12 ปีของการวิจัยเชิงปฏิบัติการแบบมีส่วนร่วม ในคลินิกโรคเบาหวานโรงพยาบาลสุรินทร์

12 Years of Participatory Action Research in Diabetes Clinic at Surin Hospital.

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ABSTRACT

Objective : To evaluate clinical practices and outcomes of a 12-year pilot project of participatory action research (PAR) in the diabetes clinic at Surin Hospital. The objectives of PAR are to improve clinical outcomes, to prevent early diabetic complications in all participants, and to help them have a better quality of life.

Materials and Methods : All patients including the multidisciplinary team and researchers in the diabetes clinic at Surin Hospital were enrolled. Participatory action research was performed since 1996. This PAR used the paradigms of critical theory and constructivism by using a range of qualitative and quantitative methods. Research methodology is a strategy or plan of action that shapes the choice and use of methods then links them to the desired outcomes.

Results : Ten action researches, two Master's theses, and associated reports were created over a 12-year period. This PAR developed many applications such as a home healthcare program, a community healthcare network, a multidisciplinary team, 29 diabetes clinics in primary care units (PCU), a health education program for self-care in diabetic patients in Surin province, a program of exercise as a treatment in chronic disease, a foot care program, mobile chest x-ray screening, and mobile retinal screening for diabetic retinopathy using fundus digital camera. Pragmatic social science processes were also introduced at the clinic. Patients with HbA_{1c} < 7% increased from 26% in 1998 (n = 246) to 47.1% in 2007 (n = 1,034) and 41.6% in 2009 (n = 2,768). Due to this high rate of HbE disorder in Surin province, which can affect HbA_{1c} measurement, DCIP test was used for screening. 45.4% of diabetic patients with negative DCIP results had HbA_{1c} < 7% (n = 390). Action plans were implemented to decrease the high rate of dyslipidemia, hypertension, overweight, and obesity to meet current standards. In 2009, clinical control was difficult in the majority of patients. 37.2% of diabetic dyslipidemia patients with statin therapy had LDL level < 100 mg/dl (n = 1,180). 29.3% of 3,176 patients had both systolic and diastolic blood pressure below 130 and 80 mmHg respectively, and 37.8% had body mass index from 18.5 Kg/m^2 to < 23.0 Kg/m^2.

Conclusions : This participatory action research (PAR) is an innovative clinical practice. It was designed on the basis of critical social science which also integrates the theories of positivism and interpretivism. In harmony with the culture and beliefs of the context, this model can construct new knowledge from the experiences of participants. The process of research forms social phenomena in diabetes clinic which gradually changes the behavior of the participants and finally improves the outcomes of clinical care.

Keywords : Participatory action research, PAR, Diabetes mellitus, DM, Surin Hospital, Diabetes clinic

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บทคัดย่อ

วัตถุประสงค์ : เป็นการประเมินผลการดำเนินการวิจัยเชิงปฏิบัติการแบบมีส่วนร่วม (Participatory action research) ในคลินิกโรคเบาหวานโรงพยาบาลสุรินทร์ ตั้งแต่ปี พ.ศ. 2539 จนถึง พ.ศ. 2552 วัตถุประสงค์ของการวิจัย คือ พัฒนาผลลัพธ์ทางคลินิก ป้องกันโรคแทรกซ้อนของเบาหวานและชักนำสมาชิกในคลินิกเบาหวานให้ปรับปรุงตนเพื่อการมีคุณภาพชีวิตที่ดีขึ้นด้วยตัวเอง ระเบียบวิธีวิจัยการวิจัยใช้กระบวนทัศน์แบบสังคมศาสตร์เชิงวิพากษ์ โดยได้ร่วมประสานทั้งการวิจัยเชิงปริมาณและเชิงคุณภาพเพื่อประโยชน์ของการวิจัย การดำเนินงานใช้กลยุทธ์หรือแผนปฏิบัติการจากความร่วมมือของสหสาขาวิชาชีพและผู้เกี่ยวข้องเพื่อมุ่งเน้นผลลัพธ์เป็นสำคัญ

ผลการศึกษา : ภายใต้การดำเนินงานตามแผนปฏิบัติการ มีผลการวิจัยของสหสาขาวิชาชีพที่เข้าร่วมได้รับการตีพิมพ์ 10 รายงาน สนับสนุนการค้นคว้าวิทยานิพนธ์ระดับปริญญาโท 2 ผลงาน รายงานส่งกระทรวงสาธารณสุขอีกจำนวนหนึ่ง ได้ก่อตั้งทีมสหสาขาวิชาชีพตั้งแต่ปี พ.ศ. 2540 ดำเนินโครงการที่สำคัญดังนี้ คือ โครงการเยี่ยมบ้านผู้ป่วยเบาหวาน, เครือข่ายสุขภาพในชุมชน, ก่อตั้งคลินิกเบาหวานในสถานีอนามัยตำบลทั้งสิ้น 29 แห่ง, คู่มือการให้สุขศึกษาผู้ป่วยเบาหวานสำหรับชาวสุรินทร์, แผนการออกกำลังกายร่วมรักษาในผู้ป่วยเรื้อรัง, โครงการตรวจเท้าผู้ป่วยเบาหวาน, โครงการคัดกรองเบาหวานขึ้นจอประสาทตาเคลื่อนที่โดยใช้กล้องถ่ายภาพจอประสาทตาชนิดไม่ต้องขยายม่านตา และได้สร้างปรากฏการณ์ทางสังคม (Social phenomena) ขึ้นในคลินิก โดยใช้องค์ความรู้ทางสังคมศาสตร์เพื่อการปรับเปลี่ยนพฤติกรรมของทั้งผู้ป่วยและผู้ให้การดูแลรักษา ผู้ป่วยเบาหวานที่มีค่า HbA_{1c} < 7% เพิ่มขึ้นจากร้อยละ 26 ในปี พ.ศ. 2541 (n = 246) เป็นร้อยละ 47.1 ในปี พ.ศ. 2550 (n = 1,034) และร้อยละ 41.6 ในปี พ.ศ. 2552 (n = 2,768) ตามลำดับ เนื่องจาก HbE disorder ในจังหวัดสุรินทร์พบในอัตราสูงมากและรบกวนผลการตรวจหาค่า HbA_{1c} ได้ใช้ DCIP test คัดกรองผู้ป่วยที่มี HbE disorder พบว่าร้อยละ 45.4 ของผู้ป่วยเบาหวานที่มีผลลบต่อ DCIP test มีค่า HbA_{1c} < 7% (n = 390) ได้ใช้การวิจัยเชิงปฏิบัติการเพื่อแก้ไขปัญหาภาวะไขมันในเลือดสูง, ความดันโลหิตสูง, น้ำหนักเกินและโรคอ้วนในคลินิกเบาหวานโดยเฉพาะกลุ่มที่ควบคุมรักษาได้ยาก กำลังติดตามผลการรักษาอย่างต่อเนื่อง

สรุป : การวิจัยเชิงปฏิบัติการแบบมีส่วนร่วมในคลินิกเบาหวานของโรงพยาบาลสุรินทร์เป็นนวัตกรรมทางคลินิก ใช้แก้ปัญหาได้ผลลัพธ์น่าพอใจ ก่อเกิดองค์ความรู้ใหม่โดยผู้เข้ามีส่วนร่วมสามารถสร้างปรากฏการณ์ทางสังคมที่นำมาซึ่งการเปลี่ยนแปลงพฤติกรรมของทั้งผู้ป่วยและผู้ให้บริการ เป็นต้นแบบที่อาจนำไปปรับใช้กับคลินิกโรคเรื้อรังได้อย่างเหมาะสมกับบริบทอันหลากหลายของแต่ละพื้นที่ในประเทศไทย

Introduction

Participatory action research (PAR) differs from most other research approaches to public health problems. It is based on reflection, data collection, and actions to improve health as well as to reduce health inequities through involving people who take actions to improve their own health[1]. PAR is suitable for identifying clinical issues and working collaboratively to develop potential solutions to improve clinical practice[2]. PAR has been used as a mechanism for putting the rhetoric of participation into action. It encourages reflection on the nature of knowledge and the extent to which knowledge can represent the interests of individuals and served to reinforce their positions in society[3]. The reflective process is directly linked to action, influenced by an understanding of history, culture, local context, and embedded social relationships. The process of PAR should be empowering and lead to people having increased control over their lives[4,5].

Diabetes and its associated complications represent major health and economic burdens worldwide[6,7]. This problem is particularly relevant to the Asia-Pacific region, where lifestyle changes associated with rapid economic development, improved survival of communicable diseases, and genetic susceptibility have led to rising diabetes prevalence[8,9]. Thailand provides a prime example of this trend[10]. Because of the differences in economic development and lifestyles between geographical regions, health administration in Thailand is decentralized[11]. In the present study, the author described the results of a 12-year effort to PAR in the diabetes clinic at Surin Hospital to improve clinical outcomes and the quality of life of diabetic patients.

Methods

This PAR was designed to use critical theory and constructivism through a range of qualitative and quantitative methods. Research methodology is a strategy or plan of action that shapes the choice and use of methods, then links them to the desired outcomes[12]. Participation has been central to improving health since the WHO Health for All Strategy, and its importance has been reinforced by subsequent statements on health promotion[13]. PAR focuses on research whose purpose is to enable action. Action is achieved through a reflective cycle, whereby participants collect and analyze data then determine what action should follow. The resultant action is then further researched and an iterative reflective cycle perpetuates data collection, reflection, and action in a corkscrew action (Figure 1).

PAR pays careful attention to power relationships, advocating for power to be deliberately shared between the researcher and the researched, blurring the line between them until the researched become the researchers. The researched cease to be objects and become partners in the whole

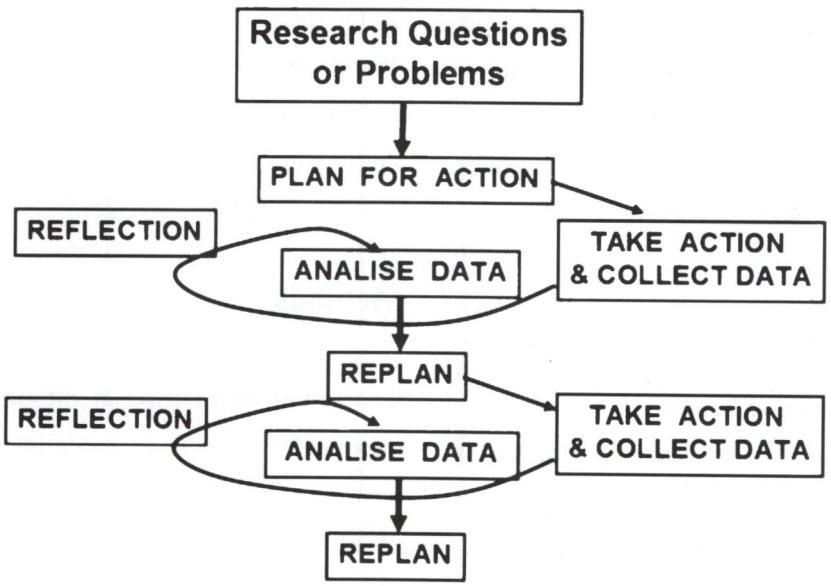
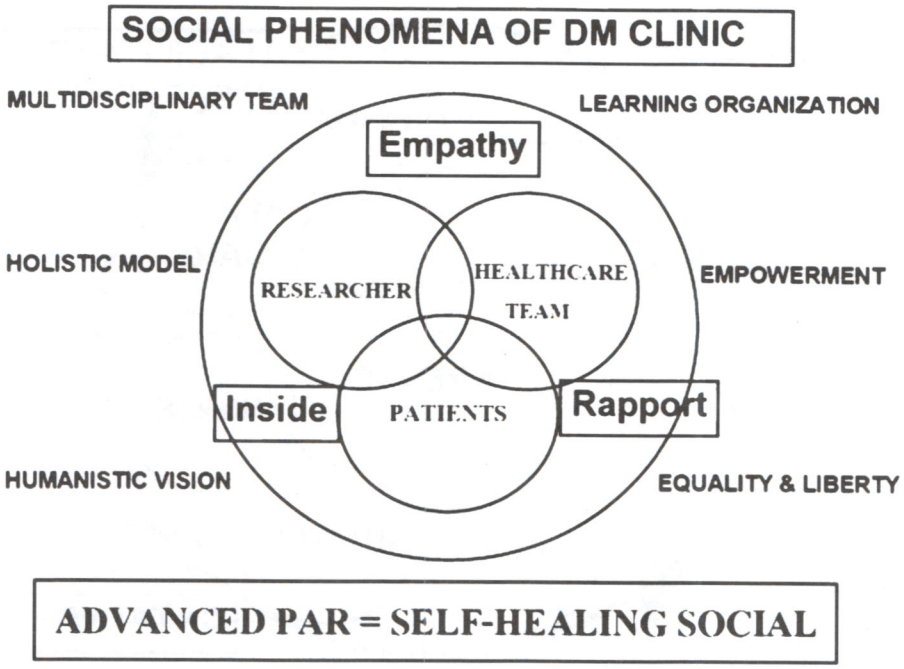


Figure 1

research process, including selecting the research topic, data collection, analysis, and deciding what action should happen as a result of the research findings[1]. When action and reflection take place at the same time they become creative and mutually illuminate each other[14]. This research aims to empower all its participants[1].

In order to form "social phenomena," the author implemented social processes into the clinic (Figure 2, 3). Associated methods are rapid assessment and rapid rural appraisal, both of which aim to produce knowledge that combines multidisciplinary healthcare team and community perspectives, driving the clinic to reach its objectives (Figure 4, 5). The concept of "social phenomena" is based on pragmatic social science; it has similarities to "mini-public" which was published in recent years[15]. This concept makes use of a deliberately constructed public of relevant stakeholders to act as a "mini-public" who are empowered to deliberate and make decisions.



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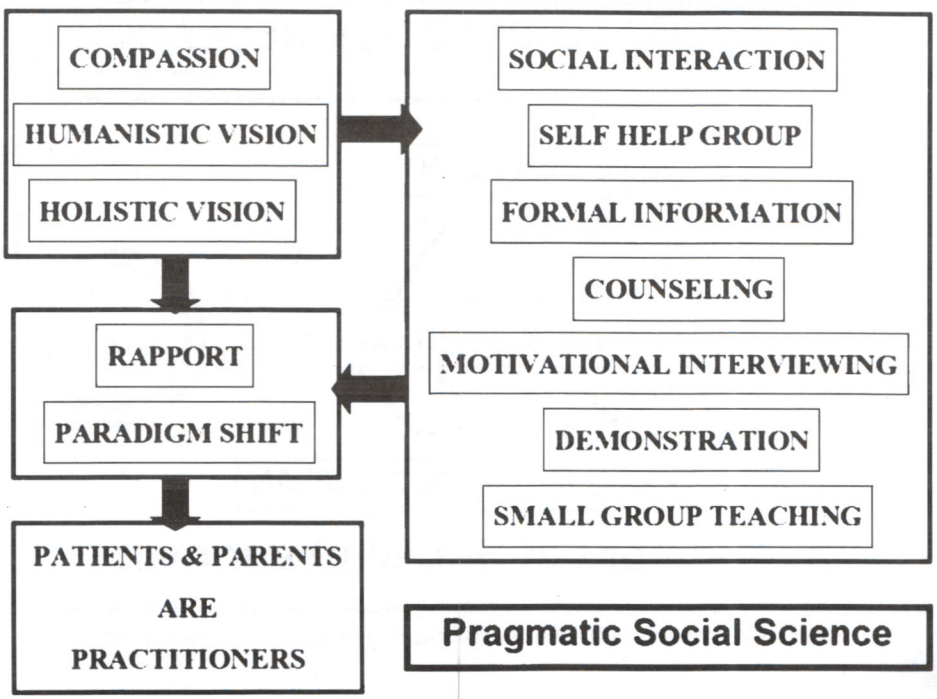

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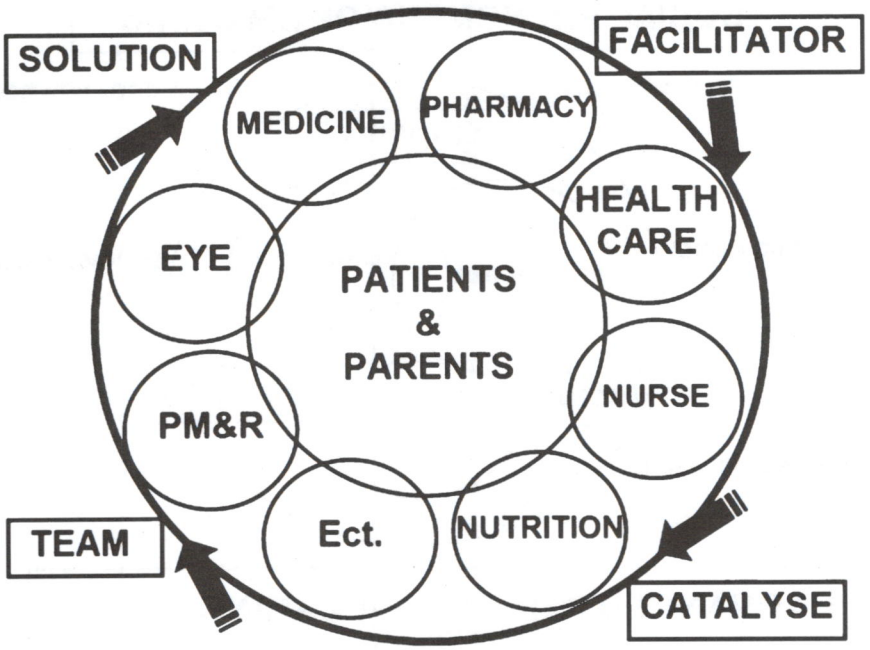

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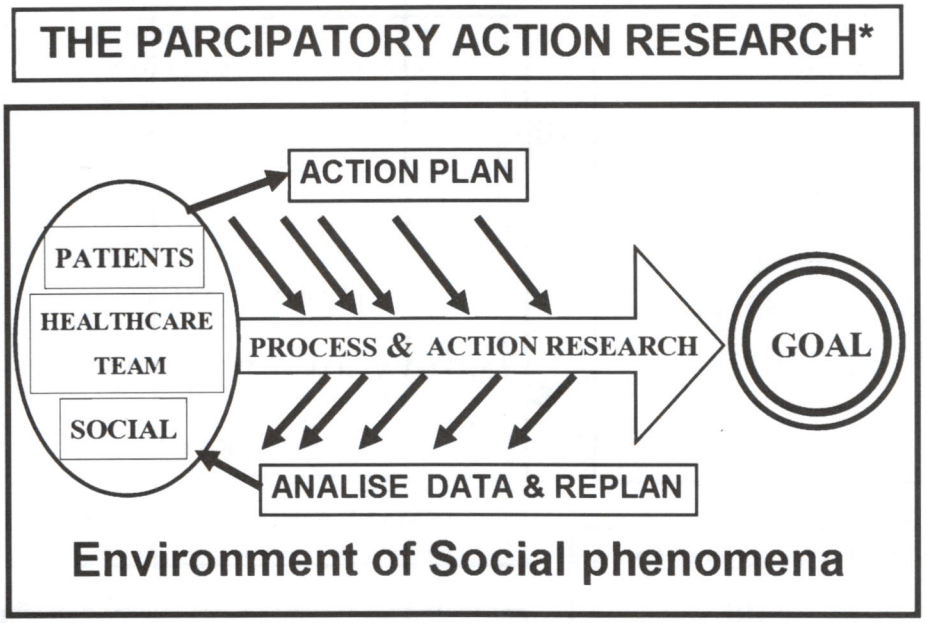

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Figure 5

PAR has been implemented in the diabetes clinic at Surin Hospital since 1996. Clinical practices began following American Diabetic Association (ADA) guidelines in 1998 and have been updated each year[16,17]. The action plans and results were analyzed as action researches. Situation analysis was done one year before the beginning of the multidisciplinary team in 1998 and again 12 years later. Outcome measurements were formally reported in 1999 and 2008. The author acts as the research manager, a member of the healthcare team, a field worker, and also a participant.

Population

All diabetic patients in the diabetes clinic at Surin Hospital including the multidisciplinary healthcare team, the researchers, and 29 primary care units (PCU) supervised by Surin Hospital have been enrolled since 1996. The multidisciplinary team has included internists, ophthalmologists, nephrologists, surgeons, psychiatrists, physiatrists, public health doctors, various paramedics, and volunteers. The number of patients increased from 613 cases in 1996 to 4,615 cases in 2009. 1,058 cases with acceptable medical conditions were sent to PCU for treatment after approval by physicians in 2008 and 381 cases were cared for in the division of nephrology. Of the remaining patients in the diabetes clinic, the majority had conditions which were difficult to clinically control.

Results

Under the process of this PAR, 10 action researches, two Master's theses, and associated reports were performed over a 12-year period (Figure 6). In 1996 the reports from Surin Hospital's outpatient department showed that a large amount of diabetic patients were old, had low education, lived in poverty, and lived far away from the hospital. Most lacked self-care and also had poor hygiene.

After the reflective process was done between participants, action plans were devised and implemented. These were the home visit program, self-management education programs, and the development of a new healthcare system for diabetic patients. The network of patient care delivery required not only determining what care was needed, but clarifying roles and tasks to ensure that the patient received that care.

In 1997 the first situation analysis was performed, a prospective study to evaluate the problems of diabetic patients[18]. Data from 467 diabetic inpatients showed a mortality rate of 11.1%. Septicemia was the most common cause of death (51.9%). Infection was significantly related to their residence in a suburban area ($p = 0.026$) and their non-compliance in receiving treatment ($p = 0.044$). Reflection after data analysis persuaded them to set up a multidisciplinary healthcare team called 'shared care' at that time[19,20].

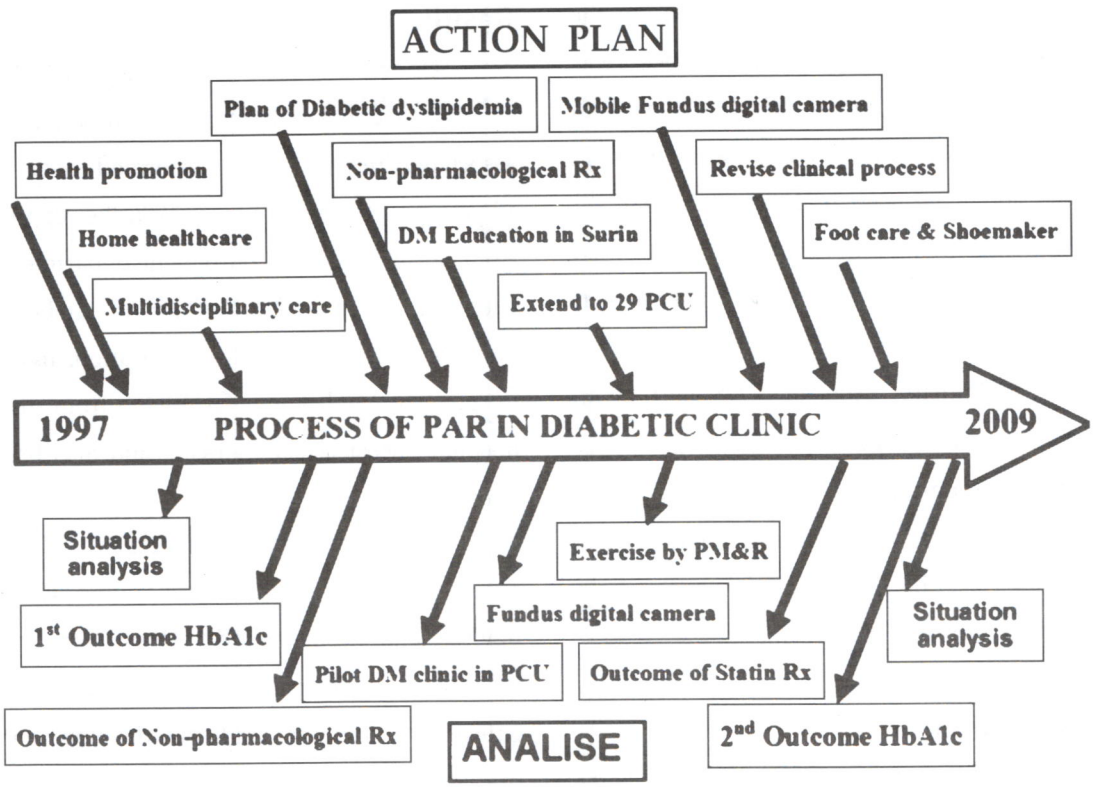

Figure 6

Glycemic control outcomes and associated conditions were measured one year after the multidisciplinary team was established[21]. Only 26% (n = 246) had HbA_{1c} < 7% whereas 54.5% had HbA_{1c} > 8%. The relationship between mean fasting plasma glucose (FPG) of the last three monthly measurements and HbA_{1c} was statistically significant but the correlation coefficient (r) was moderately positive (r = 0.57) and the coefficient of determination (r^2) was low (r^2 = 0.325). Dyslipidemia, hypertension, overweight, and obesity were the major problems. Thus the action plans were to control the major problem noted, and HbA_{1c} was determined to be a standard clinical guideline in late 1998. The clinic's primary goal was identified as reducing HbA_{1c} levels to < 7% in at least half of diabetic patients over the next 10 years.

In 1998 the clinic implemented self-management training and exercise promotion for diabetic dyslipidemia; these programs could significantly reduce each type of dyslipidemia (n = 138)[22]. However, after the end of study, pharmacological therapy was initiated in 71.3% of the study group. Near the end of the study, the standard target for serum low density lipoprotein cholesterol (LDL) was changed from < 130 mg/dl to < 100 mg/dl[23]. The

author had reevaluated the result of the programs for diabetic patients with high serum LDL in another paper; only 18.3% of the study group (n = 93) achieved the new goal of LDL[24]. The author also measured the effect of non-pharmacological therapy on lowering LDL levels (n=91); the difference of mean levels of LDL after being adjusted for the changes in HbA_{1c} and body weight was 15.4 ± 4.6 mg/dl (mean ± S.E.) (p = 0.02)[25]. Based on this data, medical treatment of high LDL level by statins and non-pharmacological therapy were implemented as clinical standards in 2002.

In 2004, after reflecting on the results of non-pharmacological therapy together, the rehabilitation department developed a new program of exercise to treat chronic disease and initiated it in the diabetes clinic (n = 85). The in-hospital exercise group controlled by intensity, duration, and frequency showed increased cardiovascular functions, physical fitness, and metabolism[26]. These results were also significantly better than those from home self-training program group. This research helped the team to learn more about the details of an effective exercise program, which soon led to the development and demonstration of appropriate exercise programs for each of the clinic's patients. The health education program for self-care in diabetic patients in Surin province was simultaneously developed; its contents were scientifically approved for quality and outcome[27].

The number of patients grew to 2,736 in 2004. This problem led to the pilot project of establishing the diabetes clinic in PCU at Thambol Nabua. Outcomes were measured from aspects of humanity, economy, and medical treatment[28]. Since the outcomes of those aspects revealed no statistical differences from hospital care, 12 diabetes clinics in PCU were established two years later, and were expanded to cover all 29 PCU in 2008.

In 2006, the ophthalmology department evaluated the efficacy and reliability of a new diabetic retinopathy screening process, using a mobile non-mydriatic fundus digital camera performed by trained nurses. This process was found to be highly acceptable[29]. The clinical team reflected on how to best use this tool. After screening nurses to determine which were qualified to provide this service, 59% of diabetic patients in the clinic (n = 3,083) completed retinopathy screening in 2006, and all of them received this service in the first trimester of 2008. 82% of patients in the clinic who had diabetic retinopathy had regular treatment by ophthalmologists (n = 123).

This screening also serviced diabetic patients at the community level. Alternatively month by month, mobile non-mydriatic fundus digital camera serviced Surin Hospital and community hospitals in Surin province, so that each had received the service at the end of 2008. At least two community hospitals trained for their own non-mydriatic fundus digital cameras.

Statins were usually prescribed in the outpatient department. In 2006, this drug therapy was evaluated for compliance and outcomes[30]. Therapeutic compliance, which is based on proportion of day covered, statins usage, eating behavior, and lifestyle modification, had good results. Goals were achieved in 38.2%, 58.6%, and 100% of high, moderate, and low risk patients respectively. Non-diabetic patients achieved the targets three times as much as diabetic patients. The resulting action plans were more frequent checking of blood lipid profiles and a target for diabetic dyslipidemia which followed ADA recommendations for 2007[31].

Secondary outcomes measurement was performed in 2006[32]. The services of the clinic had continuous quality improvement in most processes by the multidisciplinary team. 47.1% of diabetic patients in the clinic had HbA_{1c} < 7% and 31.2% had HbA_{1c} < 6.5% (n = 1,034). The coverage of screening for renal involvement and dyslipidemia was 80.1%. The rates of self-screening for diabetic foot and direct counseling in new diabetic patients were both 100% (n = 3,160). 553 diabetic patients were sent to receive treatment at the diabetes clinic in 12 PCU. Screening test for finding new diabetic patients in the communities by using fasting plasma glucose were 6,532 cases in 2004, 10,538 cases in 2005, and 5,163 cases in 2006.

The annual situation analysis in 2009

The annual situation analysis was carried out in the third trimester of 2009. There were 4,615 diabetic patients; male: female = 1 : 1.98; all 29 PCU have diabetes clinics. 1,058 patients with acceptable medical conditions were sent to receive treatment in PCU after approved by physicians, and 381 cases of nephropathy were cared for in the division of nephrology. The majority of the remaining patients in the diabetes clinic at Surin Hospital were poor clinical control patients.

At the last visit of 3,176 patients in the diabetes clinic at Surin Hospital, 22.2% had FPG between 70 mg/dl and < 110 mg/dl and 47.9% had FPG between 70 mg/dl and < 130 mg/dl. 85.2% had HbA_{1c} levels checked in this year; the rest were new entries. 41.6% had HbA_{1c} < 7% and 26% had HbA_{1c} < 6.5% (n = 2,768).

However, the most common cause of hemoglobinopathy in Surin province is hemoglobin E disorder (HbE)[33,34]. Reports have revealed that about half of the population has this disorder. Therefore the possibility of the coexistence of DM and HbE disorder is higher than other types in Surin[35], and also higher than most diabetes clinics in other regions of Thailand. HbE can affect the immunoassays used to measure HbA_{1c}[36]. Among patients in the clinic with similar fasting glucose, HbE disorder is associated with lower HbA_{1c} level[37]. Dichlorophenol Indophenol Precipitation test

(DCIP test) was used to screen for HbE disorder (n = 656)[38,39]. All positive cases (44.1%) were checked for hemoglobin typing (n = 290). 36.1% of the population receiving DCIP tests were heterozygous HbE and 7.2% were homozygous HbE. 45.4% of diabetic patients with negative DCIP tests had HbA_{1c} < 7% (n = 390).

77.9% of 3,176 patients had annually completed lipid profiles, 27.3% had serum total cholesterol (CHOL) levels < 170 mg/dl, 46.9% had serum total triglyceride (TG) levels < 150 mg/dl, 65.0% of males had serum high density lipoprotein cholesterol (HDL) levels > 40 mg/dl, and 43.1% of females had serum HDL levels > 50 mg/dl. The percentage of diabetic patients with LDL levels < 100 mg/dl after excluding those with TG levels > 400 mg/dl was 30.4%.

45.9% of 3,176 patients received statins to control serum LDL levels. 80.9% of those had annually completed lipid profiles (n = 1,458). 37.2% of diabetic dyslipidemia patients who received statin therapy had serum LDL levels < 100 mg/dl (n = 1,180).

29.3% of 3,176 patients had normal blood pressure[17] at the last visit. 53.1% had systolic hypertension, 59.9% had diastolic hypertension, and 42.5% had both systolic and diastolic hypertension. 37.8% had body mass index (BMI) from 18.5 Kg/m^2 to < 23.0 Kg/m^2, 20.9% had BMI from 23.0 Kg/m^2 to < 25 Kg/m^2, 31.7% had BMI from 25.0 Kg/m^2 to < 30 Kg/m^2, 7.9% had BMI 30.0 Kg/m^2 or above, and the rest were underweight. 87 cases had coronary artery disease, 22 cases had congestive heart failure, and 53 cases had evidence of stroke.

91.3% of diabetic patients who had registered before the third trimester of 2009 received retinal screening by fundus digital camera (n = 4,903). Of those, 11.7% had diabetic retinopathy (DR), and 8.6% of DR cases were proliferative diabetic retinopathy (PDR).

71.5% of 3,176 patients were screened for microalbuminuria, and 48.6% had positive result. 672 cases which tested positive received ACE inhibitor therapy. 26.3% of 2,637 patients had serum creatinine levels > 1.2 mg/dl and 4.0% had serum creatinine levels > 2.0 mg/dl.

Individual evaluation with motivational interviewing[40] was performed by healthcare providers in 517 patients. 1,195 patients received direct counseling from a nutritionist. The behavior of diabetic patients in PCU were studied, and it was found that perception of risk of diabetic complication and knowledge of all the disease's aspects statistically affected the patients' glycemic control behavior ($p < 0.05$)[41]. A foot care program including monofilament test and ankle brachial pressure index (ABI) was implemented with the support of the Foundation for the Development of Diabetes Care and the World Diabetes Foundation, the results of which will be presented in another report. However 114 patients received individually designed orthotic insoles before this support.

There were 4,697 patients in which drugs were prescribed. An evaluation by the Pharmacy department showed 696 instances of compliance error, 77 instances of adverse drug reaction, 25 instances of processing error, eight instances of prescribing error, and one instance of dispensing error.

Chest x-ray for heart and lung screening by mobile unit were performed in 1,996 patients; 16.7% showed abnormal films. 9.8% were cardiomegaly. 4.0% were compatible with pulmonary tuberculosis (TB) but only three cases were concluded to have TB. Lung mass was found in five cases.

Forty-three patients died in 2009. Infection is still the major cause of death (48.9%). Death rates from cardiovascular disease, renal failure, and stroke were 37.2%, 7.0%, and 2.3% respectively. Fourteen patients were amputated; 13 cases were below knee amputation.

Discussion

The present study describes the status of diabetes care and the outcomes among diabetic patients managed in the diabetes clinic at Surin Hospital in Thailand during the years 1997 to 2009. The context at Surin province, which is located in the northeastern region of Thailand, differs from others. In the time the PAR was conducted, participants could continuously solve essential problems of the clinic in various aspects using the paradigm of critical theory. Besides medical science, social science also plays an important role, especially in quality improvement and self-management by the patients. This PAR is an innovative clinical practice. It integrates the theories of positivism and interpretivism, and is based on critical social science. The results of action plans can be interpreted in quantitative studies, various kinds of social interaction in the clinic, and individual evaluation of patients related to interpretive theory (Figure 3), but the processes of this research were deliberated and carried out using the knowledge of critical theory and constructivism. Social phenomena within the clinic persuaded both patients and healthcare providers to join the research; they took part in finding the research problems and created action plans by the dialectic technique and reflective method.

Compelling evidence from epidemiologic studies indicates that the current worldwide diabetes epidemic is largely due to changes in diet and lifestyle[42]. In Surin province there is still a wide gap between what the team know and what the team practice in the field of public health. Narrowing that gap remains a major public health challenge. As the team know, therapeutic lifestyle and disease management interventions are complex in design, composition, and application; many are multidisciplinary, comprising several individual components[43]. This PAR includes various domains as described by the American Heart Association Disease Management Taxonomy Writing Group[44]. All of the action plans aim to modify patient behavior

and to improve the quality, consistency, comprehensiveness, and outcomes of care. In harmony with the culture and beliefs of its context, the characteristics of the plans were flexibility, compassion, empowerment of the participants, democracy, and liberty.

One of the aims of this PAR is to administer all resources in the real situation. Compassion rather than incentives drive these activities, because sometimes incentives cause only temporary success in solving problems. In this way, without bias, the results of the research can accurately present the next research problems for study in the spiral model (Figure 1), which is the definition of a sustainable development model. The model can construct new knowledge from their experiences.

For example, at the beginning the team intended to use HbA_{1c} as a standard clinical guideline, but then the team learned that nearly half of the patients had HbE disorder which can cause inaccurate measurement of HbA_{1c} levels. However 45.4% of patients with negative DCIP tests reached the goal for HbA_{1c} levels in 2009. Screening for HbE disorder in the clinic is ongoing to separate them from normal patients, and the clinic is actively seeking another standard for glycemic control in HbE disorder patients.

This PAR has developed many applications, such as the home healthcare program, the community healthcare network, a multidisciplinary team, diabetes clinics in all 29 PCU, a health education program for self-care in diabetic patients in Surin province, a program of exercise which treats chronic disease, a foot care program, and a fundus digital camera service. Reflection on the utility of retinal screening initiated the mobile unit which can service all community hospitals in Surin province.

The services of the diabetes clinics in 29 PCU differ from those of the clinic in Surin Hospital. Because no full-time physician practices in PCU, visits to PCU by the multidisciplinary team and a zoning program for direct telephone consultation to PCU by physicians will both begin in the fourth quarter of 2009.

After implementing statins with non-pharmacological therapy as the standard treatment, 37.2% of diabetic patients with high serum LDL level reach the target of LDL in 2009, compared to 18.3% in 1998. But the number of patients with high LDL level was still high and nearly the same as the Lipid Treatment Assessment Project II in Thailand[45] because the majority of studied group in 2009 were patients of difficult control. More frequent checking of lipid profiles and rapid dose adjustment of statins will be the new policy.

Blood pressure and glycemic control have important impacts on the deterioration of renal function in CKD patients at Surin Hospital. 62.6% of hospitalized end stage renal disease patients who received hemodialysis were diagnosed as DM and 44.8% of them were DM with hypertension[46]. More aggressive procedures to control blood pressure and fasting plasma glucose should be emphasized.

From a social science perspective, the social phenomena of the clinic increase the knowledge of diabetes care. Its history shows an evolution of context which must count when analyze conditions of the clinic. Life and all physical controls within the diabetes clinic are dynamic, so some static experiments or studies can not properly explain the phenomena. In addition to objective data, subjective data must be considered to understand the holistic composition. Some variables have patterns, but others are chaotic and cannot be controlled, especially lifestyle and daily interaction. These variables are not independent of these social aspects, so any research conducted in a social stream such as this must consider the variety of cultures and beliefs.

Nevertheless, correct social action can cause social change. The intention of this PAR is to create social change which will encourage participants (including the researchers) to improve their own lives by themselves. The changes within diabetes clinic over the past 12 years of this PAR clearly demonstrate the meaning and value of this chronic disease care model.

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Conflicts of interest

Under the authority of the Endocrine Society of Thailand, diabetes clinic at Surin Hospital won Sanofi-Aventis Distinguished Diabetes Service Award 2006 at team category. The research won Sanofi-Aventis Distinguished Diabetes Service Award 2009 at individual category. We declare that we have no conflict of interest.

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