592

A comparison of the outpatient reimbursement for interstitial cystitis/ bladder pain syndrome and irritable bowel syndrome treatment in Taiwan : A nationwide population-based study

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Hypothesis / aims of study

Interstitial cystitis/bladder pain syndrome (IC/BPS) and irritable bowel syndrome (IBS) are chronic pelvic pain disorders. Both are embarrassing and can inhibit daily activities. They often coexist which might be due to "neural cross-talk". There are many similarities between these two diseases, such as difficult to get definite diagnosis and efficient treatment because of elusive etiology. These patients often have physical, psychological, social and work influences, and consequently need lots of medical care. Clemens (2008) reported IC/BPS mean yearly medical expense 2.4 times higher than the age and gender controlled non- IC/BPS. The cost differences were mainly due to pharmacy and outpatient expense. In this study, we objectively compared public health insurance reimbursement between IC/BPS and IBS during one year after index date (the date of first diagnosis) in outpatient perspective to evaluate whether IC/BPS had more reimbursement than IBS.

Materials and methods

Through data mining in 2002-2013 Longitudinal Health Insurance Database of Taiwan, we identified IC/BPS and IBS patients. There were 2 models (unmatched and matched) designed to compare outpatient reimbursement for IC/BPS and IBS. The conclusion would be verified if we got same results from both models. In model 1, we compared two cohorts before matching. In model 2, IC/BPS to IBS were matched under 1:1 ratio based on index date, sex, age, income, and 22 co-morbidities (chronic diseases modified from RxRisk model) (Figure 1). Data of expense were compared with Chi-square, ANOVA and multiple linear regressions based on the purpose of our research and properties of variables.

RESULTS

In model 1, IC/BPS had larger female proportion and less income level. There was no significant ratio difference in comorbidities between two cohorts (Table 1). Before matching, IC/BPS had significantly higher visit times (2.9 vs. 2.5). There was no significant difference in pharmacy expense. There were significant differences in yearly non-pharmacy expense, yearly total, per-visit non-pharmacy expense and per-visit total claims (Table 2). In model 2, IC/BPS and IBS were matched nearly identically (Table 4). Except total visit times and yearly total pharmacy claim, there were significant differences in yearly total non-pharmacy, yearly total, per-visit pharmacy, per-visit non-pharmacy and per-visit total claims. (Table 5) From regression analysis, both models revealed the medical expenses of IC/BPS to IBS were significantly higher in yearly total, yearly non-pharmacy, per-visit non-pharmacy and per-visit total claims. There was no significant difference in yearly total pharmacy claim in both models, per-visit pharmacy claim in model 1 and visit times in model 2 (Table 3 and Table 6).

CONCLUSIONS

In unmatched model, the larger female proportion and lower income in IC/BPS were compatible with clinical scenario. Patient characteristics of these two cohorts showed no significant difference in ratio of comorbidities. It probably reflected "neural cross-talk" between these 2 patient groups. More IC/BPS outpatient visits might be the result of larger proportion of female gender and easy accessibility to health care with low co-payment in Taiwan

As compared model 1 to model 2, the pharmacy cost per-visit had different significant result. It might be the result of more outpatient visits in matched IBS as compared to unmatched situation. It again echoed the larger female proportion would increase the medical utilization and resulted in higher visit times. Many studies illustrated IC/BPS had more medical cost than non-IC/BPS patients. The results demonstrated the outpatient reimbursements of IC/BPS were higher than IBS, mostly from non-pharmacy expense, no matter model 1 or 2. This might be due to the necessity of non-pharmacy intervention for treatment, including urodynamic survey and cystoscopic interventions such as coagulation or hydrodistension.

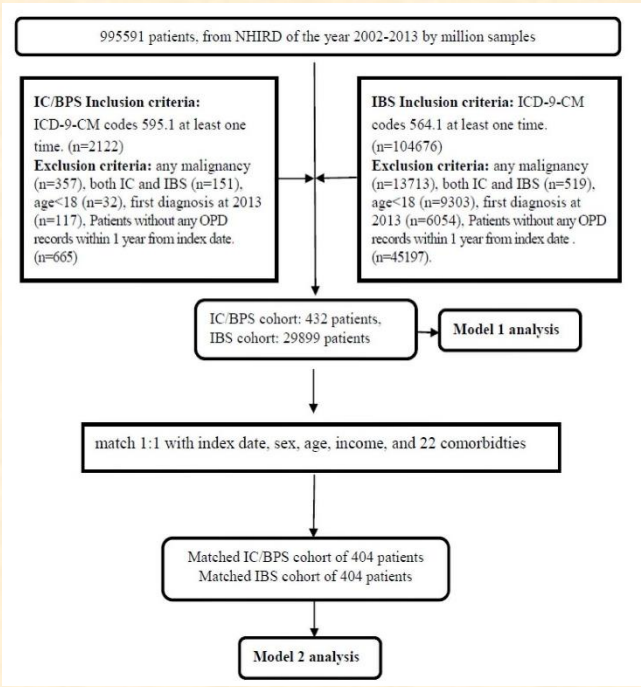

Figure 1Flow chart

<Table 1> Comparison of confounders in IC/BPS and IBS cohorts (unmatched).

Variable	IC/BPS (n = 432)	IBS (n = 29899)	p
Age, mean (SD), year	43.8 (16.35)	43.7 (15.52)	0.908
Female, n (%)	326 (75.5%)	15331 (51.3%)	<0.001
Income, mean (SD), $	973.6 (698.17)	1157.9 (849.82)	<0.001
Hospital level, n (%)			
1. Medical center	47 (10.9%)	2675 (8.9%)	0.212
2. Regional hospital	39 (9.0%)	3457 (11.6%)	
3. Local hospital	45 (10.4%)	2847 (9.5%)	
4. Clinic	301 (69.7%)	20920 (70.0%)	
Comorbidities†, n‡ (%)			
(No comorbidities that rate with significant values between two cohorts)			

Range: minimum-maximum
† Comorbidity rate with statistically significant values
‡ Patients with the comorbidity

<Table 2 >Comparison of outpatient reimbursement for IC/BPS and IBS cohorts (unmatched), without adjusting for confounders.

Variable	IC/BPS (432)		IBS (29899)		p
	Mean (SD)	Range	Mean (SD)	Range	
Pharmacy claim	32.6 (99.06)	0–1297.1	30.8 (141.37)	0–14012.6	0.795
Non-pharmacy claim	109.7 (338.10)	3.0–3122.8	50.4 (76.64)	0–1491.6	<0.001
Total claim	142.3 (370.32)	3.0–3175.3	81.2 (179.69)	1.67–14158.1	<0.001
Pharmacy claim per-visit	8.7 (13.93)	0-144.1	7.9 (14.00)	0–934.2	0.236
Non-pharmacy claim per-visit	28.0 (43.73)	3.0–337.2	21.3 (29.00)	0–120:	<0.001 <0.001
Total claim per visit	36.7 (45.05)	3.0–338.3	29.2 (31.9)	1.67–12	
Total visits	2.9 (4.08)	1-41	2.5 (3.10)	1-89	0.007

range: minimum-maximum.

<Table 3> Regression analysis of the comparison of outpatient reimbursement for IC/BPS and IBS cohorts (unmatched) *

Variable	Regression coefficient	(95% confidence interval)
Pharmacy claim	3.7	(-9.7 to 17.1)
Non-pharmacy claim	61.5†	(53.4 to 69.6)
Total cost	65.4†	(47.9 to 82.9)
Pharmacy claim per visit	1.1	(-0.3 to 2.4)
Non-pharmacy claim per visit	7.6†	(4.8 to 10.3)
Total cost per visit	8.6†	(5.6 to 11.7)
Total visits	0.46†	(0.2 to 0.8)

*adjusting for the confounders; sex and income
†$p < 0.05$

<Table 4> Comparisons of confounders in IC/BPS and IBS cohorts (matched).

Variable	IC/BPS (n = 404)	IBS (n = 404)	p
Age, mean (SD), year	43.20 (16.00)	43.06 (15.97)	0.900
Female, n (%)	306 (75.7%)	306 (75.7%)	1.000
Income, mean (SD), $	962.56 (656.3)	968.24 (667.5)	0.903
Hospital level, n (%)			
1. Medical center	41 (10.1%)	43 (10.6%)	0.404
2. Regional hospital	37 (9.2%)	39 (9.7%)	
3. Local hospital	44 (10.9%)	30 (7.4%)	
4. Clinic	282(69.8%)	292 (72.3%)	

Range: minimum-maximum

<Table 5>Comparison of outpatient reimbursement for IC/BPS and IBS cohorts (matched)

Variable	IC/BPS (404)		IBS(404)		p
	Mean (SD)	Range	Mean (SD)	Range	
Pharmacy claim	33.0 (101.76)	0–1297.1	22.8 (54.41)	0–557.4	0.075
Non-pharmacy claim	110.5 (347.58)	3.0–3122.8	50.2 (68.07)	3.0–423.1	0.001
Total claim	143.5 (380.53)	3.0–3175.3	73.0 (106.51)	3.0–922.7	<0.001
Pharmacy claim per-visit	8.8 (14.28)	0-144.1	6.8 (10.94)	0–151.3	0.027
Non-pharmacy claim per-visit	27.5 (43.07)	3.0–337.2	20.9 (24.37)	3.0–184.7	0.007
Total claim per visit	36.3 (44.60)	3.0–338.3	27.7 (26.03)	3.0–186.8	0.001
Total visits	2.9 (4.2)	1-41	2.6 (3.3)	1-34	0.197

range: minimum-maximum.

<Table 6> Regression analysis of the comparison of outpatient reimbursement for IC/BPS and IBS cohorts (matched) *

Variable	Regression coefficient	(95% confidence interval)
Pharmacy claim	10.2	(-1.0 to 21.5)
Non-pharmacy claim	60.3†	(25.7 to 94.9)
Total cost	70.6†	(32.0 to 109.1)
Pharmacy claim per visit	2.0†	(0.2 to 3.7)
Non-pharmacy claim per visit	6.6†	(1.8 to 11.5)
Total cost per visit	8.6†	(3.6 to 13.7)
Total visits	0.34	(-1.78 to 0.86)

*no confounders after matching two cohorts
†$p < 0.05$