Current status of community based diabetes education in China: A Shanghai Sample

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Abstract: The study analyzed the status of diabetes education at community in a developed city. A community with sixteen health clinics was enrolled in the study. Questionnaires were used and qualitative interview applied to four clinics and their physicians in the area. Investigation focused on the plan, educator, program, costs, evaluation, obstacles, and satisfaction in diabetes education. The survey was based on the National Diabetes Education Practice Survey (AADE 2008) and Chinese Diabetes Prevention and Care Guideline (CDA 2004). In the survey community, there were inconsistencies in the diabetes educator training curriculum, education method and evaluation. The frequency of education and the percentage of educated patients with diabetes differed depending on the staff to patient ratio. No dietician enrolled in diabetes education at community. The education courses were mainly developed by clinic with different method. The sessions mainly included basic information of disease, nutrition, treatment and complications, but little emphasis on behavioral supporting. Investment of financial and human resource for diabetes education still is a major challenge at community. The results indicate the areas for improvement of diabetes education at community in China, especially in evaluation and standardization. It is an important and necessary step to promote the effect of diabetes control for China in the future.
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1. Introduction

The rates of diabetes and pre-diabetes in China have tripled over the last 20 years. China now has the largest population of the patients in the world (Pan CY, 2005 and Yang W et al., 2010). The lack of diabetes education and awareness in China has resulted in a low rate of diagnosis, around 10-15% for type 2diabetes, compared to rates of around 50% in Europe (Pan CY, 2005). Community health centers and their associated community clinics are designed to be one of the most important components of the health care safety net for diabetes and other chronic diseases care in China. Currently, most of the community health facilities in China are underutilized due to residents' mistrust of the quality and level of care rendered there. As a result, residents frequently bypass them to seek care at larger hospitals (Pan X l, 2006). Despite being the government's top priority in recent healthcare reform, community clinics have not yet improved the quality of care.

Diabetes education has proven to have a positive impact in diabetes control. Recent studies of diabetes education in Chinese community health facilities have found that education programs help patients monitor their blood sugar levels, avoid co-morbidities, and increase their quality of life (Zhang Y et al., 2003; Ju CP et al, 2007 and Lu L et al., 2005). Along with administering medical care; diabetes education is one of the six government- designated main functions of community health facilities in China. However, a study in 2009 on residents in Beijing, Shanghai, Guangzhou, Chengdu, Wuhan, and Shenyang found that only 55.4% of residents surveyed knew that diabetes education was a function of the community health centers (Wei Zhang et al., 2012). There is great disparity in the effects that different educational models have on patient outcomes. For example, a study by Zhao et al. in 2001 found that diabetes education in general hospitals have different effects on the ability of patients to control their blood glucose levels depending on the different models and methods used for education (Zhao LB et al., 2001). These studies suggests that community health facilities are under-utilized as a source of diabetes education and that there may be room for improvement in the way they conduct their education programs.

Better understanding the forms and the methodologies of education in a usual community

setting will provide insights into the phenomenon of under-utilization. Investigating the structure and process of diabetes education at the community level may also assist in identifying particular strengths and weaknesses of the clinic diabetes care models. This information will help determine an appropriate level of program consistency across clinics. As the reason of ageing and the rate of diabetes prevalence, it is a critical task.to improve the current status of diabetes education at the community.

2. Material and Methods

Due to the economic boom in China, many urban cities have been going through major transformations. The study selected a district with stable and mature communities within the city of Shanghai. The chosen district, Luwan district, had 280,000 total population and on average 20 thousand residents utilizing one community health clinic (Shanghai Government and Shanghai Bureau of Health, 2008). A survey in 2008 indicated the prevalence of diabetes in Luwan was 10.2 percent, which is consistent with the national average (Dong B et al., 2011) .

There were four community health centers in the district. Each center was associated with 3-4 community health clinics that were staffed with 3-4 physicians. Based on the interview and the recommendations given by the health center administrators, one clinic of each community center was chosen to participate in the survey. The recommendations criteria were based on the appraisal of their diabetes education in the past.

The study was a non-experimental descriptive survey. The survey sample included all physicians in the selected clinics. Characteristics and distribution of survey participants are shown in Table 1.

Table 1 Community Health Facilities and Population*

Clinic (affiliated with the Community Health Center)	Total Population served by the Clinic	Total Families served by the Clinic	People over Age 60 served by the Clinic
Jiangnan (Wuli)	6165	2430	1701
Fusan (Huaihai)	28065	9510	6957
Xiangshan (Ruijin)	29132	9310	7140
Zhonghai (Dapu)	7758	2725	1442

* Bureau of Health, Luwan District, Shanghai, 2008

Our study refer to the related parts of National Standards for Diabetes Self-Management Education from Unite States (Carole M et al., 2000). The main tool of the study was a written questionnaire on diabetes education, and a Key Informant Survey (KIS) given in each of the 4 community health clinics. The survey instrument was based on two reference materials: the American Association of Diabetes Educators National Diabetes Education Practice Survey (used to investigate the state of diabetes education in the United States) and the Survey of Attitude, Desire, Need of Patient with Diabetes and Status of Diabetes Education (based on Chinese Diabetes Prevention and Care Guidelines from Chinese Diabetes Association) (Martin et al., 2008 and China Diabetes Association, 2007). All of physicians in the clinics were interviewed, and investigators collected the data based on 6 sections of questionnaire. Viewpoints of all physician were used to perfect the information of each clinic. A total of 26 questions appeared in the interviews and surveys. Questions focused mainly on diabetes education in the community and were organized into the following 6 sections:

1. General information about the diabetes education (7 questions)
2. General information about the diabetes educators (3 questions)
3. Methods of diabetes education (3 questions)
4. Curriculum and reimbursement of diabetes (4 questions)
5. Evaluation of diabetes education (7 questions)
6. Challenges faced in diabetes education (2 questions)

A 5-point Likert Scale was used to evaluate satisfaction and the effectiveness of diabetes education in the community (ranging from “Very Unsatisfied”, “Unsatisfied”, “Neutral”, “Satisfied”, and “Very Satisfied”).

3. Results

General information about the Diabetes Education in the Community. All four of the community health clinics reported having diabetes education activities, though these activities were only initiated a few years ago. Many clinics had various audiences in addition to diabetic patients, including families of patients and high-risk community members. These clinics did not have same frequency of diabetes education. There was the percentage of twenty five to fifty patients enrolled in the education program in three clinics. Some clinics had the education program ,for organization care (Table 2).

General information about the Diabetes Educators in the Community. Diabetes educators at the Luwan community health clinics included doctors, nurses, and public health staff. None of the centers had a dietician on the education team. Only one clinic

conducted patient education using interdisciplinary teams. Overall, training for diabetes educators varied between the clinics (Table 3).

Diabetes Education Methods. All clinics had outpatient education programs. Education programs were given in large groups, lasting between 30 and 60 minutes, and all clinics used audio-visual materials (Table 4).

Curriculum and the Reimbursement of Diabetes Education. The diabetes education curricula at each of the four centers seemed to be fairly similar, with all four covering basic knowledge, nutrition, diabetes treatment and complications. The curricula and education materials were developed primarily by each care provider. Only one of the clinics periodically updates its curriculum. The costs of the diabetes education programs were subsidized by the government, and it was a free program for the patients (Table 5).

Evaluation of Diabetes Education. Two of the four clinics engaged in formal evaluation of their diabetes program and three of the four clinics evaluated patient satisfaction towards the program orally. One clinic evaluated patient satisfaction at random times, while the other two clinics evaluated patient satisfaction before and after every education session. The overall effect and satisfaction of diabetes education were neutral in many health clinics (Table 6). Only one of the four clinics evaluated patient behavioral outcomes. All four clinics evaluated patient clinical outcomes, with the most commonly used measures being fasting and post-meal blood sugar. In summary, the evaluation mechanism and content are inconsistent across clinics.

Obstacles and Comparisons in Diabetes Education. Many clinics seemed to be experiencing human resources, financial, and time challenges in regard to their diabetes education. (Table 7).

Table 2 General information about the Diabetes Education in Community

Part A	Jiangnan	Fusan	Xiangshan	Zhonghai
A1. Do you have a diabetes education program?	√	√	√	√
A2. What year did the education program begin?	2006	2004	2006	2008
A3. Who can attend the education program?				
Patient with diabetes	√	√	√	√
Family members with diabetes	√		√	√
High risk population	√	√		√
A4. Frequency of diabetes education program	Every 3 Months	Random	Every Month	Every 3 Months
A5. Percentage of patients educated in your program	51-75%	25-50%	25-50%	25-50%
A6. Last year, how many patients took part in your program?	118	205	250	120
A7. Content of your education program				
Education with pre-evaluation	√	No	No	No
Education with post-evaluation	√	No	√	No
Education with goal setting	√	No	√	No
Education with planning and intervention	√	No	√	No

Table 3 General information about the Diabetes Educators in the Community

Part B	Jiangnan	Fusan	Xiangshan	Zhonghai
B1. Who takes part in the education program*?				
Primary care physician	3	2	5	4
Nurse	3	0	1	0
Dietician	0	0	0	0
Other professionals (public health staff)	0	2	5	1
Total	6	4	11	5
B2. Interdisciplinary diabetes education team	Yes	No	No	No
B3. Which educator training program did the above professionals attend?				
Program from Association	√		√	
Program from Post Graduation Training	√	√	√	
Program from Internal Educator Training	√		√	
Program from Externally-led Training	√			
Printed and audio-visual training materials		√	√	√

* These professionals are part time in diabetes education

Table 4 Diabetes Education methods

Part C	Jiangnan	Fusan	Xiangshan	Zhonghai
C1. Program of diabetes education				
Outpatient education	√	√	√	√
Inpatient education				
Follow up after discharge				
Home visitation	√	√	√	
Phone education	√			
Web education				
Audio-visual education	√	√		
Discussion meeting with specialists	√			
Patient peer education club				√
Course of diabetes control practice				
Printed education materials	√	√	√	
C2. Type of routine education program				
Large group education and duration*	√(60min)	√(60min)	√(30min)	√(45min)
Small group education and duration†	None	None	√(20min)	None
Individual education and duration‡	√(10min)	√(10min)	None	None
C3. Diabetes education tools				
Lifestyle diaries				
Models of food				
Diabetes information books		√	√	
Audio-visual education materials	√	√	√	√
C4. Other educational tools				
Specialists from outside				√
Patient peer educator				
Health care volunteer				

* More than 15 patients with diabetes attend; † 8-15 patients with diabetes attend; ‡ Face to face program

Table 5 Curriculum and the Reimbursement of Diabetes Education

Part D	Jiangnan	Fusan	Xiangshan	Zhonghai
D1. Curricula of diabetes education				
Knowledge of diabetes*	√	√	√	√
Nutrition	√	√	√	√
Exercise	√	√		√
Self monitoring and management	√	√		
Diabetic oral agent and insulin	√	√	√	√
Diabetes complications	√	√	√	√
Psychology related to diabetes	√		√	
D2. Origin of curricula and education materials				
Developed by the clinic itself	√	√	√	
Developed by professional association			√	√
Developed by other hospitals and specialists				√
Developed by an outside Company				√
D3. Update curriculum and how often	No	No	Every 3 Months	Randomly
D4. Fee and reimbursement of diabetes education				
Free to patients with diabetes	√	√	√	√
Subsidized by the government	√	√	√	√
Out-of-pocket payments				
Funding from company				

* Including diabetes definition, type, prevalence, incidence, mortality, pathophysiology, and goals of treatment and self management

Table 6 Evaluation of Diabetes Education

Part E	Jiangnan	Fusan	Xiangshan	Zhonghai
E1. Time spent in diabetes education and evaluation each month	1/3 day	None	3 days	None
E2. Form of evaluation of patient satisfaction	Before and After Education	None	Random	Before and After Education
Formal written evaluation	No	No	No	No
Oral evaluation	√	No	√	√
E3. Evaluation of patient behavioral outcomes	√	None	None	None
Diet	√			
Exercise	√			
Monitoring	√			
Treatment adherence	√			
Knowledge of diabetes	√			
Emotional health	√			
E4. Evaluation of clinical outcomes	√	√	√	√
Fasting blood glucose	√	√	√	√
Post meal blood glucose	√	√	√	√
HbA1c	√		√	
Weight	√			√
Blood pressure	√			√
Blood lipoprotein	√			
Foot care			√	
Eye care	√		√	
Others			√	
E5. Satisfaction of education by staff	Satisfied	Satisfied	Neutral	Neutral
E6. Satisfaction of education effect on clinic by staff	Satisfied	Neutral	Neutral	Neutral
E7. Satisfaction of education by patients	Very Satisfied	Neutral	Neutral	Neutral

Table 7 Obstacles and Comparisons in Diabetes Education

Part F	Jiangnan	Fusan	Xiangshan	Zhonghai
F1. Obstacles in diabetes education				
Financial support	√		√	√
Human resources for the educator	√	√	√	√
Place for education	√			
Time allotted for education	√	√		√
Method of education		√		
Others(acceptance or cooperation by patients, family members and high risk population)		√	√	
F2. Compared with other health facilities, the clinic staff believe the effectiveness of diabetes education in investigated community is:				
In comparison with health facilities in the district and the city	Better	Uncertain	Better	Uncertain

4. Discussion

In last two decades, diabetes has become a global health problem. With such a large ageing population, China now faces the crisis task to cope with chronic diseases such as diabetes. Diabetes and its resulting complications are one of the main causes of mortality in the country. A study of 10,002 adult residents in the Luwan district revealed the rate of diabetes to be 10.2 percent in 2009. Many people were also diagnosed with hypertension and coronary heart disease (Dong B et al., 2011). Furthermore, many patients are simply not aware of the high risk and complications associated with diabetes. As the National Standards for Diabetes Self-Management Education from United States, favourable diabetes education program will help patients to achieve successful health-related outcomes (Carole M et al., 2000). In the China Guidelines of T2DM Prevention and Care, they also describe the principle of diabetes education and management, educator, the contents of education and blood monitoring were mentioned (China Diabetes Association, 2007). But still now, we do not have standard and structured education program in community, especially in evaluation. Different methods of education will yield different effects in disease control (Zhao LB et al., 2001).

This study found many variations in the diabetes education programs at a usual Chinese community, in particular in the areas of diabetes educator training, teaching methodology, curriculum design, and evaluation strategies. The study found that educator training varies noticeably. For instance, while some clinics provided various external diabetes association or hospital-led training sessions for their educators, other clinics only gave their educators printed materials for self-study. Another major discrepancy was in the choice of education program. Jiangnan provided more choices for their patients such as phone education and lectures by outside speakers. Other clinics only provided usual outpatient and home visit education. One reason for these differences could be that some clinics are more overwhelmed with their workload than others. For example, we found that the patient-to-educator ratio differs greatly across clinics: 19.7 patients per educator at Jiangnan, 22.7 patients per educator at Xiangshan, 24.0 patients per educator at Zhonghai, and 51.3 patients per educator at Fushan. The clinics with the lower patient per educator ratios reported having greater consistency of training for their educators, and more vigorous diabetes education programs for their patients. This suggests that perhaps they were not as pressed for time or resources.

Lacking the completeness of the content was found across programs. For example, two of the four clinics are missing any sort of behavioral or mental health component in their diabetes education curriculums. Given the proven psychosocial needs of patient with diabetes, the lack of mental health support within a diabetes curriculum is a significant area of concern. These community clinics preferred a simpler and less time intensive method of education. Audio-visual education materials are widely used in these facilities. This is important to recognize in standardization of curricula, or choosing the best curriculum as a model for these community clinics.

Another important finding was that there was insufficient follow up of patient education outcomes at these community health clinics. There was no formal written record of patient satisfaction monitoring at any of the clinics. Furthermore, only one of the four clinics conducted the evaluation of education effectiveness using behavior measures. Jiangnan clinic conducts the most extensive evaluations and is the only clinic to monitor non-clinical measures, reports a higher level of staff satisfaction than any other clinic. Though the results cannot suggest that causation exists between evaluation and satisfaction, it is plausible that a better tracking of the program increases staff ownership and work satisfaction. As seen from the results of Part F, lack of evaluation has also led to clinics having very little understanding of diabetes education quality comparisons for quality improvement. All of these factors suggest that having systematic evaluations in place would enable quality improvement process for both patients and clinic staffs. However, as all of the clinics are already suffering from resource constraints, the feasibility of increasing evaluation and follow up remains uncertain.

Although many limitations in the study such as small survey sample size and number of the clinics, the exclusion of migrant population, it provides a general view of the current status of diabetes education at community in China. The finding of the study suggests two steps are necessary to improve the quality of diabetes education for China in the future. First, more clinics need to engage in formal evaluation of their education programs incorporating important measures such as lifestyle behavioral factors and patient satisfactions. Second, the public health bureau or community health center leaders should divert more effort toward the training of certificated educator, developing teaching methodology, and perfecting the curriculum, based on the guidelines and the evidences in order to ensure a maximum level of quality at all clinics. These aforementioned issues of evaluation and standardization are the areas which China should pay attention to, and it is the cornerstone of diabetes education. It is not the mere existence of diabetes education programs but the existence of effective educational models that can lead to improved patient's health-related outcomes.

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