流行病學方法論及實驗
(The Methods of Epidemiology and Practices)

護理人如何校正偏好選擇之實例

傾向偏好分數分析
(Propensity score analysis)

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Estimating Effects of Nursing Intervention via Propensity Score Analysis

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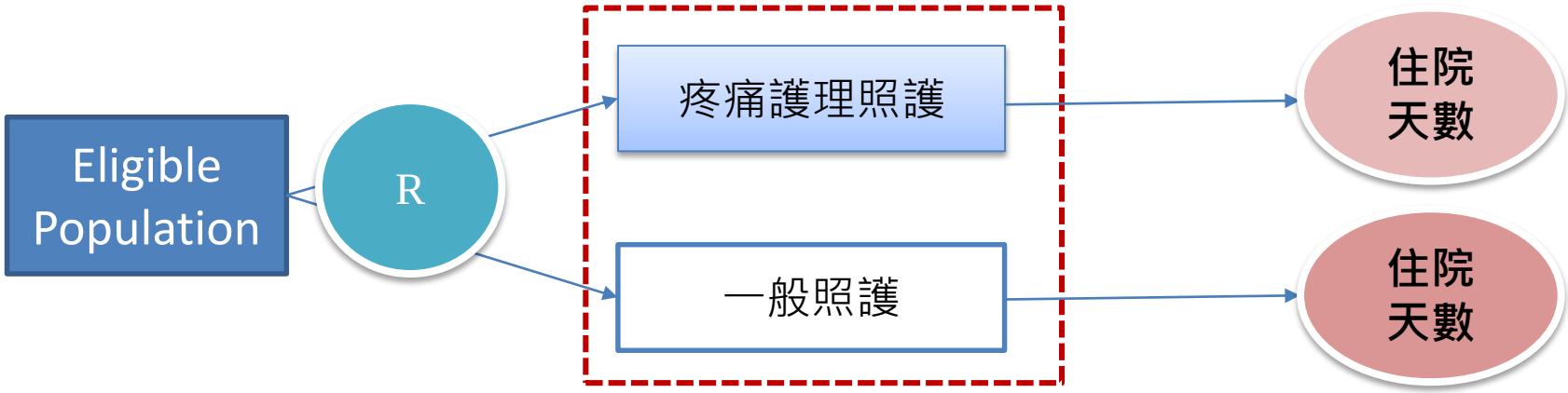
護理問題與實證資料特性

- 依據病患特性提供護理照護
- 多種護理照護組合併藥物與臨床治療
- 隨機分派試驗難以執行

疼痛照護是否對住院天數有影響?

護理人如何校正偏好選擇?



年齡、性別、外科既往史、共病既往史、合併護理照護種類

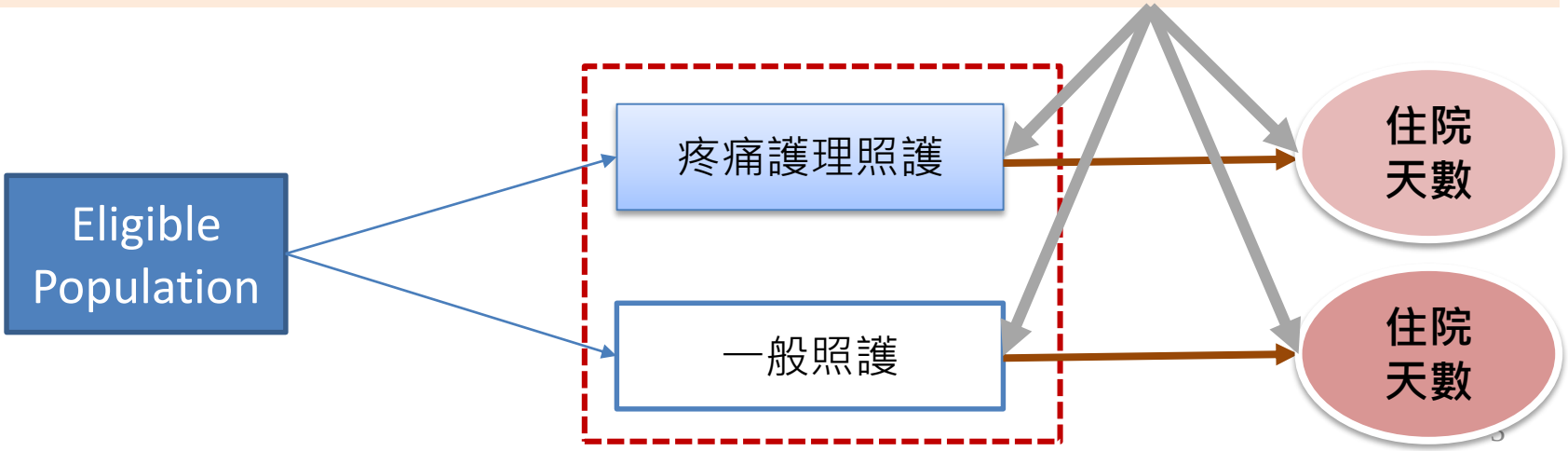


TABLE 2. Example of Results From the Regression Covariance Adjustment Analysis (*n* = 568 Hospitalizations)

	Parameter estimate	*p*
Propensity score	−1.395	.152
Pain management	1.140	.002
Clinical conditions		
Severity of illness		.596
Context of care		
Number of units resided on		.004
CGPR RN dip proportion		.004
RN skill mix		.516
Average CGPR RN		.004
Percentage of time in intensive care unit		.031
Medical treatment		
Number of procedures		.001
Pharmacy treatment		
Number of unique medications		<.001
Nursing treatments		
Number of unique nursing interventions		.227

Note. Specific nursing interventions are omitted, but a full-length table can be seen on the journal Web site at http://www.nursing-research-editor.com. CGPR = caregiver patients ratio.

調整傾向分數迴歸分析結果

TABLE 2. Example of Results From the Regression Covariance Adjustment Analysis (n = 568 Hospitalizations)

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傾向分數分層分析結果

TABLE 3. Example of Results From the Stratification Analysis (*n* = 568 Hospitalizations)

	Stratum 1 (*n* = 113)		Stratum 2 (*n* = 114)		Stratum 3 (*n* = 114)		Stratum 4 (*n* = 114)		Stratum 5 (*n* = 113)	
	Estimate	*p*	Estimate	*p*	Estimate	*p*	Estimate	*p*	Estimate	*p*
Pain management	4.600	.001	−0.523	.264	−0.137	.624	0.487	.284	2.040	.031
Clinical conditions										
Severity of illness		.100		.002		.662		.019		.010
Context of care										
Number of units resided on		.050		.051		.001		.280		.400
CGPR RN dip proportion		.001		.008		<.001		.017		.312
RN skill mix		.001		.740		.960		.006		.166
Average CGPR RN		.192		.458		.188		.688		.014
Percentage of time in intensive care unit		.320		<.001		.002		.153		.002
Medical treatment										
Number of procedures		.324		.066		.162		.236		.264
Pharmacy treatment										
Number of unique medications		.227		.646		.002		<.001		.218
Nursing treatments										
Number of unique nursing interventions		.005		.025		.903		.438		.282

Note. Specific nursing interventions are omitted, but a full-length table can be seen on the journal Web site at http://www.nursing-research-editor.com.

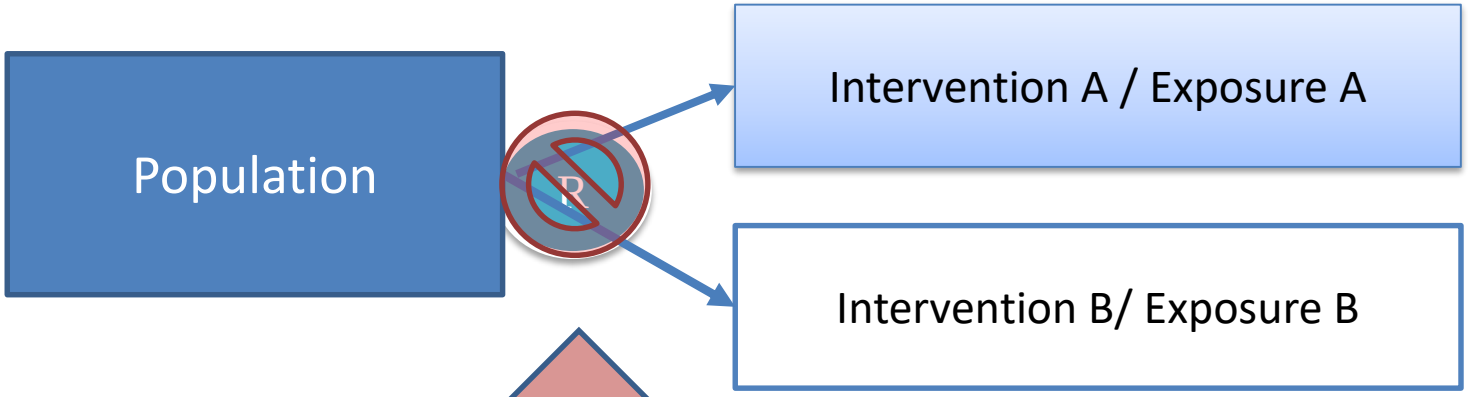
傾向分數配對分析結果

TABLE 4. Example of Results From the Matching Analysis (n = 308 hospitalizations)

	Parameter estimate	p
Pain management	0.947	.006
Clinical conditions		
Severity of illness		.946
Context of care		
Number of units resided on		.001
CGPR RN dip proportion		.243
RN skill mix		.022
Average CGPR RN		.280
Percentage of time in intensive care unit		.513
Medical treatment		
Number of procedures		.007
Pharmacy treatment		
Number of unique medications		<.001
Nursing treatments		
Number of unique nursing interventions		.768

Note. Specific nursing interventions are omitted, but a full-length table can be seen on the journal Web site at http://www.nursing-research-editor.com.

傾向分數分析原理



接受治療傾向

1. Propensity Score Matching
2. Propensity Score Adjustment
3. By Decile of Propensity Scores
4. Weighting by Propensity of selection

Balanced by the propensity of being selected into treatment groups

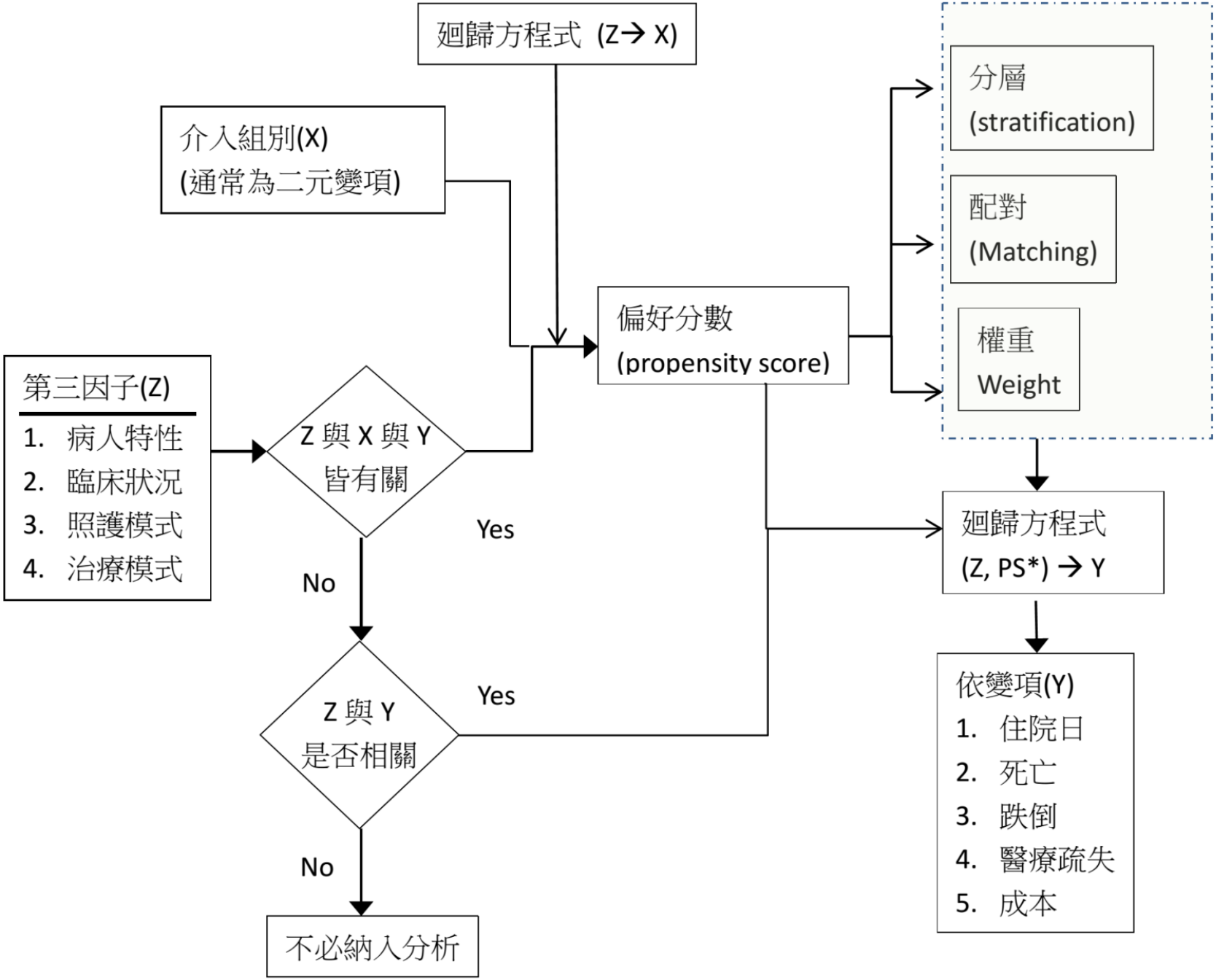
Logistic Regression Model

Logit $(P(Tx=1))=\alpha+\beta_1X_1+\beta_2X_2+\ldots$

$P(Tx=1) = \exp(\alpha+\beta_1X_1+\beta_2X_2+\ldots\_)/(1+\exp(\alpha+\beta_1X_1+\beta_2X_2+\ldots\_))$

$P(Tx=0) = 1/(1+\exp(\alpha+\beta_1X_1+\beta_2X_2+\ldots\_))$

Assessing the propensity by using characteristics that associated with the **probability of selection for treatment** groups (Z)


迴歸方程式 (Z→ X)
介入組別(X)
(通常為二元變項)
第三因子(Z)
1. 病人特性
2. 臨床狀況
3. 照護模式
4. 治療模式
Z 與 X 與 Y
皆有關
Yes
No
Z 與 Y
是否相關
Yes
No
不必納入分析
偏好分數
(propensity score)
分層
(stratification)
配對
(Matching)
權重
Weight
迴歸方程式
(Z, PS*) → Y
依變項(Y)
1. 住院日
2. 死亡
3. 跌倒
4. 醫療疏失
5. 成本

Which Propensity Score Method Best Reduces Confounder Imbalance? An Example From a Retrospective Evaluation of a Childhood Obesity Intervention

護理問題與實證資料特性

兒童肥胖控制介入之對象具選擇性

- 非隨機分派試驗
- 志願者: 控制動機較高者較易接受介入
- 年齡、性別、種族之差異

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TABLE 1. Sample Characteristics: Treated and Untreated Groups

Level/characteristic	Treated (n = 1,054) M	Treated (n = 1,054) (SD)	Untreated (n = 19,464) M	Untreated (n = 19,464) (SD)	Difference	p
Community						
Poverty in community (%)	23.4	(6.3)	23.8	(6.5)	0.4	.06
Institutional						
Poverty in school (%)	71.0	(20.1)	74.1	(18.0)	3.1	<.001
School nurse workload[a]	13.2	(6.6)	14.6	(6.4)	1.4	<.001
Interpersonal or individual						
Age in months	99.5	(19.8)	91.0	(21.5)	8.5	<.001
BMI	29.8	(4.9)	27.1	(4.4)	2.7	<.001
BMI percentile	99.5	(0.3)	99.4	(0.3)	0.1	<.001
	n	(%)	n	(%)		
Food insecurity (yes)	871	(82.6)	15,805	(81.2)	(1.4)	.26
Gender						.07
Male	620	(58.8)	11,990	(61.6)	(2.8)	
Female	434	(41.2)	7474	(38.4)	(2.8)	
Grade						<.001
Kindergarten	73	(6.9)	4000	(20.6)	(13.7)	
1st	172	(16.3)	3939	(20.2)	(3.9)	
2nd	228	(21.6)	3684	(18.9)	(2.7)	
3rd	198	(18.8)	3042	(15.6)	(3.2)	
4th	202	(19.2)	2555	(13.1)	(6.1)	
5th	181	(17.2)	2244	(11.5)	(5.7)	
Race/ethnicity						.10
Non-Hispanic White	113	(10.7)	1927	(9.9)	(0.8)	
Non-Hispanic Black	227	(21.5)	4924	(25.3)	(3.8)	
Hispanic	620	(58.8)	10973	(56.4)	(2.4)	
Asian[b]	83	(7.9)	1426	(7.3)	(0.6)	
AI/AN	6	(0.6)	158	(0.8)	(0.2)	
Multiracial	4	(0.5)	64	(0.3)	(0.2)	
>1 chronic illness	485	(46.0)	5936	(30.5)	(15.5)	<.001

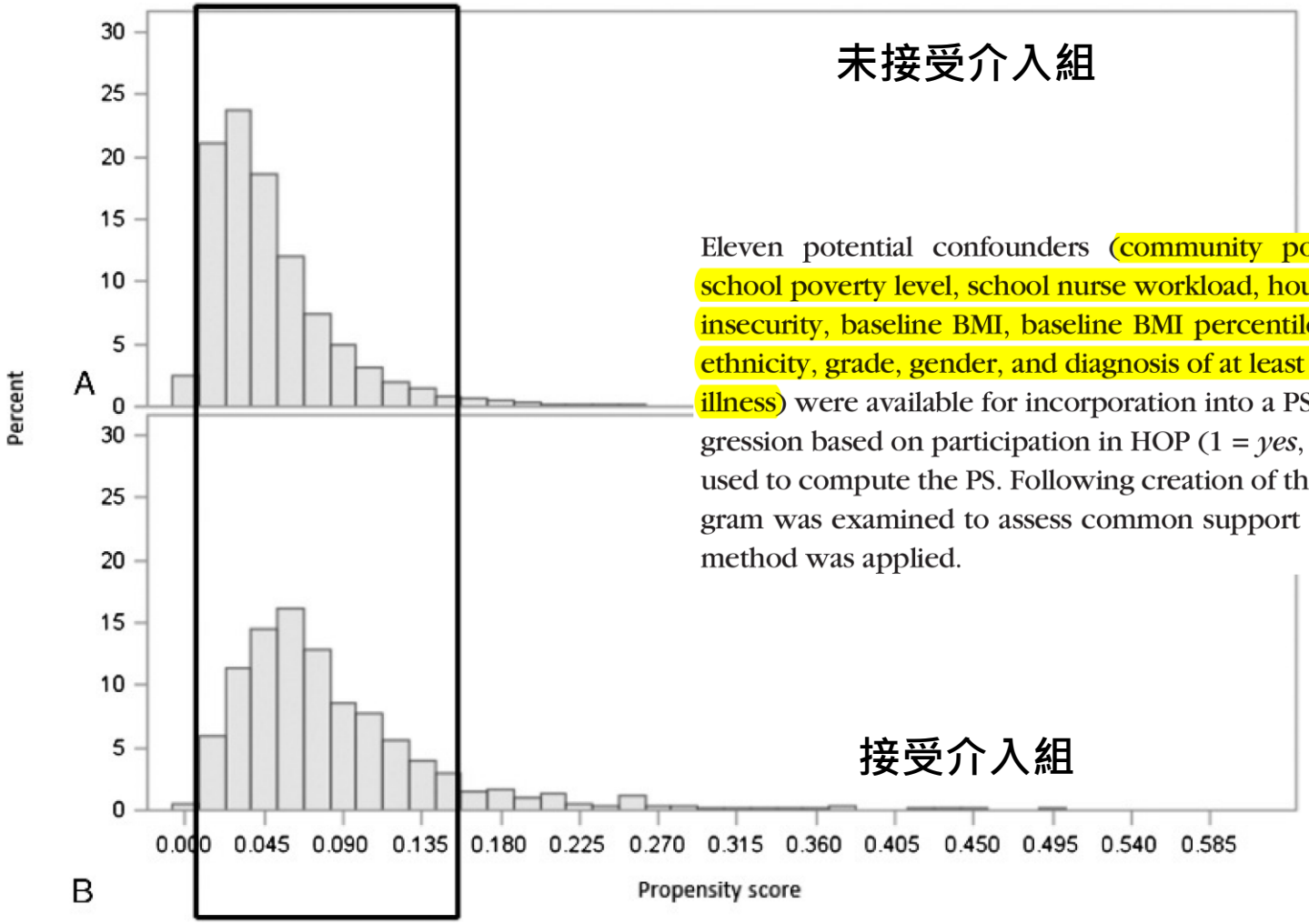
傾向分數分析結果

TABLE 3. BMI Percentile Change Before and After Application of Propensity Score Methods

Method	Treated	Untreated	Difference[a]	*p*[b]
No PS (*n* = 20,518)	–0.17	–0.29	0.12	<.001
Matching (*n* = 2,098)	–0.17	–0.22	0.05	.01
Stratification (*n* = 20,443)			0.14	<.001
Strata 0 (*n* = 4,088)	–0.51	–0.42	–0.09	.15
Strata 1 (*n* = 4,089)	–0.24	–0.32	0.08	.20
Strata 2 (*n* = 4,089)	–0.12	–0.25	0.13	.001
Strata 3 (*n* = 4,089)	–0.17	–0.23	0.06	.09
Strata 4 (*n* = 4,088)	–0.13	–0.19	0.06	.01
Weighting (*n* = 20,443)	–0.26	–0.28	0.02	.001

Note. PS = propensity score. [a]Difference in BMI percentile change in treated group (intervention) minus untreated group (control). [b]Significance of the difference.

傾向分數分佈



Eleven potential confounders (community poverty level, school poverty level, school nurse workload, household food insecurity, baseline BMI, baseline BMI percentile, age, race/ethnicity, grade, gender, and diagnosis of at least one chronic illness) were available for incorporation into a PS. Logistic regression based on participation in HOP (1 = *yes*, 0 = *no*) was used to compute the PS. Following creation of the PS, a histogram was examined to assess common support and each PS method was applied.

應用傾向分數分析之趨勢