Non-Prescription Antibiotic Use For People Aged 15 Years Or Older For Cough In China: A Community-Based Survey

Yan Luo
Zhejiang Provincial CDC: Zhejiang Provincial Center for Disease Control and Prevention
Xuewen Tang
Zhejiang Provincial Center for Disease Control and Prevention
Lingling Ding
Zhejiang Provincial Center for Disease Control and Prevention
Zhujun Shao
Chinese Center for Disease Control and Prevention
Jianxing Yu
Chinese Center for Disease Control and Prevention
Yangqing Chen
Xiamen University
Yang Zhou
Zhejiang Provincial CDC: Zhejiang Provincial Center for Disease Control and Prevention
Hanqing He (hanqinghe@cdc.zj.cn)
Zhejiang Provincial Center for Disease Control and Prevention https://orcid.org/0000-0003-0863-5177
Zhiping Chen
Zhejiang Provincial Center for Disease Control and Prevention

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Abstract

Background Non-prescription antibiotic use at community is a main driver of antimicrobial resistance. Cough is a common condition and prevalent in all communities, including China. This study aims to investigate the non-prescription antibiotic use for cough in China and explore to which extent antibiotic use knowledge was correctly instructed in communities.

Methods A probability-proportionate-to-size (PPS) sampling method was adopted to survey from all 14 communities in Yiwu city, China. All participants were investigated by face-to-face interview on Portable Android Devices (PADs). The continuous variables were presented by mean and standard deviation (SD) or medium and inter-quartile range (IQR). The categorical variables were presented using percentage or constituent ratio. Chi-square test for univariate analysis and logistic regression for multivariate analysis were conducted to assess the odds ratios (ORs) and 95% confidence intervals (CIs), respectively.

Results A total of 3034 respondents across the 14 communities and the 50 natural villages/streets completed all key items of the questionnaire. Of 2400 (79.10%) respondents stated that they experienced cough in the past 12 months with the medium age of 36.5 (IQR: 26-49) and 12.21% (293/2400) respondents had the non-prescription antibiotic use behavior. Among those 293 respondents, the proportion of non-prescription antibiotic use for cough peaked at around 16% among people aged 30-39 years old. The major sources of antibiotics were pharmacy (77.70%) and/or family storage (43.92%). As for antibiotic knowledge in 3034 participants, 61.8% participants had minimal knowledge on broad-spectrum antibiotic and 53.76% were not familiar about the effects of joint use.

Conclusions Non-prescription antibiotics use for cough is prevalent in the community, especially among people in their thirties. Strengthened drug purchase regulation and well-trained professional pharmacists would be promising alternatives to ameliorate AMR. Moreover, penetrating antibiotics knowledge to common citizens and is an urgent task to alleviate antimicrobial resistance. Therefore, proactive policies and regulations should be made to improve current situations.

Introduction

Among the various accessibility to antibiotics, non-prescription use of antibiotics is prevalent in the community of China [1], which increases the risk of inappropriate use. The inappropriate use of antibiotics leads to adverse consequences include antimicrobial resistance (AMR), adverse drug events and drug waste [2]. AMR is a major threat to public health and human development in this century. Due to AMR, it is increasingly difficult to treat infections, which thereafter results in ascending mortality. In addition, prolonged illness leads to longer hospital stays and higher medical costs. According to the published data, around 700,000 people die from drug-resistant each year and the number is estimated to rise to 10 million by 2050 if no action is taken [3]. The inappropriate use of antibiotics is accelerating the process of AMR and is the main driver in the development of drug-resistant pathogens [4]. AMR is more

challenging in developing countries because the health system is more vulnerable and people can obtain antibiotic without prescription easily [5, 6].

China, as the largest developing country, with one fifth of the world's population, therefore, non-prescription dispensing of antibiotics at community indeed is a global issue. In the past decade, China launched some health reforms and policies for using antibiotics rationally [7], however, few impacts from those actions were observed [8, 9].

Cough and expectoration are also prevalent in China [10, 11]. Past surveys showed that self-medication with antibiotics is common for people to treat self-limiting illnesses, like coughing, expectoration and upper respiratory tract infection (URTI) [12–14] in China. Previous studies [15, 16] have also shown the non-prescription antibiotic rates at community pharmacies for adult acute URTI without population-based data. In addition, the previous population-based surveys only limited to university students [14, 17] or children [18]. These studies have highlighted the seriousness of the non-prescribed and injudicious use of antibiotics, as well as high rate of antibiotic use for cough. However, there is no age-specific community-based accurate data to clarify the non-prescription frequency from a comprehensive view.

We hereby conduct a community-based survey among people aged 15 years and above to study 1) the proportion of non-prescription antibiotic use in population with respiratory disease related symptoms; 2) the sources and types of antibiotics used without prescription among people with respiratory disease related symptoms; 3) explore knowledge related to antibiotics use; and 4) factors that influenced people's behavior of non-prescription antibiotics usage.

Methods

Study population

This study was carried out in Yiwu city, Zhejiang Province (approximately 1,318,600 inhabitants) from June to December in 2019. People who aged 15 years or older and had been living in Yiwu for more than 6 months were considered as source population. We selected people for the survey from all 14 communities in Yiwu.

Definition

Cough: cough (defined as at least 3 days per week and at least 4 times per day) with or without expectoration in the past year (12 months) because of common cold or other reasons.

Non-prescription antibiotic use: self-medication antibiotics without doctor's prescription and get antibiotic from an unregulated supply chain.

Questionnaire

The questionnaire used in the survey comprising 3 sections: 1) sociodemographic information; 2) non-prescription antibiotic behaviors during cough; and 3) antibiotic knowledge. People were asked to state

the sources and reasons of antibiotic use when they cough and generic names of antibiotics they have used. The 9 knowledge questions related to non-prescription use and overuse of antibiotics.

Data collection

Investigation was conducted by staffs in centers for disease control (CDC) and prevention by face-to-face communication. All investigators underwent two-round training before investigation. Probability-Proportionate-to-Size (PPS) sampling method was adopted to select people for the survey from all 14 communities in Yiwu city, then followed by a simple random sampling. The aim was to achieve a sample size of 3000 individuals. First, we divided the whole sample size into 50 clusters, thus 60 individuals in each cluster. In each community, the number of cluster (*n*) was calculated by the number of population (*N*) divides 50, meaning *n* equals to round up *N/50*. Then, we randomly chose *n* natural villages/streets as *n* clusters in corresponding community. Finally, in each cluster/natural village/street, we stratified by age group (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–64 and > = 65 years old) and gender; 60 individuals were investigated according to the age distribution and the gender distribution. Investigation in each age group completed when its corresponding quota achieved. No-response surveys did not include in the final analysis while reasons of no response were recorded. Data collection was implemented through offline face-to-face interview system on Portable Android Device (PAD). Source data verification and data export was conducted by two investigators for quality control weekly. The data was collected between October 2019 and December 2019.

Statistical analysis

Data analysis were done using Microsoft Excel 2010 and R v3.5.1, and $P < 0.05$ was considered statistically significant. The continuous variables were presented by mean and standard deviation (SD) or medium and inter-quartile range (IQR). The categorical variables were presented using percentage or constituent ratio. For risk factors that associated with non-prescription antibiotic behavior during cough, we used chi-square test for univariate analysis and logistic regression for multivariate analysis to assess the odds ratios (ORs) and 95% confidence intervals (CIs), respectively. Cochran-Armitage trend test was used to test the trend of age-specific frequency. Variables with statistically significant or professional significant in univariate analysis were included in the multivariate analysis. The score of antibiotic-related knowledge was calculated by simply adding the number of correct answers. A score of 0–3 was considered as a low level of knowledge, 4–6 was medium and 7–9 was high.

Results

Sociodemographic characteristics

A total of 3051 respondents across the 14 communities and the 50 natural villages/streets participated in the interviews. A total of 3034 (99.44%) respondents completed all key items of the questionnaire (Table 1). The spectrum of age for recruited participants spanned from 15 to 94 with the medium age of 37 (IQR: 26–49). Specially, 1819 (59.95%) lived in the urban areas and 1499 (49.41%) were male. Among

the 3034 subjects, 2400 (79.10%) stated that they experienced cough in the past 12 months; the medium age was 36.5 (IQR: 26–49). (Table 1)

Table 1
The sociodemographic characteristics of study participants

characteristics	total (n = 3034)	participants with cough (n = 2400)
	n (%)	n (%)
Age (years)		
15–19	210 (6.92)	179 (7.46)
20–24	420 (13.84)	327 (13.63)
25–29	416 (13.71)	329 (13.71)
30–34	318 (10.48)	251 (10.46)
35–39	312 (10.28)	239 (9.96)
40–44	314 (10.35)	250 (10.42)
45–49	313 (10.32)	241 (10.04)
50–64	417 (13.74)	333 (13.88)
>=65	314 (10.35)	251 (10.46)
median (IQR)	37 (26, 49)	36.5 (26, 49)
Residence		
urban	1819 (59.95)	1391 (57.96)
rural	1215 (40.05)	1009 (42.04)
Gender		
male	1499 (49.41)	1174 (48.92)
female	1535 (50.59)	1226 (51.08)
Occupation		
student	164 (5.41)	146 (6.08)
unemployed	695 (22.91)	582 (24.25)
Business/service/food personnel	1111 (36.62)	831 (34.63)
professional	705 (23.24)	560 (23.33)
Farmers and workers	359 (11.83)	281 (11.71)
Education		
Primary school and below	625 (20.60)	492 (20.50)

Abbreviations: IQR, inter-quartile range; CNY, Chinese Yuan.

characteristics	total (n = 3034)	participants with cough (n = 2400)
	n (%)	n (%)
middle school	1695 (55.87)	1330 (55.42)
college and above	714 (23.53)	578 (24.08)
Child under 5 years old		
no	1912 (63.02)	1528 (63.67)
yes	1122 (36.98)	872 (36.33)
Annual household income (CNY)		
< 100,000	1789 (58.97)	1382 (57.58)
100,000—199,999	902 (29.73)	733 (30.54)
≥ 200,000	343 (11.31)	285 (11.88)
Smoking status		
no	1696 (55.9)	1341 (55.88)
yes	1338 (44.10)	1059 (44.13)
Chronic disease		
no	2430 (80.09)	1891 (78.79)
yes	604 (19.91)	509 (21.21)
Abbreviations: IQR, inter-quartile range; CNY, Chinese Yuan.		

Proportions and ratios of non-prescription antibiotics

Among 2400 participants who experienced cough in the past 12 months, 293 (12.21%) individuals had the non-prescription behavior. After stratified by age (Fig. 1), non-prescription proportion was ranged from 15.08% (standard error, SE:±2.68) in individuals aged 15–19 years, 9.48% (SE:±1.62) in people aged 20–24, to 13.98% (SE:±1.91) in individuals aged 25–29 years. Then, the proportion was peaked at 16.73% (SE:±2.36) among people in 30–34 years. After slightly dropped to 16.32% (SE:±2.39) in 35–39 years old, the proportion dramatically decreased to 10.40% (SE:±1.93) in 40–44 years old. Despite a few fluctuations, the overall proportion was around 10% (SE:±1.68) from 45 to 64 years old, then reached the lowest 5.58% (SE:±1.45) in people aged 65 years old or older. (Z_{trend} =-1.358, P_{trend} =0.1743). (Fig. 1)

In 293 participants who used antibiotic without prescription when they coughed in the past year are shown in Table 2. The major sources were from pharmacy (77.70%) and family storage (43.92%), followed by last remaining antibiotic (13.18%). Only 5 (1.69%) and 3 (1.01%) individuals stated that they obtained antibiotic without prescription from friend/colleagues or online, respectively. Then we further

undermine the underlying cause for non-prescription antibiotics use, 201 (67.91%) individuals considered cough was unnecessary to visit a doctor. More than half (57.09%) individuals used non-prescription antibiotic as they had antibiotic stored at home. 125 (42.23%) participants had non-prescribed use because purchasing antibiotics in pharmacy was convenient and 102 (34.46%) participants believed that self-treating by antibiotics was effective for cough. The remaining 34 (11.60%) participants used antibiotic without prescription as they considered going to hospital was time-consuming. Only 1 (0.34%) individual non-prescribed antibiotic use because its safety. (Table 2)

Table 2
Details of non-prescription antibiotic use in participants for cough (N = 293)

Antibiotic use	N	Ratio (%)	Ratio of options (%)
Source			
Pharmacy	230	77.70	55.83
Family storage	130	43.92	31.55
Last remaining antibiotic	39	13.18	9.47
Friends or colleagues	5	1.69	1.21
Online purchase	3	1.01	0.73
Reasons for non-prescription			
Cough is ailment and not necessary to see a doctor	201	67.91	31.36
With antibiotic at home	169	57.09	26.37
Pharmacy purchase is convenient	125	42.23	19.50
Believe self-treating by antibiotic is effective for cough	102	34.46	15.91
Too busy to see a doctor	15	5.07	2.34
The process of seeing a doctor is too long	10	3.38	1.56
Self-treatment by antibiotic is more convenient than go to hospital	9	3.04	1.40
Antibiotic is safe	1	0.34	0.16
Antibiotic type			
Penicillin	145	48.99	38.98
Cephalosporin	116	39.19	31.18
Don’t remember	61	20.61	16.40
Macrolides	15	5.07	4.03
Quinolones	6	2.03	1.61

Antibiotic use knowledge

All answers of 3034 participants are shown in Table 3. Key findings were that the majority agree that antibiotic should be used under prescription (73.01%) and patients should not require doctor to prescribe antibiotic (55.11%). More than half subjects (52.5%) somewhat disagree or complete disagree expensive antibiotic is better. Almost half (49.11%) participants disagree that intravenous infusion was more effective. Notably, 61.8% participants have no idea about broad-spectrum antibiotic and 53.76% were not

sure about the effects of joint use. Most people (69.18%) somewhat disagree or completely agree that antibiotic can be used prophylactically. (Table 3)

Table 3
The antibiotic related knowledge of participants (N = 3034)

Questions	Answer N (%)				
	Completely agree	Somewhat agree	No opinion	Somewhat disagree	Completely disagree
1. antibiotic should be used as early as possible for the sake of effectiveness	152 (5.01)	595 (19.61)	1103 (36.35)	1079 (35.56)	105 (3.46)
2. antibiotic has the same effect as anti-inflammatory drug	36 (1.19)	871 (28.71)	1360 (44.83)	699 (23.04)	68 (2.24)
3. antibiotic is prescription medicine, and it should be used under doctor's prescription	574 (18.92)	1641 (54.09)	703 (23.17)	104 (3.43)	12 (0.4)
4. patients can require doctor to prescribe antibiotic because it is patients' right	25 (0.82)	442 (14.57)	895 (29.5)	1329 (43.8)	343 (11.31)
5. the higher price of antibiotic; the better of its effectiveness	54 (1.78)	450 (14.83)	937 (30.88)	1403 (46.24)	190 (6.26)
6. Intravenous infusion is more effective than oral medication	62 (2.04)	528 (17.4)	954 (31.44)	1290 (42.52)	200 (6.59)
7. broad-spectrum antibiotic can resist multiply bacteria and doctor should use broad-spectrum antibiotic first	29 (0.96)	353 (11.63)	1875 (61.8)	690 (22.74)	87 (2.87)
8. early usage of different types of antibiotics can jointly reduce antibiotic resistance	16 (0.53)	247 (8.14)	1631 (53.76)	993 (32.73)	147 (4.85)
9. antibiotic has no adverse effect and can be used prophylactically	7 (0.23)	199 (6.56)	729 (24.03)	1636 (53.92)	463 (15.26)

Univariable and multivariable analyses for risk factors for non-prescription antibiotic use

Table 4 shows univariate and multivariate analyses results. In multivariable analysis, families with child under 5 years old were less likely to non-prescription use of antibiotic during cough, with an OR of 0.730 (95% CI:0.552–0.965). Similarly, individuals with chronic diseases were less likely to use antibiotic without prescription when they coughed, with an OR of 0.654 (95% CI: 0.441–0.969). Participants with medium knowledge of antibiotic were more likely to use antibiotic without prescription when compared to those of low knowledge, with an OR of 1.511 (95% CI: 1.122–2.034). (Table 4)

Table 4
Univariate and multivariate analyses of factors associated with non-prescription antibiotic use in participants for cough (N = 2400)

Characteristics	Non-prescription antibiotic use		Univariable		Multivariable	
	Yes N (%)	No N (%)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age (years)						
15–29	104 (12.46)	731 (87.54)	Reference	0.003	Reference	0.198
30–44	107 (14.46)	633 (85.54)	1.170 (0.891–1.536)	0.258	1.241 (0.921–1.671)	0.156
>=45	82 (9.94)	743 (90.06)	0.644 (0.450–0.920)	0.016	0.926 (0.575–1.491)	0.752
Residence						
urban	185 (13.30)	1206 (86.70)	Reference		Reference	
rural	108 (10.70)	901 (89.30)	0.781 (0.607–1.006)	0.056	0.799 (0.617–1.033)	0.087
Gender						
male	144 (12.27)	1030 (87.73)	Reference		Reference	
female	149 (12.15)	1077 (87.85)	0.990 (0.775–1.264)	0.933	1.040 (0.805–1.345)	0.762
Occupation						
student	18 (12.33)	128 (87.67)	Reference	0.009	Reference	0.185
unemployed	60 (10.31)	522 (89.69)	0.817 (0.466–1.432)	0.481	1.077 (0.561–2.069)	0.823
Business/service/food personnel	129 (15.52)	702 (84.48)	1.307 (0.771–2.215)	0.321	1.244 (0.697–2.223)	0.460

Abbreviations: OR, odds ratio; CI, confidence interval; CNY, Chinese Yuan.

Characteristics	Non-prescription antibiotic use		Univariable		Multivariable	
	Yes N (%)	No N (%)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
professional	57 (10.18)	503 (89.82)	0.806 (0.458–1.417)	0.453	0.797 (0.427–1.486)	0.475
Farmers and workers	29 (10.32)	252 (89.68)	0.818 (0.438–1.529)	0.530	1.045 (0.518–2.105)	0.903
Education						
Primary school and below	39 (7.93)	453 (92.07)	Reference	0.003	Reference	0.074
middle school	184 (13.83)	1146 (86.17)	1.865 (1.298–2.679)	0.001	1.614 (1.069–2.436)	0.023
college and above	70 (12.11)	508 (87.89)	1.601 (1.060–2.416)	0.025	1.602 (0.955–2.687)	0.074
Child under 5 years old						
no	196 (12.83)	1332 (87.17)	Reference		Reference	
yes	97 (11.12)	775 (88.88)	0.851 (0.657–1.102)	0.221	0.730 (0.552–0.965)	0.027
Household income (CNY)						
< 1 00,000	167 (12.08)	1215 (87.92)	Reference	0.825	Reference	0.628
100,000—199,999	88 (12.01)	645 (87.99)	0.993 (0.754–1.307)	0.958	0.877 (0.654–1.176)	0.382
≥ 200,000	38 (13.33)	247 (86.67)	1.119 (0.767–1.633)	0.559	1.020 (0.676–1.539)	0.926
Smoking status						
yes	134 (12.65)	925 (87.35)	Reference		Reference	

Abbreviations: OR, odds ratio; CI, confidence interval; CNY, Chinese Yuan.

Characteristics	Non-prescription antibiotic use		Univariable		Multivariable	
	Yes N (%)	No N (%)	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
no	159 (11.86)	1182 (88.14)	0.929 (0.726–1.187)	0.554	0.977 (0.759–1.257)	0.855
Chronic disease						
no	254 (13.43)	1637 (86.57)	Reference		Reference	
yes	39 (7.66)	470 (92.34)	0.535 (0.376–0.761)	< 0.001	0.654 (0.441–0.969)	0.034
Knowledge score						
0–3	87 (9.68)	812 (90.32)	Reference	0.001	Reference	0.008
4–6	134 (15.60)	725 (84.40)	1.725 (1.294-2.300)	< 0.001	1.511 (1.122–2.034)	0.007
7–9	72 (11.21)	570 (88.79)	1.179 (0.847–1.640)	0.328	1.037 (0.724–1.485)	0.842
Abbreviations: OR, odds ratio; CI, confidence interval; CNY, Chinese Yuan.						

Discussion

This is the largest and the first community-based study that investigated the nonprescribed antibiotics for cough in China to date. Our findings illustrate the age-specific proportion of non-prescription antibiotic use at community for cough among residents aged 15 years or older because cough is prevalent in China [19]. We found that non-prescription antibiotic use for cough was prevalent despite of factors such as age groups, residence, gender and occupations *etc*.

The overall proportion of non-prescription is 12.21% (293/2400) for the source population, which can extrapolate to make a more accurate estimation of the non-prescription antibiotics use population for cough in national-wide. Previous studies showed the proportion was 36% in China [13] and 48.8% in a cross-sectional survey among Chinese university students [17], respectively. The inconformity between our study and past studies is due to different sampling strategy. They used the number of people who used antibiotics as denominator, while our study used the people cough in the past year as denominator. In our study, there were 293 people used non-prescription antibiotics while 336 people used under doctor's prescription among 2400 participants. By adopting the same calculation as previous studies, the

prevalence would therefore be 46.58% (293/629), similar to the two aforementioned studies [13, 17]. The prevalence is much higher than European countries, for instance, Sweden, Denmark, Netherlands, Austria, Belgium, Ireland and UK, for which the prevalence was approximately 3% [13, 20]. Great importance should be attached to participants in 30–39 years old, they were in the highest prevalence to used antibiotic without prescription. Some surveys reported that middle-east people aged 18–39 years with the highest prevalence while others reported a higher prevalence in people aged 40–59 years [21, 22].

Our study not only informs the high prevalence of non-prescription antibiotics used for cough, but also articulates sources, reasons, and patterns for self-medication. First, the main source of antibiotics is pharmacy, which highlights the easy access to antibiotics in communities. Strengthened drug purchase regulation and well-trained professional pharmacists would be promising alternatives to ameliorate AMR in developing countries [6]. Therefore, interventions for reducing non-prescription antibiotics sales in the large number of community pharmacies in China is in urgent need. Strategies involving national guidance on antibiotics for training more qualified pharmacists and delivering the WHO AWaRe antibiotic list [23] in retail shops would be effective ways to enhance pharmacists' knowledge [24]. Second, penicillin and cephalosporin were two most common non-prescription types of antibiotics. Monitoring pharmacies using mobile technologies and/or internet to improve the regulations will be good ways for surveillance [25]. Third, participants' knowledge on antibiotics was relatively low. Delivering pamphlets about antibiotic knowledge for community residence and use antibiotic under qualified pharmacists' construction can be used to enhance people's knowledge and awareness.

Under the situation of Corona Virus Disease 2019 (COVID-19), potential threats that would affect antibiotic stewardship should not be neglected. Since the facile accessibility and little knowledge of antibiotics in China community, the irrational use of antibiotics increased for prophylaxis and self-treatment [26]. As a consequence of COVID-19, the disruption of vaccination and other health service will also increase risk of infection that ultimately leads to more prevalence non-prescription antibiotics use. Considering the COVID-19 pandemics may last for years, the high prevalence of non-prescription antibiotics use would undoubtfully challenge the stewardship system and pose threat to the antibiotic resistance [27, 28].

To conclude, PPS sampling method has strengthened the power of our study that can clarify the age-specific frequency and reasonably representative of the population in the community. Thus, providing data for China to better understand the quantity, types, and patterns of nonprescribed antibiotics used at the population, which can inform policies, regulations, and interventions to ensure that antibiotics are used appropriately. We believe that our study would be of great importance in assisting national-wide health care policy making.

This study has some limitations. The 9-item antibiotic use knowledge questionnaire has not been validated in previous studies. However, these 9 questions raised fundamental factors including antibiotic indications, prescription and administration principles, adverse effects and prophylactic use. Another

limitation is that we have only one-site survey in Zhejiang province, more data of other provinces will be more representative.

Conclusions

In conclusion, non-prescription antibiotics use for cough is prevalent in the community. This result may reflect the real-world situation in China national-wide. Effective policies and regulations should be made to inverse this situation and efforts should be exerted to slow down the pace of AMR.

Abbreviations

AMR: Antimicrobial resistance; URTI: Upper respiratory tract infection; CDC: Center for disease control; PPS: Probability-proportionate-to-size; PAD: Portable android device; SD: Standard deviation; IQR: Inter-quartile range; OR, Odds ratio; CI: Confidence interval; SE, Standard error; COVID-19, Corona virus disease 2019.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the ethics committee of the Chinese Centre for Disease Control and Prevention (ICDC-2019010) before study initiation. Written informed consent was obtained from all study participants or their guardian/parents prior to inclusion in the study.

Consent for publication

Not applicable.

Availability of data and materials

The data can be available from the corresponding author upon reasonable request.

Competing interests

All authors declare that they have no conflicts of interest.

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Authors' contributions

Hanqing He, Zhujun Shao, Jianxing Yu and Zhiping Chen planned and designed the study; Yan Luo, Xuewen Tang, Lingling Ding, Yang Zhou and Yangqing Chen collected the data; Hanqing He and Zhiping Chen coordinated the research; Yan Luo performed the statistical analysis and wrote the manuscript; Hanqing He revised the manuscript. The corresponding authors are the guarantors for the data and have full access to all data. All authors approved the final version of the manuscript.

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Figures

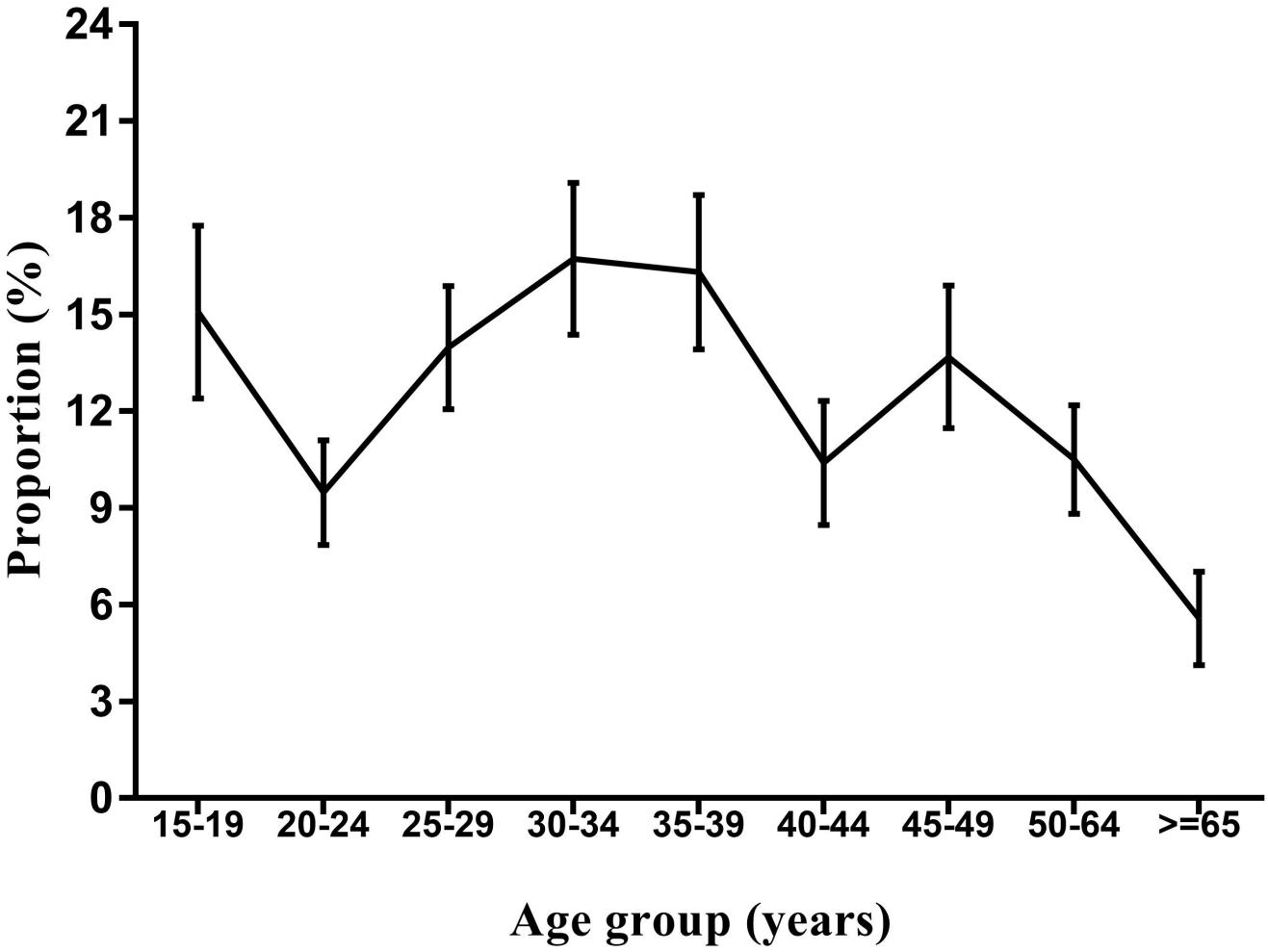

Figure 1

After stratified by age, non-prescription proportion was ranged from 15.08% (standard error, SE:±2.68) in individuals aged 15-19 years, 9.48% (SE:±1.62) in people aged 20-24, to 13.98% (SE:±1.91) in individuals aged 25-29 years.