

# Socioeconomic status inequity in inpatient service utilization based on need among migrants: Evidence from a national study in China

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## Research

**Keywords:** Migrants, socioeconomic status (SES), inpatient service utilization, concentration index, Blinder-Oaxaca decomposition, China

**Posted Date:** May 22nd, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-29742/v1>

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1 **Title page**

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3 **Socioeconomic status inequity in inpatient service utilization based on need among**  
4 **migrants: Evidence from a national study in China**

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### Abstract

30 **Background:** Equity in access to healthcare is a major health policy challenge in many low-  
31 and middle- income countries. However, millions of people, especially migrants, do not have  
32 the adequate access to health care they need. This study aims to identify the socioeconomic  
33 status (SES) inequities in inpatient service utilization based on need among migrants by using  
34 a nationally representative study in China.

35 **Methods:** The data used in this study was derived from the 2014 National Internal Migrant  
36 Population Dynamic Monitoring Survey collected by the National Health Commission of  
37 China. We used logistic regression method and Blinder-Oaxaca decomposition and calculated  
38 the concentration index to measure inequities of SES in inpatient service utilization based on  
39 need. Sample weights provided in the survey were applied in all the analysis to represent the  
40 China population.

41 **Results:** The total number of the migrants who needed inpatient service told by doctors was  
42 7592, of which, 1667 (21.96%) did not use the inpatient services (unmet inpatient service  
43 need). Results showed that inpatient service utilization concentrated among high-SES  
44 migrants (Concentration Index: 0.041,  $p < 0.001$ ) and the decomposition results suggested that

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45 about 53.76% of the total SES gap in inpatient service utilization could be attributed to the  
46 gradient effect. After adjusting for other confounding variables, the odds ratios of inpatient  
47 service utilization by internal migrants with high SES according to educational attainment,  
48 economic status, and employment status were 1.41 (95% CI 1.08-1.85,  $p=0.012$ ), 1.25 (95% CI  
49 1.01-1.56,  $p=0.046$ ), and 1.62 (95% CI 1.12-2.36,  $p=0.011$ ), respectively.

50 **Conclusion:** This study observed an inequity in inpatient service utilization where the  
51 utilization concentrates among high SES migrants. This suggests that future policies should  
52 make the reimbursement more pro-poor among migrants in primary care and use more  
53 effective policies targeting the migrants with low educational attainment and unemployed,  
54 such as health education activities.

## 55 **Keywords**

56 Migrants, socioeconomic status (SES), inpatient service utilization, concentration index,  
57 Blinder-Oaxaca decomposition, China

58

## 59 **Background**

60 According to the World Health Organization (WHO) [1], the key goal of the universal health  
61 coverage (UHC) is to ensure that everyone receive the health care they need. Providing equal  
62 treatment for those who have the same need for healthcare, regardless of their socioeconomic  
63 and cultural background, has become a shared goal among policymakers who strive to improve  
64 healthcare. However, millions of people, especially migrants, do not have the adequate access  
65 to health-care services they need [1]. Migrants face many obstacles in accessing essential  
66 health care services due to factors such as language barriers, a lack of inclusive health policies,

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67 and inaccessible public services [2]. The WHO has been promoting the health of migrants and  
68 committed to adequately address health needs for migrants. A WHO framework for migrant  
69 health has recognized the urgent need for the health sector to address the impact of migration  
70 on health effectively [2].

71 China has experienced the largest migration during the past three decades, with the  
72 number of migrants increased from 230 million in 2011 to 244 million in 2017, which  
73 constituted 18% of the total population of China [3]. Internal migrants, in Chinese literally  
74 “floating population”, which is defined as those who have left their hometowns to live and work  
75 in a new place for more than one month but do not have a local ‘Hukou’ (registered residence)  
76 at the new location [4]. Since 1980s, the rate of urbanization has increased dramatically in  
77 China which is due to internal rural-to-urban migration [5]. However, migrants are known to be  
78 marginalized in China, because of the Hukou system. Although the internal migrants have  
79 made an important contribution to urban economic growth and social stability, their health  
80 status and health service utilization have not received due attention. Comparing with local  
81 residents, the migrants face many barriers in accessing essential health care, which lead to  
82 unmet health care need and poor quality care [2, 6]. The challenge for China is how to promote  
83 economic growth and develop wealth while reducing inequality among migrants. Addressing  
84 the health care needs of migrants can improve their health status, facilitate social integration,  
85 and contribute to economic development [7]. During the past two decades, China implemented  
86 several national healthcare development plans [8] to improve healthcare access and equality  
87 with many challenges and successes. National Health Commission of the People’s Republic  
88 of China (NHC-PRC) has started an initiative called ‘Equal Access to Public Services among

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89 Migrants (EAPSM)' since 2013, to improve access to public service especially the utilization  
90 of health service.

91 According to previous studies, socioeconomic status (SES) has been found to be a key  
92 determinant in the utilization of health services. A study in Korea found that women with lower  
93 SES have limited access to necessary health care service [9]. Another study conducted in China  
94 showed that the patients with higher SES preferred public health services than private health  
95 services [10]. A few studies also explored the needs and utilization of health services among  
96 migrants. A study [11] in the United States identified factors related to healthcare utilization  
97 among Asian migrant women and found that those had health insurance and more work-related  
98 health symptoms were more likely to visit a primary care provider. Guo and colleagues  
99 examined potential linkages between family relationships and health service utilization among  
100 Chinese American elderly, which showed that positive spousal or family relations were not  
101 associated with either physician visits or hospital stays [12]. Another study [13] in China found  
102 that migrants who were insured were more likely to have doctor visits than those who were  
103 uninsured. These existing studies have mostly been divided into three categories. The first is  
104 about the difference and comparison of the utilization of health services between the migrants  
105 and the local residents [6, 14, 15]. Second, most studies on the internal migrants are based on  
106 regional data [13, 16-19], and there were few studies using a nation-wide data about the  
107 migrants. More importantly, most of the studies focused on the influencing factors of the  
108 utilization of health services of the migrants, but few explored from the perspective of health  
109 need [18, 20, 21]. Equity in health can only be attained if persons with the same level of  
110 healthcare needs receive equal level of care, regardless of their socioeconomic status.

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111 Although health equity became an increasingly popular research topic worldwide, there is a  
112 shortage of studies explored the SES inequities in inpatient service utilization among internal  
113 migrants in China, especially based on need. It is also essential for more studies to evaluate  
114 the situation in the utilization of health services after EAPSM. In order to fill these gaps in the  
115 current studies, this study was performed to explore the SES inequities in inpatient service  
116 utilization based on need among the internal migrants in China, in order to quantify SES roles  
117 in healthcare utilization inequity as a guide for health policy makers and draw public policy  
118 implications to further reform the health care systems.

119

## 120 **Methods**

### 121 **Study design and data**

122 The data used in this study was derived from the 2014 National Internal Migrant Population  
123 Dynamic Monitoring Survey [22], which covered 348 cities in 32 provincial units and collected  
124 by the National Health Commission of China. The purpose of the survey was to investigate the  
125 utilization of health services among internal migrants. The sampling frame for this study was  
126 taken using the stratified multistage random sampling method by probability proportional to  
127 size (PPS) approach. All respondents in this study were aged 15-59 years who had been living  
128 in local residence without the ‘Hukou’ for more than one month, including migrants from both  
129 rural and urban areas. For more details on sampling, design and approvals of the survey, please  
130 refer to an earlier study. [23] The detailed sampling process was shown in **Fig. 1**. Finally, a  
131 total of 7592 migrants with inpatient service need were included in this nationally  
132 representative analysis.

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133 **Variables**

134 In this study, migrants' inpatient service need was measured by questions about whether they  
135 were asked to be hospitalized by a doctor during the last 12 month (inpatient need). Based on  
136 the inpatient service need, the outcome was categorized into unmet inpatient services need and  
137 receiving inpatient services. The unmet need for inpatient service referred to the proportion  
138 migrants who were asked to be hospitalized but did not utilize it. The key independent variable  
139 was socioeconomic status (SES). SES was an economic and sociological combined total  
140 measure of a person's work experience and an individual's or family's economic and social  
141 position in relation to others, based on household income, individual education, and  
142 employment status [24]. In this study, we assessed the SES in two ways. First, in order to  
143 compare the inequity of the high-low SES in inpatient service utilization from a macro  
144 perspective, we integrated the educational level, economic status (household income per  
145 month) and employment status into a single SES index using principal component analysis  
146 (PCA) [25] method (details see in Appendix Table A1). Then, we used three specific  
147 indicators (economic status, employment status and educational attainment) to show the  
148 associations between SES and inpatient service utilization. All three socioeconomic status  
149 types were measured in two categories: low SES and high SES. Low and high SES was  
150 defined in the following ways: 1) educational attainment, as middle school or below vs. high  
151 school or above; 2) economic status was created using a median split based on household  
152 income per month; 3) employment status which means whether the respondent had a job, as  
153 employed vs. unemployed.

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154 Referring to previous studies [26-28] on the confounding factors of health service  
155 utilization, controlled variables included gender, age, marital status (married or single), number  
156 of children and ethnic group (Han or ethnic minority), whether had a health record, Hukou  
157 types (urban or rural), health insurance, movement area (across province, city or county),  
158 duration of migration, region, and willingness for long-term residence of more than 5 years (yes,  
159 no, and not decided yet). Types of health insurance were divided into five subgroups: no health  
160 insurance, having New Rural Cooperative Medical Scheme (NCMS), having Urban Employee  
161 Basic Medical Insurance (UEBMI) and having Urban Resident Basic Medical Insurance  
162 (URBMI). Movement area was categorized into three types: migration across provinces;  
163 migration across prefectural cities but within a province and migration across counties but  
164 within a prefectural city. All the controlled variables were available through the 2014 National  
165 Internal Migrant Population Dynamic Monitoring Survey and were included in multivariate  
166 logistic regression model 2.

### 167 **Analytical methods**

168 Data analyses were conducted by using the STATA 14.2. Descriptive analyses were performed  
169 to compare the inpatient service utilization across different subgroups of the participants using  
170 t-test or chi-square test as appropriate and reported their *p*-values. Sample weights were  
171 applied in all the analysis to represent the China population.

172 First, we estimated the concentration index (CI) and constructed a concentration curve  
173 (CC) to illustrate inequity in unmet inpatient service need among migrants. The CC graphs the  
174 cumulative percentage of the sample on the x-axis, ranked by SES index, beginning with the  
175 lowest. CI was used to quantify the magnitude of inequity in unmet need and corresponds to

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176 twice the area between the CC and the 45° line [29]. CC runs from -1 (over-diagonal) to +1  
 177 (under-diagonal), indicating whether the unmet inpatient service need is concentrated among  
 178 the low-SES (CI < 0), the high-SES (CI > 0), or equally distributed (CI = 0) [30].

179 The concentration index  $C_M$  was calculated by the following formula:

$$180 \quad C_M = \frac{2}{N\bar{y}} \sum_{i=1}^N (y_i - \bar{y}) \left( R_i - \frac{1}{2} \right) \quad (1)$$

$$181 \quad = \frac{2}{\bar{y}} \text{cov}_w(y_i, R_i) \quad (2)$$

182 Where  $\bar{y}$  stands for the mean of  $y$ ,  $y_i$  is the measure of unmet inpatient service need of  
 183  $i$ th individual,  $R_i$  denotes the fractional rank of the  $i$ th individual in the SES index, and  
 184  $\text{cov}_w$  is the covariance with sampling probability weights. The concentration index and the  
 185 associated  $p$ -values were obtained by the delta method [31]. If the  $C_M$  is significantly smaller  
 186 than 0, low SES individuals are more likely to have unmet inpatient service need, and vice  
 187 versa [32].

188 Then, we adopted logistic regression method to investigate the SES disparities in  
 189 multivariate analyses adjusted for confounding variables. Those who received inpatient  
 190 services were defined as the reference group. Binary logistic regression (model 1) to examine  
 191 the association between SES and inpatient service utilization without controlled variables. In  
 192 order to control for potential confounding factors, multiple logistic regression (model 2) were  
 193 used to estimate the adjusted odds ratio and the 95% confidence intervals. The model was  
 194 specified as:

$$195 \quad \text{Logit} \left( \frac{p_i}{1-p_i} \right) = \beta_0 + \beta_1 * \text{SES}_i + \beta_2 * C_i + \epsilon \quad (3)$$

$$196 \quad OR = \text{Exp}(\beta_1) \quad (4)$$

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197 Where  $p_i$  represented the probability of inpatient service utilization;  $SES_i$  represented  
198 the socioeconomic status of  $i$ th individual;  $C_i$  indicated the confounding variables;  
199 Coefficients  $\beta_0$  and  $\beta_1$  represented intercept and SES inequalities, respectively;  $\epsilon$  indicated  
200 error terms; OR indicated Odds Ratio.

201 Finally, the decomposition of the gap in inpatient service use between the high and low  
202 SES migrants was assessed using the Blinder-Oaxaca (BO) decomposition method. The BO  
203 decomposition method was originally developed to explain wage gaps between whites and  
204 blacks and between men and women since the seminal work of Oaxaca and Blinder in the  
205 early 1970s [33, 34]. The BO decomposition [35] was a counterfactual method with an  
206 assumption that “what the probability of unmet inpatient service need would be if low SES  
207 migrants had the same characteristics as their high SES counterparts”. In this part, SES was  
208 created using a median split with low SES categorized as below the median of SES index  
209 total score and high SES categorized as above the median. Based on it, the SES inequity was  
210 divided into two parts by using BO decomposition as followed:

$$211 \quad E(P_h - P_l) = (E[Z_h] - E[Z_l])\beta_l + E[Z_h](\beta_h - \beta_l) \quad (5)$$

212 Where  $l$  represented low SES migrants and  $h$  represented high SES migrants;  $Z$   
213 represented all the independent variables in our study;  $\beta$  represented the estimated  
214 coefficients. The first term in Equation (1) corresponded to the proportion of the gap in  
215 outcomes between two groups that were accounted for by group differences in the distribution  
216 of observable characteristics, it indicated “endowments effect”; while the second term was  
217 “gradient effect” traces the differences that are attributable to the effect of the variables.

218 Decomposing SES differences in inpatient service utilization into endowments and gradient

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219 effects has strong policy implications since the evidence of gradient effect would reflect that  
220 high-low SES migrants endowed with the same characteristics do not enjoy the same level of  
221 inpatient service.

222

## 223 **Results**

224 According to the Table 1, the total number of the migrants who needed inpatient service  
225 diagnosed by doctors was 7592, of which, 1667(21.96%) did not use the inpatient services  
226 (unmet inpatient service need) and 5925(78.04%) had used the inpatient services. The  
227 migrants with high-SES defined by educational attainment, economic status, and employment  
228 status was 2942 (which accounted for 38.75% in total), 3438 (45.28%), and 7137 (94.01%),  
229 respectively. Of the 7592 participants, about two-thirds (n=5461) were female. The mean age  
230 was 32 (SD=9.02) years old. Most of the migrants were Han Chinese and had married, 97.43%  
231 had at least one child; 82.86% were registered as having a rural ‘Hukou’ and 74.39% had  
232 established the health records in the local residence. Overall, 58.57% of the respondents were  
233 covered by the NCMS, 7.26% and 20.13% were covered by the URBMI and UEBMI,  
234 respectively, while 14.04% had no social health insurance. Generally speaking, the majority of  
235 our sample population was migrants across province (48.08%) and has willingness for  
236 long-term residence (66.81%). Using chi-square tests, we found that there were statistically  
237 significant differences in socioeconomic status, gender, age, marital status, number of children,  
238 health insurance, movement area, and duration of migration. **Figure 2** plotted the  
239 concentration curves for probability of inpatient service utilization among migrants in the

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240 previous 12 month. A significant distribution of inpatient service utilization based on need  
241 concentrated among high-SES migrants was observed (CI: 0.041,  $P < 0.001$ ).

242 In Table 2, we showed the association between SES and those who receive inpatient  
243 healthcare services among migrants who need them. There were significant associations  
244 between three SES indicators and the inpatient service utilization. Model 1 presented the  
245 disparities in utilization of inpatient services in different socioeconomic status without  
246 covariate adjustment. The OR values of inpatient service utilization by internal migrants with  
247 high SES according to educational attainment, economic status, and employment status, which  
248 were 1.54 (95% CI 1.23-1.93,  $p < 0.001$ ), 1.39 (95% CI 1.14-1.71,  $p = 0.001$ ), and 2.24 (95% CI  
249 1.60-3.14,  $p < 0.001$ ), respectively. After adjusting for other confounding variables such as  
250 gender, age, marital status etc., the associations were still statistically significant in model 2.  
251 Specifically, the OR values of inpatient service utilization by internal migrants with high SES  
252 according to educational attainment, economic status, and employment status were 1.41 (95%  
253 CI 1.08-1.85,  $p = 0.012$ ), 1.25 (95% CI 1.01-1.56,  $p = 0.046$ ), and 1.62 (95% CI 1.12-2.36,  
254  $p = 0.011$ ), respectively. Logistic regression analysis showed that migrants with higher SES  
255 defined by educational attainment were 1.41 times, economic status were 1.25 times, and  
256 employed migrants were 1.62 times than the lower SES to utilize the inpatient healthcare  
257 services. **Figure 3** showed the composition of the reasons for unmet inpatient service need, of  
258 which the most important was economic difficulties (605, 36%), followed by the feeling  
259 unnecessary (574, 34%).

260 Table 3 presented the BO decomposition results. The probabilities of inpatient service  
261 utilization when needed were 85.4% for high-SES migrants and 76.1% for low-SES. Both

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262 endowments effect and gradient effect were significant in logistic decompositions, 46.24% of  
263 the gap between the two groups could be attributed to differences in the distribution of  
264 explanatory variables included in the model. About 53.76% of the total SES difference in  
265 inpatient service utilization could be attributed to gradient effect.

266

## 267 **Discussion**

268 Healthcare utilization based on need is a key indicator to assess the operation of a country's  
269 healthcare system, and any barriers of access to healthcare should be identified and then  
270 eliminated [9]. It is important to assess equity in meet health services need rather than access  
271 to healthcare, since access simply denotes an opportunity to receive healthcare, while meeting  
272 need mean utilizing the opportunity. One of the objectives of UHC is equity in access to  
273 healthcare services, which means 'everyone who needs these services should get them, not  
274 just those who can pay for them'[36]. By analyzing the SES inequities in inpatient service  
275 utilization based on need among the migrants is vital to develop targeting measures, so as to  
276 better meet the health services need of the migrants. The present study can also be considered  
277 as the first results of evaluating the situation in utilization of inpatient services after EAPSM.  
278 Using the National Internal Migrant Population Dynamic Monitoring Survey dataset in 2014,  
279 we found that the rate of unmet inpatient service need among migrants was 22.75%, which  
280 was higher than 17.1% of general population [37], implying the migrants still face many  
281 barriers in accessing essential health care than the local residents. CI has been widely used in  
282 the health inequity literature. This study found that CI was significantly larger than 0 and the  
283 CC lying over the line of equality, meaning inpatient service utilization concentrated more

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284 among the high SES group. Socioeconomic inequality in the use of healthcare, i.e., the high  
285 SES group having a higher probability of healthcare utilization when needed, is a persistent in  
286 low- and middle- income countries [38]. Our results are similar to previous studies on general  
287 healthcare utilization in China [39, 40].

288 Logistic regression was used to show the association between SES and inpatient service  
289 utilization. We found the three SES indicators, including economic status, employment status  
290 and educational attainment, were statistically significant. Our study indicated that low  
291 economic status of internal migrants was a key barrier to accessing inpatient service. Compared  
292 with those in the low-economic status group, internal migrants with higher economic status  
293 were more likely to utilize inpatient service when they had an inpatient service need, which was  
294 consistent with the top reason shown in Figure 3 (economic hardship, 36.29%) for unmet  
295 inpatient service need among internal migrant. Previous studies have shown that the risk of  
296 unmet inpatient service of the poor people was significantly higher than that of non-poor  
297 people[27], both in the permanent residents and the migrants[4, 41] . There are several possible  
298 reasons for this finding. First, migrants with higher economic status in China have higher  
299 payment capacity, and hence, they were more likely to use inpatient services when in need.  
300 Second, most of those with low economic status were those rural-to-urban migrants. The  
301 primary goal of migration among this population was in search of economic opportunities in  
302 urban areas. Thus, they tended to focus on their economic conditions only, and usually do not  
303 prioritize their own health [2]. Even if they needed inpatient health services, going to hospital  
304 would cost them a fortune. Despite the nearly universal medical insurance coverage in China,  
305 economic status remains the dominant barrier to healthcare services utilization [28, 42, 43],

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306 including outpatient and inpatient services, and lead to inequity in general health care  
307 utilization[44-46]. This phenomenon is even more severe among the internal migrants. This  
308 study also found that low educational attainment was associated with unmet inpatient service  
309 need among internal migrants, which was consistent with other studies [20, 47-49]. One  
310 possible interpretation for this finding was that the internal migrants with higher education  
311 usually received more knowledge and awareness about the importance of inpatient service use,  
312 and thus tended to use inpatient services when they have a need. The present study revealed  
313 that employed migrants were more likely to use inpatient service when needed than the  
314 unemployed migrants, which was consistent with previous studies [20]. The employed  
315 migrants with formal job usually conduct regular medical examinations and receive health  
316 education from their work place. In contrast, most of the unemployed migrants might be a  
317 dependent of the migrant who had a job, which result in less health education. In addition,  
318 unemployed migrants have no financial source, thus, one another possible interpretation for  
319 this finding was the inability of unemployed migrants to meet the costs. These reasons may  
320 explain the lower possibility to use inpatient service when they in need concentrated among  
321 unemployed migrants.

322 The results of BO decomposition showed that migrants with high SES had higher  
323 probability of inpatient service utilization and the gradient effect, rather than the endowments  
324 effect, accounted for most of the SES difference in unmet inpatient service need. In other  
325 words, about 46.24% gap in inpatient service utilization between low and high SES can be  
326 explained by difference in the levels of observable characteristics. The “gradient effect”,  
327 which was considered as “discrimination” in previous studies, could reflect inequity here. The

---

328 decomposition results suggested that about 53.76% of the total SES gap in inpatient service  
329 utilization could be attributed to the gradient effect. Namely, SES inequity could account for  
330 around 54% in inpatient service utilization among migrants. Migrants with lower SES may  
331 choose to delay or resist the need of inpatient services since meeting the need of inpatient  
332 services often means high medical expenses. Improving social and economic resources of low  
333 SES migrants would be helpful for reducing the barriers of unmet inpatient need. To be  
334 specific, policy makers should develop pro-poor health insurance scheme in migrants with low  
335 economic status and those who unemployed. Also, future interventions might consider using  
336 health education focused on migrants with low level of education. It is worth mentioning that  
337 popular and easy ways should be conducted to intervene for migrants with low educational  
338 attainment and improve their use of inpatient service when in need. For example, a better form  
339 of health education on migrants is peer education. Those low education migrants with similar  
340 age profile, gender and economic status can have common topics of discussion, and thus share  
341 information, so as to amplify the effect of “peer effect”.

342       Although previous studies have shown that high-SES is a protective factor in using public  
343 health service among the migrants [10, 17, 20, 21, 50, 51], few explored from the perspective of  
344 health need among internal migrants in China. As to study limitation, it should be noted that the  
345 utilization of inpatient services and doctor's diagnostic information of the internal migrants  
346 were both self-reported, therefore, recall bias might exist. Second, due to the lack of the  
347 information on the use of outpatient services, we cannot analyze the utilization of full health  
348 services of migrants.

349

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350 **Conclusion**

351 This study observed an inequity in inpatient service utilization where the utilization  
352 concentrates among high SES migrants. To be specific, three individual-level SES indicators  
353 of internal migrants including economic status, employment status, and educational  
354 attainment were all significantly associated with inpatient service utilization. Internal  
355 migrants with higher economic status, higher educational attainment and employed were  
356 more inclined to utilize inpatient services when needed. This suggests that future policies  
357 should make the reimbursement more pro-poor among migrants in primary care and more  
358 effective policies targeting the migrants with low educational attainment and unemployed,  
359 such as health education activities.

360

361

362 **List of abbreviations**

363 SES: socioeconomic status; UHC: universal health coverage; WHO: World Health  
364 Organization; NHC-PRC: National Health Commission of the People's Republic of China;  
365 EAPSM: Equal Access to Public Services among Migrants; PPS: probability proportional to  
366 size; PCA: Principal Component Analysis; NCMS: New Rural Cooperative Medical Scheme;  
367 UEBMI: Urban Employee Basic Medical Insurance; URBMI: Urban Resident Basic Medical  
368 Insurance; CI: Concentration Index; CC: Concentration Curve; BO: Blinder-Oaxaca; OR:  
369 Odds Ratio

370

371 **Declarations**

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372 **Ethics approval and consent to participate**

373 Not applicable.

374 **Consent for publication**

375 Not applicable.

376 **Availability of data and materials**

377 The datasets are open to all of the potential users online.

378 [<http://www.chinaldrk.org.cn/wjw/##/data/classify/population/yearList>].

379 **Competing interests**

380 The authors declare that they have no competing interests.

381 **Funding**

382 This study was supported by the National Science Foundation of China (Grant Numbers  
383 71974117, 71473152, 71774104), the China Medical Board (16-257), Cheeloo Youth Scholar  
384 Grant, and Shandong University (IFYT1810, IFYT181031). The funding bodies had no role  
385 in the design, data collection, analysis, interpretation of the data, and writing of this article.

386 **Authors' contributions**

387 CCZ and ZC conceived the idea and polished the manuscript. YW coded and analyzed data  
388 and wrote the manuscript. ZJ, YF, XT, and LD participated in interpretation of the data. All  
389 authors read and approved the final manuscript.

390 **Acknowledgements**

391 This research uses data from the National Internal Migrant Population Dynamic Monitoring  
392 Survey. We thank the National Health Commission of China providing this data available  
393 online.

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533

534 **Tables**

535 **Table 1** Characteristics of the migrants who need to be hospitalized, China (n=7592)

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Characteristics	Total N (%)	Inpatient services		
		Receive N (%)	Unmet need N (%)	p-value
<b>Total</b>	7592	5925 (78.04)	1667 (21.96)	
<i>Socioeconomic status</i>				
<b>Educational attainment</b>				<0.001
High	2942 (38.75)	2479 (41.84)	463 (27.77)	
Low	4650 (61.25)	3446 (58.16)	1204 (72.23)	
<b>Economic status</b>				<0.001
High	3438 (45.28)	2838 (47.90)	600 (35.99)	
Low	4154 (54.72)	3087 (52.10)	1067 (64.01)	
<b>Employment status</b>				<0.001

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Employed	7137 (94.01)	5659 (95.51)	1478 (88.66)	
Unemployed	455 (5.99)	266 (4.49)	189 (11.34)	
<b><i>Controlled variables</i></b>				
<b>Gender</b>				<0.001
Female	5461 (71.93)	4670 (78.82)	791 (47.45)	
Male	2131 (28.07)	1255 (21.18)	876 (52.55)	
<b>Age</b>	32.97±9.02	31.48±8.15	38.27±9.91	<0.001
<b>Marital status</b>				<0.001
Married	7120 (93.78)	5649 (95.34)	1471 (88.24)	
Single	472 (6.22)	276 (4.66)	196 (11.76)	
<b>Number of children</b>				<0.001
0	195 (2.57)	126 (2.13)	69 (4.14)	
1	4070 (53.61)	3340 (56.37)	730 (43.79)	
≥2	3327 (43.82)	2459 (41.50)	868 (52.07)	
<b>Ethnic group</b>				0.91
Han	6915 (91.08)	5396 (91.07)	1519 (91.12)	
Ethnic minority	677 (8.92)	529 (8.93)	148 (8.88)	
<b>Health records</b>				0.47
Yes	5648 (74.39)	4396 (74.19)	1252 (75.10)	
No	1944 (25.61)	1529 (25.81)	415 (24.90)	
<b>Hukou</b>				0.061

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Urban	1301 (17.14)	1041 (17.57)	260 (15.60)	
Rural	6291 (82.86)	4884 (82.43)	1407 (84.40)	
<b>Health insurance</b>				0.002
No insurance	1066 (14.04)	844 (79.17)	222 (20.83)	
NCMS	4447 (58.57)	3433 (77.20)	1014 (22.80)	
URBMI	551 (7.26)	410 (74.41)	141 (25.59)	
UEBMI	1528 (20.13)	1238 (81.02)	290 (18.98)	
<b>Movement area</b>				0.034
Across province	3650 (48.08)	2867 (48.39)	783 (46.97)	
Across city	2330 (30.69)	1838 (31.02)	492 (29.51)	
Across county	1612 (21.23)	1220 (20.59)	392 (23.52)	
<b>Migration time (year),</b>	4.51±4.80	4.09±4.42	6.03±5.73	<0.001
<b>Plans for long-term residence(&gt; 5 years)</b>				0.093
Yes	5072 (66.81)	3940 (66.50)	1132 (67.91)	
No	740 (9.75)	565 (9.54)	175 (10.50)	
Not decided yet	1780 (23.45)	1420 (23.97)	360 (21.60)	

536 Note: Hukou refers to the household registration system in China, classified all residents into

537 rural and urban registration categories;

538 NCMS: New Rural Cooperative Medical Scheme; UEBMI: Urban Employee Basic Medical

539 Insurance; URBMI : Urban Resident Basic Medical Insurance.

540

541

542 **Table 2** Association between socioeconomic status and receivers of inpatient services among  
 543 migrants who need them, China (n=7592)

Characteristics	Model 1		Model 2	
	Unadjusted OR (95% CI)	p-value	Adjusted OR (95%CI)	p-value
<i>Socioeconomic status</i>				
Educational attainment				
High	1.54 (1.23, 1.93)	<0.001	1.41 (1.08, 1.85)	0.012
Low	Ref.		Ref.	
Economic status				
High	1.39 (1.14, 1.71)	0.001	1.25 (1.01, 1.56)	0.046
Low	Ref.		Ref.	
Employment status				
High	2.24 (1.60, 3.14)	<0.001	1.62 (1.12, 2.36)	0.011
Low	Ref.		Ref.	

544 Note: Sample weights applied; CI indicated confidence interval; Model 2 were adjusted for  
 545 gender, age, marital status, number of children, ethnic group, health record, Hukou type,  
 546 health insurance, movement area, duration of migration and willingness for long-term  
 547 residence of more than 5 years.

548

549

550 **Table 3** BO decomposition of the gap in inpatient service utilization when needed between  
 551 the high and low SES among migrants in China (n = 7592)

	Coef. (95% CI)	SE	Contrib. (%)	P
<b>Predicted probability</b>				
High SES	0.854 (0.834, 0.873)	0.010	-	<0.001
Low SES	0.761 (0.738, 0.784)	0.012	-	<0.001
<b>Difference in predicted probability</b>				
Total gap	0.093 (0.063, 0.123)	0.015	100	<0.001
Due to endowments effect	0.043 (0.027, 0.060)	0.008	46.24	<0.001
Due to gradient effect	0.050 (0.019, 0.080)	0.015	53.76	<0.001

552 Note: Regressions and decompositions are weighted with sampling weights provided in the  
 553 survey.

554

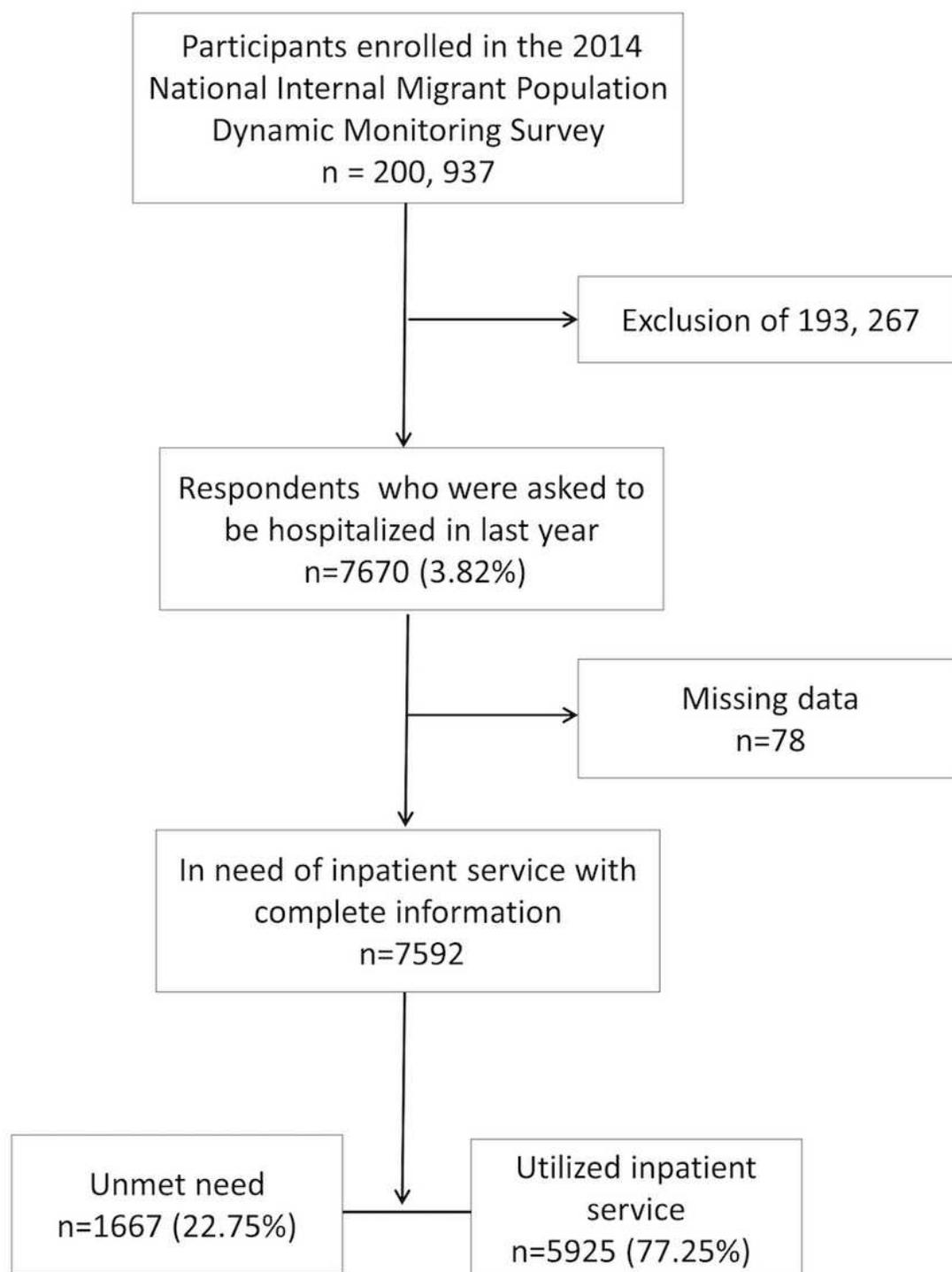
555 **Figures**

556 Figure 1: Flow chart of sample selection

557 Figure 2: Concentration curves for probability of inpatient service use among migrants

558 Figure 3: Reasons for unmet inpatient service need among the migrants

# Figures



**Figure 1**

Flow chart of sample selection

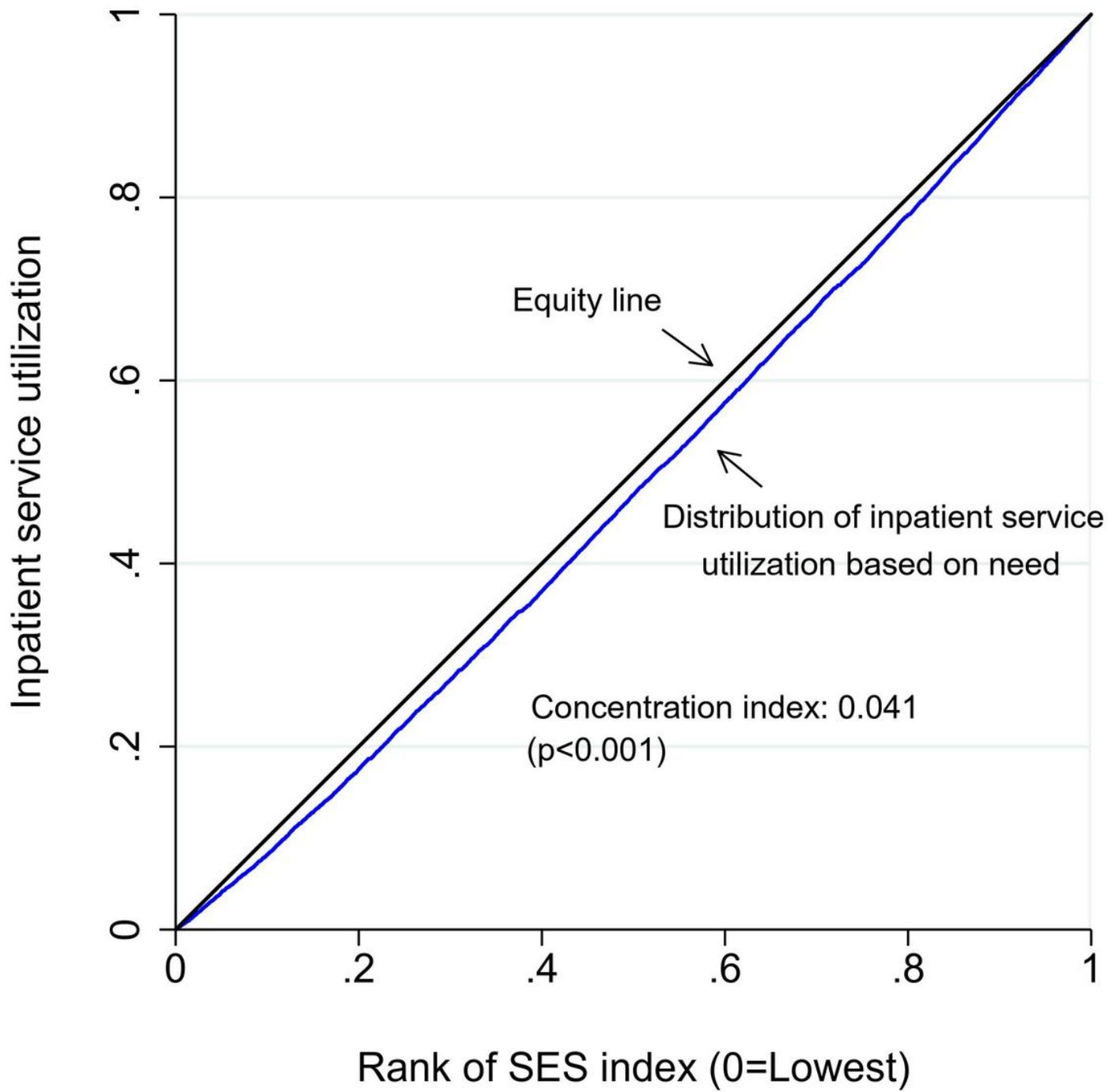
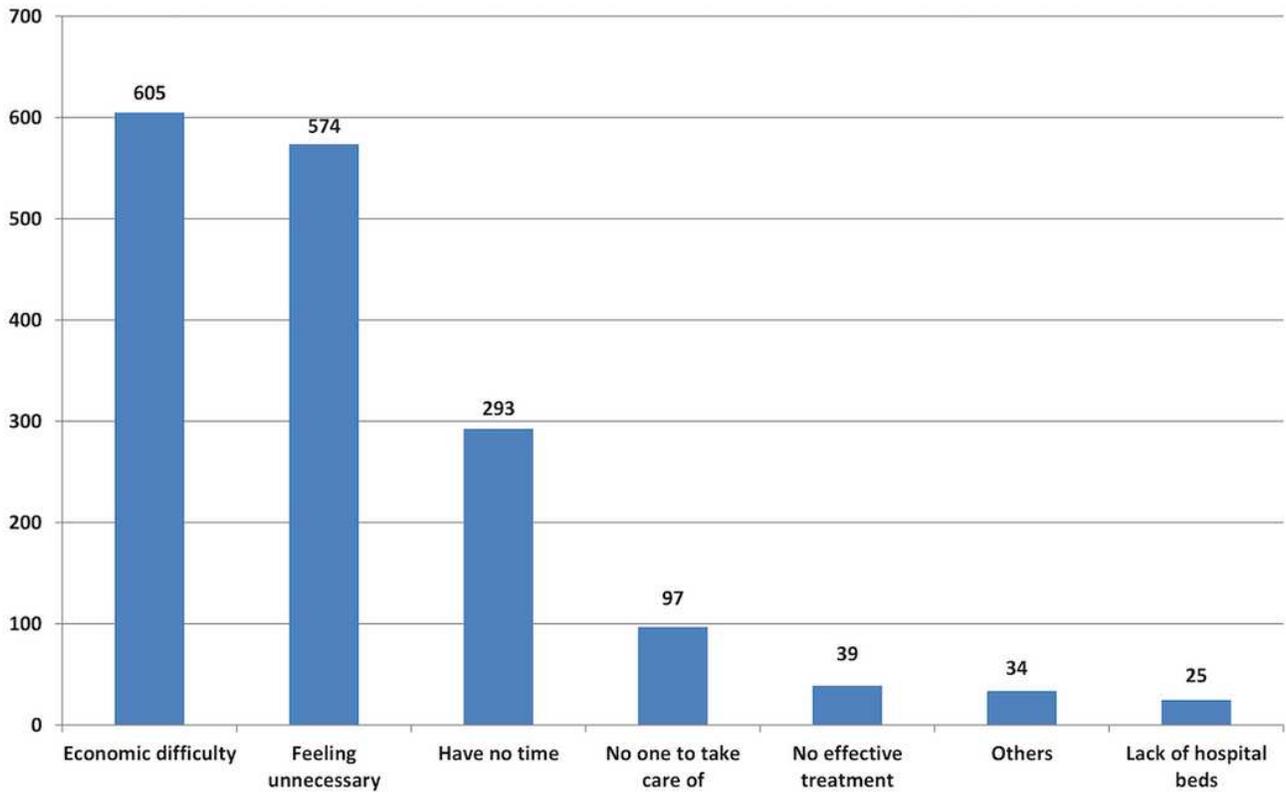


Figure 2

Concentration curves for probability of inpatient service use among migrants



**Figure 3**

Reasons for unmet inpatient service need among the migrants

## Supplementary Files

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- [SupplementaryAppendixTableA1.docx](#)
- [SupplementaryAppendixTableA1.docx](#)