

A COMPARISON STUDY ON OUTPATIENT REIMBURSEMENT BETWEEN INTERSTITIAL CYSTITIS/ BLADDER PAIN SYNDROME AND RHEUMATOID ARTHRITIS PATIENTS IN TAIWAN PUBLIC HEALTH INSURANCE

Hypothesis / aims of study

Interstitial cystitis/bladder pain syndrome (IC/BPS) and Rheumatoid arthritis (RA) are two non-cancer chronic pain diseases. They share similar age and gender distribution. The goal of treatment is better quality of life, but the medical reimbursement is difficult to evaluate. Clemen (2008) reported IC/BPS medical expense 2-4 times higher than non- IC/BPS. In this study, we objectively compared public health insurance reimbursement between IC/BPS and RA during one year after index date (the date of first diagnosis) in outpatient perspective to evaluate whether IC/BPS had more reimbursement than RA.

Study design, materials and methods

Through data mining in 2002-2013 Longitudinal Health Insurance Database of Taiwan, we identified IC/BPS and RA patients. IC/BPS to RA were matched under 1:5 ratio based on index month. (See figure 1) Possible confounders, including age, sex, insurance fee, hospital levels and the cost from comorbidities (24 chronic diseases modified from RxRisk model) were surveyed and adjusted. Data of expense were compared with Chi-square, ANOVA and Multiple linear regression based on the purpose of our research and properties of variables.

Results

There were significant differences in age and sex between the two groups. IC/BPS patients were younger (IC/BPS vs. RA: 46.62± 15.82 y/o vs. 52.25± 15.05 y/o), with larger female ratio (79.5% vs. 71.4%). Fifty two percent IC/BPS were first diagnosed in hospitals above regional level, while RA (63%) were below local hospital level. (See table 1) There was no significant difference in the cost from comorbidities, except patients with end stage renal disease (ESRD). Without confounders adjusted, there were significant differences in total yearly pharmacy claim (IC/BPS vs. RA: \$ 39.5± 142.8 vs. \$94.3± 413.3), total yearly claim (IC/BPS vs. RA: \$144.1± 377.8 vs. \$193.9± 549.8) and pharmacy claim per visit (IC/BPS vs. RA: \$8.2± 12 vs. \$11.2± 24.6). After confounders adjusted, there were significant differences in yearly total pharmacy claim (IC/BPS to RA: \$-65.8), yearly total claim ((IC/BPS to RA: \$-64.1), pharmacy claim per visit (IC/BPS to RA: \$ -3.4) and total cost per visit (IC/BPS to RA: \$-5.0). (See table 2 and 3) Average time of IC/BPS outpatient visit was less by nearly 1 time than RA.

Interpretation of results

In our study, female dominant in IC/BPS population is compatible with clinical scenario. More than half IC/BPS patients were first diagnosed at higher hospital level. Because of disease complexity in IC/BPS, efficient diagnosis might depend on expert physicians in those hospitals. Though IC/BPS were younger and larger female ratio than RA, there was no difference in reimbursement from comorbidities, except ESRD. Many studies illustrated IC/BPS had more medical cost than non-IC/BPS patients. The results demonstrated the outpatient reimbursements of IC/BPS were less than RA, mostly from pharmacy expense, no matter confounders adjusted or not. This might be due to tremendous resources dispensed in new pharmaceutical development, resulting in good outcome of RA patient care but much medical expenses. Less IC/BPS outpatient visit perhaps was due to inefficient treatment and patients reluctant to go out because of frequency and urgency. Limitation of this study: because of poor treatment outcome, IC/BPS would search complementary and alternative medicine which cost could not be identified in our study.

Concluding message

Compared to RA, IC/BPS has significant different age and gender distribution. The outpatient reimbursement for IC/BPS was significant lower than RA, mainly on the pharmacy expenditure. It might be due to well-developed RA diagnosis criteria, treatment guideline and pharmaceutical advancement. The etiology of IC/BPS has been considered multifactorial, and it makes correct diagnosis and efficient treatment difficult. To improve quality of life of IC/BPS patients, we should pay more attention to the disease research and treatment development.

<Figure 1> Flow chart

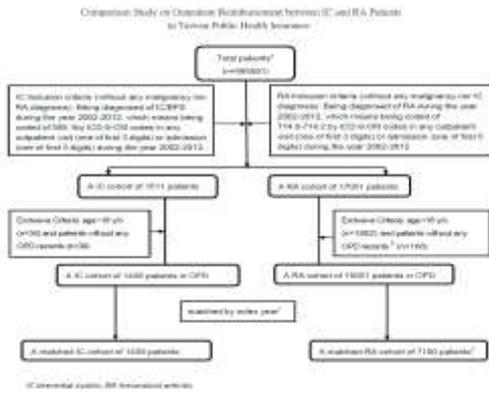


Figure 1. The process of selecting outpatient IC and RA cohorts. ^aTotal patient population includes all reimbursements by order numbers from NHIRD between year 2002-2012 (1 study period). ^bEach IC cohort of 1438 patients diagnosed occurred from admission but without any ICD-9 codes followed within 1 year period. Order year defined as the year of the earliest diagnosis occurring during the study period. ^cA matching algorithm was done by maximal allowed pair matching (1:1) based on the order year.

<Table 1> Characteristics and reimbursement of outpatient with comorbidities between IC/BPS and RA cohort

Variable	IC (n=1438)	RA (n=7190)	p
Age, mean (s.d.) (range)	62.22 (13.82) (20-97.89)	62.70 (13.58) (18.02-97.84)	0.088
Female, n (%)	1349 (93.82)	6117 (85.09)	0.000
Insurance fee, mean (s.d.) (range)	10899.6 (21399.0) (0-100000)	11679.2 (21789.8) (0-100000)	0.119
Hospital level, n (%)			
1. medical center	288 (20.05)	1397 (19.43)	0.000
2. regional hospital	460 (32.05)	2440 (33.94)	
3. local hospital	289 (20.15)	1343 (18.82)	
4. other	401 (27.75)	2210 (30.81)	
Comorbidity	IC (ICD-9-CM)	RA (ICD-9-CM)	
1. Anxiety and stress	98 (6.82)	294 (4.09)	0.000
2. Asthma	71 (4.93)	277 (3.85)	0.007
3. Back pain	1286 (89.57)	6418 (89.57)	0.999
4. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
5. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
6. Depression	144 (10.01)	511 (7.11)	0.000
7. Schizophrenia	84 (5.84)	346 (4.81)	0.000
8. Dementia	132 (9.18)	421 (5.86)	0.000
9. Diabetes	92 (6.40)	396 (5.51)	0.000
10. Hypertension	187 (13.01)	719 (10.01)	0.000
11. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
12. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
13. Tuberculosis	1 (0.07)	1 (0.01)	0.999
14. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
15. Vascular disease	92 (6.40)	396 (5.51)	0.000
16. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
17. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
18. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
19. Depression	144 (10.01)	511 (7.11)	0.000
20. Schizophrenia	84 (5.84)	346 (4.81)	0.000
21. Dementia	132 (9.18)	421 (5.86)	0.000
22. Diabetes	92 (6.40)	396 (5.51)	0.000
23. Hypertension	187 (13.01)	719 (10.01)	0.000
24. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
25. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
26. Tuberculosis	1 (0.07)	1 (0.01)	0.999
27. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
28. Vascular disease	92 (6.40)	396 (5.51)	0.000
29. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
30. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
31. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
32. Depression	144 (10.01)	511 (7.11)	0.000
33. Schizophrenia	84 (5.84)	346 (4.81)	0.000
34. Dementia	132 (9.18)	421 (5.86)	0.000
35. Diabetes	92 (6.40)	396 (5.51)	0.000
36. Hypertension	187 (13.01)	719 (10.01)	0.000
37. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
38. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
39. Tuberculosis	1 (0.07)	1 (0.01)	0.999
40. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
41. Vascular disease	92 (6.40)	396 (5.51)	0.000
42. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
43. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
44. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
45. Depression	144 (10.01)	511 (7.11)	0.000
46. Schizophrenia	84 (5.84)	346 (4.81)	0.000
47. Dementia	132 (9.18)	421 (5.86)	0.000
48. Diabetes	92 (6.40)	396 (5.51)	0.000
49. Hypertension	187 (13.01)	719 (10.01)	0.000
50. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
51. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
52. Tuberculosis	1 (0.07)	1 (0.01)	0.999
53. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
54. Vascular disease	92 (6.40)	396 (5.51)	0.000
55. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
56. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
57. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
58. Depression	144 (10.01)	511 (7.11)	0.000
59. Schizophrenia	84 (5.84)	346 (4.81)	0.000
60. Dementia	132 (9.18)	421 (5.86)	0.000
61. Diabetes	92 (6.40)	396 (5.51)	0.000
62. Hypertension	187 (13.01)	719 (10.01)	0.000
63. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
64. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
65. Tuberculosis	1 (0.07)	1 (0.01)	0.999
66. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
67. Vascular disease	92 (6.40)	396 (5.51)	0.000
68. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
69. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
70. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
71. Depression	144 (10.01)	511 (7.11)	0.000
72. Schizophrenia	84 (5.84)	346 (4.81)	0.000
73. Dementia	132 (9.18)	421 (5.86)	0.000
74. Diabetes	92 (6.40)	396 (5.51)	0.000
75. Hypertension	187 (13.01)	719 (10.01)	0.000
76. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
77. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
78. Tuberculosis	1 (0.07)	1 (0.01)	0.999
79. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
80. Vascular disease	92 (6.40)	396 (5.51)	0.000
81. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
82. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
83. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
84. Depression	144 (10.01)	511 (7.11)	0.000
85. Schizophrenia	84 (5.84)	346 (4.81)	0.000
86. Dementia	132 (9.18)	421 (5.86)	0.000
87. Diabetes	92 (6.40)	396 (5.51)	0.000
88. Hypertension	187 (13.01)	719 (10.01)	0.000
89. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
90. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
91. Tuberculosis	1 (0.07)	1 (0.01)	0.999
92. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
93. Vascular disease	92 (6.40)	396 (5.51)	0.000
94. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
95. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
96. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
97. Depression	144 (10.01)	511 (7.11)	0.000
98. Schizophrenia	84 (5.84)	346 (4.81)	0.000
99. Dementia	132 (9.18)	421 (5.86)	0.000
100. Diabetes	92 (6.40)	396 (5.51)	0.000
101. Hypertension	187 (13.01)	719 (10.01)	0.000
102. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
103. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
104. Tuberculosis	1 (0.07)	1 (0.01)	0.999
105. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
106. Vascular disease	92 (6.40)	396 (5.51)	0.000
107. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
108. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
109. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
110. Depression	144 (10.01)	511 (7.11)	0.000
111. Schizophrenia	84 (5.84)	346 (4.81)	0.000
112. Dementia	132 (9.18)	421 (5.86)	0.000
113. Diabetes	92 (6.40)	396 (5.51)	0.000
114. Hypertension	187 (13.01)	719 (10.01)	0.000
115. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
116. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
117. Tuberculosis	1 (0.07)	1 (0.01)	0.999
118. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
119. Vascular disease	92 (6.40)	396 (5.51)	0.000
120. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
121. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
122. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
123. Depression	144 (10.01)	511 (7.11)	0.000
124. Schizophrenia	84 (5.84)	346 (4.81)	0.000
125. Dementia	132 (9.18)	421 (5.86)	0.000
126. Diabetes	92 (6.40)	396 (5.51)	0.000
127. Hypertension	187 (13.01)	719 (10.01)	0.000
128. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
129. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
130. Tuberculosis	1 (0.07)	1 (0.01)	0.999
131. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
132. Vascular disease	92 (6.40)	396 (5.51)	0.000
133. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
134. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
135. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
136. Depression	144 (10.01)	511 (7.11)	0.000
137. Schizophrenia	84 (5.84)	346 (4.81)	0.000
138. Dementia	132 (9.18)	421 (5.86)	0.000
139. Diabetes	92 (6.40)	396 (5.51)	0.000
140. Hypertension	187 (13.01)	719 (10.01)	0.000
141. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
142. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
143. Tuberculosis	1 (0.07)	1 (0.01)	0.999
144. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
145. Vascular disease	92 (6.40)	396 (5.51)	0.000
146. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
147. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
148. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
149. Depression	144 (10.01)	511 (7.11)	0.000
150. Schizophrenia	84 (5.84)	346 (4.81)	0.000
151. Dementia	132 (9.18)	421 (5.86)	0.000
152. Diabetes	92 (6.40)	396 (5.51)	0.000
153. Hypertension	187 (13.01)	719 (10.01)	0.000
154. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
155. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
156. Tuberculosis	1 (0.07)	1 (0.01)	0.999
157. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
158. Vascular disease	92 (6.40)	396 (5.51)	0.000
159. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
160. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
161. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
162. Depression	144 (10.01)	511 (7.11)	0.000
163. Schizophrenia	84 (5.84)	346 (4.81)	0.000
164. Dementia	132 (9.18)	421 (5.86)	0.000
165. Diabetes	92 (6.40)	396 (5.51)	0.000
166. Hypertension	187 (13.01)	719 (10.01)	0.000
167. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
168. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
169. Tuberculosis	1 (0.07)	1 (0.01)	0.999
170. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
171. Vascular disease	92 (6.40)	396 (5.51)	0.000
172. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
173. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
174. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
175. Depression	144 (10.01)	511 (7.11)	0.000
176. Schizophrenia	84 (5.84)	346 (4.81)	0.000
177. Dementia	132 (9.18)	421 (5.86)	0.000
178. Diabetes	92 (6.40)	396 (5.51)	0.000
179. Hypertension	187 (13.01)	719 (10.01)	0.000
180. Interstitial cystitis	1438 (100.00)	0 (0.00)	0.000
181. Rheumatoid arthritis	0 (0.00)	7190 (100.00)	0.000
182. Tuberculosis	1 (0.07)	1 (0.01)	0.999
183. Urinary tract infection	144 (10.01)	511 (7.11)	0.000
184. Vascular disease	92 (6.40)	396 (5.51)	0.000
185. Anxiety disorder	98 (6.82)	294 (4.09)	0.000
186. Bipolar disorder	11 (0.76)	46 (0.64)	0.344
187. Borderline personality disorder	92 (6.40)	296 (4.12)	0.011
188. Depression	144 (10.01)	511 (7.11)	0.000
189. Schizophrenia	84 (5.84)	346 (4.81)	0.000
190. Dementia	132 (9.18)		