National Journal of Advanced Research
ISSN: 2455-216X
Impact Factor: RJIF 5.12
www.allnationaljournal.com
Volume 4; Issue 1; January 2018; Page No. 118-123

Nursing: Chronic care model for diabetes mellitus

Abeer El-Said Hassane El-sol[1], Rosa Khalil Mohammed Babikir[2]
[1] Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Menoufia University, Egypt
[2] Assistant Professor, Community of Health Nursing, Faculty of Nursing, the National Ribat University Sudan
[2] Faculty of Applied Medical Sciences, Nursing department, Al-Baha University Kingdom of Saudi- Arabia

Abstract
Nursing practice changes in outpatient and community settings have focused attention towards the value of registered nurse in improving outcomes and reducing the use of costly inpatient care. The chronic care model is widely accepted as a standard for improving care for people with chronic conditions. Nurses as leaders in chronic care, their role is pivotal in improving care for chronic diseases. Most of patients prefer nurse led shared care for managing diabetes over doctor led care by a ratio of nearly 6 to 1**.** Chronic disease is an international concern. The increasing incidence of chronic diseases is approaching epidemic levels. Chronic disease as diabetes mellitus is a strain on individuals and on healthcare systems. The Chronic Care Model was developed to improve chronic disease care, but it may also inform delivery of other types of preventive care as long term complications. The Chronic Care Model uses a systematic approach to restructuring medical care to create partnerships between health systems and patients. Diabetes is a major cause of heart disease and stroke among adults around the world. Nurse researchers, such as Wellard, Burckhardt, Baker and Stern, and Lubkin and Larson, were often on the front lines of actual care for patients with ongoing treatments for conditions such as diabetes or renal failure. Finding evidence-based and effective strategies to promote health and to prevent and manage chronic diseases is essential. Others Pioneers have created innovations in Chronic Care model to create the Guided Care model; they combined the principles underlying such innovations and integrated them with primary care**.** E Health technologies has been especially effective in the management of diabetes.

Keywords: diabetes mellitus, chronic complications, chronic care model

Introduction
Nursing practice changes in outpatient and community settings have focused attention towards the value of registered nurse in improving outcomes and reducing the use of costly inpatient care [1]. Numerous exertions to improve chronic care indicate that nurses, not doctors, are the key to implementing the chronic care model in a patient centered care team. By nature of their education and role, nurses are in a position to champion transformation of chronic care. In many nations, nurses have been taking this central role for decades. Most of patients prefer nurse led shared care for managing diabetes over doctor led care by a ratio of nearly 6 to 1 [2].

Diabetes mellitus (DM)
Diabetes mellitus (DM) is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. If left untreated, diabetes can cause many complications. Acute complications can include diabetic ketoacidosis, hyperosmolar hyperglycemic state, or death [3]. Worldwide prevalence of diabetes mellitus is predicted to increase from 171 million in 2000 to 366 million in 2030. So the upcoming of diabetes nursing care will be formed by the frightening projections of improved occurrence, creating extra overwhelming complications and higher budgets of care [4].

The main types of diabetes mellitus
- Type 1 DM results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown [5].
- Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as "non- insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes". The most common cause is excessive body weight and insufficient exercise [5, 6].
- Gestational diabetes is the third main form, and occurs when pregnant women without a previous history of diabetes develop high blood sugar levels [5, 6].

Signs and symptoms of DM [7, 8].

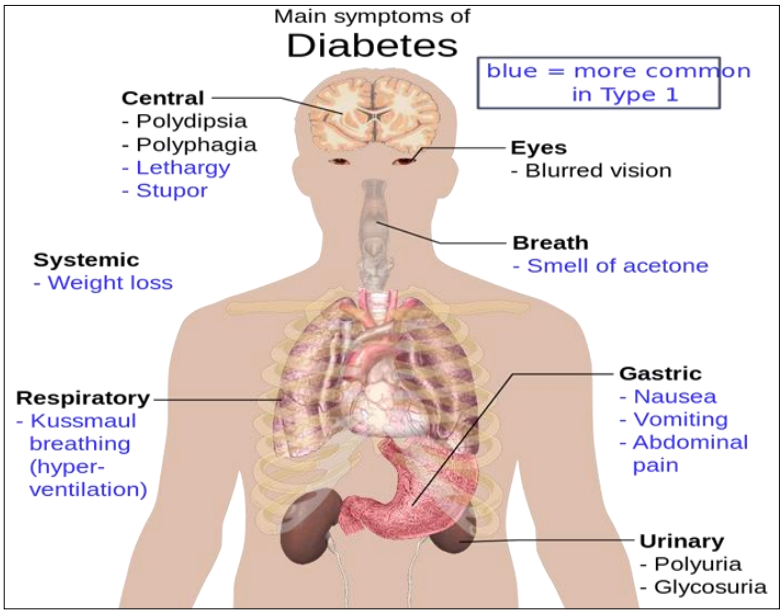

Fig 1: Manifestations of DM

Comparison between type 1 and 2 diabetes [9].

Table 1: Comparison between type 1 and 2 diabetes

Feature	Type 1 diabetes	Type 2 diabetes
Onset	Sudden	Gradual
Age at onset	Mostly in children	Mostly in adults
Body size	Thin or normal	Often obese
Ketoacidosis	Common	Rare
Autoantibodies	Usually present	Absent
Endogenous insulin	Low or absent	Normal, decreased or increased
Concordance in identical twins	50%	90%
Prevalence	~10%	~90%

WHO diabetes diagnostic criteria [10, 11].

Table 2: Criteria of DM diagnosis

Condition	2 hour glucose	Fasting glucose	HbA_{1c}	
Unit	mmol/l(mg/dl)	mmol/l(mg/dl)	mmol/mol	DCCT %
Normal	<7.8 (<140)	<6.1 (<110)	<42	<6.0
Impaired fasting glycaemia	<7.8 (<140)	≥6.1(≥110) & <7.0(<126)	42-46	6.0–6.4
Impaired glucose tolerance	≥7.8 (≥140)	<7.0 (<126)	42-46	6.0–6.4
Diabetes mellitus	≥11.1 (≥200)	≥7.0 (≥126)	≥48	≥6.5

Complications of DM

Diabetes is a chronic disease that characterized by hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels [12]. Serious long-term complications include cardiovascular disease, stroke, chronic kidney disease, foot ulcers, and damage to the eyes [6].

Management of chronic disease

Chronic disease management as DM relies on the assumption that providing optimal chronic care requires changes of patients and professionals with regard to behavior, culture, and communication [13]. Indeed, with ageing of the population and the growing prevalence of chronic diseases, initiatives to improving quality of chronic care require more than evidence about effective diagnostic procedures and treatments in comparison to acute disorders [13].

Chronic Care Model

The Chronic Care Model (CCM) is a well-established and validated framework that illustrates a comprehensive approach to caring for the chronically ill that supports increased functional and clinical outcomes. It provides a blueprint for changing office systems to improve chronic illness care [14]. Furthermore, the comprehensive, multisystem approach of the

CCM makes it ideal for working with the susceptible populations to chronic complications and they have lack of information regarding their disease [15].

Historical background of CCM

In the latter part of the 20th century, researchers began to develop care models for the assessment and treatment of the chronically ill. Nurse researchers, such as S. Wellard, C. S. Burckhardt, C. Baker and P. N. Stern, and I. M. Lubkin and P. D. Larson, were often on the front lines of actual care for patients with ongoing treatments for conditions such as diabetes or renal failure. They stated that their patients experienced a series of "phases", and that during some of these phases the patients responded to the same interventions quite differently [16, 17, 18, 19].

Goal of CCM for diabetic patient

Goal of CCM for diabetic patient to improve the care and outcomes of adult patients with diabetes especially type 2 by teaching interprofessionally teams of learners the principles and practices of the improving Chronic Illness Care Model [20].

Chronic Care model for improving outcomes.

This model asserts that improving chronic care will require simultaneous improvements in support for self-management, design of practices, decision support, clinical information systems, and integration of community resources into health care. According to the model, improvements in these processes will foster more productive interactions between patients who are informed participants in their care, and practice teams that are prepared and proactive in providing care. Ultimately, these productive interactions should improve the outcomes of chronic care [21].

The Expanded Chronic Care Model (Expanded CCM)

There is an opportunity to integrate population health promotion into the prevention and management of chronic disease. This integration would broaden the CCM by directing additional efforts to reducing the burden of chronic disease, not just by reducing the impact on those who have a disease but also by supporting people and communities to be healthy. This strategy requires action on the determinants of health as well as delivering high quality healthcare services. Glasgow *et al*. (2001) suggest that there are numerous advantages to having a single model for the organization of healthcare for both disease prevention and management. The integration of population health promotion into an Expanded Chronic Care Model (Expanded CCM) will address the requirement to develop the Community portion of the CCM and to guide action that would address health determinants [22].

The Health System and the Community in the Expanded Chronic Care Model

The Expanded CCM, includes a porous border between the formal health system and the community. This porous border is a graphical representation of the flow of ideas, resources and people between the community and the health system. A second area of change in the Expanded CCM is the placement of the four areas of focus: self-management support, decision support, and delivery system design and information systems. These four circles now straddle the border between the health system and the larger community. To address both the delivery of healthcare services and population health promotion, the activities of these four areas can be integrated within, and have an impact on, both the healthcare organization and the community [23].

The Ottawa Charter for Health Promotion refers to five action areas [23]:

- Develop personal skills
- Re-orient health services
- Build healthy public policy
- Create supportive environments
- Strengthen community action.

Table 3: Comparison between Chronic Care model and Expanded Chronic Care Model [24].

Components of Chronic Care model		Components of Expanded Chronic Care model		Examples
Health System Organization of healthcare.	*Program planning that includes measureable goals for better care of chronic illness.			
Self-Management Support.	*Emphasis on the importance of the central role that patients have in managing their own care.	*Self-management/ Develop personal skills.	*Enhancing skills and capacities for personal health and wellness.	*Smoking prevention and cessation Senior's walking programs.
Decision Support	*Integration of evidence based guidelines into daily clinical practice.	*Decision Support.	*Integration of strategies for facilitating community's abilities to stay healthy.	*Development of Health Promotion & prevention best practice guidelines.
Delivery System Design.	*Focus on teamwork and an expanded scope of practice to support chronic care	*Delivery System zDesign. *Re-orient Health Services.	*Expansion of mandate to support individuals and communities in a more holistic way	*Advocacy on vulnerable populations *Emphasis in quality improvement on health & quality of life outcomes
Clinical Information Systems.	*Developing information systems based on patient populations to provide relevant client data	*Information Systems	*Creation of broadly based information systems to include community data beyond the healthcare system	*Use of broad community needs assessment considering poverty rates, public transport, crime rates
Community Resources and Policies	*Developing partnerships with community organizations that support and meet the needs of patients.	*Build Healthy Public Policy *Create Supportive Environments *Strengthen	Development and implementation of policies designed to improve population health *Generating living and	*Partner with local council to advocate/develop smoking bylaws, walking trails, restrict new fast food outlets *Development well lit streets & bicycle paths, community gardens

		Community Action	employment conditions that are safe, stimulating, satisfying and enjoyable *Working with community groups to set priorities and achieve goals that enhance the health of the community	*Support the community in addressing the need for safe affordable housing.

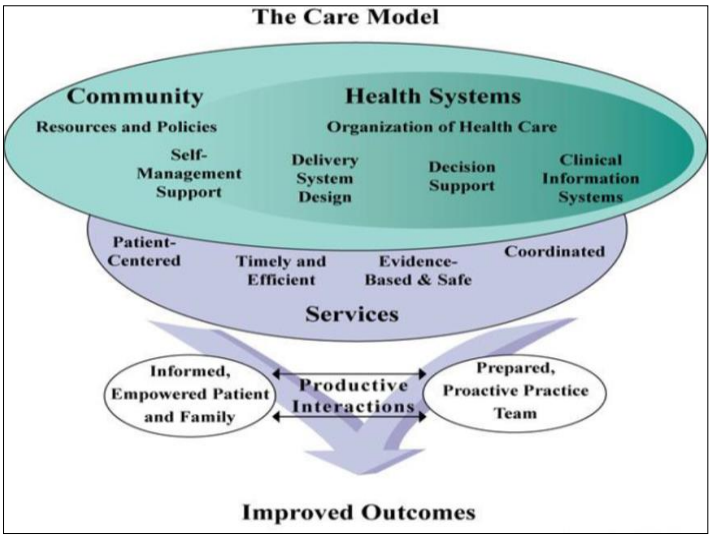

Fig 2: Components of the Chronic Care Model [25].

Evidence of the Chronic Care Model in diabetes. (**Essential elements of a health care system) [4].**

Table 4: Evidence of the Chronic Care Model in Diabetes [4].

Elements of the Chronic Care Model	Elements of the Chronic Care Model Examples of the Chronic Care Model in diabetes management
Delivery system design	Team-based patient care. Standing orders for routine laboratory tests Automated letters to patients overdue for diabetes screening tests
Self-management support	Motivational interviewing Web-based diabetes education Problem-solving skills and support
Clinical information systems	Patient registries to identify high-risk patients Tracking referrals and identify gaps in care
Decision support	Prompts to providers for overdue care Providing patients with evidence-based goals and data summaries (e.g., report cards)
Community	Referrals to local gyms, studios or exercise facilities and programs Referrals to healthy food memberships or programs (i.e., Weight Watchers)
Health systems	Establishing a culture that supports quality Pay for performance, quality-driven care

How Guided Care improves outcomes [25].

During the past 20 years, pioneers have created innovations in Chronic Care model to create the Guided Care model; they combined the principles underlying such innovations and integrated them with primary care [26].

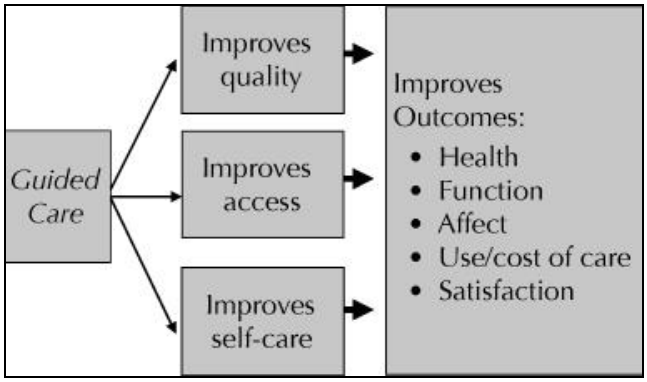

Fig 3: Methods of improving Outcomes [25].

Barriers faced nurses in spreading of successful Chronic Care Model.

Even though evidence and examples show the pivotal role played by nurses in improving chronic care, several barriers inhibit the spread of nurse led programs [2].

Table 5: Barriers of Chronic Care Model Success [25]

Financial incentives		Lack of incentives to provide care coordination and supportive services under fee-for-service payment: difficulty of prevailing against fee-for-service incentives to generate sufficient cost savings in an acceptable time frame
Capacity to change		Stresses on primary care and limited capacity to implement care management models, despite the logic of doing so in this setting
Culture and workforce		Professional uncertainty and lack of training and skills to take on new roles, adopt a patient-centered paradigm, and change the culture
Infrastructure		Inadequate electronic health records systems and interoperability to support integrated care management and coordination across the care continuum
Evidence		Difficulty scaling up limited evidence from single-site or single-condition studies to multiple contexts and chronic conditions (e.g., determining the relative importance and ideal intensity of each feature in the bundle, etc.)

E-Health for Chronic Illness

E-Health is in the area of telehealth, sometimes called telemedicine, which have been used eHealth technologies as (telecommunication, videoconferencing, remote monitoring, etc.) in care intervention across many aspects of health care for the delivery of a class or training to individuals or groups in a remote setting [27].

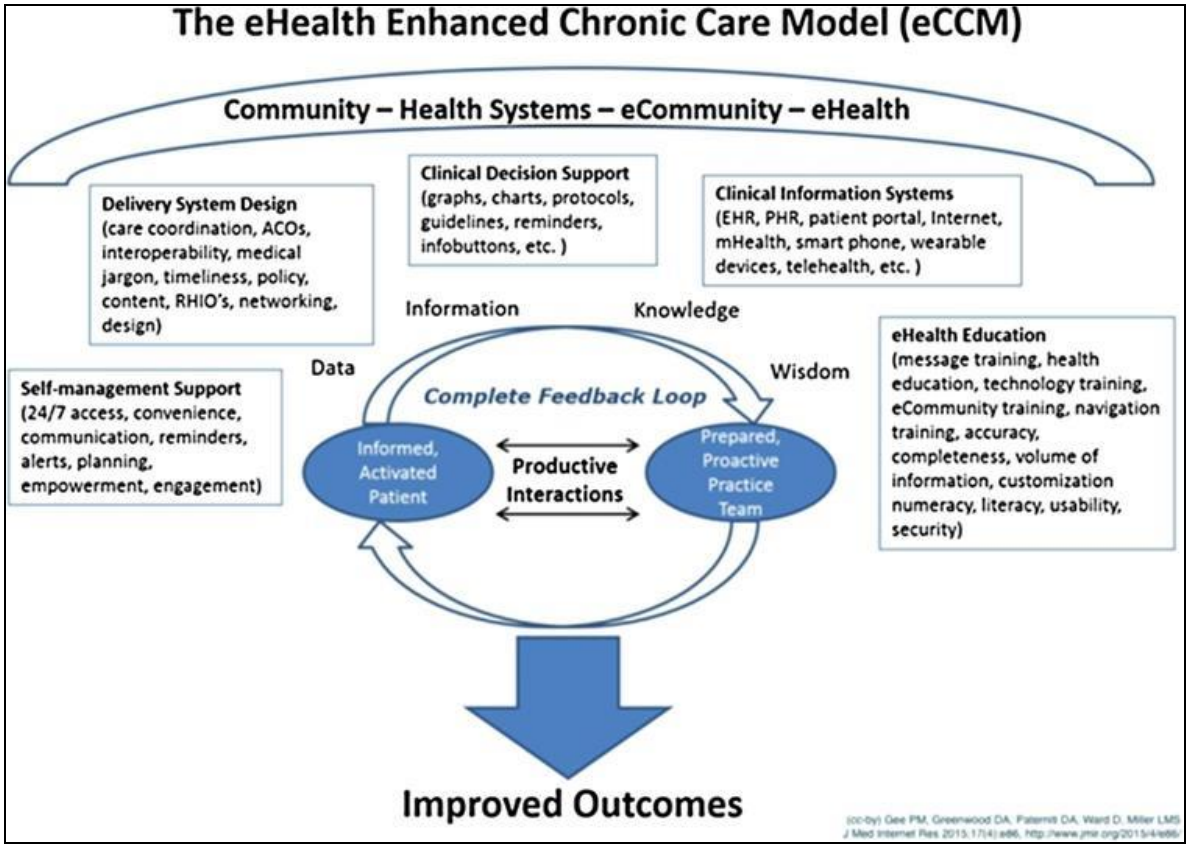

Fig 4: e-Health in Chronic Care Model Improve Outcomes [28].

Conclusion

Chronic disease management as DM relies on the assumption that providing optimal chronic care requires changes of patients and professionals with regard to behavior, culture, and communication. Most of patients prefer nurse led shared care for managing diabetes over doctor led care by a ratio of nearly 6 to 1. Goal of CCM for diabetic patient to improve the care and outcomes of adult patients with diabetes especially

type 2 by teaching inter professionally teams of learners the principles and practices of the improving Chronic Illness Care Model. During the past 20 years, pioneers have created innovations in Chronic Care model to create the Guided Care model; they combined the principles underlying such innovations and integrated them with primary care**.** E Health is in the area of telehealth, has been especially effective in the management of diabetes, it can use in care intervention across many aspects of health care for the delivery of a class or training to individuals or groups in a remote setting.

References

1. Linda McConnell. Role of Nurses in Managing Chronic Disease. FORUM- Translating research into quality health care for Veterans. 2017. Available at www.hsrd.research.va.gov/publications/forum.
2. Thomas Bodenheimer, *et al*., Nurses as leaders in chronic care. Their role is pivotal in improving care for chronic diseases. BMJ. 2005; 330(7492):612-613. Doi: 10.1136/bmj.330.7492.612**.**
3. Kitabchi AE, Umpierrez GE, Miles JM, Fisher JN. (Hyperglycemic crises in adult patients with diabetes. Diabetes Care. 2009; 32(7):1335-43. doi:10.2337/dc09-9032. PMC 2699725 . PMID 19564476.
4. Heather L Stuckey, Alan M Adelmanm, Robert A Gabbay. Improving care by delivering the Chronic Care Model for diabetes. Diabetes Manage. 2011; 1(1):37-52.
5. RSSDI textbook of diabetes mellitus (Rev. 2nd ed.). Jaypee Brothers Medical Publishers, 2012, 235. ISBN 9789350254899. Archived from the original on 14 October 2015.
6. Diabetes Fact sheet N°312". *WHO*. October 2013. Archived from the original on 26 August 2013. Retrieved, 2014.
7. Cooke DW, Plotnick LType 1 diabetes mellitus in pediatrics". Pediatr Rev. 2008; 29(11):374-84. Quiz 385. doi:10.1542/pir.29-11-374. PMID 18977856**.**
8. Rockefeller, J. D. (2015-06-18). Diabetes: Symptoms, Causes, Treatment and Prevention. ISBN 9781514603055. Archived from the original on 2017-09-06**.**
9. Williams textbook of endocrinology (12th ed.). Elsevier /Saunders. 2015, 1371-1435. ISBN978-1-43770 324-5.
10. Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: report of a WHO/IDF consultation (PDF). Geneva: World Health Organization, 2006, 21. ISBN 978-92-4-159493-6**.**
11. Vijan S. Type 2 diabetes. Annals of Internal Medicine. 2010; 152(5):ITC31-15. Doi: 10.7326/0003-4819-152-5-201003020-01003. PMID 20194231.
12. Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, Paciorek CJ, *et al*. National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2.7 million participants. Lancet. 2011; 378(9785):31-40.
13. Pamela A, Ohman Strickland, *et al*., Features of the Chronic Care Model (CCM) Associated with Behavioral Counseling and Diabetes Care in Community Primary Care. JABFM, 2010, 23(3).
14. Perry M Gee, *et al*., The eHealth Enhanced Chronic Care Model: A Theory Derivation Approach. J Med Internet Res. 2015; 17(4):86. Doi:10.2196/jmir.4067.
15. Coleman K, Austin B, Brach C, *et al*. Evidence on the Chronic Care Model in the new millennium. Health Aff (Millwood) 2009; 28(1):75-85. Available at: http://content.healthaffairs.org/content/28/1/75.full. Accessed April 8, 2013.
16. Wellard S. Constructions of chronic illness. Int J Nurs Stud. 1998; 35(1/2):49-55. Doi: 10.1016/S0020-7489(98)00013-3. PMID 9695010.
17. Burckhardt CS. Coping strategies of the chronically ill. Nurs. Clin. North Am. 1987; 22(3):543-50. PMID 3649790.
18. Baker C, Stern PN. Finding meaning in chronic illness as the key to self-care. Can J Nurs Res. 1993; 25(2):23-36. PMID 8118760.
19. Lubkin IM, Larson PD. Chronic illness: Impact and interventions (5th ed.) Sudbury, MA: Jones and Bartlett, 2002.
20. Lorig KR, Ritter P, Stewart AL, *et al*. Chronic disease self-management program: 2-year health status and health care utilization outcomes. Med Care. 2001; 39(11):1217-23. [PubMed].
21. Janson SL, Cooke M, McGrath KW, Kroon LA, Robinson S, Baron RB. Improving chronic care of type 2 diabetes using teams of inter professionally learners. Acad Med. 2009; 84 (11):1540-8.
22. Glasgow R, Orleans C, Wagner E, Curry S, Solberg L. Does the Chronic Care Model also Serve as a Template for Improving Prevention? The Milbank Quarterly. 2001; 79(4):579-612.
23. Victoria J. Barr. The Expanded Chronic Care Model: An Integration of Concepts and Strategies from Population Health Promotion and the Chronic Care Model. Healthcare Quarterly 2003; 7(1):73-82. doi:10.12927/hcq.2003.16763.
24. A Hume Region resource for health services. The Expanded Chronic Care Model. Version, 2014.
25. http://www.improvingchroniccare.org/index.php.
26. Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness. JAMA. 2002; 288(14):1775-9.
27. Lorig KR, Ritter P, Stewart AL, *et al*. Chronic disease self-management program: 2-year health status and health care utilization outcomes. Med Care. 2001; 39(11):1217-23. [PubMed].
28. https://www.google.com.sa/search?safe.