Including prognosis evaluation in the management of older patients across different healthcare settings: The Cologne Experience

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Abstract

The increase of the older population hypothesized during the last century for the beginning of the third millennium was fundamental for the establishment and development of the medical discipline of geriatrics as well as of biogerontological research. This increase, however, is reaching unexpected proportions, due to various scenarios demographic investigations could not predict. These include among others accelerated *vs*. usual aging and initial amelioration of quality of life in the recent generations *vs*. subsequent worsening of disability prevalence. The major consequence for this situation is that healthcare systems are challenged in keeping the pace with the individual and social demands of the older population. This situation requires an urgent paradigm shift with the implementation of authentic comanagement of medical specialists and geriatricians for the amelioration of integrated and transitional care. The present work shows the first results of the studies from a task force established 2015 at the Dpt. II of the University Hospital of Cologne with the aim of integrating personalized medicine with high-performance organ medicine in older adults accessing various non-geriatric medical settings.

Introduction

The older population is increasing worldwide to the extent of a *silver tsunami* and the associated burden of multimorbidity and disability causes enormous discomfort to patients and caregivers as well as unsustainable healthcare costs to the society. Germany is a very representative country of the demographic change in Europe, where almost one third of the EU-27 population will be over 65 years of age in 2060.[1] Japan is currently experiencing the fastest demographic change among the leading industrialized nations, with a similar trend in Germany.[2] The fraction of the older population rising most is the oldest-old one - over 80 years of age - with currently almost 6 million people in Germany. Van den Heede *et al*. reported most recently the results of the analysis of hospital discharge and population data in Belgium to estimate the required hospital capacity by 2025 for the older population by analyzing date retrieved by population surveys and the National Hospital Discharge Dataset over 11 years.[3] Accordingly, parameters considered were population changes, trends in hospital admission rates and length of stay. The authors calculated a *base* forecast and an *alternative* scenario, based on the two possible conditions of *normal* and *accelerated* aging of the population in the upcoming years, presenting an expected increase of inpatient stays by 23% from 2014 to 2025 in the case of normal aging and by 50% up to 2025 in case of accelerated aging.[3,4]

Strikingly, geriatrics is the only discipline which performs since decades that kind of medicine which is currently needed most: *personalized* medicine, focusing on several dimensions of the patient, not only on the physical one.[5-7] The comprehensive geriatric assessment (CGA) is the cornerstone of geriatric methodology because it has clearly shown to improve patients' trajectories.[8,9]

The CGA allows shared clinical decisions which can be taken with the aim of real *goal-oriented*, *patient-centered*, *value-based tailored interventions*. However, there are several barriers to the routine, adequate and therefore effective implementation and use of the CGA,[10] which are object of analysis and correction currently. In fact, if older resilient adults benefit as much as young adults from specialized organ medicine, they are often frail or prefrail; if this vulnerability is not diagnosed accordingly, the advantages of high-performance medicine are not reached. In older adults, disease and recovery outcomes are highly influenced by psychosocial and functional aspects and they require therefore a holistic approach. As diseases in advanced age not only present typically, they are difficult to diagnose. Geriatric syndromes do not fall into specific disease categories and they cause often a delayed response to treatment. There is frequently a need for social support and simultaneous functional rehabilitation. Geriatric medicine, in this sense, goes beyond organ- oriented medicine, offers additional therapy in a multidisciplinary team setting, the main aim of which is to optimize the functional status of the older person and improve the quality of life as well as autonomy.

As prognosis is a critical factor for clinical decision-making and resource allocation in older adults, a prognosis indicator has been developed and validated in the past recent years which bases upon a CGA: the multidimensional prognostic index (MPI).[11] After validation and performance in over 50,000 patients including large

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international populations, the MPI is currently considered the best prognostic tool for older adults among several indexes, not only for its excellent clinimetric properties (sensitivity, specificity, feasibility, accuracy) but also for its ability to predict frailty, along with mortality, rehospitalization rates, discharge destination (homes vs. nursing homes), and several other poor outcomes.[12] The MPI is based on information obtained from a CGA that explores comprehensively health aspects (multimorbidity, medications, risk of pressure sores), functional and cognitive, nutrition as well as co-habitation status using standardized rating scales extensively validated and common in the aged population. Recently, an MPI-task force was established in Cologne which explored and consistently showed the high informative value of the MPI across several clinical settings in, to date, over 1100 older multimorbid patients. The purpose of this work is to present to the readers the ad interim results of the studies concerning this task force.

The older patient in the Emergency Department

Current situation

The number of older patients admitted to Emergency Departments (ED) is steadily increasing[3,13] and poses the health systems dramatic socioeconomic challenges. This situation is similar in Germany, Europe and United States.[13-15] While every second patient receiving medical care today is over 65 years old, almost two-thirds of all patients in German emergency rooms are over 70 years old with seven million cases of treatment.[13] EDs face huge challenges to make accurate decisions about the admission or discharge of older patients,[3] while treating a larger number of patients in a shorter time.[13] The high burden of co-morbidities and age-associated changes leads to patients more often presenting with complex, unspecific and atypical symptoms.[16] This not only complicates the organ-medical diagnosis but increases the risk of poor outcomes and thus also leads to higher costs.[3] Early accurate identification of older patients requiring prompt geriatric management is therefore a public health priority. Several successful attempts to ameliorate the management of the geriatric patient in the ED by the CGA have been shown worldwide.[17,18] However, and due to the know-do gap, these systems are not powerfully implemented everywhere. In Germany, the estimated 35-40% of all ED patients older than 75 years prompted the use of better screening methods for the early identification of older patients at risk for poor outcomes,[13-15] while currently used methods like ISAR-screening are not really convincing.[16]

Paradigm shift: The Cologne Experience: *MPI_HoPE und Jede Jeck is anders*

In order to demonstrate the feasibility of a CGA, or more precisely of a CGA-based personalized prognosis evaluation, in a German ED, we designed and conducted the *MPI_HoPE* (Influence of the MPI on the Hospitalization of older multimorbid Patients admitted to the Emergency Department)-study in Cologne. So far, over 300 consecutive patients admitted to the internist-led ED of the University Hospital of Cologne were recruited. In addition to the MPI, the quality of life of the patients was examined by the EQ5D by the EuroQol group.[19] The 6-month follow-up monitors the further course of hospitalization, mortality, changes in quality of life and long-term care. Preliminary results of the study have already confirmed the validity of the MPI in this patient cohort and at the same time show an association of the MPI with the quality of life.[20] The final results are under analysis, but the promising preliminary observations prompted the *Jede jeck is anders*-study (in the dialect of the city of Cologne, *Every crazy person is different from the others* - the concept indicates the heterogeneity of human beings and the term *Jeck* is not negatively connotated, it in fact underlines the fragility intrinsic to the human nature). Within the framework of this study, the MPI will be used as a triage method to influence patient trajectories at an early stage of hospitalization - already at ED admission. The idea is to identify geriatric syndromes and resources at admission to be comanaged by specialist and geriatrician during hospitalization. An unnecessarily long or frequent hospitalization could thus be prevented.

The older patient in an acute internal setting

Current situation

Older and multimorbid patients are the main patient collective in the stationary setting.[21,22] However, the holistic approach and the consequent personalized medicine of the older adult require geriatric knowledge that is not systematically implemented in hospitals yet.[23]

Among various other challenges whose description goes beyond the scope of this work, older patients in hospitals have a high vulnerability to critical illness.[17,22] While acute inpatient care often focuses on the therapeutic management of diseases, the preservation of patients' autonomy and ability to perform activities of daily living is equally important in older patients admitted to acute internal wards.[22] Approximately 30% to 40% of older multimorbid patients are discharged from hospitals with new disabilities, with the rate increasing with age.[24-26] Physical function, cognitive status and the individual prognosis significantly correlate with the discharge destination.[24-26] The great demands and problems of older patients force the hospitals to move away from the acute care model they were originally trained for and towards a chronic care model, which sees the acute illness as the *tip of an iceberg* of chronic problems and illnesses. This includes the awareness that despite treatment of acute diseases, the patient will return to this iceberg after discharge.[24-26]

The mix of multimorbidity, acute diseases - as seen in acute internal wards - and age-related changes leads to geriatric syndromes (GS).[27] These are common clinical conditions in advanced age not fitting into discrete disease categories because they involve multiple underlying factors and organ systems. GS are often underdiagnosed in acute hospital settings, although their effect on quality of life and disability is documented.[27,28] In fact, the MPI has been shown to be significantly associated with the grade of care[28-31] and an early assessment of nursing needs is a fundamental pillar of resource allocations in the health insurance system. Latest projections predict that, due to the demographic change, the need of care will steadily increase until the year 2050, when about 4.5 million people will be in the need of care assistance in Germany.[32] Appropriately identifying the risks related to care dependency as soon as possible, indeed, is a public health priority. The MPI represents an accurate prognostic tool for identifying the current care needs of older patients admitted to an acute medical setting. This might gain particular significance considering that nursing needs might be underestimated.

Paradigm shift: The Cologne Experience: *MPI_InGAH*

To test the reliability of the MPI in an acute medical setting, we performed the *MPI_InGAH* (Influence of Geriatric Assessments on Hospitalization of older multimorbid patients) - study at the Department II of Internal Medicine - Nephrology, Diabetology, Rheumatology and General Internal Medicine of the

University Hospital of Cologne. In the study, we were able to show that the MPI is significantly associated with hospitalization time, source of referral, allocation at discharge, and grade of care,[28] as well as the number of geriatric syndromes and resources.[27] Characteristics of geriatric patients - such as geriatric syndromes and resources - have been identified, which highly impact the outcome of pathologic conditions in advanced age. We identified by means of the MPI patients' needs which would have been underdiagnosed in usual care.[28] After the preliminary observations, further recruitment was encouraged which has reached over 600 patients as of October 2016, while the one-year follow-up is still ongoing. In a pilot-project, patients who were diagnosed with functional impairment and underwent a multidimensional intervention provided by physiotherapists, occupational therapists, pharmacists, social services, geriatricians, and specialist, showed improved functional abilities at discharge. These results have been presented at the Annual Congress of the German Geriatrics Society in 2017 (where the project was awarded with the Prize for Interdisciplinary Aging Research)[29] and 2019.[30,31]

The older patient in general practice

Current situation

Older adults are frequent users of general practice (GP), with at least 10% of the people over 60 years visiting their GP over ten times per year and an even higher percentage for persons older than 70 years.[33-36] Key challenges to the health care system include an increased number of home and specialist visits as well as extended waiting times for appointments. Although geriatric patients are highly represented in GP, CGAs are infrequently used in this setting, possible reasons being time and reimbursement limitations.[10,34-36] Usually, GP physicians are familiar with the measurement of function, so according to skills and knowledge, the implementation of a CGA would be manageable. Sometimes, however, GP physicians have difficulties to provide the full range of CGA due to the family medicine-related need to cover a broad range of medical issues and concerns of their patients and the family members.[35-37]

Paradigm shift: The Cologne Experience: *MPI_NoGEP*

In the *MPI_NoGeP* (NExus on GEriatric Patients)-study, 125 patients were examined in a rural GP practice with the MPI. The aim of this study was firstly to validate the MPI in the primary care environment and to highlight the problems of old-age medicine of these patents, and secondly to show the feasibility in the implementation. In the context of this study we could show for the first time that the MPI was significantly associated with poor outcomes such as number of GP contacts in the months preceding and following the MPI evaluation as well as with falls number.[36] Interestingly, the MPI was highly associated in this study with the GP's attitude and perspective on the patients after 15 years of knowledge of the patients herself, suggesting that the MPI can provide in few minutes a comprehensive information highly similar to that of a doctor knowing the patient status since years. The results are highly encouraging to the overcoming of the *know-do gap*[10] in the GP setting.

The older patient in the interface gap between outpatient and inpatient setting: transitional care

Current situation

Because of demographic change, more and more older patients are requiring treatment from the health care system - therefore, the problems and needs of patients, which the treating physicians have to face when a patient is transferred to outpatient care, are of far higher severity and complexity.[8,12,38] The transition from home to hospital, as well as the other way around, is a delicate moment for the older person, which provides space for many mistakes. Most of these are related to inappropriate communication with patients and caregivers between inpatient and outpatient care.[39] The numerous interfaces in the health care system pose a major risk of inefficiencies and misuse, overtreatment as well as undertreatment. The economic pressure is also already noticeable in different settings among the medical staff. Less time, many different tasks, continuously growing savings, the least possible effort - the requirements are great, the support systems often small.[40]

Against this background, the demographic change is leading to a vicious spiral: older patients with their multiple and complex health care needs are leading to cost increases in the health care system. The already existing cost pressures are leading to growing errors in treatment, especially of older people. The resulting mis-, over- or under-treatment then again generates additional costs, especially if the medical care is not demand-oriented. Therefore, the follow-up care of older patients after their hospital stay is decisive for the further course and must be well prepared. This is often time-consuming and demanding for doctors with very limited time windows and it requires the cooperation of service providers both intersectorial and intrasectorial. Insufficient discharge management causes an interface gap, with a huge loss of information and incalculable consequences for the patient and the health care system. Cooperation in the treatment of patients requires the structured transfer of important information to the GP physician, so that the information can be used for aftercare. A poor transition from the inpatient to the outpatient setting can cause medication errors, gaps in follow-up care, miscommunication, unnecessary rehospitalizations, and a higher rate of institutionalization.[41] Thus, even discharge itself proves more complicated in older adults. It was shown that if no geriatric expertise is involved in the clinical decision-making on acute care wards, this can also cause delays in the discharge management, for example, due to missing coordination in post-hospital care - up to 17% of all hospital days are caused by unnecessary delays in discharge.[42] These *difficult hospital discharges* have a higher risk of poor outcomes after discharge.[41,42]

However, the interface gap is not just a problem between the inpatient and outpatient care providers. The discharged patient himself is also an active player in the discharge management who can cause problems. Previous studies showed that the concept of self-efficacy seems to still be poorly communicated by physicians.[37] A paradigm shift from disease-oriented to goal-oriented personalized care is necessary, together with a further examination of alternative care structures in the care of older, multimorbid patients.

Paradigm shift: The Cologne Experience: *Vun nix kütt nix*

The *Vun nix kütt nix*-study (In the dialect of Cologne: *From nothing comes nothing*) is a project which started on October 7th, 2019, in concomitance with the inauguration of the acute geriatric treatment ward *Universitäre Altersmedizin* (in German: *Unit of Ageing Medicine*) of the Dpt. II of Internal Medicine at the University Hospital of Cologne in cooperation with the Center for General Medicine of the same hospital. The study is a clinical-interventional, randomized, controlled trial designed to improve the discharge management of older multimorbid patients in the acute care unit. It starts in the ED at the hos-

pitalization of the multimorbid, older patient; the multi-professional team (geriatrician, geriatric specialist, nutritionist, occupational therapist, physiotherapist, pharmacist, social service, geriatric nurse) visits the patient immediately after hospitalization, depending on the need identified, in order to recognize needs, geriatric syndromes, risk factors and resources at an early stage. This is done with the help of various geriatric assessments including prognosis calculation by the MPI. All recognized resources, risks and problem areas of the patient are collected, discussed in the multi-professional team and together with the patient and his attending family doctor action goals for the outpatient follow-up are identified. At the same time, targeted patient training is taking place to prepare the patient for a quality of life-based routine after hospital discharge. The goal is to optimize the inpatient-outpatient-transition of the patient by supporting inter-sectorial teamwork between patient, geriatrician, and general practitioner, thereby improving the treatment of the patients through shared clinical decision-making. This project was awarded with the 2019 Wilhelm Woort Foundation prize.

Conclusions

Until Marjorie Warren overtook in 1926 the West Middlesex County Hospital, multimorbid patients with disability were not managed from a medical point of view and were instead kept in institutions as inmates.[4] Warren showed the positive effects of treating chronic disease in older patients by implementing a progressive care system[42] in which the acute medical intervention in the hospital is only one step of a longitudinal treatment process including home and post-discharge settings.[42]

In 2012, the official journal of the Royal College of Physicians of London dedicated its cover to hospitals on the edge advocating the urgent need for higher standards.[43] After so many years, the forecast of a silver-tsunami-driven massive increase in hospitalizations[3,4] highlights once more the need for better care. Research has found that many untreated geriatric syndromes as well as unpromoted geriatric resources exist in older adults, which are strongly interwoven and highly impact the individual prognosis of the patient.

The CGA-based MPI was shown to be a reliable instrument for the prediction of the patients' outcomes in both GP and acute medical setting as it was significantly associated with mortality, use of home care services as well as number of GP visits and the degree of nursing needs.[27-31,37]

Together with previous findings, our results indicate that the MPI can predict the dimensions of healthcare costs that a patient may cause in the time following the prognosis evaluation. As it uncovers the complex interrelated multidimensional aspects of the person and catches the fingerprints of frailty in its complete spectrum,[44] the MPI is highly important for resource planning[45] across healthcare sectors.

The prognosis of many hospitalized older patients, especially those who are admitted with an intermediate to severe forecasted outcome, often worsens during hospital stay without a complementary tailored geriatric intervention.

This implicates that targeted, goal-oriented treatment of geriatric conditions is to be highly encouraged in acute care, especially as rehospitalization in older adults is highly common and therefore the transition takes place several times during life in advanced age. The structured and goal-oriented teamwork of patient, GP physician and geriatric team in the acute hospital setting will improve the reveal of important geriatric conditions as well as draft concrete treatment plans for the long-term care of the patient.

References

1. Herdman M, Gudex C, Lloyd A, et al. Development and preliminary testing of the new five-level version of EQ-5D (EQ-5D-5L). Qual Life Res 2011;20: 1727-36.
2. Kohlbacher F. Bevölkerungsentwicklung in Japan: Fokus Märkte Berlin: Berlin Institut für Bevölerung und Entwicklung; 2011. Available from: https://www.berlin-institut.org/online-handbuchdemografie/bevoelkerungsdynamik/auswirkungen/japan-fokus-maerkte.html Accessed: 22 April, 2019.
3. Heede K, Bouckaert N, Voorde C. The impact of an ageing population on the required hospital capacity: results from forecast analysis on administrative data. Eur Geriatr Med 2019 [Epub ahead of print].
4. Polidori MC. Geriatrics' turning point. Eur Geriatr Med 2019 [Epub ahead of print].
5. UEMS Geriatric Section. https://www.uemsgeriatricmedicine.org/
6. Pilotto A, Cella A, Pilotto A, et al. Three Decades of Comprehensive Geriatric Assessment: Evidence Coming From Different Healthcare Settings and Specific Clinical Conditions. J Am Med Dir Assoc 2017;18:192e1-e11.
7. Rubenstein LZ, Josephson KR, Wieland GD, et al. Effectiveness of a geriatric evaluation unit. A randomized clinical trial. N Engl J Med 1984;311:1664-70.
8. Ellis G, Gardner M, Tsiachristas A, et al. Comprehensive geriatric assessment for older adults admitted to hospital. Cochrane Database Syst Rev 2017;9: CD006211.
9. Ellis G, Whitehead MA, Robinson D, et al. Comprehensive geriatric assessment for older adults admitted to hospital: meta-analysis of randomised controlled trials. BMJ 2011;343:d6553.
10. Gladman JRF, Conroy SP, Ranhoff AH, Gordon AL. New horizons in the implementation and research of comprehensive geriatric assessment: knowing, doing and the 'know-do' gap. JOURNAL NAME 2016;45:194-200.
11. Pilotto A, Ferrucci L, Franceschi M, et al. Development and validation of a multidimensional prognostic index for one-year mortality from comprehensive geriatric assessment in hospitalized older patients. Rejuvenation Res 2008; 11:151-61
12. Polidori MC. Target- and patient-oriented care using the comprehensive geriatric assessment: Prognosis estimation for clinical decisions with elderly patients. Zeitschr Gerontol Geriatr 2017;50:706-9.
13. Carpenter CR, Shelton E, Fowler S, et al. Risk factors and screening instruments to predict adverse outcomes for undifferentiated older emergency department patients: a systematic review and meta-analysis. Acad Emerg Med 2015;22:1-21.
14. Thiem U, Greuel HW, Reingraber A, et al. [Consensus for the identification of geriatric patients in the emergency care setting in Germany]. Zeitschr Gerontol Geriatr 2012;45:310-4.
15. Singler K, Heppner HJ, Skutetzky A, et al. Predictive validity of the identification of seniors at risk screening tool in a German emergency department setting. Gerontology 2014;60:413-9.
16. Weinrebe W, Schiefer Y, Weckmuller K, et al. Does the identification of seniors at risk (ISAR) score effectively select geriatric patients on emergency admission? Aging Clin Exp Res 2019 [Epub ahead of print].
17. Besdine RW, Wetle TF. Opportunities to improve healthcare outcomes for elderly people and reduce re-hospitalization. Aging Clin Exp Res 2011;23:427-30.
18. Lucke JA, de Gelder J, Blomaard LC, et al. Vital signs and impaired cognition in

older emergency department patients: The APOP study. PLoS One 2019;14: e0218596.
19. Lloyd A, Pickard AS. The EQ-5D and the EuroQol Group. Value Health 2019;22:21-22.
20. Rarek M, Meyer AM, Burst V, et al. A snapshot from the older patient's emergency department visit: Associations between the Multidimensional Prognostic Index (MPI) and health-related quality of life. 15th Annual Conference of the European Geriatric Medicine Society, Cracow September 25th-27th 2019, oral presentation.
21. Williams BC, Malani PN, Wesorick DH. Hospitalists' Guide to the Care of Older Patients. New York, NY: Wiley and Sons; 2013.
22. London RCoPo. Management of the Older Medical Patient: Teamwork in the Journey of Care: the Interface Between General (internal) Medicine and Geriatric Medicine. London: Royal College of Physicians; 2000.
23. Polidori MC, Roller-Wirnsberger RE. Chances and challenges of comprehensive geriatric assessment training for healthcare providers. Geriatric Care 2018;4:7853.
24. Ranasinghe C, Fleury A, Peel NM, Hubbard RE. Frailty and adverse outcomes: impact of multiple bed moves for older inpatients. Int Psychogeriatr 2017;29:345-9.
25. Palleschi L, Galdi F, Pedone C. Acute medical illness and disability in the elderly. Geriatric Care 2018;4:7561.
26. Campbell SE, Seymour DG, Primrose WR, Project A. A systematic literature review of factors affecting outcome in older medical patients admitted to hospital. Age Ageing 2004;33:110-5.
27. Meyer AM, Becker I, Siri G, et al. The prognostic significance of geriatric syndromes and resources. Aging Clin Exp Res 2019 [Epub ahead of print].
28. Meyer AM, Becker I, Siri G, et al. New associations of the Multidimensional Prognostic Index. Zeitschr Gerontol Geriatr 2018 [Epub ahead of print].
29. Meyer AM, Becker I, Siri G, et al. Multidimensionale Prognoseberechnung bei älteren multimorbiden Patienten: Design und vorläufige Ergebnisse der MPI_InGAH-Studie. 29th Annual Congress of the German Geriatrics Society, October 2017.
30. Heeß A, Pickert L, Meyer AM, et al. Comprehensive Geriatric Assessment-basierte Prognoseberechnung und subjektive Lebensqualität älterer hospitalisierter Patienten. 31st Annual Congress of the German Geriatrics Society, September 2019.
31. Müller F, Meyer AM, Pickert L, et al. Einfluss einer multidimensionalen, akutgeriatrischen Behandlung auf die Prognose älterer, multimorbider Patienten auf internistischer Akutstation. 31st Annual Congress of the German Geriatrics Society, September 2019.
32. Tille F, Gibis B, Balke K, et al. [Sociodemographic and health-related determinants of health care utilisation and access to primary and specialist care: Results of a nationwide population survey in Germany (2006-2016)]. Z Evid Fortbild Qual Gesundhwes 2017; 126:52-65.
33. Stott DJ, Langhorne P, Knight PV. Multidisciplinary care for elderly people in the community. Lancet 2008;371:699-700.
34. Barkhausen T, Junius-Walker U, Hummers-Pradier E, et al. "It's MAGIC" - development of a manageable geriatric assessment for general practice use. BMC Family Pract 2015; 16:4.
35. Rakel RE. Textbook of Family Medicine E-Book. Berlin: Elsevier Health Sciences; 2007.
36. Meyer AM, Siri G, Becker I, et al. The Multidimensional Prognostic Index in general practice: One-year follow-up study. Int J Clin Pract 2019 [Epub ahead of print].
37. Zurlo A, Zuliani G. Management of care transition and hospital discharge. Aging Clin Exper Res 2018;30:263-70.
38. Gellis ZD, Kim E, Hadley D, et al. Evaluation of interprofessional health care team communication simulation in geriatric palliative care. Gerontol Geriatr Educ 2019;40:30-42.
39. Nolte E KC, Saltman RB. Assessing chronic disease management in European health systems - Concepts and approaches Available from: http://www.euro.who.int/__data/assets/pdf_file/0009/270729/Assessing-chronic-disease-management-in-European-health-systems.pdf Accessed: March 25, 2019.
40. Scala-Foley MW, Ryan C, Morgan A. Bridging the Gap: The Role of Geriatric Care Managers in Reducing Avoidable Hospital Readmissions. J Aging Life Care 2011 [Epub ahead of print].
41. Nardi R, Scanelli G, Tragnone A, et al. Difficult hospital discharges in internal medicine wards. Intern Emerg Med 2007;2:95-9.
42. Warren MW. Care of the chronic aged sick. Lancet 1946;1:841-3.
43. Royal College of Physicians. Hospitals on the edge? The time for action; 2015. Available from: https://www.rcplondon.ac.uk/guidelines-policy/hospitals-edge-time-action
44. Dent E, Martin FC, Bergman H, et al. Management of frailty: opportunities, challenges, and future directions. Lancet 2019;394:1376-86.
45. Pilotto A, Veronese N, Daragjati J, et al. Using the Multidimensional Prognostic Index to Predict Clinical Outcomes of Hospitalized Older Persons: A Prospective, Multicenter, International Study. J Gerontol A Biol Sci Med Sci 2019;74:1643-9.