Health outcomes and implementation effectiveness of the Ankylosing Spondylitis Rural Health Project in China: A prospective cohort study from health equity perspective

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BACKGROUND

- **Ankylosing spondylitis (AS)** is a chronic progressive inflammatory disease that primarily affects the spine and involves the sacroiliac and peripheral joints.
- Although **biologics** are recommended as first-line therapy for AS in clinical guidelines, the high cost places a heavy **disease burden.**
- The physical pain and limited mobility caused by AS also result in **a loss of productivity** for patients and their families.
- To alleviate the suffering of patients with AS and reduce the disease burden, the **"Ankylosing Spondylitis Health Village Project" (AS-Health Village Project)** has been in operation since October 2019.
- Implementation of the AS-Health Village Project

I. **Primary care initiatives** : free diagnosis, treatment, and screening by primary care physicians

II. **Subsidies** for specialized medical treatment

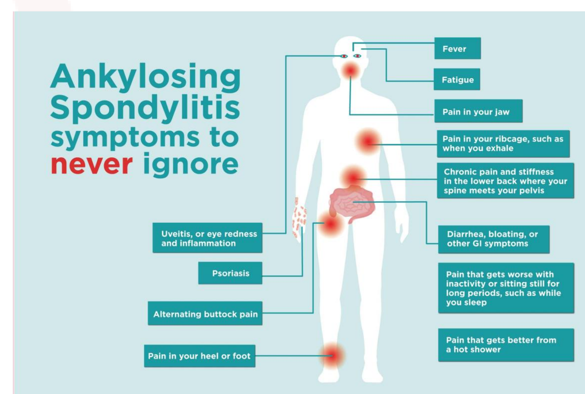

Figure 1 Symptom of AS

Figure 2 AS-Health Village Project

- **"Health equity"** is defined as a situation in which all individuals in society have equal opportunities to access health care.

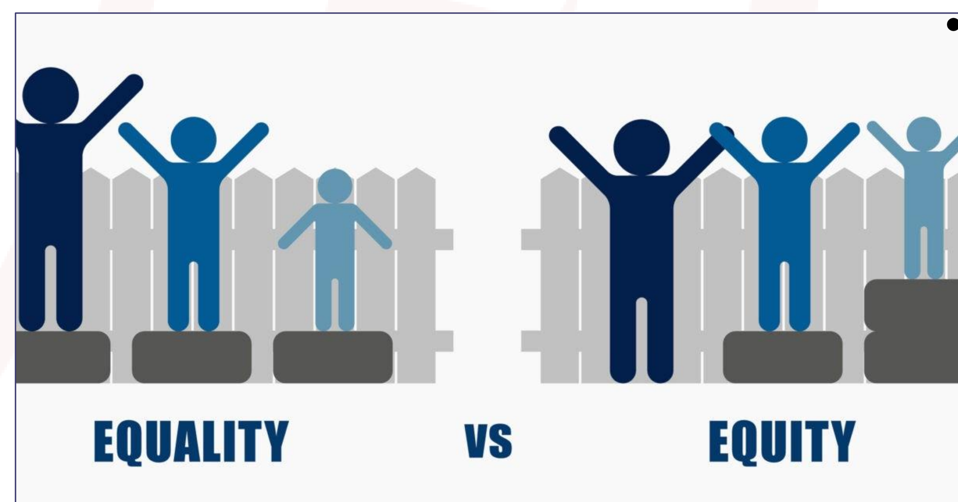

Figure 3 Difference between health equality and health equity

- The project aims to reduce disparities in access to healthcare resources caused by factors like **urban-rural disparities**, individual **economic status, and regional economic development**, and to promote health equity.

OBJECTIVE

- This study aims to evaluate how health outcomes are distributed and to assess the project's impact on health equity.

METHODS

Socioeconomic status (SES)

- **Individual-level economic:**
  - I. Employment status and type
  - II. Type of health insurance coverage
  - III. Total annual per capita expenditure of household members living in the same household
- **Regional-level economic:**
  - I. Per capita disposable wage income
  - II. Per capita consumption expenditure
  - III. Urbanization rate

Latent class analysis (LCA)

- LCA was applied to identify SES subgroups based on item response probabilities.

Concentration curves (CC) and concentration index (CI)

- The CC includes a diagonal line with a slope of 45 degrees, known as the **line of absolute equity.** The CI is twice the area between the concentration curve and the diagonal line, and its values range from **-1 to 1**.
- Plot the cumulative percentage of patients using SES on the x-axis and the cumulative percentage of patients' AS-score scores on the y-axis

Distributed Cost-Effectiveness Analysis (DCEA)

- To assess the cost-effectiveness of an intervention across different SES.
- This study employs a simplified version of the **aggregated DCEA (aDCEA).** aDCEA directly calculates the distribution of INHB across different socioeconomic statuses.

Health outcomes

- Net Health Benefit: $INHB = (QALYs - Cost) \div WTP$
- AS-score: Incorporates five HRQoL scores—EQ-5D-5L, EQ-VAS, SF-36, BASDAI, and BASFI—and standardizes each item.

RESULT

Table 1 Result of LCA

Category	AIC	BIC	RLT	χ^2	Percentage of each category
1	17886.12	17954.67			
2	16832.25	16975.31	507.34	533.04	0.725/0.2746
3	16448.78	16666.23	98.07	107.43	0.279/0.365/0.356
4	16428.77	16720.61	53.06	57.27	0.3645/0.3136/0.0802/0.2418
5	16439.47	16805.71	36.76	42.69	0.3136/0.2086/0.1559/0.2418/0.0802

- The BIC value is minimized when the **categories were 3**, classifying both regional-level economic and individual-level economic into **low**, **moderate**, and **high level**.

Table 2 Distribution of SES

Individual-level	Regional-level	SES-level	Patients(N)	Percentage of rural patients(%)
Low	Low	Low	1322	54.66%
Moderate	Moderate			
Moderate	Low			
Low	High	Moderate	629	43.47%
Moderate	Moderate			
High	Low			
Moderate	High	High	739	18.60%
High	Moderate			
High	High			

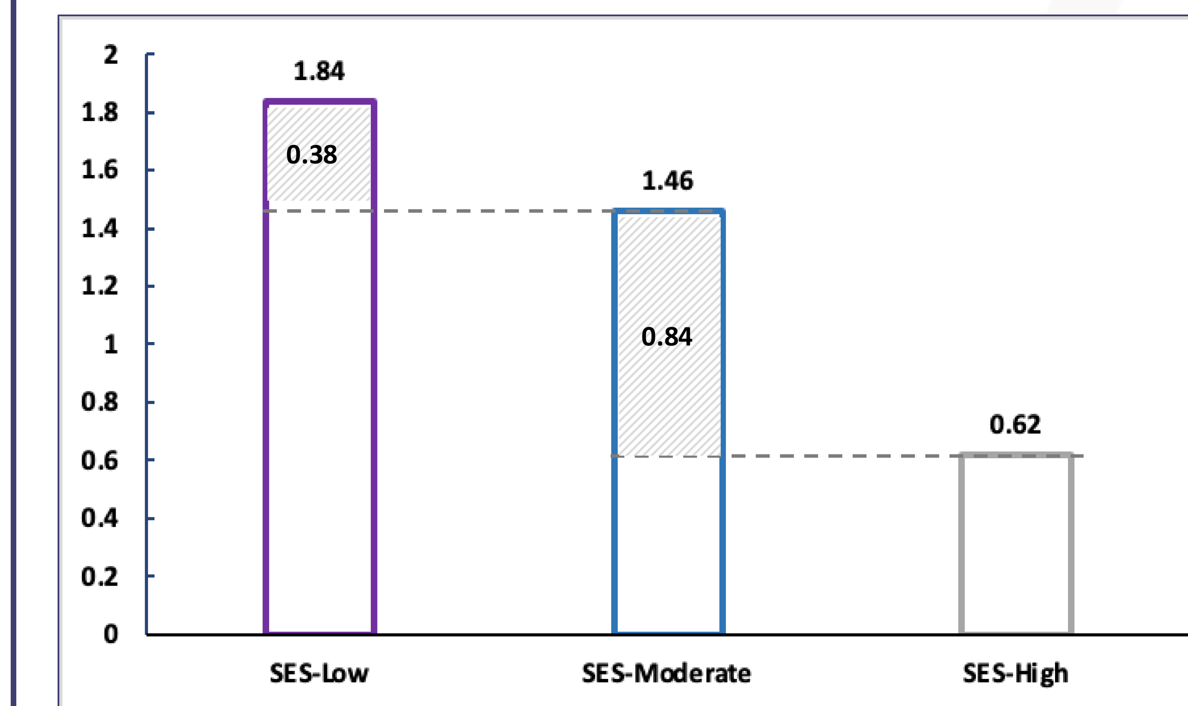

Figure 4 Distribution of INHB across different SES level

- The total INHB of was 3.92 QALYs.

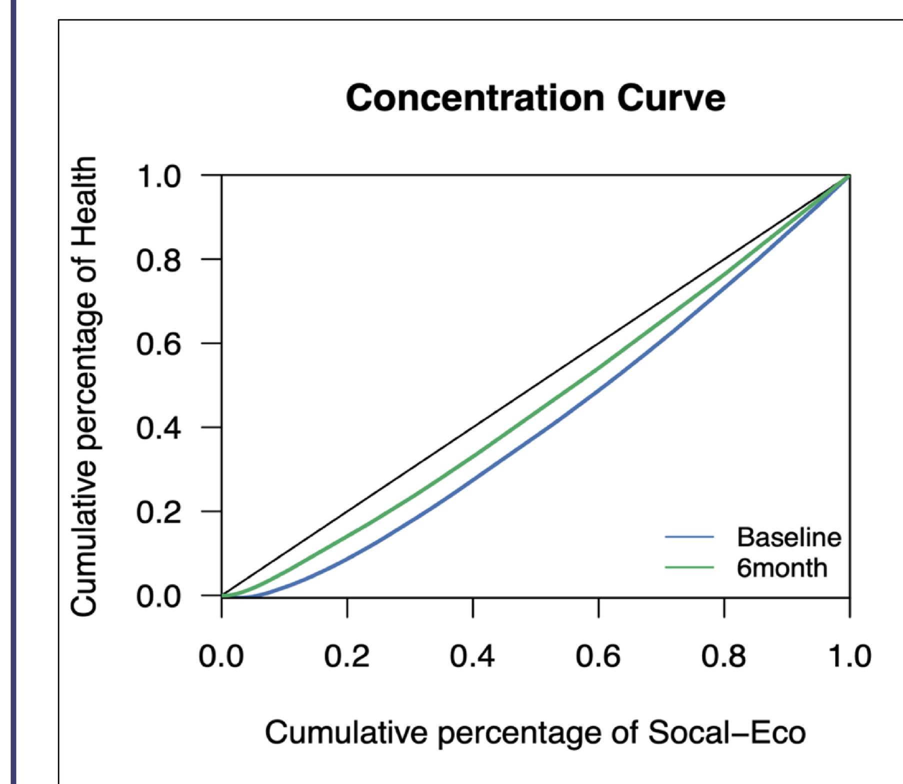

Figure 5 CC before and after implementation

- Before implementation, the CI **decreased** from 0.000459918 to 0.000426257 ($p < 0.05$).
- The CC moved closer to the line of equality.

CONCLUSION

- There was **health inequality** before implementation.
- AS-Health Village Project primarily **benefited patients with lower SES** and contributed to **reducing pre-existing inequalities** in the distribution of health resources.

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