Short- and Long-Term Impacts of the National Essential Medicines Policy on Drug in Rural China

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Background

Access to safe, effective and affordable medicines is crucial for enhancing health outcomes and achieving universal health coverage.

The World Health Organization (WHO) has introduced the concept of essential medicines since 1975 to address the population priority of healthcare needs on medicines.

China has launched National Essential Medicines Policy (NEMP) In 2009, as a key component of healthcare system reform to realize universal health coverage for all citizens. However, empirical evidence regarding its long-term impacts is lacking.

This study aims to assess the short- and long-term effects of NEMP on drug availability, pricing, and usage in a deprived rural county in southwestern China.

Materials and Methods

Study Design and Setting

This is a quasi-experimental design study comparing the pre- and post-implementation of NEMP in a rural, remote and poverty-stricken county in Yunnan Province, China.

In this economically underdeveloped county, the three-tiered healthcare system led by the government (73 village clinics – 7 township hospitals – 3 county hospitals) has predominantly acted as a health gatekeeper and delivered health service for the local population.

Policy

The implementation of NEMP in the selected county unfolded in two stages.

- In the initial stage (2010.9-2015.10), policies were directed at all government owned PHFs (township healthcare centres [THCs] and village clinics).
- The second stage (2015.11-2016.7), started from November 2015 and extended NEMP to secondary care facilities (county hospitals).

Data Collection

We collected data from 2 THCs and 2 county hospitals owned by the government. Drug purchase records between January 2009 and December 2016 were obtained from the electronic system or paper records of pharmaceutical warehouses of these facilities.

A total of 95,205 purchase records were retrieved, and 76,436 were included in the analysis.

Materials and Methods

Drug Categorization

Medicines were categorized by:
(1) Policy properties (essential or non-essential drug; western or Chinese traditional medicine);
(2) Therapeutical attributes, according to the Anatomical Therapeutic Chemical (ATC) system.

In total, 797 unique western medicines (essential 520, non-essential 422) and 599 unique TCMs (essential 272, non-essential 327) were defined.

Outcome Measures

The availability of medicines was quantified by the number of medicines accessible in healthcare facilities. Drug usage was measured by sales in monetary value, and drug prices were traced by the drug price index (DPI). Three commonly used DPIs were calibrated:

DPI-L measures the ratio of prices in different periods, weighted by the consumption quantity in the baseline period.

$$L_p = \sum P_1 Q_0 \,/\, \sum P_0 Q_0$$

DPI-P is weighted by the consumption quantity in reporting periods, assuming changes in quantity occur once after the changes in price.

$$P_p = \sum P_1 Q_1 \,/\, \sum P_0 Q_1$$

DPI-F is therefore used to mitigate these biases, by averaging the changes in baseline and reporting periods.

$$F_p = \sqrt{L_p \times P_p}$$

Statistical Analysis

Single-group interrupted time-series analysis (ITSA) was applied to examine the immediate and sustained impacts of NEMP on different outcomes (number, sale with log-transformation, and price indices).

In ITSA, data were constructed semi-annually with 16 time points: four for pre-NEMP, ten for first stage NEMP, and two for second stage NEMP. Segmented linear regression models were built with two interruption points:

$$Y_t = \beta_0 + \beta_1 T + \beta_2 X_{1\_t} + \beta_3 T X_{1\_t} + \beta_4 X_{2\_t} + \beta_5 T X_{2\_t} + \varepsilon_t,$$

where Yt denotes the outcome in semi-year t, T denotes the time point since observation, and X1_t and X2_t denote whether the first-stage and second-stage policy has been implemented at T (coded 0 or 1).

Results

Availability of medicines

The number of essential medicines increased immediately after 1st-stage NEMP, while that of non-essential medicines decreased dramatically; however, the number of essential drugs encountered a sudden decrease after the 2nd stage of NEMP.

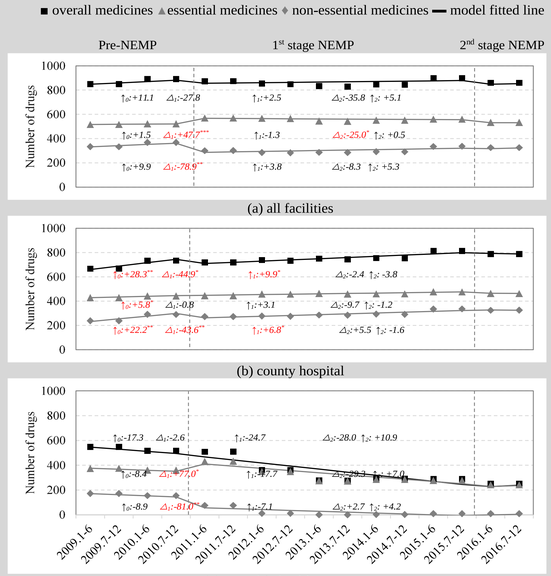

Figure 1. Number of medicines by facility level and essential medicine list

Sales of medicines

Pharmaceutical expenditure in county hospitals dominated the drug market, showing a trend of an increase in both essential and non-essential drugs after 1st-stage NEMP.

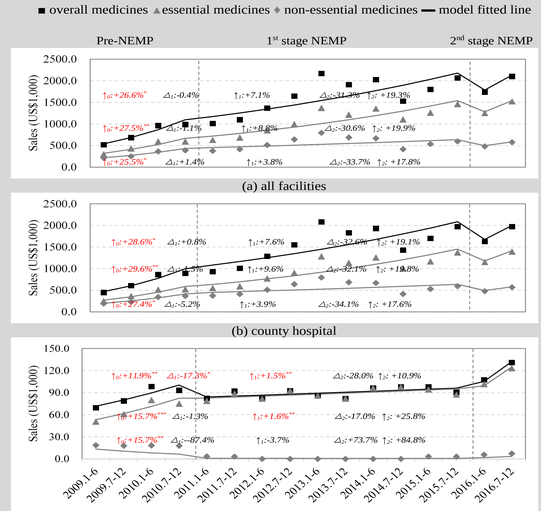

Figure 2. Sales of medicines by facility level and essential medicine list

Results

Retail price of medicines

The DPI-Fs of both essential and non-essential medicines showed significantly immediate falls after the 1st-stage and 2nd-stage of NEMP. However, a significant change to the increasing price trend was also observed for essential drugs after 2nd-stage NEMP.

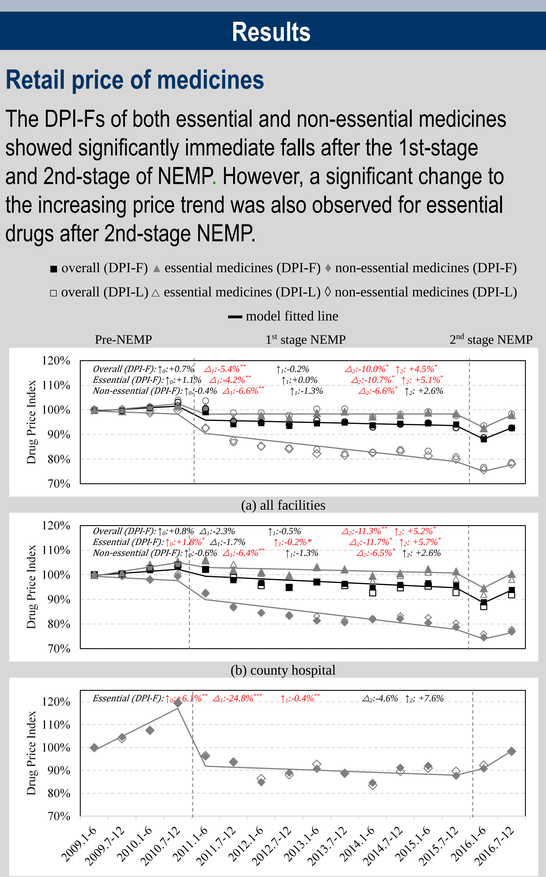

Figure 3. Retail price of medicines by facility level and essential medicine list

Discussion & Conclusion

- NEMP not only successfully controlled drug prices in primary care in the short- and long-terms, but also yielded spill-over effects in cutting down drug prices in secondary care facilities.
- Nevertheless, a noticeable disparity in medicine utilization and sales between rural THCs and county hospitals was detected over time.
- Ongoing monitoring is imperative, and more attention should focus on the disproportionate impacts of policy on different pharmaceuticals, facility levels, regions, and populations.

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