count=countmccbt percent=pcntmccbt))
        tablelscbt (in=in3 rename=(count=countscbt percent=pcntscbt))
        tableledu (in=in4 rename=(count=countedu percent=pcntedu));
  by rownum covar covarf;
  if in1 or in2 or in3 or in4;

  ** clean up the print;
  if covar = 'age' then covarf = 'Age';
  if covar = 'income_continuous' then covarf = 'Income, $';
  if covar = 'duration_ibs_sxs' then covarf = 'Years with IBS';
  if covar = 'bsianx_pre' then covarf = 'Anxiety';
  if covar = 'bsidep_pre' then covarf = 'Depression';
  if covar = 'bsisom_pre' then covarf = 'Somatization';
  if covar = 'bsigsi_pre' then covarf = 'Global Severity Index';
  if covar = 'numb_medical_comorbid_p' then covarf = 'Medical comorbidities';
  if covar = 'numb_psych_comorbid_p' then covarf = 'Psychiatric comorbidities';

run;

proc print data=combinetb11;
  var rownum covar covarf count percent countmccbt pcntmccbt countscbt pcntscbt countedu pcntedu;
  title3 'Table 1 combined';

```

run;