

# The Effect of Clinical Factor on the Health System Integration

Bayaneh Seyedamini<sup>1</sup>, Leila Riahi<sup>2</sup>, Mahmoud Mahmoudi Majdabadi Farahani<sup>2</sup>, Seyed Jamaledin Tabibi<sup>2</sup>, Iravan Masoudi Asl<sup>3</sup>

<sup>1</sup>Department of Nursing, Mahabad Branch, Islamic Azad University, Mahabad, <sup>2</sup>Department of Health Services Management, Science and Research Branch, Islamic Azad University, <sup>3</sup>Majlis Research Center, Tehran, Iran

ORCID:

Bayaneh Seyedamini: <https://orcid.org/0000-0003-4962-6867>

## Abstract

**Introduction:** Integration in the health system can improve the coordination and continuity of care for the patient. Clinical integration can facilitate the continuous, comprehensive, and coordinated provision of services at the individual level. This study was conducted to determine the effect of clinical variables on the integration of Iran's health system in 2017–2018. **Methodology:** This is an applied research which has been used in different stages of review, comparative, and quantitative methods in terms of necessity. In the first stage, various patterns of the theory and practice of integration of the health system were studied through library studies. Then, the common and noncommon dimensions of these patterns were set in a comparative table. After determining the variables of various patterns of integration, a questionnaire was developed, and its validity and reliability were confirmed. At the field stage, a survey of 506 experts and management experts of hospitals, data were collected, and exploratory and confirmatory factor analysis was performed. **Results:** Based on the results of the exploratory factor analysis in the clinical field, “the development of multifaceted care plans and team meetings” with the highest score of 0.649 was the most important. Regarding the standard coefficients of correlation analysis, the effect of the clinical factor on integration was 0.91. Furthermore, “case management,” “providing continuous care,” and “using protocols and clinical guidelines” with 0.79 factor load are the most important factors in the clinical integration of the health system. **Conclusion:** The health system can increase the quality of care through the development of multifaceted care plans and multiple team meetings, the development of coordination and continuity of care, focusing on the needs of patients, and step up the development of integration in the health system.

**Keywords:** Clinical integration, health system, integration

## INTRODUCTION

Population aging, increasing complexity of medicine, increasing the incidence of chronic and multisystem diseases, in addition to increasing technological costs, has put all health systems under considerable pressure. Integration as a solution is defined by the World Health Organization as a concept for collecting resources, providing, managing, and organizing services for diagnosis, treatment, care, rehabilitation, and health promotion is defined. In short, integration with precise planning and financing, with a shared vision and focus on a targeted population, is achieved.<sup>[1]</sup>

Integration has a significant potential for health-care systems to improve cost, efficiency, and quality of care. Key factors such as proper financing, cultural change, and supportive provisions are needed to facilitate such changes. Resources should be provided for focus on the key elements of the success of integration, including the infrastructure of information

technology, motivational interventions in primary care, and the explicit evaluation framework.<sup>[2,3]</sup>

Most scholars considered the integrity of the health system as a positive value and endorsed its benefits to patients, providers, and health systems.<sup>[4]</sup> Integration allows access to quality information and action based on this information. As a result, quality can increase with increasing coordination.<sup>[5]</sup>

One of the dimensions of integration considered in the literature review is the clinical dimension.<sup>[6]</sup> Clinical integrity refers to the coherence of the initial processes of providing care to unique patients. Clinical integrity requires a centralized perspective for overall well-being of the

**Address for correspondence:** Dr. Bayaneh Seyedamini,  
Department of Nursing, Mahabad Branch, Islamic Azad University,  
Mahabad, Iran.  
E-mail: [seyedaminib@gmail.com](mailto:seyedaminib@gmail.com)

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Seyedamini B, Riahi L, Farahani MM, Tabibi SJ, Asl IM. The effect of clinical factor on the health system integration. *Int Arch Health Sci* 2019;6:6-11.

### Access this article online

#### Quick Response Code:



**Website:**  
<http://iahs.kaums.ac.ir>

**DOI:**  
10.4103/iahs.iahs\_18\_18

individual, and they must properly examine the needs of the people and match the services provided to their needs. In other words, clinical integration can facilitate the continuous, comprehensive, and coordinated provision of services at the individual level.<sup>[7]</sup>

According to existing literature, integrity requires collaboration in organizational, clinical, service, informational, systematic, financial, and legal processes. In the meantime, clinical integration is probably the most important integration process.<sup>[8]</sup> Accordingly, the aim of this study was to investigate the effect of clinical variables on the integrity of the Iranian Health System.

## METHODOLOGY

This is an applied research study in different stages, and it has been used in comparative and quantitative methods in terms of necessity and has been carried out in Iran in 1396.

This research was conducted to assess the impact of “clinical dimension” on the integrity of the health system. In the first stage, different patterns of theory and practice of integration of the health system were collected through library studies and literature review and various factors affecting integration. In the second stage of the research, the research questionnaire was designed and validated. The questionnaire was adjusted according to the items extracted from the texts and experts’ opinions in this field, which could cover the components necessary to examine the factors affecting integration. For validation, a questionnaire was distributed among 10 experts and experts in the health system and distributed their views. To measure the reliability of the questionnaire, the modified questionnaire was examined through a pilot test study and Cronbach’s alpha (0.96), and the results of the internal consistency coefficient showed that in the case of elimination of two terms, reliability increases. After removing them, a questionnaire containing 47 questions was extracted. The questions of the questionnaire were measured by Likert five-point scale, so that the score was very low, 1 and the very high score was 5.

In the third stage of the study entitled field study, a final questionnaire was distributed among the managers of hospitals and health centers, supervisors, departmental officials, health-care providers, and health professionals with sufficient knowledge and experience, and they aimed at research goals and the confidentiality of their comments was informed. The sample size was determined ten times the questionnaire according to the number of questionnaires and the required level of performance for performing factor analysis. In this stage, the cluster sampling method was selected in five provinces of Iran, including West Azerbaijan, Golestan, Khorasan Razavi, Kohgiluyeh and Boyer-Ahmad Provinces, and Khuzestan Province. In each of the randomly selected provinces, 110 questionnaires were distributed among the general hospitals. Finally, 506 questionnaires were completed by managers and carriers of the health system.

In the fourth stage, data were collected and analyzed using SPSS software version 23 (IBM Corp, Armonk, New York). The factors influencing health system integrity based on the field stage findings were extracted using exploratory factor analysis. For this purpose, the “special value analysis” method was used to identify the key factors. In this way, agents with a special value larger than one were extracted as the factors. For more accurate analysis of the rotation using the “Varimax” method, the value of the Kaiser–Meyer–Olkin (KMO) index, as well as the significance of the Bartlett’s sphere test, showed the accuracy of the factor analysis and the adequacy of the sample size.

In the fifth step, exploratory factors from the fourth stage using the AMOS validation method, the confirmatory factor analysis was verified using software 22, and the results were verified using confirmatory factor analysis using the indexes. Furthermore, the regression coefficient was used to show the effect of factors.

## RESULTS

The results of this study are summarized in three sections. In the first part, the results of the review study and identifying the patterns of integration, comparative matrix, the initial conceptual model, and the opinion of the experts are discussed. In the second part, the findings of the exploratory factor analysis and its verification tests and the adequacy of the sample size are presented. In Section 3, the results are derived from confirmatory factor analysis and fitness indicators.

The results of the review study led to the identification and selection of 18 patterns in the context of health system integration, and their comparative matrix adjustment showed that common and unobtrusive factors affecting integrity can be identified in terms of seven dimensions.

These factors are clinical, functional, informational, professional, organizational, systemic, and normative dimension. By studying the various factors and variables in the patterns, the conceptual model of the research was presented [Figure 1]. Table 1 shows the comparative matrix of the clinical dimension of the integrity of the health system based on the patterns studied.

Table 2 shows the mean and standard deviation of the questionnaire’s response to the clinical questionnaire by the experts. The results show that according to the views of the participants in the research, the issue of “the development of multifaceted care plans and multiple team meetings for the effective transmission of information and identification of roles” and “proper guidance of patients in the system through appropriate education” are of the greatest importance in the clinical integration of health system.

Before performing the exploratory factor analysis, three indices were used to examine the accuracy of the test. Considering the normality assumption of the research population, the value of KMO index (0.971) indicated the

**Table 1: Comparative matrix clinical dimension of health system integration based on studied patterns**

Clinical dimension	Patterns																	
	SM <sup>[27]</sup>	CM <sup>[26]</sup>	CC <sup>[25]</sup>	LHCC <sup>[24]</sup>	MCN <sup>[23]</sup>	PW <sup>[22]</sup>	Mataror <sup>[21]</sup>	DMP <sup>[20]</sup>	PRISMA <sup>[18,19]</sup>	CHC <sup>[17]</sup>	Torbay <sup>[15,16]</sup>	PACE <sup>[13,14]</sup>	Mayo VA <sup>[12]</sup>	CCNC <sup>[11]</sup>	GRIPA <sup>[11]</sup>	Gesinger <sup>[10]</sup>	Kaiser <sup>[9]</sup>	
Multidisciplinary medical groups	✓								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Evidence-based care and clinical guidelines		✓							✓					✓				✓
Care management plan													✓					
Meeting the needs of patients									✓		✓		✓					
Case management (disease)	✓								✓				✓					✓
Active patient participation																		
Give the patient information																		
Coordination of care	✓										✓	✓	✓	✓	✓	✓	✓	✓
Joint monitoring and evaluation	✓										✓			✓				
Continuous care	✓																	
Interaction between patient and professionals	✓										✓		✓	✓	✓	✓	✓	✓
SM	✓																	

SM: Self Management, CM: Case Management in England, CC: Care Chain in Sweden, LHCC: Local Health care cooperatives in Scotland, MCN: Managed Care networks in Scotland, PW: Participation in the work in England, Mataror in Netherlands, DMP: Disease Management Programs in Germany, PRISMA: Program of Research to Integrate the Services for the Maintenance of Autonomy in Canada, CHC: Coordinated Health Care in Australia, Torbay Care True in England, PACE: Program of All inclusive Care for the Elderly in US, Mayo clinic in US, VA: Veteran Health Administration, CCNC: Community Care of North Carolina, GRIPA: Greater Rochester Independent Practice Association in US, Gesinger, Kaiser: Kaiser Permanent in US

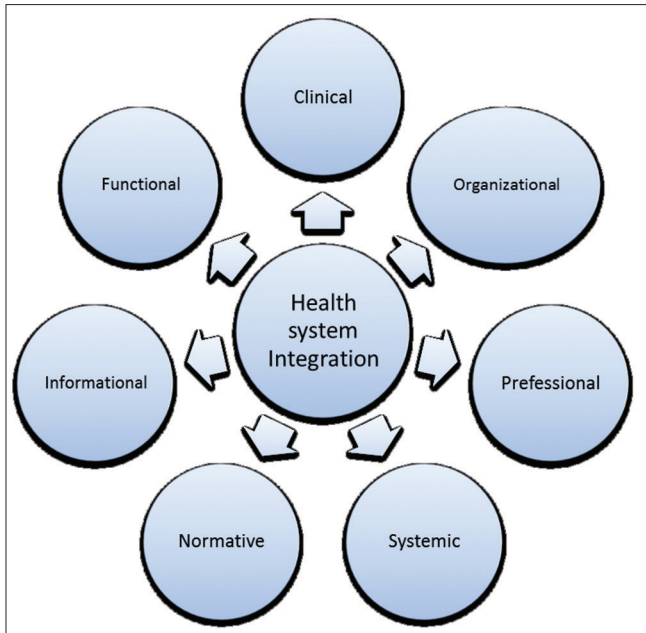


Figure 1: Conceptual model

Table 2: The mean and standard deviation of the scores of the clinical integration

Question	Effective factors in the integrity of the health system	Mean	SD
Q12	Attention and responsiveness of providers to the needs, priorities, and values of patients	4.17	1.177
Q15	The development of multifaceted care plans and multiple team meetings to effectively transfer information and identify roles	4.20	1.2
Q17	Coordination of clinical activities and services focusing on the needs of the population	4.02	1.205
Q18	Proper guidance of patients in the system through appropriate training	4.2	1.143
Q19	Sharing electronic health records between providers	4.18	1.091
Q20	CM, coordination of customer care with high risk	4.16	1.137
Q21	Provide care continuously from the home care center	4.07	1.261
Q22	Use protocols and clinical guidelines to enhance quality and change in care	3.97	1.286
Q23	Pay attention to the characteristics of services, providing care with the highest fit and cost-effectiveness	3.99	1.242

SD: Standard deviation, CM: Case management

sufficiency of the sample size; besides, the significance of the Bartlett’s test ( $P < 0.001$ ) showed the desirability of performing the factor analysis.

According to the results of the exploratory factor analysis, five factors were extracted that explain 59.443% of the variance. The first factor with the special value of 22.83 explains 48.57% of the variance by itself. Varimax rotation was used for better

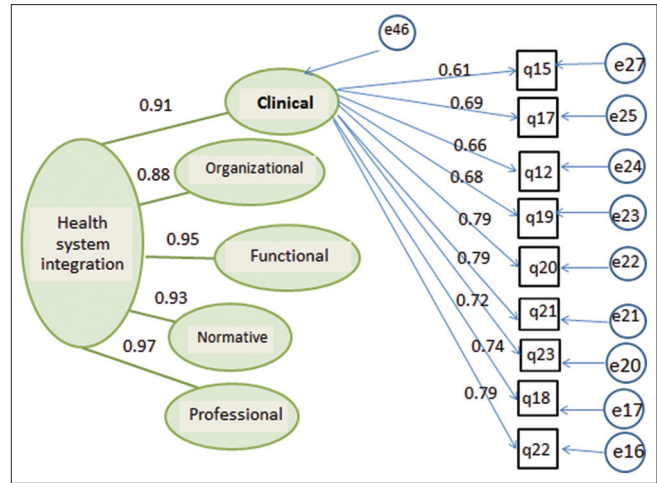


Figure 2: Confirmatory factor analysis of the clinical integration based on standardized coefficients

alignment. Table 3 shows the questions or variables related to the clinical integration of the health system and their factor loadings [Table 3].

After the exploratory factor analysis was performed and the clinical agent was identified, it was necessary to confirm its accuracy. For this purpose, confirmatory factor analysis method was used. Figure 2 shows the model of confirmatory factor analysis along with the path coefficients of regression equations. According to the standard estimates of path coefficients, the effect of the clinical agent was 0.91.

The results also showed that “case management (CM),” “providing continuous care,” and “using protocols and clinical guidelines” with factor load 0.79 have the greatest importance in the clinical dimension of the health system’s integrity.

The results of the confirmatory factor analysis were examined based on the indices of the goodness of fit [Table 4].

## DISCUSSION AND CONCLUSION

In this research, attention to the needs and priorities of patients, the use of clinical protocols and guides, continuous care, focusing on population needs, the development of nursing care plans and multiple team meetings, CM, attention to service features, and providing relevant information to the patient by the providers were acknowledged as a key features of clinical integration.

Based on Armitage results, clinical integration reflects the concept of umbrella, including the idea of continuous care, coordination of care, disease management, good communication between care providers, continuous transmission of information and reports, removal or removal of tests, and additional procedures,<sup>[4]</sup> which is in line with our results.

Based on Suter view, to achieve clinical integrity or complete care, it is necessary to pay attention to service consolidation and alignment of programs and practices. Hence, processes must strengthen collaboration and help develop and maintain

**Table 3: Factor load related to the clinical dimension of the health system integration**

Number of question	Questions related to the clinical dimension of integration	Factor load
15	The development of multifaceted care plans and multiple team meetings to effectively transfer information and identify roles	0.649
18	Proper guidance of patients in the system through appropriate training	0.642
22	Use protocols and clinical guidelines to enhance quality and change in care	0.628
12	Attention and responsiveness of providers to the needs, patient's health priorities	0.608
17	Coordination of activities and services will focus on the needs of the population	0.596
21	Provide continuous care from the care center to the patient's home	0.558
20	CM, coordination of customer care with high risk	0.549
19	The sharing of electronic health records between providers	0.528
23	Pay attention to the characteristics of services, providing care with the highest fit and cost-effectiveness	0.503

CM: Case management

**Table 4: The indices of the goodness of fit of health system integration model**

Fit indices	Limit required	The values obtained	Fit the model
Relative X2	2-5	2.368	Suitable
The significance level	>0.05	<0.001	Not suitable
RMSEA	<0.08 and preferably <0.05	0.052	Suitable
CFI	0.9>	0.933	Suitable
TLI	0.9>	0.925	Suitable
IFI	0.9>	0.933	Suitable

RMSEA: Root mean square error of approximation, CFI: Comparative fit index, IFI: Incremental fit index, TLI: Tucker-Lewis index

clinical and managerial competence through accountability and regulatory incentives. Managers should focus on communication, especially the relationship between primary caregivers and specialized physicians. The development of standardized care provision programs for patient populations is a strategy that has been successfully used for clinical integration, which includes multidisciplinary protocols.<sup>[28]</sup> Pike and Moongan point to the need for the implementation of evidence-based guidelines to achieve integration.<sup>[8]</sup>

Indicators identified as part of a study in Estonia in 2015 aiming at assessing the status of health system integrity include providing appropriate care and coordination and continuity throughout the care unit.<sup>[29]</sup> In Italy, a number of indicators are also considered as part of a comprehensive review of the integrated care, effectiveness, and continuity of care and adherence to treatment-based therapy. Care coordination has

also been highlighted as an indicator of integration in Sweden and Spain.<sup>[1]</sup> Shaw *et al.* referred to the coordination of information, services, and continuity of care, the development of clinical guidelines and facilitating the role of patients in joint decision-making,<sup>[30]</sup> which are consistent with the results of the present study.

The existence of partnerships, integrated care teams, the existence of joint responsibilities, the setting of goals and plans, standards, paths, workflows, clinical and technical protocols, and the expansion of new roles (for example, the case manager, the coordinator caregivers, and continuous nurses) have been introduced in Europe as a successful integration factor.<sup>[1]</sup>

Based on the results of this study, proper guidance of patients through education plays a role in clinical integration. Based on the sole experience of integrated care assessment in Belgium regarding the dimensions chosen in the health system performance review, sustainability, effectiveness, and centrality indicators for the success of integration have been proposed. In the meantime, coordination in care, providing education and information to patients, as well as the ability to perceive patients and engaging patients in decision-making about care are important in clinical integration. Furthermore, the focus on patient empowerment in Europe has been highlighted as a successful integration factor.<sup>[1]</sup>

Based on Valentijn's view, empowering people to control their own health and improve care efficiency is also important in coping with increasing disease burden. In recent years, this focus on empowerment has led to a personalized and population-based renaissance. Demographic changes and increased multiple diseases, due to the increasing burden of public health care, clearly require a more comprehensive approach, rather than a focus on disease.<sup>[31]</sup>

The results of this study have shown that the coordination of activities, the sharing of medical records, attention to needs, and the development of care plans and team meetings are important in the clinical integration of the health system, which in various studies have pointed them. In Valentijn study, attention to patients' needs and preferences has been mentioned as a necessity for integration.<sup>[31]</sup>

Based on Valentijn's view, health services, along with medical criteria, must take into account the needs and priorities of a person with regard to the burden of complex illnesses.<sup>[31]</sup> Hill describes care management as a mechanism for accelerating clinical integration, which includes four main components, including the development of a care plan, a clinical roadmap, collaboration and teamwork, accountability, integrated CM, and integrated information systems.<sup>[32]</sup> These results are in agreement with obtained results in this study.

Therefore, the health system can increase the clinical integration through the development of multifaceted care plans and team meetings, the development of coordination and continuity of care, focusing on the needs of patients, and step up the integration of the health system.

## Acknowledgments

This study was part of the PhD thesis of the first author, conducted in health services management in Science and Research Branch of the Islamic Azad University, Tehran. The authors would like to thank all participants in this research.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. The Expert Group on Health Systems Performance Assessment. Blocks: Tools and Methodologies to Assess Integrated Care in Europe. Luxembourg: The Expert Group on Health Systems Performance Assessment; 2017.
2. Lai YF, Lum AY, Ho ET, Lim YW. Patient-provider disconnect: A qualitative exploration of understanding and perceptions to care integration. *PLoS One* 2017;12:e0187372.
3. Maruthappu M, Hasan A, Zeltner T. Enablers and barriers in implementing integrated care. *Health Syst Reform* 2015;1:250-6.
4. Armitage GD, Suter E, Oelke ND, Adair CE. Health systems integration: State of the evidence. *Int J Integr Care* 2009;9:e82.
5. van der Heiden AB. The Advantages And Disadvantages of Insurer-Provider Integration: What Are Implications For Dutch Health Care Policy? Erasmus; 2012-2013.
6. Lyngso AM, Godtfredsen NS, Frølich A. Interorganisational integration: Healthcare professionals' perspectives on barriers and facilitators within the Danish healthcare system. *Int J Integr Care* 2016;16:4.
7. Valentijn PP, Schepman SM, Opheij W, Bruijnzeels MA. Understanding integrated care: A comprehensive conceptual framework based on the integrative functions of primary care. *Int J Integr Care* 2013;13:e010.
8. Pike B, Mongan D. The integration of health and social care services. European Public Health Association, Health Research Board (HRB) 2014. p. 137.
9. McCarthy D, Mueller K, Wrenn J. Kaiser Permanente: Bridging the Quality Divide with Integrated Practice, GROUP Accountability, and Health Information Technology. Vol. 17. New York: Commonwealth Fund Pub; 2008. p. 1-28.
10. McCarthy D, Mueller K, Wrenn J. Mayo Clinic: Multidisciplinary Teamwork, Physician-Led Governance, and Patient-Centered Culture Drive World-Class Health Care. Vol. 27. New York: Commonwealth Fund Pub; 2009. p. 1-18.
11. Curry N, Ham C. Clinical and service integration: The route to improved outcomes. *Int J Integr Care* 2012;12:e199.
12. Darkins A, Ryan P, Kobb R, Foster L, Edmonson E, Wakefield B, *et al.* Care coordination/Home telehealth: The systematic implementation of health informatics, home telehealth, and disease management to support the care of veteran patients with chronic conditions. *Telemed J E Health* 2008;14:1118-26.
13. Berry LL, Seltman KD. Management Lessons from Mayo Clinic: Inside One of the World's most Admired Services Organizations. New York: McGraw-Hill Professional; 2008.
14. Johri M, Beland F, Bergman H. International experiments in integrated care for the elderly: A synthesis of the evidence. *Int J Geriatr Psychiatry* 2003;18:222-35.
15. Ham C. Working Together for Health: Achievements and Challenges in the Kaiser NHS Beacon Sites Programme. Discussion Paper. Birmingham: Health Services Management Centre; 2010.
16. Thistlethwaite P. Integrating Health and Social Care in Torbay: Improving Care for Mrs Smith. The King's Fund; 2011. p. 1-28.
17. Department of Health and Ageing. Coordinated Care – Evaluation Report of 2<sup>nd</sup> Round Trials. Canberra: Department of Health and Ageing; 2007.
18. Hébert R, Durand PJ, Dubuc N, Tourigny A; PRISMA Group. PRISMA: A new model of integrated service delivery for the frail older people in Canada. *Int J Integr Care* 2003;3:e08.
19. Hebert R, Raiche M, Dubois MF, Gueye NR, Dubuc N, Tousignant M. Impact of PRISMA, a coordination-type integrated service delivery system for frail older people in Quebec (Canada): A quasi-experimental study. *J Gerontol* 2010;65B:107-18.
20. Siering U. Germany. In: Nolte E, Knai C, McKee M, editors. Managing Chronic Conditions: Experience in Eight Countries. Copenhagen: World Health Organization on behalf of the European Observatory on Health Systems and Policies; 2008.
21. Lankhorst EK, Spreeuwenberg C. Netherlands. In: Nolte E, Knai C, McKee M, editors. Managing Chronic Conditions: Experience in Eight Countries. Copenhagen: World Health Organization on Behalf of the European Observatory on Health Systems and Policies; 2008. p. 97.
22. Glasby J, Dickinson H, Miller R. Partnership working in England-where we are now and where we've come from. *Int J Integr Care* 2011;11:e002.
23. Stc Hamilton KE, Sullivan FM, Donnan PT, Taylor R, Ikenwilo D, Scott A, *et al.* A managed clinical network for cardiac services: Set-up, operation and impact on patient care. *Int J Integr Care* 2005;5:e10.
24. Woods K, McCollam A. Progress in the development of integrated mental health care in Scotland. *Int J Integr Care* 2002;2:e21.
25. Ahgren B, Axelsson R. A decade of integration and collaboration: The development of integrated health care in Sweden 2000-2010. *Int J Integr Care* 2011;11:e007.
26. Ross S, Curry N, Goodwin N. Case Management: What is it and How it Can Best be Implemented? London: The King's Fund; 2011.
27. Rijken M, Jones M, Heijmans M, Dixon A. Supporting self-management. In: Nolte E, McKee M, editors. In Caring for People with Chronic Conditions: A Health Systems Perspective. Copenhagen: World Health Organization on Behalf of the European Observatory on Health Systems and Policies; 2008.
28. Suter E, Oelke ND, Adair CE, Waddell C, Armitage GD, Hubner LA. Health Systems Integration; Definitions, Processes & Impact: A Research Synthesis; 2007.
29. The World Bank Group and Estonian Health Insurance Fund. The State of Health Care Integration in Estonia. The World Bank Group and Estonian Health Insurance Fund; 2015.
30. Shaw S, Rosen R, Rumbold B. What is Integrated Care? An Overview of Integrated Care in the NHS. London: The Nuffield Trust; 2011.
31. Valentijn PP, Ruwaard D, Vrijhoef HJ, de Bont A, Arends RY, Bruijnzeels MA, *et al.* Collaboration processes and perceived effectiveness of integrated care projects in primary care: A longitudinal mixed-methods study. *BMC Health Serv Res* 2015;15:463.
32. Hill M. Clinical excerpts. The development of care management systems to achieve clinical integration. *Top Clin Chiropr* 1998;5:14-9.