

Assessing Quality of Institutional Care in Yichang City, China

Dr. Lin CHEN

International Business Faculty, Beijing Normal University, Zhuhai, [CHINA](#).
chenlin@bnuz.edu.cn

Dr. Yuebin XU

School of Social Development and Public Policy, Beijing Normal University
Xuyuebin@bnu.edu.cn

ABSTRACT

This research aims to assess the quality of care in residential facilities in Yichang city in China. A list of all elderly care residential facilities in four urban districts of Yichang was first obtained, resulting a total number of 31 residential facilities with 1,661 current residents. 22 facilities in Yichang each having at least 20 residents were selected for the survey, which covered 97% of the total institutional residents identified above. Among them, 19 facilities were successfully surveyed. A systematic sampling method was applied to each facility to select the individual participants, producing 446 urban institutional residents whose most recent stay were over six months. 12 outcome-oriented long stay quality indicators were used drawing on the Resident Assessment Instrument (RAI), which has been used successfully in many countries to improve quality of care in institutions, including falls with major injury, with self-reported moderate to severe pain, with pressure ulcers, given influenza vaccine, given pneumococcal vaccine, with urinary tract infection, etc. Quality Management score of each indicators and its distribution by facility ownership (public/private) is provided, followed by a mean score at the facilities-level for international comparison. The percentage of residents experiencing one or more falls with major injury in past six months are comparable to that in past 12 months in the States, while less Chinese residents suffering from self-report moderate to severe pain. It's also found that the portion of residents who were physically restrained or have depressive symptoms in Yichang is more than that in the States. This is the first known study on quality of institutional care evaluated by widely used QM indicators in Mainland China. This study explores the application of outcome-based indicators in assessing quality of care in residential facilities in China, and facilitates international comparison.

Keywords: Quality, Institutional Care

1. Introduction

1.1 Aging and Institutional Care in Yichang

Yichang is one of the most rapidly ageing cities in China. By the end of 2013, the number of old people aged 60 and above amounted to 0.76 million, accounting for 18.5% of its population with local residence, which is higher than the national and provincial average. It was estimated that by the end of 2014 the number of the urban elderly reached 0.17 million, occupying 19% of the urban residents. To meet the care needs of the elderly, the Yichang Municipality government aimed to increase the number of beds in residential care facilities to a level of 29 per thousand people aged 60 and above. In 2014 it was reported that a total number of 207 community-based elderly service centers was established in urban areas and 708 mutual-help activity centers in rural areas.

Meanwhile, Yichang government has also taken some measures to support the development of privately operated elderly care facilities by providing them each with a lump sum of 500-1000 Yuan of construction subsidies if they have 50 beds or above in the urban areas and an annual amount of 360 Yuan of operational subsidies per bed if they have been in operation for 11 months. Old people in special circumstances are given a monthly fixed amount of subsidies for them to receive community-based services ranging from 50 to 150 Yuan depending on the severity of their difficulties. These include “three-nos” elderly, the functionally impaired, and single elders living on dibao.

In 2015, Yichang had 30 residential care facilities located in its four urban districts (excluding Yiling District): Xiling, Wujiagang, Dianjun, and Xiaoting. These facilities provided a total capacity of 3,686 beds,

with 1,661 residents currently receiving care in them, averaging an occupancy rate of 45%. Among them, 11 facilities were owned and run both by the government and the rest was privately operated. The number of beds and residents in the facilities, either public and private, was quite uneven. The public facilities had a total number of 1,505 beds with 856 current residents, making an occupancy rate of 57%, while the private ones had 2,181 beds and 805 residents, which was about 37% in terms of the occupancy rate.

Among the public facilities, the Municipal Social Welfare Home is the largest one, which alone had a capacity of 400 beds and 358 residents, followed by Wujiagang District Social Welfare Home (300 beds with 203 residents), Dianjun Tucheng village Welfare Home (160 beds with 49 residents), and Xiaoting District Central Welfare Home (150 beds with 63 residents). The number of beds in other public facilities falls mostly between 50 and 80, with occupancy rates mostly falling between 20% and 40%, and only one home with 70 beds was fully occupied.

Among the privately run homes, the largest one was in Dianjun district, which had 300 beds but was not in operation yet by August 2015, followed by Wujiagang Fushou Elderly Home (280 beds with 50 residents), Xiling Wanxia Elderly Home (236 beds with 149 residents), and Dianjun Songhe Nursing Home (200 beds with 82 residents), and the rest mostly had around 80-120 beds with a occupancy rate ranging from 3% to 50%.

1.2 Study Objectives

This study used 12 outcome-based indicators developed from Minimum Data Set (MDS) by the Centers for Medicare & Medicaid Services, USA to assess the quality of institutional care in Yichang city in China, and make comparison on quality of care in two countries. These indicators included falls with major injury, with self-reported moderate to severe pain, with pressure ulcers, given influenza vaccine, given pneumococcal vaccine, with urinary tract infection, etc.

2. Instrument and Measurement

2.1 Instrument

This study used interRAI-HC (Home Care) Assessment Form Version 9.1.2 (Chinese), one of the interRAI Suite of instruments, as the main data collection and measurement tool. The instrument was developed in the mid-1990s, and has been adopted by many developed countries as a standardized tool for assessing old people with disability in home or community settings. Its validity and reliability was tested in multiple countries and proved adequate. The Chinese version was validated in 2001 and has since been used by a number of social service agencies in Hong Kong for assessing LTC need at individual level. It was also used as the data collection tool by the School of Social Development and Public Policy, Beijing Normal University in two waves of study in Beijing in 2011 and 2014 respectively to estimate LTC needs of old people and in an assessment study of community dwelling old people aged 65 and above in Yichang in 2014. The instrument comprises of over 300 clinical and non-clinical items covering 15 domains of functioning: 1) Cognition; 2) Communication and Vision; 3) Mood and Behavior; 4) Psychosocial Well-Being; 5) Functional Status; 6) Continence; 7) Disease Diagnoses; 8) Health Condition; 9) Oral and Nutritional Status; 10) Skin Condition; 11) Medications; 12) Treatment and Procedures; 13) Social Supports; 14) Environmental Assessment; 15) Service Utilization. It was shortened and modified to suit the purpose of this study. Training material was also adjusted for the modified instrument.

2.2 Quality Indicators for Institutional Care

This study evaluated the performance of facilities in Yichang, China, on a set of 12 outcome-oriented quality indicators which Quality Measure was composed of as one of three domains in Nursing Home five-star quality rating system designed by the Centers for Medicare and Medicaid, aiming to include a set of quality ratings for each nursing home that participates in Medicare or Medicaid (the Centers for Medicare and Medicaid, 2015)

Long-stay quality indicators¹:

- QM #5, % of residents experiencing one or more falls with major injury
- QM #6, % of residents who self-report moderate to severe pain (risk-adjusted)
- QM #7, % of high-risk residents with pressure ulcers
- QM #8, % of residents assessed and appropriately given the seasonal influenza vaccine
- QM #9, % of residents assessed and appropriately given the pneumococcal vaccine
- QM #10, % of residents with urinary tract infection
- QM #11, % of low risk residents who lose control of their bowel or bladder
- QM #12, % of residents who have a catheter inserted and left in their bladder
- QM #13, % of residents who were physically restrained
- QM #14, % of residents whose need for help with ADL has increased
- QM #15, % of residents who lose too much weight
- QM #16, % of residents who have depressive symptoms

2.3 Measurement

2.3.1 Risk Adjustment

The analysis measures variation in resident characteristics which included: (1) denominator exclusions and (2) covariates. Exclusion or sample restriction almost always include restrictions based on data availability and sometimes include sample exclusions related to risk factors or residents' clinical status(Zheng, Reilly, & Kissam, 2012).

A model-based risk-adjustment approach is applied in QM #6. This risk-adjusted QM score can be thought of as an estimate of what the facility's QM score would be if the facility had residents with average risk. In this approach, MDS items, indicating certain health conditions that increase or decrease the likelihood of a health outcome, are identified as covariates. A logistic regression model is fitted and the estimated coefficients are used to predict the probability that a resident will experience that outcome given the covariate values. The average of these resident-level probabilities for a given facility represents that facility's expected score for that measure. The final QM score for a facility is found by combining its observed score (i.e., the prevalence or incidence of the outcome) with its expected score(Zheng et al., 2012).

2.3.2 Missing Data

Missing data represent a potential threat to the validity of a quality measure. If patterns emerge associated with resident types and assessment types, the integrity of the measure is compromised, that is, the QM is biased and potentially inflating or suppressing QM scores. Further, if missing data rates are systematically dissimilar across public-funded or private facilities, then the ability to compare two types of facilities on certain measures may be compromised.

The impact of missing data was minimal for most measures. For long-stay residents quality indicators,(QM #5-QM #16 (long-stay residents), no missing data were found in QM #7, QM #8, QM #9, QM #12,and QM #14, and missing rate in QM #5, QM #10, QM #13, QM #15, and QM #16 were below 3.5%.

Among all of 12 quality indicators, Logistic regression and chi-square test were applied to examine the possible impact of relative high missing rate (10.3% and 7.0% separately) on the validity of scores in another two indicators - QM #11 and QM #6. A model-based risk-adjustment approach was applied to diminish the impact of missing data to the value of score when necessary. We found no evidence to suggest that missing data may post a threat to the validity of conclusion that significant difference scores between public and private facility in QM #11 and QM #6, although the value of their scores might be slightly impacted.

For QM #6, % of residents who self-report moderate to severe pain (adjusted), missing data rates tended to be positively related to residents who were aged 85 and above, who were unable to answer at least 5 items in Brief Interview for Mental Status (BIMS), and who were farmer/housewife/other.

¹ For Background and Introduction to Quality Measure, see 3.0 Quality Measures USER'S MANUAL (v5.0 03-01-2012), The Centers for Medicare & Medicaid Services under Contract No. HSM-500-2008-00021I, available at <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/downloads/MDS30QM-Manual.pdf>

In QM #5-QM #16 (long-stay residents), 5 indicators, QM #7, QM #8, QM #9, QM #12, and QM #14 has no missing data; 5 indicators, QM #5, QM #10, QM #13, QM #15, and QM #16 has a missing data rate below 3.5%. The highest missing data rate was found in QM #11, % of low risk residents who lose control of their bowel or bladder, and QM #6, % of residents who self-report moderate to severe pain (adjusted), which is 10.3% and 7.0% respectively. Logistic regression analysis shows that missing data may somehow have some effects on the total score of QM #11 and QM #6, but produced no threats on the reliability of the assessment results. The Center for Medicare and Medicaid Service provides the detailed logical specifications for the measurement(CMS (The Centers for Medicare & Medicaid Services), 2012)

2.4 Key definitions and measurements

Long-Stay Residents whose most recent admission were before 180 days ago would be categorized as long-stay residents, and those most recent admission were less than 180 days would be categorized as short-stay residents.

Long-Stay residents shared 86% (N=446) of our respondents. At the facility-level, the mean proportion of short-stay residents within nursing homes is 83.0 percent; the median is 92.0 percent. Most provide services to a mix of short-stay and long-stay residents.

The average length of stay is 4 years for long-stay residents (median= 3 years). Short-stay and long-stay residents have somewhat different demographic and health characteristics (e.g., a slightly higher proportion of long-stay residents are cognitively impaired or depressed compared to short-stay residents) as well as self-rated needy care service. The short-stay residents are insignificantly more favorable to be discharged to the community, whereas the majority of long-stay residents are expected to remain in the facility.

Reportability

To be useful for public reporting, the majority of nursing homes should have sufficient sample size to meet minimum requirements for public reporting (i.e., have 30 long-stay residents that qualify for the denominator of QMs) after applying measure exclusion criteria.

Because most institutions in Yichang had a small size of residents, this study reports quality indicator scores for all institutions, public institutions, and private institutions.

3. Survey Methods

3.2 Sampling Procedures

To produce a representative sample of the urban institutional residents in Yichang, the sampling followed a multi-stage systemic method as described below:

Step 1: A list of all elderly care residential facilities in four urban districts of Yichang (Xiling, Wujiagang, Dianjun and Xiaoting) was first obtained with: 1) names; 2) addresses; 3) year of starting operation; 4) mode of operation (public or private); 5) number of beds; 6) number of residents; and 7) number of residents with different levels of disability assessed by the institutions on their own. This resulted in a total number of 31 residential facilities with 1,661 current residents.

Step 2: 22 facilities each having at least 20 residents were selected for the survey, which covered 97% of the total institutional residents identified above. Among them, 19 facilities were successfully surveyed. Three facilities declined the survey due to various reasons (Lihua Nursing Home in Xiling District and Laolaile Nursing Home in Dianjun District temporarily suspended operation due to requirements of Civil Affairs Bureau for them to improve services, and Sanxia Nursing Home Taohualing Branch in Xiling District was being renovated at the time of the survey).

Step 3: Based on the target of a minimum sample size of 500 residents from these facilities, which amounted to over one third of the total population, the random systematic sampling method was applied to each facility to select the individual participants. Specifically, in each sampled facility, we first obtained a

list of all current residents. Then we used the last digit of the facility director's mobile phone number and divided it by 3 to reach a remainder A, which became the starting number in selecting the respondents from the name list of all residents in that facility. Thus the selected respondents were persons at the position of "A+3n (n=0, 1, 2, 3...)" of the name list.

3.3 Use of proxy respondent in interview

Proxies (e.g. nurses) were used to answer part of the survey questions when a respondent was unable to provide, or not in the state of giving, accurate information on his or her conditions. Specific rules are provided in the survey instrument with regard to when and how proxies should be used.

81 respondents (15.6%) were unable to complete independently all of the survey questions, excluding questions regarding community services which have to be answered by respondents. 37 respondents (7.1%) were assessed through Staff Assessment on "short-term memory" on the Cognitive Performance Scale (CPS). This item is one of the exclusion criteria in one of quality indicators, QM#6 % of residents who self-reported moderate to severe pain, on which 13 respondents (2.5%) were assessed through Staff Assessment. 50 respondents (9.6%) were unable to complete the Resident Mood Interview (Patient Health Questionnaire PHQ-9), and Staff Assessment was conducted for the information. This instrument is used only for assessing quality of care, which is the only criterion in QM#16 % of residents who has depressive symptoms. The length of completing a form averaged 1 hour.

3.4 Supplement Sample

There were 94 sampled residents who were unable to be interviewed at the time of the survey due to various reasons, accounting for 18% of the total sample. 20% (19) of them were not at the facility, over 70% were being hospitalized (35) or having no proxy respondent (33) to answer questions for them, and another 7.4% (7) declined to be interviewed.

A supplement sample of 94 residents was used to replace the residents who were not able to be interviewed. Specifically, if the selected person was unable to be interviewed, he would be replaced by another resident in the same room or in the neighboring room. Table 3.3.2 compares the gender and age between the two groups. No significant differences were found in gender and age between the two groups ($p>0.05$).

3.5 Quality Assurance Measures

3.5.1 *Recruitment and training of Interviewers*

20 interviewers with prior experience of survey with a similar instrument were recruited from Beijing Normal University. Two trainings were conducted before the survey started. One was given in Beijing with each of them given a printed copy of the instrument and the training manual. The consultant explained the rationale of the study particularly the meaning and use of the quality indicators, illustrated ways how a proxy respondent should be used, and suggested techniques of probing responses. The second training was done in Yichang, which focused on logistics, roles of supervisors and supervision method, data checking, and reporting and decision making procedures when unexpected issues should arise such as replacement of sample.

Two measures were taken to ensure interviewing quality:

- (i) Interviewers were divided into four groups of 5 persons, and each group was assigned a team leader who also worked as supervisor. The group leader was responsible for coordinating with the managers of the institutions, sampling participants at each facility, assigning interviewers to participants, deciding replacement of the samples, checking randomly the completed forms, and providing advises.
- (ii) Data checking: To ensure the accuracy of information and minimize other random errors, data checking meeting was organized at the end of each day. Each interviewer was first required to go over their completed forms, and then exchanged the forms among the group members for mutual checking.

3.5.2 *Data processing*

The completed forms were sent to a company specialized in data entry to enter them in STATA format. Double data entry was used to ensure no errors stemming from typing. After data is entered, checking was

performed for inconsistencies, missing or illegal values, outliers, or cross-variable contradictions. This was to ensure logical consistency at both variable level and person-level data coherence.

4. Results

Table 4.1 provides an overview of Quality measures and scores, and is followed by descriptive statistics and finds of each quality indicators. Each section presents numerator/denominator selection/exclusions, QM score and its distribution by facility ownership, as well as a mean score at the public/private facilities-level for international comparison.

In QM #6 & QM #11 with relative higher percentage of missing data over 4%, a potential threat to the validity of the two QM scores is also evaluated.

The assessment results on the 12 indicators are presented in the following sequence. Each indicator is presented in Table 4.1: 1) score for All Facilities, 2) score by facility type, and 3) the Mean score at the facility-level in Yichang, and USA 2011 scores for Quarter 4th in 2011 for reference.

Table 4.1 Overview of Quality measures and scores for long stay residents

Quality measure	Score ^a			Mean score at the facility-level	
	Overall	Public	Private	Yichang (N ^b)	US, 2011
Long-stay (most recent admission before Jan 1 st , 2015)					
QM #5 % of residents experiencing one or more falls with major injury^d	3.8%^d	3.2%^d	4.7%^d	3.5%^d (3)	3.4%^d
QM #6 % of residents who self-report moderate to severe pain (risk-adjusted)	15.1%	13.3%	17.2%	9.3% (2)	11.5%
QM #7 % of high-risk residents with pressure ulcers	7.1%	0.0%	13.3%	/ (0)	6.9%
QM #8 % of residents assessed and appropriately given the seasonal influenza vaccine	2.0%	1.2%	3.1%	1.2% (3)	89.1%
QM #9 % of residents assessed and appropriately given the pneumococcal vaccine	2.2%	1.6%	3.1%	1.8% (3)	93.8%
QM #10 % of residents with urinary tract infection	2.1%	2.0%	2.2%	2.4% (3)	7.7%
QM #11 % of low risk residents who lose control of their bowel or bladder	10.2%	4.2%	17.8%	5.5% (2)	42.8%
QM #12 % of residents who have a catheter inserted and left in their bladder	0.2%	0.4%	0.0%	0.0% (3)	4.2%
QM #13 % of residents who were physically restrained	3.4%	4.4%	2.1%	3.6% (3)	2.4%
QM #14 % of residents whose need for help with ADL has increased	1.4%	0.8%	2.2%	1.2% (3)	16.7%
QM #15 % of residents who lose too much weight	7.9%	7.6%	8.3%	8.0% (3)	7.1%
QM #16 % of residents who have depressive symptoms	15.2%	15.0%	15.6%	20.2% (3)	7.3%

- a. Observed score if not specified as risk-adjusted.
- b. Numbers of reportable facilities in Yichang, having at least 20 short-stay or 30 long-stay respondents that qualify for the denominator of QMs after applying measure exclusion criteria.
- c. Not comparable since post-acute care facilities are included in US score.
- d. Measure is calculated over a 6-month period in Yichang 2015, and is a 12-month period in US, 2011.

5. Conclusion

As shown in Table 4.1, Quality Management score of each indicators and its distribution by facility ownership (public/private) is provided, followed by a mean score at the facilities-level for international comparison. The percentage of residents experiencing one or more falls with major injury in past 6 months in this study are comparable to that in past 12 months in the States, while less Chinese residents suffering from self-report moderate to severe pain. It's also found that the portion of residents who were physically restrained or have depressive symptoms in Yichang is more than that in the States.

References

- CMS (The Centers for Medicare & Medicaid Services). (2012). MDS 3.0 Quality Measures USER'S MANUAL, (211942).
- the Centers for Medicare and Medicaid. (2015). Design for Nursing Home Compare Five-Star Quality Rating System : Technical Users' Guide February 2015, (February).
- Zheng, N. T., Reilly, K., & Kissam, S. (2012). Nursing Home MDS 3.0 Quality Measures : Final Analytic Report, (211942), 25–27.

Authors' Backgrounds

	<i>Dr. Lin Chen, a faculty in International Business Faculty, Beijing Normal University, Zhuhai, CHINA</i>
	<i>Dr. Yuebin Xu, Professor, School of Social Development and Public Policy, Beijing Normal University</i>