

Analysis on Regional Difference of Narcotic Analgesic Medication in China – Based on Data of 2011-2013

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Abstract

In recent years, the medication level about Chinese narcotic analgesic achieve some improvement, but the annual personal average morphine use is far behind of developed counties, there are obvious regional differences referencing to analysis on narcotic analgesic medication structure (drug use frequency) in Chinese west-central-east areas and 31 provinces, the east area get obvious higher medication frequency than middle and west regions, and is associated with medical volume. So adjusting medical volume, regulating proper medication behavior and adapting new technology in curbing abuse and such on can improve per medication level and promote optimization in regional medication structure.

Keywords: narcotic analgesic, medication structure, regional differences, defined daily dose (DDD)

1. Introduction

Narcotic Analgesic work on central nervous system, it can remiss pain in alterative, mainly comprises of drug varieties included in Chinese narcotic catalog (2013 version). On account of board area, different economy development, medical level, medication concept and cognition degree etc in China, so there is some regional distinctions about narcotic analgesic medication level and structure. But at present there is not referring research from domestic experts, that it is necessary to have analysis on regional differences of narcotic analgesic in china to explore ways in promoting regional structure optimization and per medication level.

2. Review about Chinese Narcotic Analgesic Development and Its Current Status

2.1 Review about Narcotic Analgesic Development

From birth of country to now, Chinese Narcotic Analgesic operating and managing systems experienced stages of limited quantity supplying, planning supplying, filing, Which gradually injected market competition mechanism. To motivate appropriate use of narcotic analgesic, government had adjust related approval polices many times. While in China, Narcotic Analgesic purchase and use are strictly controlled by govern sections, which have effected its appropriate use in some degree and result in its medical consumption is far lower than developed even some developing countries although have controlled illegal abuse of Narcotic Analgesic effectively.

Since the 1990s, China had implemented three-stage analgesic principle for cancer, pain treatment of diseases is continually improved. The medical consumption of narcotic analgesic get some increase, but large gap still exist comparing with international level. World Health Organization (WHO) takes Morphine consumption quantity as important standard in weighing one nation's pain control level. Chinese annual morphine narcotic analgesic increases gradually year by year, become the largest among all Narcotic Analgesic consumption. In 2011, Chinese per annual Morphine consumption is over 1mg and ascend to median level with small deference, but far lower than the developed countries.

2.2 Present Use of Narcotic Analgesic

In recent years medication level of Chinese Narcotic Analgesic achieve some improvement. According to data research from Chinese medical industry information center, the major market amount of Narcotic Analgesic from 22cities' sample hospitals got an up-trend with only sharing 0.9% in overall medical industry market, but gained

far higher year-on-year growth rate than whole industry (Figure 1). The national healthcare insurance catalog nearly includes all narcotic analgesics varieties needed in clinical utilization, not only comprises of much variety but amounts of preparation style (Table 1). In recent year, there is some improvement in proper level of narcotic analgesics medication structure, but large drug use distinction exists among regions and between urban and rural areas, so analysis on medication regional structure and per medication level of Narcotic Analgesics should be available necessarily.

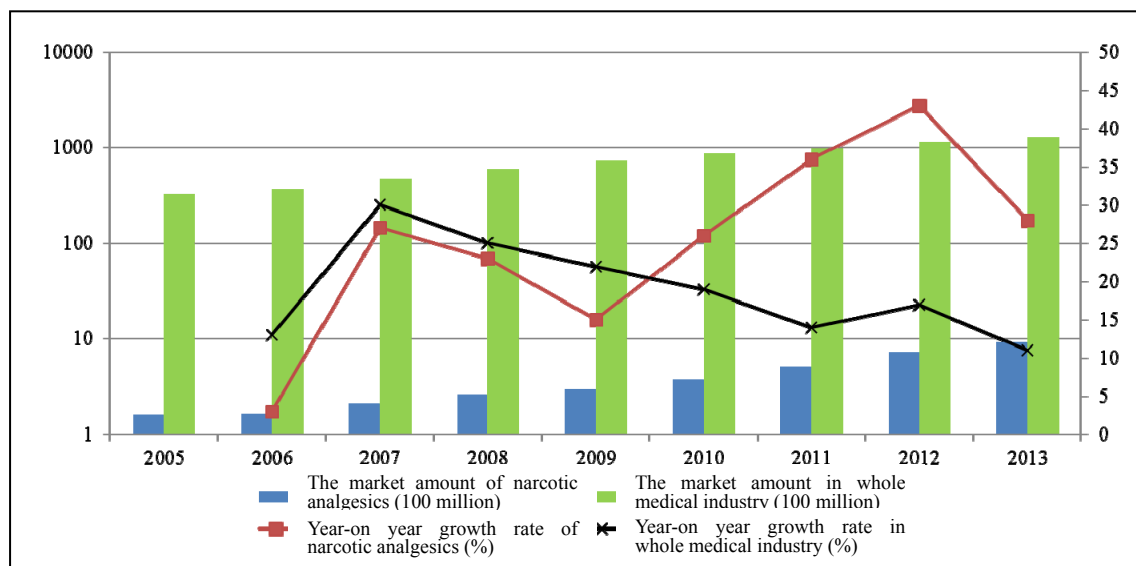


Figure 1. Whole tendency fluctuation of Chinese Narcotic Analgesics from 2005 to 2013

Data source: Chinese medical industry information center

Table 1. Narcotic Analgesics variety included in national basic health insurance catalog

Category	Name	Preparation style	Price (RMB)	Remark
A	fentanyl	injection	4.21~11.59	
A	morphine	oral ordinary release preparation	0.78~8.16	
A	morphine	injection	2.10~3.50	
A	pethidine	injection	1.49~2.89	only occupied for acute pain in short time
B	fentanyl	patch	74.38~124.90	
B	diaminon	oral or injection	2.38~11.70	
B	pethidine	oral ordinary release preparation	0.02~1.80	
B	tramadol	oral/injection /suppository	1.10~11.16	
B	dihydrocodeine	oral ordinary release /sustain release preparation	1.69~1.80	

Data source: Chinese medical industry information center; Price data of 2013 from sample hospitals in 22 cities

3. Regional Analysis on Narcotic Analgesics Medication among East–Central–West Parts of China

3.1 Medication Structure among West-Central-East Parts in China

In view of the unbalance development of national regional economy and health care, the medication structure of narcotic analgesics is available with difference situation among West-central-east parts in China. Measuring narcotic analgesics dosage referring to “Defined Daily Dose, DDD” recommended by world health organization reflexes dynamic and structure of drug use in different year. During 2011 to 2013, the east area get obvious higher dosage and medication frequency of narcotic analgesics than middle and west regions (Table 2). The medication structure of major narcotic analgesics (DDDs index) in 2013 among east –central –west regions are similar, but east area got more optimized structure than central and west area. Fentanyl and Morphine were two varieties gained highest medication frequency. Fentanyl, Morphine, Oxycodone, Remifentani, and Bucinnazine were five largest medication consumable analgesic (Table 3). The world health organization recommended morphine as preferred painkiller in third stage of cancer. Taken Morphine dosage as behalf, from 2011to 2013 among east–central–west regions, the Morphine medication frequency got higher increase tendency. The relative share of Morphine DDDs in east area got a down-trend, but central and west areas got an up- trend (Table 4), which meant the fluctuation of medication structure was different among east–central–west regions.

Table 2. During 2011-2013, analgesic dosage among east–central–west regions and its relative share (unit: kg)

region year	east area		middle area		west area	
	dosage	Relative share	dosage	relative share	dosage	relative share
2011	1671	47.57%	1129	32.14%	713	20.29%
2012	1737	48.53%	1122	31.34%	720	20.12%
2013	1825	48.81%	1182	31.60%	733	19.59%

Data source: from2011-2013, Chinese Narcotic Analgesics sales data from Sinopharm Pharmaceutical Limited Company. Remark: Sinopharm Pharmaceutical Limited Company is the largest nationwide analgesics wholesale group in mainland, sharing 80% market size of Chinese mainland. So its Narcotic Analgesics sale data can be on behalf of well.

Table 3. The medication structure of major Narcotic Analgesics (DDDs index) in 2013 among east–central–west regions

Region	codeine	diaminon	sufentanil	opium	pethidine	bucinnazine	remifentani	oxycodone	morphine	fentanyl	Sum
east	0.35	0.54	1.43	1.72	1.83	2.92	3.87	7.60	22.77	56.98	100.0
middle	0.44	0.45	1.71	1.21	3.67	3.66	3.87	4.67	23.53	56.79	100.0
west	0.22	0.81	1.76	0.55	4.08	1.70	4.11	2.56	16.36	67.84	100.0
average	0.34	0.57	1.58	1.32	2.84	2.85	3.92	5.67	21.56	59.34	100.0

Data source: Chinese narcotic analgesics sales data from Sinopharm Pharmaceutical Limited Company in 2013.

Table 4. Relative share of morphine DDDs from 2011 to 2013 among east–central–west regions and its growth rate (%)

area	Relative share of DDDs			Growth rate of DDDs	
	2011	2012	2013	2012	2013
east area	56.34%	54.58%	53.05%	6.38%	6.31%
middle area	27.82%	29.51%	30.10%	16.48%	11.59%
west area	15.84%	15.90%	16.85%	10.24%	15.88%

Data source: Chinese narcotic analgesics sales data from Sinopharm Pharmaceutical Limited Company during 2011 to 2013.

3.2 Provincial Medication Structure of Narcotic Analgesic

In 2013, medication frequency of Narcotic Analgesic in each province was associated with their medicine size in some degree (Table 5). According to Pearson reverence verification, there was significant positive correlation between medical market share and DDDs share of Narcotic Analgesic, which meant the larger medical market size, the higher Narcotic Analgesic DDDs, and corresponded with its provincial medical expense (Figure 2). In 2013 there was DDDs distinction of major narcotic analgesic among per 100 persons in different provinces (Table 6), provincial medication structure of Diaminon, Opium, Oxycodone, and Codeine existed some distinction. Morphine and Fentanyl as two varieties gaining nationwide largest medication frequency was available with small medication structure distinction in each province.

Table 5. Medical market share in each province and their relative share of analgesic DDDs (%) in 2013

province	medical market share	relative share of narcotic analgesic DDDs	province	medical market share	relative share of narcotic analgesic DDDs
Guangdong	12.10%	7.57%	Fujian	2.80%	3.00%
Shangdong	7.20%	6.25%	Hei Longjiang	2.70%	2.25%
Jiangsu	6.70%	8.57%	Shanxi	2.60%	3.09%
Beijing	6.10%	3.49%	Guangxi	2.30%	2.42%
Zhejiang	5.90%	4.78%	Jining	2.20%	3.67%
Shanghai	5.70%	3.66%	Shanxi	2.20%	2.32%
Sichuan	5.00%	5.75%	Jiangxi	2.10%	1.31%
Henan	4.50%	6.13%	Tianjian	1.90%	2.00%
Liaoning	4.30%	5.45%	Chongqing	1.90%	0.41%
Hebei	4.30%	7.03%	Yunnan	1.50%	2.99%
Hubei	3.80%	4.50%	Nei Monggol	1.50%	1.42%
Hunan	3.50%	4.36%	Guizhou	1.00%	1.28%
anhui	3.10%	3.04%	Others	2.90%	—

Data source: 2013 Narcotic Analgesics sales data from Chinese medical industry information center and Sinopharm without deletion data.

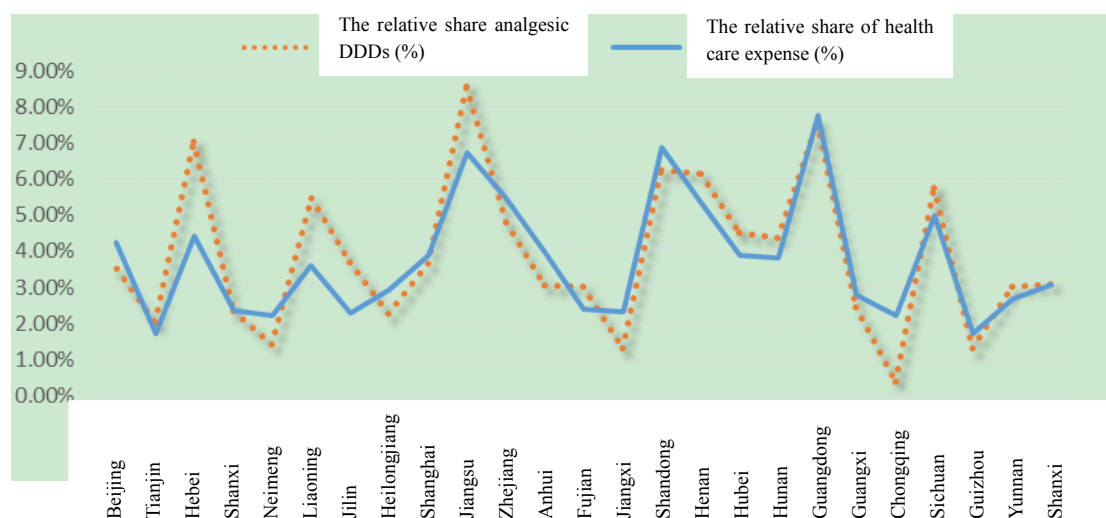


Figure 2. The provincial relative share of health care expense and analgesic DDDs in 2013 (%)

Data source: Chinese health care statistical yearbook and Narcotic Analgesics sales data of Sinopharm without sale deletion data in 2013

Table 6. The DDDs distinction among per 100 persons about main analgesic at different provinces in 2013

drug name	average	Minimum value	maximum value	Standard deviation	coefficient of variation (%)
fentanyl	3.7567	0.6749	7.3722	1.6232	43.21%
morphine	1.3647	0.1740	4.8388	0.9799	71.80%
oxycodone,	0.3590	0	2.5966	0.4860	135.38%
remifentani,	0.2483	0.0501	0.9206	0.1819	73.26%
bucinnazine	0.1805	0	0.6766	0.1644	91.08%
opium	0.0837	0	0.5237	0.1189	142.05%
pethidine	0.1797	0.0480	0.4073	0.0967	53.81%
diaminon	0.0363	0	0.3371	0.0808	222.59%
sufentanil	0.1002	0.0167	0.4055	0.0740	73.85%
codeine	0.0217	0.0003	0.1087	0.0232	106.91%
DDD's the DDDs among per 100 persons about total medication.	6.3309	1.1826	14.1594	2.9379	46.41%

Data source: Chinese narcotic analgesics sales data from Sinopharm pharmaceutical Limited Company in 2013.

4. Optimization Strategies about Medication Structure of Chinese Narcotic Analgesics

4.1 Adjusting Each Provincial Medication Structure Distinction with Medical Scale

For medication structure of Chinese Narcotic Analgesics, there is low general level and far behind, the per medication level of analgesic exist many differences among each province. In 2011, the dosage of Fentanyl is 8380 (S-DDD per million inhabitants per day) and morphine is 2092 in USA, with fentanyl (11288) and Morphine (2061) in Canada, Fentanyl (1009) and Morphine (70) in Japan, but in China its index is only Fentanyl (45) and Morphine (20), that is far behind other developed countries. The provincial general per medication level is available with many differences on narcotic analgesic. But there is less medication structure difference on Morphine, Fentanyl, Pethidine, Remifentani, and Sufentanil which are major national analgesic medication Varieties. From 2011 to 2013, there is some distinction about narcotic analgesic among east-central-west areas, thus there is some possibility in adjusting medication regional differences of the Narcotic Analgesic by adapting government regulating strategies on medical market scale and hospitalization expense.

4.2 Regulating Appropriate Medication behavior about Narcotic Analgesic

The Narcotic Analgesic are the drugs that can make disease yields physic dependence on easily and get addicted to after sequent and inappropriate use. So it will become the narcotic drug after flowing into illegal channel. So strengthening the regulation associated with inappropriate medication behavior of narcotic analgesic will adjust national regional difference of medication structure effectively. China has implemented WHO three-stage analgesic treatment programs of cancer for over 10 years, but problem that cancer disease are not yet supplied with enough treatment is still not solved, so scientific and standard cancer analgesic treatment plays a very important role.

But in view of Chinese large population, aboard area, unbalanced economy development, thus to optimize regional medication structure of Narcotic Analgesic effectively, it is necessary to popularize proper cancer analgesic treatment concept and scientific caring method in middle-small size cites even rural areas, advertise "regulation about narcotic and psychotropic drug" and "management of adverse drug reaction report and monitor".

4.3 Adopting New Technology about Curbing Narcotic Analgesic Abuse

In 2013, the American FDA issue the *Industry Guiding Draft*: "approve and identification in curbing abusive opiate drug "to motivate the research and development of opioid with feature curbing its abuse. After special prescription composition and design, the original opioid can become new production that could decrease and curb its abuses by lessening or stopping the yield of euphoriant effect when it was in abuse. So this kind of new

technology should be employed with popularity and application. The pharmaceutical enterprise through changing physical and chemical property of the preparation, adding opioid receptor antagonist or aversive agent with pungent smell and such on kinds of new technology can curb or decrease abuse of Narcotic Analgesic, and make it be used properly in clinical application, and promote medication structure optimization of analgesic effectively.

5. Conclusion

According to Analysis on medication structure difference of Narcotic Analgesic from each province and east-central-west areas, the provincial medication structure is nearly similar, but medication choice inclination is available with regional feature and there are many differences in per medication level. Adapting proper optimism strategy about analgesic medication structure will effectively improve its provincial medication level and life quality of cancer disease. In mainland area, there is necessity to launch more advertising and education activity about analgesic application to improve its appropriate use level in clinical and promote the balance development of regional and provincial medication level.

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