

Additional file 1. Psychological and Sleep Quality Assessment Scales

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The Pittsburgh Sleep Quality Index (PSQI) assesses sleep quality over the past month. It consists of 19 self-rated items generating seven component scores. Each component is scored from 0 (no difficulty) to 3 (severe difficulty), yielding a global score ranging from 0 to 21.

Component 1. Subjective Sleep Quality

- 0 = Very good
- 1 = Fairly good
- 2 = Fairly bad
- 3 = Very bad

Component 2. Sleep Latency

- 0 = ≤15 minutes
- 1 = 16–30 minutes
- 2 = 31–60 minutes
- 3 = >60 minutes

Component 3. Sleep Duration

- 0 = ≥7 hours
- 1 = 6–7 hours
- 2 = 5–6 hours
- 3 = <5 hours

Component 4. Habitual Sleep Efficiency

- 0 = ≥85%
- 1 = 75–84%
- 2 = 65–74%
- 3 = <65%

Component 5. Sleep Disturbances

- 0 = Not during the past month
- 1 = Less than once a week
- 2 = Once or twice a week
- 3 = Three or more times a week

Component 6. Use of Sleeping Medication

- 0 = Not during the past month
- 1 = Less than once a week
- 2 = Once or twice a week
- 3 = Three or more times a week

Component 7. Daytime Dysfunction

- 0 = No problem

- 1 = Slight problem
- 2 = Moderate problem
- 3 = Severe problem

Montgomery–Åsberg Depression Rating Scale (MADRS)

Instructions: Rate each item based on the severity of symptoms during the past 7 days. Each item is scored from 0 (no symptoms) to 6 (severe symptoms).

1. Apparent Sadness

- 0 = No sadness
- 2 = Looks dispirited but brightens without difficulty
- 4 = Appears sad and unhappy most of the time
- 6 = Appears miserable all the time; extremely depressed

2. Reported Sadness

- 0 = Occasional sadness only
- 2 = Sad or low but able to enjoy things
- 4 = Persistent sadness, difficulty enjoying activities
- 6 = Continuous, overwhelming sadness

3. Inner Tension

- 0 = Calm, no inner tension
- 2 = Occasional feelings of unease
- 4 = Continuous inner tension or anxiety
- 6 = Unbearable anxiety or panic

4. Reduced Sleep

- 0 = Normal sleep
- 2 = Slight difficulty falling asleep
- 4 = Reduced or disturbed sleep
- 6 = Severe insomnia

5. Reduced Appetite

- 0 = Normal appetite
- 2 = Slight reduction in appetite
- 4 = Marked reduction in appetite
- 6 = Requires persuasion to eat

6. Concentration Difficulties

- 0 = No difficulty concentrating
- 2 = Occasional difficulty
- 4 = Sustained difficulty concentrating
- 6 = Unable to concentrate at all

7. Lassitude

- 0 = Normal energy
- 2 = Tires more easily
- 4 = Marked fatigue

6 = Unable to initiate activities

8. Inability to Feel

0 = Normal emotional involvement

2 = Reduced ability to enjoy

4 = Very limited emotional response

6 = Complete emotional numbness

9. Pessimistic Thoughts

0 = No pessimism

2 = Occasional self-doubt

4 = Persistent pessimism

6 = Delusional guilt or hopelessness

10. Suicidal Thoughts

0 = Enjoys life

2 = Weary of life

4 = Frequent thoughts of death

6 = Explicit suicidal plans or attempts

Hamilton Anxiety Rating Scale (HAMA)

Instructions: Rate each item from 0 (not present) to 4 (severe), based on anxiety symptoms during the past week.

1. Anxious Mood

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

2. Tension

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

3. Fears

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

4. Insomnia

- 0 = No difficulty
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

5. Intellectual (Cognitive)

- 0 = No difficulty
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

6. Depressed Mood

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

7. Somatic (Muscular)

- 0 = Absent

- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

8. Somatic (Sensory)

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

9. Cardiovascular Symptoms

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

10. Respiratory Symptoms

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

11. Gastrointestinal Symptoms

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

12. Genitourinary Symptoms

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

13. Autonomic Symptoms

- 0 = Absent
- 1 = Mild
- 2 = Moderate
- 3 = Severe
- 4 = Very severe

14. Behavior at Interview

- 0 = No abnormality

1 = Mild

2 = Moderate

3 = Severe

4 = Very severe

Additional file 2. Raw data used in this paper

NO.	Age	Gender	Weight	Height	BMI	Dex-N2	Dex-N2	Dex-N3	Dex-N3	PSQI Score	MAD	Hypno	Antidepr	Antipsyc	
						dose	dose_group	dose	dose_group		RS Score	HAMA Score	tics use	essant use	otics use
1	50	Male	650	1649	239	40	Q3 [39.6,48)	641	Q4 [63.6,76]	20	20	27	No	No	No
2	52	Female	800	1704	276	64	Q4 [48,80]			18	13	29	No	Yes	Yes
3	54	Female	670	1705	230	40	Q3 [39.6,48)	72	Q4 [63.6,76]	19	6	32	Yes	No	No
4	50	Male	590	1644	218	272	Q1 [16,32.8)	36	Q1 [32.8,48)	13	28	27	No	No	No
5	48	Male	500	1607	194	32	Q1 [16,32.8)	48	Q2 [48,54.8)	12	33	25	Yes	No	No
6	70	Female	600	1714	204	52	Q4 [48,80]	64	Q4 [63.6,76]	8	21	20	No	Yes	Yes
7	25	Male	650	1660	236	36	Q2 [32.8,39.6)	40	Q1 [32.8,48)	9	10	4	No	No	No
8	70	Female	770	1790	240	512	Q4 [48,80]	74	Q4 [63.6,76]	11	20	20	Yes	No	No
9	33	Female	700	1800	216	30	Q1 [16,32.8)	52	Q2 [48,54.8)	12	5	9	No	No	No
10	23	Male	500	1609	193	32	Q1 [16,32.8)	54	Q2 [48,54.8)	14	14	0	No	No	No
11	55	Male	620	1580	248	40	Q3 [39.6,48)	44	Q1 [32.8,48)	15	11	32	Yes	No	No
12	48	Female	635	1680	225	396	Q3 [39.6,48)			20	16	25	No	No	No
13	54	Male	640	1600	250	724	Q4 [48,80]			20	49	31	Yes	Yes	Yes
14	70	Male	430	1600	168	348	Q2 [32.8,39.6)	60	Q3 [54.8,63.6)	17	19	15	Yes	No	No
15	44	Male	700	1700	242	456	Q3 [39.6,48)	668	Q4 [63.6,76]	14	12	20	Yes	Yes	No
16	60	Female	628	1713	214	312	Q1 [16,32.8)			12	6	12	Yes	Yes	No
17	18	Male	600	1624	227	44	Q3 [39.6,48)	628	Q3 [54.8,63.6)	8	7	3	No	Yes	Yes
18	47	Male	590	1650	217	328	Q2 [32.8,39.6)	432	Q1 [32.8,48)	17	16	22	No	No	Yes
19	51	Male	520	1650	191	456	Q3 [39.6,48)	584	Q3 [54.8,63.6)	19	11	13	No	No	No
20	42	Female	760	1714	259	424	Q3 [39.6,48)	68	Q4 [63.6,76]	13	15	15	No	No	Yes
21	50	Female	645	1690	226	44	Q3 [39.6,48)	60	Q3 [54.8,63.6)	21	18	32	Yes	No	No
22	59	Male	500	1580	200	36	Q2 [32.8,39.6)	532	Q2 [48,54.8)	17	44	46	No	Yes	Yes
23	56	Male	650	1640	242	36	Q2 [32.8,39.6)	56	Q3 [54.8,63.6)	19	17	35	No	Yes	No
24	58	Male	500	1570	203	288	Q1 [16,32.8)	488	Q2 [48,54.8)	20	25	42	Yes	Yes	No
25	42	Male	460	1587	183	44	Q3 [39.6,48)	587	Q3 [54.8,63.6)	9	11	15	No	Yes	No
26	62	Male	520	1612	200	50	Q4 [48,80]	64	Q4 [63.6,76]	11	9	12	Yes	No	No
27	68	Male	550	1600	215	508	Q4 [48,80]	74	Q4 [63.6,76]	15	17	16	No	Yes	Yes

28	43	Female	770	1691	269	58	Q4 [48,80]	688	Q4 [63.6,76]	16	12	17	No	Yes	No
29	54	Female	520	1720	176	44	Q3 [39.6,48)	668	Q4 [63.6,76]	16	17	31	No	No	No
30	59	Male	500	1550	208	352	Q2 [32.8,39.6)	432	Q1 [32.8,48)	17	15	44	Yes	No	No
31	66	Male	542	1601	211	352	Q2 [32.8,39.6)	52	Q2 [48,54.8)	10	14	15	Yes	No	No
32	58	Female	925	1701	320	452	Q3 [39.6,48)	596	Q3 [54.8,63.6)	18	24	42	No	Yes	No
33	39	Female	650	1760	210	452	Q3 [39.6,48)	52	Q2 [48,54.8)	8	1	13	Yes	No	Yes
34	50	Male	540	1650	198	26	Q1 [16,32.8)	44	Q1 [32.8,48)	18	24	26	Yes	No	No
35	49	Female	720	1730	241	664	Q4 [48,80]			15	17	26	Yes	No	No
36	60	Male	560	1593	221	328	Q2 [32.8,39.6)	512	Q2 [48,54.8)	17	5	12	Yes	No	Yes
37	70	Male	550	1616	211			50	Q2 [48,54.8)	10	26	21	No	No	No
38	74	Male	570	1619	218			588	Q3 [54.8,63.6)	17	11	18	Yes	Yes	Yes
39	36	Female	740	1680	262	468	Q3 [39.6,48)	628	Q3 [54.8,63.6)	18	10	10	Yes	No	Yes
40	67	Female	830	1770	265	732	Q4 [48,80]			12	16	17	Yes	Yes	No
41	45	Female	600	1680	213			476	Q1 [32.8,48)	8	13	20	No	No	No
42	56	Female	600	1800	185	32	Q1 [16,32.8)	496	Q2 [48,54.8)	21	30	33	Yes	No	No
43	57	Male	604	1625	229	396	Q3 [39.6,48)	46	Q1 [32.8,48)	10	22	37	No	No	No
44	59	Male	800	1730	267	328	Q2 [32.8,39.6)	476	Q1 [32.8,48)	9	24	48	Yes	Yes	Yes
45	22	Male	594	1631	223	484	Q4 [48,80]	68	Q4 [63.6,76]	11	12	0	No	No	Yes
46	55	Female	660	1680	234	36	Q2 [32.8,39.6)	44	Q1 [32.8,48)	14	13	32	Yes	No	Yes
47	63	Female	600	1685	211	24	Q1 [16,32.8)	384	Q1 [32.8,48)	16	11	15	Yes	Yes	No
48	42	Male	550	1640	204	36	Q2 [32.8,39.6)	48	Q2 [48,54.8)	11	4	16	No	No	No
49	44	Female	875	1710	299	384	Q2 [32.8,39.6)	564	Q3 [54.8,63.6)	17	28	18	Yes	No	No
50	48	Female	720	1710	246	34	Q2 [32.8,39.6)	36	Q1 [32.8,48)	13	32	25	No	No	No
51	56	Male	485	1586	193	40	Q3 [39.6,48)	56	Q3 [54.8,63.6)	15	21	35	Yes	No	No
52	56	Male	400	1550	166	28	Q1 [16,32.8)	52	Q2 [48,54.8)	18	5	35	Yes	No	No
53	55	Female	800	1719	271	416	Q3 [39.6,48)	60	Q3 [54.8,63.6)	19	11	14	No	Yes	Yes
54	28	Male	560	1624	212	284	Q1 [16,32.8)	44	Q1 [32.8,48)	11	6	5	Yes	No	No
55	60	Female	500	1650	184	36	Q2 [32.8,39.6)	44	Q1 [32.8,48)	9	30	54	Yes	Yes	No
56	53	Male	520	1626	197	696	Q4 [48,80]	748	Q4 [63.6,76]	12	24	30	No	Yes	No
57	39	Male	650	1663	235			66	Q4 [63.6,76]	13	10	13	No	No	No
58	63	Female	725	1696	252	676	Q4 [48,80]			11	11	11	Yes	Yes	No
59	43	Male	600	1618	229	436	Q3 [39.6,48)	588	Q3 [54.8,63.6)	14	19	33	No	Yes	No
60	34	Male	525	1614	202	204	Q1 [16,32.8)	356	Q1 [32.8,48)	16	10	9	Yes	No	No

61	41	Female	750	1693	262	468	Q3 [39.6,48)	64	Q4 [63.6,76]	9	10	15	Yes	No	No
62	60	Male	500	1600	195	30	Q1 [16,32.8)	452	Q1 [32.8,48)	18	2	12	No	No	No
63	25	Female	830	1740	274	396	Q3 [39.6,48)	642	Q4 [63.6,76]	12	3	4	Yes	No	No
64	70	Female	650	1706	223	344	Q2 [32.8,39.6)	468	Q1 [32.8,48)	15	19	18	No	No	No
65	71	Female	639	1700	221	44	Q3 [39.6,48)	694	Q4 [63.6,76]	10	10	11	No	No	No
66	39	Male	520	1600	203	312	Q1 [16,32.8)	575	Q3 [54.8,63.6)	8	12	12	Yes	No	No
67	43	Male	532	1601	207	388	Q2 [32.8,39.6)	52	Q2 [48,54.8)	9	15	17	No	Yes	No
68	66	Male	600	1580	240			56	Q3 [54.8,63.6)	12	15	15	No	No	No
69	50	Female	620	1670	222	44	Q3 [39.6,48)	72	Q4 [63.6,76]	19	17	27	Yes	No	No
70	38	Male	520	1615	199	572	Q4 [48,80]	656	Q4 [63.6,76]	14	11	11	Yes	No	No
71	39	Female	630	1700	218	44	Q3 [39.6,48)	56	Q3 [54.8,63.6)	10	13	11	Yes	Yes	Yes
72	56	Male	770	1652	282	508	Q4 [48,80]	544	Q2 [48,54.8)	12	24	34	No	Yes	Yes
73	68	Male	640	1634	240	48	Q4 [48,80]	612	Q3 [54.8,63.6)	13	16	16	No	Yes	No
74	65	Female	600	1688	211	52	Q4 [48,80]	60	Q3 [54.8,63.6)	12	28	30	No	Yes	No
75	32	Male	600	1620	229	312	Q1 [16,32.8)	484	Q2 [48,54.8)	14	1	9	Yes	No	No
76	55	Male	650	1649	239	404	Q3 [39.6,48)	488	Q2 [48,54.8)	9	15	32	Yes	Yes	No
77	43	Male	470	1593	185	48	Q4 [48,80]	64	Q4 [63.6,76]	13	25	16	No	Yes	No
78	48	Female	700	1703	241	56	Q4 [48,80]	64	Q4 [63.6,76]	15	21	24	No	Yes	No
79	26	Male	430	1585	171	396	Q3 [39.6,48)	484	Q2 [48,54.8)	20	17	4	Yes	No	No
80	47	Male	550	1615	211	256	Q1 [16,32.8)	50	Q2 [48,54.8)	19	24	23	Yes	No	Yes
81	66	Female	657	1708	225	304	Q1 [16,32.8)	44	Q1 [32.8,48)	14	13	13	Yes	Yes	No
82	63	Male	546	1610	211			476	Q1 [32.8,48)	8	11	16	No	No	No
83	54	Female	650	1810	198	292	Q1 [16,32.8)	524	Q2 [48,54.8)	9	18	31	Yes	Yes	Yes
84	52	Female	610	1712	208	44	Q3 [39.6,48)	628	Q3 [54.8,63.6)	14		29	Yes	No	No
85	42	Male	560	1613	215	48	Q4 [48,80]	688	Q4 [63.6,76]	11	10	16	Yes	No	No
86	31	Male	500	1597	196	496	Q4 [48,80]	731	Q4 [63.6,76]	14	6	8	Yes	No	No
87	25	Female	662	1696	230	364	Q2 [32.8,39.6)	452	Q1 [32.8,48)	14	15	0	Yes	No	No
88	47	Male	630	1631	237	34	Q2 [32.8,39.6)	48	Q2 [48,54.8)	15	11	24	Yes	Yes	No
89	60	Female	525	1680	186	504	Q4 [48,80]	62	Q3 [54.8,63.6)	14	4	11	No	No	No
90	59	Female	700	1710	239	34	Q2 [32.8,39.6)	48	Q2 [48,54.8)	8	22	46	Yes	Yes	No
91	78	Male	500	1613	192	60	Q4 [48,80]	72	Q4 [63.6,76]	13	11	12	Yes	No	No
92	42	Female	929	1725	312	60	Q4 [48,80]	76	Q4 [63.6,76]	16	11	16	No	No	No
93	60	Male	630	1654	230			62	Q3 [54.8,63.6)	12	6	12	No	No	No

94	84	Female	702	1690	246	70	Q4 [48,80]			20	13	12	No	Yes	Yes
95	47	Male	640	1644	237	36	Q2 [32.8,39.6)	48	Q2 [48,54.8)	13	10	24	Yes	No	No
96	48	Male	500	1560	205	308	Q1 [16,32.8)	552	Q3 [54.8,63.6)	17	13	25	Yes	No	Yes
97	61	Male	510	1595	200	344	Q2 [32.8,39.6)	496	Q2 [48,54.8)	15	7	12	No	No	No
98	63	Male	600	1624	227	48	Q4 [48,80]	60	Q3 [54.8,63.6)	12	22	29	Yes	No	No
99	49	Male	750	1642	278	572	Q4 [48,80]	64	Q4 [63.6,76]	10	8	26	Yes	No	Yes
100	44	Male	500	1630	188	296	Q1 [16,32.8)	396	Q1 [32.8,48)	15	33	19	No	Yes	No
101	64	Male	557	1598	218	32	Q1 [16,32.8)	545	Q2 [48,54.8)	18	12	14	Yes	No	No
102	67	Male	550	1603	214	304	Q1 [16,32.8)	552	Q3 [54.8,63.6)	12	15	16	Yes	Yes	No
103	56	Male	480	1560	197	32	Q1 [16,32.8)	40	Q1 [32.8,48)	20	24	34	Yes	Yes	Yes
104	49	Male	630	1646	233	364	Q2 [32.8,39.6)	56	Q3 [54.8,63.6)	15	20	26	Yes	Yes	No
105	27	Female	700	1720	237	24	Q1 [16,32.8)	64	Q4 [63.6,76]	8	2	1	Yes	No	No
106	49	Male	590	1628	223	448	Q3 [39.6,48)	648	Q4 [63.6,76]	20	6	26	Yes	Yes	No
107	30	Male	520	1603	202	408	Q3 [39.6,48)	528	Q2 [48,54.8)	12	9	5	Yes	Yes	Yes
108	48	Female	680	1719	230	736	Q4 [48,80]			17	36	25	Yes	Yes	No
109	60	Male	530	1601	207	28	Q1 [16,32.8)	372	Q1 [32.8,48)	8	5	12	No	No	No
110	31	Female	850	1740	281	332	Q2 [32.8,39.6)	416	Q1 [32.8,48)	8	1	6	Yes	No	Yes
111	53	Female	700	1730	234	476	Q3 [39.6,48)	616	Q3 [54.8,63.6)	15	8	30	No	Yes	No
112	37	Female	675	1720	228	48	Q4 [48,80]	72	Q4 [63.6,76]	14	2	11	Yes	No	No
113	36	Male	600	1629	226	756	Q4 [48,80]			11	14	10	Yes	No	No
114	27	Male	550	1600	215	384	Q2 [32.8,39.6)	464	Q1 [32.8,48)	10	3	5	No	Yes	Yes
115	64	Male	568	1607	220	372	Q2 [32.8,39.6)	562	Q3 [54.8,63.6)	19	12	16	Yes	No	No
116	62	Male	550	1550	229	32	Q1 [16,32.8)	468	Q1 [32.8,48)	15	10	17	Yes	No	No
117	40	Male	700	1650	257	44	Q3 [39.6,48)	628	Q3 [54.8,63.6)	15	26	13	Yes	Yes	No
118	33	Male	591	1608	229	48	Q4 [48,80]	66	Q4 [63.6,76]	10	10	9	No	No	No
119	51	Female	700	1700	242	38	Q2 [32.8,39.6)	62	Q3 [54.8,63.6)	11	28	28	Yes	Yes	No
120	51	Male	580	1631	218	30	Q1 [16,32.8)	40	Q1 [32.8,48)	13	30	27	No	Yes	No
121	37	Male	450	1605	175	24	Q1 [16,32.8)	40	Q1 [32.8,48)	8	10	11	No	No	No
122	22	Male	530	1600	207	34	Q2 [32.8,39.6)	56	Q3 [54.8,63.6)	8	2	4	Yes	No	No
123	32	Female	660	1698	229	48	Q4 [48,80]			19	13	8	Yes	No	No
124	44	Male	680	1649	250	36	Q2 [32.8,39.6)	56	Q3 [54.8,63.6)	11	16	19	No	No	No
125	67	Male	558	1599	218	34	Q2 [32.8,39.6)	52	Q2 [48,54.8)	16	15	16	No	Yes	No
126	37	Female	678	1715	231	284	Q1 [16,32.8)	476	Q1 [32.8,48)	15	7	11	Yes	No	No

127	26	Female	625	1620	238	464	Q3 [39.6,48)	584	Q3 [54.8,63.6)	13	17	28	Yes	No	No
128	59	Male	730	1640	271	344	Q2 [32.8,39.6)	508	Q2 [48,54.8)	18	23	53	Yes	Yes	Yes
129	38	Male	580	1613	223	48	Q4 [48,80]	56	Q3 [54.8,63.6)	14	10	11	Yes	Yes	No
130	51	Female	530	1680	188	40	Q3 [39.6,48)	50	Q2 [48,54.8)	14	33	28	Yes	Yes	No
131	64	Female	647	1711	221	324	Q1 [16,32.8)	60	Q3 [54.8,63.6)	17	12	15	No	No	No
132	40	Male	700	1649	257	524	Q4 [48,80]	628	Q3 [54.8,63.6)	12	4	14	Yes	No	No
133	42	Male	470	1577	189	544	Q4 [48,80]	664	Q4 [63.6,76]	13	15	15	Yes	Yes	No
134	58	Male	700	1550	291	52	Q4 [48,80]	60	Q3 [54.8,63.6)	21	12	13	Yes	No	No
135	63	Male	700	1635	262	42	Q3 [39.6,48)	608	Q3 [54.8,63.6)	20	10	13	Yes	No	No
136	39	Male	520	1580	208	28	Q1 [16,32.8)	36	Q1 [32.8,48)	10	4	12	Yes	No	No
137	71	Male	455	1584	181	40	Q3 [39.6,48)	50	Q2 [48,54.8)	12	13	13	Yes	No	No
138	41	Female	640	1707	220	68	Q4 [48,80]	74	Q4 [63.6,76]	20	13	14	Yes	No	No
139	33	Female	668	1722	226	368	Q2 [32.8,39.6)	48	Q2 [48,54.8)	10	4	9	Yes	No	No
140	40	Female	800	1700	277	60	Q4 [48,80]			10	8	14	Yes	No	No
141	61	Female	580	1630	218	256	Q1 [16,32.8)	328	Q1 [32.8,48)	12	7	13	Yes	Yes	No
142	61	Male	549	1614	211	588	Q4 [48,80]	708	Q4 [63.6,76]	9	9	14	Yes	No	No
143	58	Female	650	1650	239	36	Q2 [32.8,39.6)	53	Q2 [48,54.8)	20	21	42	Yes	Yes	No
144	56	Female	735	1700	254	384	Q2 [32.8,39.6)	592	Q3 [54.8,63.6)	20	29	42	No	No	No
145	56	Female	1150	1719	389	404	Q3 [39.6,48)	544	Q2 [48,54.8)	13	10	34	Yes	No	No
146	44	Male	630	1638	235	46	Q3 [39.6,48)	608	Q3 [54.8,63.6)	14	26	18	Yes	No	No
147	43	Female	700	1710	239			48	Q2 [48,54.8)	16	11	17	No	No	No
148	53	Male	560	1628	211	508	Q4 [48,80]	60	Q3 [54.8,63.6)	15	6	9	Yes	Yes	No
149	48	Female	740	1707	254	42	Q3 [39.6,48)	52	Q2 [48,54.8)	12	26	24	Yes	Yes	No
150	47	Male	750	1700	260	256	Q1 [16,32.8)	444	Q1 [32.8,48)	18	25	22	No	Yes	No
151	68	Female	750	1708	257	48	Q4 [48,80]	632	Q3 [54.8,63.6)	14	16	16	Yes	No	No
152	33	Female	730	1750	238	50	Q4 [48,80]	60	Q3 [54.8,63.6)	20	31	29	Yes	Yes	No
153	56	Male	520	1600	203	344	Q2 [32.8,39.6)	40	Q1 [32.8,48)	13	20	32	Yes	No	No
154	56	Male	600	1650	220	80	Q4 [48,80]			11	22	34	Yes	Yes	No
155	36	Male	560	1604	218	348	Q2 [32.8,39.6)	574	Q3 [54.8,63.6)	13	7	7	No	Yes	No
156	77	Male	750	1654	274			64	Q4 [63.6,76]	15	12	15	No	No	No
157	40	Female	700	1708	240	44	Q3 [39.6,48)	48	Q2 [48,54.8)	11	9	14	Yes	No	No
158	57	Female	700	1690	245	40	Q3 [39.6,48)	56	Q3 [54.8,63.6)	12	22	38	Yes	No	No
159	48	Male	645	1649	237	668	Q4 [48,80]	604	Q3 [54.8,63.6)	15	19	24	No	No	No

160	71	Male	780	1570	316	428	Q3 [39.6,48)	56	Q3 [54.8,63.6)	12	13	15	Yes	No	No
161	75	Male	560	1611	216	384	Q2 [32.8,39.6)	452	Q1 [32.8,48)	13	12	15	No	No	No
162	35	Female	650	1702	224	444	Q3 [39.6,48)			8	23	9	No	Yes	No
163	57	Male	540	1580	216	332	Q2 [32.8,39.6)	54	Q2 [48,54.8)	18	19	36	No	Yes	Yes
164	61	Male	540	1602	211	644	Q4 [48,80]	728	Q4 [63.6,76]	8	7	14	Yes	Yes	Yes
165	62	Male	578	1617	221	28	Q1 [16,32.8)	44	Q1 [32.8,48)	14	9	11	No	No	No
166	68	Male	550	1615	211			52	Q2 [48,54.8)	15	18	15	No	No	No
167	68	Female	680	1712	232	392	Q2 [32.8,39.6)	48	Q2 [48,54.8)	20	16	16	Yes	Yes	No
168	26	Male	430	1550	179	308	Q1 [16,32.8)	48	Q2 [48,54.8)	17	27	0	No	No	No
169	43	Male	550	1611	212	44	Q3 [39.6,48)	512	Q2 [48,54.8)	13	11	18	Yes	No	No
170	62	Female	750	1712	256	28	Q1 [16,32.8)	34	Q1 [32.8,48)	8	10	12	No	No	No
171	39	Male	640	1670	229	252	Q1 [16,32.8)	38	Q1 [32.8,48)	11	8	12	No	No	No
172	63	Male	410	1610	158	428	Q3 [39.6,48)	516	Q2 [48,54.8)	8	11	13	No	No	Yes
173	60	Female	655	1704	226	48	Q4 [48,80]	64	Q4 [63.6,76]	8	6	12	No	No	No
174	64	Female	641	1726	215	288	Q1 [16,32.8)	496	Q2 [48,54.8)	11	12	17	No	Yes	No
175	56	Male	620	1650	228	48	Q4 [48,80]			12	37	34	No	Yes	Yes
176	40	Male	510	1590	202	464	Q3 [39.6,48)			12	6	14	Yes	No	No
177	61	Male	490	1605	190	472	Q3 [39.6,48)	624	Q3 [54.8,63.6)	18	6	11	Yes	Yes	No
178	35	Female	710	1721	240	308	Q1 [16,32.8)	48	Q2 [48,54.8)	11		9	Yes	No	No
179	73	Female	700	1630	263	48	Q4 [48,80]	66	Q4 [63.6,76]	18	11	12	Yes	No	No
180	58	Male	680	1575	274	44	Q3 [39.6,48)	679	Q4 [63.6,76]	10	48	38	No	Yes	No
181	53	Female	650	1720	220	32	Q1 [16,32.8)	48	Q2 [48,54.8)	15	18	30	Yes	Yes	No
182	32	Male	700	1650	257	36	Q2 [32.8,39.6)	44	Q1 [32.8,48)	8	4	9	No	No	No
183	59	Male	500	1670	179	38	Q2 [32.8,39.6)	52	Q2 [48,54.8)	13	35	43	No	No	No
184	52	Male	640	1637	239	444	Q3 [39.6,48)	60	Q3 [54.8,63.6)	13	20	27	Yes	No	No
185	43	Female	652	1717	221	36	Q2 [32.8,39.6)	64	Q4 [63.6,76]	12	22	18	Yes	No	Yes
186	68	Male	567	1616	217	38	Q2 [32.8,39.6)	676	Q4 [63.6,76]	13	16	15	Yes	No	No
187	43	Male	551	1604	214	32	Q1 [16,32.8)	48	Q2 [48,54.8)	18	12	17	Yes	No	No
188	60	Female	425	1650	156	36	Q2 [32.8,39.6)			14	5	13	No	Yes	Yes
189	48	Female	790	1730	264	388	Q2 [32.8,39.6)	548	Q3 [54.8,63.6)	18	5	25	Yes	No	No
190	61	Male	560	1605	217	28	Q1 [16,32.8)	548	Q3 [54.8,63.6)	15	6	11	No	No	No
191	59	Male	480	1550	200	536	Q4 [48,80]	676	Q4 [63.6,76]	10	40	43	No	Yes	No
192	36	Female	730	1640	271	48	Q4 [48,80]	64	Q4 [63.6,76]	12	11	10	No	Yes	No

193	49	Male	570	1600	223	28	Q1 [16,32.8)	44	Q1 [32.8,48)	21	18	26	Yes	No	No
194	41	Female	600	1730	200	36	Q2 [32.8,39.6)			16	8	15	Yes	No	No
195	27	Male	600	1628	226	40	Q3 [39.6,48)	591	Q3 [54.8,63.6)	14	5	2	No	No	No
196	45	Male	580	1600	227	60	Q4 [48,80]	72	Q4 [63.6,76]	19	22	20	Yes	Yes	No
197	35	Female	745	1715	253	30	Q1 [16,32.8)	54	Q2 [48,54.8)	8	1	10	No	Yes	No
198	57	Female	700	1750	229	44	Q3 [39.6,48)	54	Q2 [48,54.8)	21	31	35	No	Yes	Yes
199	66	Male	500	1660	181			64	Q4 [63.6,76]	11	15	14	No	No	No
200	47	Female	650	1680	230			64	Q4 [63.6,76]	13	30	23	No	No	No
201	41	Male	600	1680	213	28	Q1 [16,32.8)	40	Q1 [32.8,48)	12	11	14	Yes	No	No
202	74	Female	1050	1694	366	48	Q4 [48,80]	68	Q4 [63.6,76]	17	13	16	No	No	No
203	45	Female	520	1676	185	44	Q3 [39.6,48)	64	Q4 [63.6,76]	18	20	20	No	No	Yes
204	39	Female	700	1722	236	344	Q2 [32.8,39.6)	404	Q1 [32.8,48)	8	6	13	Yes	No	Yes
205	31	Female	530	1630	199	424	Q3 [39.6,48)	58	Q3 [54.8,63.6)	15	6	13	No	No	No
206	58	Male	600	1619	229	66	Q4 [48,80]	74	Q4 [63.6,76]	17	42	42	No	No	No
207	52	Male	450	1579	180	48	Q4 [48,80]	688	Q4 [63.6,76]	19	11	13	No	Yes	Yes
208	18	Female	690	1717	236	368	Q2 [32.8,39.6)	547	Q2 [48,54.8)	10	1	4	No	No	Yes
209	60	Female	520	1657	189	44	Q3 [39.6,48)	52	Q2 [48,54.8)	8	3	10	Yes	No	No
210	37	Female	700	1723	236	44	Q3 [39.6,48)	52	Q2 [48,54.8)	10	6	11	Yes	Yes	No
211	44	Male	554	1611	213	30	Q1 [16,32.8)	452	Q1 [32.8,48)	8	8	19	No	No	No
212	46	Female	580	1665	209	404	Q3 [39.6,48)	676	Q4 [63.6,76]	18	23	21	No	No	Yes
213	43	Male	568	1615	218	30	Q1 [16,32.8)	52	Q2 [48,54.8)	19	13	16	Yes	No	No
214	51	Male	614	1619	234	40	Q3 [39.6,48)	64	Q4 [63.6,76]	16	17	28	Yes	No	No
215	49	Male	490	1620	187	276	Q1 [16,32.8)	36	Q1 [32.8,48)	10	17	26	No	No	No
216	56	Male	500	1589	198	32	Q1 [16,32.8)	40	Q1 [32.8,48)	14	19	34	Yes	Yes	No
217	34	Female	680	1680	241	64	Q4 [48,80]	72	Q4 [63.6,76]	11	11	9	Yes	Yes	No
218	42	Female	600	1800	185	32	Q1 [16,32.8)	56	Q3 [54.8,63.6)	19	7	16	Yes	No	No
219	69	Male	547	1612	210	40	Q3 [39.6,48)	52	Q2 [48,54.8)	12	19	17	No	No	No
220	48	Male	460	1550	191	352	Q2 [32.8,39.6)	552	Q3 [54.8,63.6)	12	21	24	Yes	Yes	No
221	44	Female	770	1730	257	44	Q3 [39.6,48)	52	Q2 [48,54.8)	12	9	19	Yes	Yes	No
222	31	Male	500	1607	194	48	Q4 [48,80]			19	8	8	Yes	No	No
223	47	Female	700	1703	241	36	Q2 [32.8,39.6)	68	Q4 [63.6,76]	15	7	22	Yes	Yes	No
224	46	Male	600	1631	226	492	Q4 [48,80]	688	Q4 [63.6,76]	20	12	21	Yes	No	No
225	46	Female	650	1703	224	28	Q1 [16,32.8)	44	Q1 [32.8,48)	16	15	21	No	Yes	No

226	38	Male	550	1617	210	436	Q3 [39.6,48)	52	Q2 [48,54.8)	16	11	11	Yes	No	No
227	24	Female	680	1690	238	48	Q4 [48,80]	56	Q3 [54.8,63.6)	8	3	4	Yes	No	No
228	45	Female	650	1740	215	44	Q3 [39.6,48)	68	Q4 [63.6,76]	8	15	20	Yes	Yes	No
229	36	Male	510	1570	207	376	Q2 [32.8,39.6)	48	Q2 [48,54.8)	12	15	10	Yes	No	No
230	58	Female	650	1710	222	412	Q3 [39.6,48)	528	Q2 [48,54.8)	16	26	43	Yes	Yes	No
231	37	Male	550	1615	211			532	Q2 [48,54.8)	15	7	11	No	No	No
232	45	Male	450	1587	179	30	Q1 [16,32.8)	42	Q1 [32.8,48)	12	23	20	Yes	No	No
233	82	Female	600	1684	212	288	Q1 [16,32.8)	396	Q1 [32.8,48)	14	10	12	Yes	No	No
234	69	Female	670	1706	230	28	Q1 [16,32.8)	44	Q1 [32.8,48)	13	19	16	Yes	Yes	No
235	60	Male	470	1560	193	40	Q3 [39.6,48)	673	Q4 [63.6,76]	8	3	14	No	No	No
236	46	Male	650	1642	241	40	Q3 [39.6,48)	528	Q2 [48,54.8)	19	8	21	Yes	Yes	No
237	60	Female	653	1744	215	304	Q1 [16,32.8)	512	Q2 [48,54.8)	13	6	11	No	No	No
238	53	Female	800	1730	267	38	Q2 [32.8,39.6)	644	Q4 [63.6,76]	19	18	30	Yes	No	No
239	64	Male	568	1623	215	388	Q2 [32.8,39.6)	60	Q3 [54.8,63.6)	12	18	10	Yes	No	No
240	46	Male	510	1614	196	80	Q4 [48,80]			20	28	20	Yes	No	No
241	46	Male	630	1660	229	368	Q2 [32.8,39.6)	508	Q2 [48,54.8)	13	7	21	Yes	No	No
242	83	Female	720	1720	243	32	Q1 [16,32.8)	40	Q1 [32.8,48)	16	14	15	Yes	Yes	No
243	39	Female	700	1730	234	396	Q3 [39.6,48)	58	Q3 [54.8,63.6)	8	2	1	Yes	No	No
244	50	Female	720	1760	232			50	Q2 [48,54.8)	20	25	27	No	No	No
245	36	Male	520	1606	201			48	Q2 [48,54.8)	11	5	10	No	No	No
246	40	Female	660	1714	225	16	Q1 [16,32.8)	36	Q1 [32.8,48)	13	4	14	No	Yes	Yes
247	61	Female	600	1682	212	36	Q2 [32.8,39.6)	64	Q4 [63.6,76]	9	8	12	No	Yes	No
248	48	Female	580	1687	204	28	Q1 [16,32.8)	56	Q3 [54.8,63.6)	10	19	25	Yes	No	No
249	31	Male	590	1614	227	28	Q1 [16,32.8)	48	Q2 [48,54.8)	17	7	8	Yes	No	No
250	62	Male	450	1500	200	508	Q4 [48,80]			9	9	16	Yes	Yes	No
251	82	Male	600	1645	222	56	Q4 [48,80]	64	Q4 [63.6,76]	11	11	15	Yes	No	No
252	31	Male	480	1584	191	336	Q2 [32.8,39.6)	608	Q3 [54.8,63.6)	8	10	7	Yes	No	No

Additional file 3. Supplementary Table 1-4

Table S1. Patient demographics and baseline characteristics

Characteristic	Dex-N2 dose				p-value
	Q1 [16,32.8] N = 59	Q2 [32.8,39.6] N = 55	Q3 [39.6,48] N = 63	Q4 [48,80] N = 60	
Gender, n (%)					0.412 ¹
Male	36 (61.0%)	33 (60.0%)	30 (47.6%)	35 (58.3%)	
Female	23 (39.0%)	22 (40.0%)	33 (52.4%)	25 (41.7%)	
Age, years, Mean ± SD	49 ± 14	50 ± 14	48 ± 12	52 ± 15	0.463 ²
BMI, Median (Q1, Q3)	21.42 (19.84, 22.42)	22.12 (20.74, 23.94)	22.75 (20.81, 24.22)	22.76 (21.05, 24.78)	0.002 ³
PSQI Score, Median (Q1, Q3)	14.0 (11.0, 17.0)	13.0 (10.0, 17.0)	14.0 (10.0, 18.0)	13.0 (11.0, 17.0)	0.895 ³
MADRS Score, Median (Q1, Q3)	12 (7, 19)	15 (7, 20)	12 (9, 20)	12 (10, 21)	0.695 ³
Missing	1	0	1	0	
HAMA Score, Median (Q1, Q3)	15 (11, 25)	18 (12, 30)	18 (13, 29)	16 (12, 24)	0.205 ³
Hypnotics use, n (%)	37 (62.7%)	34 (61.8%)	40 (63.5%)	37 (61.7%)	0.997 ¹
Antidepressant use, n (%)	19 (32.2%)	20 (36.4%)	23 (36.5%)	28 (46.7%)	0.411 ¹
Antipsychotics use, n (%)	5 (8.5%)	13 (23.6%)	11 (17.5%)	11 (18.3%)	0.182 ¹

¹Pearson's Chi-squared test

²One-way analysis of means

³Kruskal-Wallis rank sum test

Table S2. Patient demographics and baseline characteristics

Characteristic	Dex-N3 dose				p-value
	Q1 [32.8,48] N = 50	Q2 [48,54.8] N = 64	Q3 [54.8,63.6] N = 59	Q4 [63.6,76] N = 58	
Gender, n (%)					0.577 ¹
Male	32 (64.0%)	39 (60.9%)	36 (61.0%)	30 (51.7%)	
Female	18 (36.0%)	25 (39.1%)	23 (39.0%)	28 (48.3%)	
Age, years, Mean ± SD	51 ± 14	49 ± 14	49 ± 14	51 ± 15	0.834 ²
BMI, Median (Q1, Q3)	21.81 (20.81, 23.01)	21.57 (20.26, 23.60)	22.75 (20.81, 24.22)	22.44 (20.93, 24.13)	0.091 ³
PSQI Score, Median (Q1, Q3)	13.0 (10.0, 15.0)	13.0 (11.0, 17.0)	14.0 (12.0, 17.0)	13.0 (11.0, 16.0)	0.223 ³
MADRS Score, Median (Q1, Q3)	12 (8, 19)	13 (7, 22)	13 (7, 19)	12 (10, 18)	0.994 ³
Missing	0	1	1	0	
HAMA Score, Median (Q1, Q3)	16 (12, 26)	17 (11, 29)	16 (11, 27)	16 (12, 22)	0.951 ³
Hypnotics use, n (%)	26 (52.0%)	40 (62.5%)	38 (64.4%)	30 (51.7%)	0.361 ¹
Antidepressant use, n (%)	15 (30.0%)	24 (37.5%)	21 (35.6%)	19 (32.8%)	0.848 ¹
Antipsychotics use, n (%)	8 (16.0%)	12 (18.8%)	6 (10.2%)	10 (17.2%)	0.587 ¹

¹Pearson's Chi-squared test²One-way analysis of means³Kruskal-Wallis rank sum test

Table S3. Univariate and multivariate analysis of Independent Clinical Factors Influencing Dex-N2 dose (Linear regression)

Characteristic	Univariable				Multivariable			
	N	Beta	95% CI	p-value	N	Beta	95% CI	p-value
Age	237	0.06	-0.04, 0.17	0.242				
Gender								
Male	134	—	—					
Female	103	1.02	-1.93, 3.97	0.497				
BMI	237	0.71	0.25, 1.17	0.003	235	0.71	0.25, 1.17	0.003
MADRS Score	235	0.20	0.04, 0.36	0.015	235	0.17	0.01, 0.34	0.041
PSQI Score	237	0.13	-0.25, 0.52	0.499				
HAMA Score	237	0.04	-0.09, 0.18	0.545				
Hypnotics use								
No	89	—	—					
Yes	148	1.02	-1.99, 4.04	0.507				
Antidepressant use								
No	147	—	—		145	—	—	
Yes	90	3.18	0.19, 6.17	0.038	90	2.04	-1.03, 5.12	0.192
Antipsychotics use								
No	197	—	—					
Yes	40	1.22	-2.68, 5.12	0.541				

Abbreviation: CI = Confidence Interval

R² = 0.071; Adjusted R² = 0.059; Sigma = 11.1; Statistic = 5.90; p-value = <0.001; df = 3; Log-likelihood = -898; AIC = 1,806; BIC = 1,823; Deviance = 28,697; Residual df = 231; No. Obs. = 235

Table S4. Univariate and multivariate analysis of Independent Clinical Factors Influencing Dex-N3 dose (Linear regression)

Characteristic	Univariable				Multivariable			
	N	Beta	95% CI	p-value	N	Beta	95% CI	p-value
Age	231	0.02	-0.07, 0.11	0.654				
Gender								
Male	137	—	—					
Female	94	1.54	-1.04, 4.11	0.244				
BMI	231	0.48	0.07, 0.89	0.022	231	0.48	0.07, 0.89	0.022
PSQI Score	231	0.24	-0.10, 0.58	0.170				
MADRS Score	229	0.02	-0.13, 0.17	0.813				
HAMA Score	231	-0.03	-0.15, 0.09	0.611				
Hypnotics use								
No	97	—	—					
Yes	134	-0.28	-2.85, 2.30	0.834				
Antidepressant use								
No	152	—	—					
Yes	79	0.60	-2.08, 3.27	0.663				
Antipsychotics use								
No	195	—	—					
Yes	36	0.52	-2.98, 4.02	0.772				

Abbreviation: CI = Confidence Interval

R² = 0.023; Adjusted R² = 0.019; Sigma = 9.74; Statistic = 5.35; p-value = 0.022; df = 1; Log-likelihood = -853; AIC = 1,711; BIC = 1,721; Deviance = 21,712; Residual df = 229; No. Obs. = 231