JURNAL ILMIAH ILMU KEPERAWATAN INDONESIA
Indonesian Nursing and Scientific Journal

Volume: 14
Issue: 01
Years: 2024

Literature Review

Management Information Systems Towards Improving the Quality of Nursing Care Services: A Literature Review

Neli Suharti[1*], Tutik Sri Hariyati[2]
[1]Faculty of Nursing, Universitas Indonesia, Indonesia
[*]Email Corespondent: nelisuharti0806@gmail.com

OPEN ACCESS
Editor: KS
Received: 13/03/2024
Accepted: 05/04/2024
Published: 07/04/2024
Available Article: 10.33221/jiiki.v14i01.3181

Conflict of interest statement:
There is no conflict of interest in this study.

Funding: Personal Funding.

Abstract

Background: Many developing countries are striving to further develop health information technology at the healthcare service level, particularly through the implementation of electronic health records (EHR).
Objectives: This research aims to evaluate the quality and impact of implementing electronic health records in healthcare services from various perspectives.
Methods: The research design employed in this study is a literature review, involving the collection of articles from selected databases, including PubMed and Cochrane. The article search started from the year 2014, and the Boolean operators used were "Electronic Health Record" OR "Electronic Medical Record" OR "EHR" AND "Quality" OR "Documentation" OR "Quality Documentation" OR "Quality Care" AND "Nurs*". The research design incorporated into this study is observational.
Results: The use of Electronic Health Records (EHR) has a significantly positive impact on various healthcare service sectors. Hospitals that have fully implemented EHR show a significant improvement in the quality of patient medical records, a decrease in information delivery delays, and a reduction in patient admission costs.
Conclusion: Investment in EHR technology can be considered a crucial step in enhancing the quality and efficiency of healthcare services while reducing operational costs. However, it is important to note that EHR implementation is not a straightforward task and requires consideration of various factors mentioned above to achieve optimal results in health information management.

Keywords: electronic medical record, nurse, quality care

Introduction

Nurses play a key role in the current organizational structure of healthcare services.[1,2] To operate efficiently and make informed decisions, they must have quick access to relevant data. Nurses are also involved in various aspects of health issues, such as reducing mortality rates, promoting public health, improving healthcare quality, and reducing

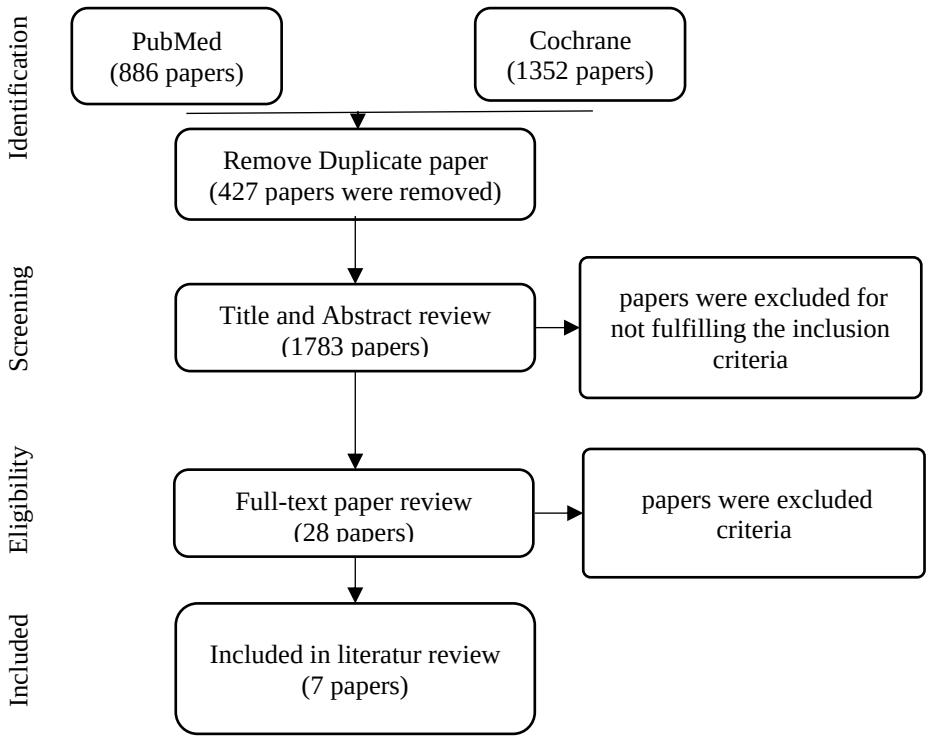
healthcare service costs, all of which are significant challenges.[3] Recently, there has been an increased focus on Electronic Health Record (EHR) management, as it can serve as a valuable source of information and support nurse managers in their administrative tasks. It also helps assess the level of communication and coordination provided by medical staff to the patients they serve.[4] Meanwhile, patient safety and service quality in hospitals remain a primary concern in various countries.[5] The focus is on preventing risks and negative outcomes in healthcare. Additionally, they advocate for the use of accreditation processes and quality indicators as tools for assessing hospital quality. The goal is to improve service quality and patient safety. Since 2008, France has implemented the collection of standard quality indicators and integrated them into the accreditation decision-making process. These quality indicators are specifically developed to provide a quantitative assessment of hospital quality.[6] The utilization of Electronic Health Records (EHR) in Indonesia has rapidly escalated in recent years, playing a pivotal role within the current organizational framework of healthcare services. EHR enables swift access to patient medical information, enhances operational efficiency, and bolsters care quality by facilitating improved care coordination. Nonetheless, encountered challenges encompass limited accessibility and infrastructure constraints in rural areas, data security concerns, and hurdles pertaining to workforce training and readiness. Nevertheless, ongoing research endeavors persist to comprehend and enhance EHR implementation in Indonesia.[7]

Although research on service quality after the use of EHR has been extensively conducted, there are still two specific concerns, namely the use of EHR and the improvement of healthcare service quality.[8] Some studies and literature reviews have linked EHR development to healthcare service quality.[9] Chaudhry (2006) has shown that EHR adoption improves healthcare service quality by enhancing compliance with care guidelines, improving disease surveillance, and reducing treatment errors.[10] However, there is still empirical work needed in evaluating the impact of EHR use on positive quality indicators, especially considering the high initial and ongoing costs of operating health information systems.[11] Additionally, research by Nguyen (2014) indicates that many of these studies rely on subjective data, such as questionnaires.[12] Second, existing research often only focuses on specific services or units, and the actual impact of EHR use is not fully understood.[13] Based on these considerations, the researcher will conduct a literature review to comprehensively reassess the impact of EHR on evaluating the quality of services provided by healthcare professionals, especially nurses.

Methods

This research adopts a study design following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Within this framework, the study adheres to the PIO (Population, Intervention, Outcome) format, comprising: P: Nurses, I: EHR, and O: Service quality. The keywords used in the article search are "Electronic Health Record" OR "Electronic Medical Record" OR "EHR" AND "Quality" OR "Documentation" OR "Quality Documentation" OR "Quality Care" AND "Nurs*". Two databases, namely PubMed and Cochrane, were utilized in this study's article search. Inclusion criteria for this research encompass (1) articles with observational research designs, (2) articles discussing EHR and healthcare professionals, particularly nurses, (3) articles in the English language. Exclusion criteria include (1) articles not addressing EHR, EMR, and other electronic recording, (2) literature reviews, (3) books, (4) chapters, (5) proceedings, and (6) cohort studies.

Scheme 1. PRISMA Article Search Method



From the search results, 886 articles were obtained from PubMed and 1352 from Cochrane. Subsequently, a duplicate check was conducted using Mendeley, revealing 37 duplicate articles. The total review comprised 1783 articles, which were screened based on titles and abstracts aligned with the PIO. The outcome yielded 28 full-text articles, with 7 articles selected for inclusion in this study after a thorough review.

Results

Table 1. Literature Review on Management Information Systems Towards Improving the Quality of Nursing Care Services

Author/Year	Research Title	Country	Research Method	Objective of Research	Intervention Instruments	Result
Morgane Plantier dkk, 2017	Does adoption of electronic health records improve the quality of care management in France? Results from the French e-SI (PREPS-SIPS) study	France	Retrospective, Cross-sectional study	This study aims to evaluate the impact of Electronic Health Record (EHR) usage on the quality of care management in acute care hospitals across France.	Questionnaire	The study explores quality indicators associated with Electronic Health Record (EHR) adoption in hospitals. Findings reveal that hospitals with complete EHR adoption exhibit superior outcomes in terms of patient medical record quality and delayed information delivery upon patient discharge compared to those using paper-based records ($p < 0.001$). Similarly, hospitals computerizing prescription records, discharge information, or care notes in all medical records demonstrate better performance in patient record quality indicators and delayed information delivery ($p < 0.001$ for all variables).
Mehdi Kahouei dkk, 2014	The evaluation of the compatibility of Electronic Patient Record (EPR) system with nurses' management needs in a developing country	Iran	Cross-sectional study	This study aims to evaluate the perceptions of head nurses and supervisors regarding the efficiency of the Electronic Medical Record (EMR) system and its impact on nursing care management tasks to provide useful recommendations.	Questionnaire	The questionnaire achieved a 71.6% response rate, with 316 out of 441 distributed questionnaires returned. Results indicate that most respondents are female (82.3%), aged 20-30 years (40.5%), and hold positions as head nurses (84.2%), with 47.5% having less than ten years of work experience. About 19.6% work in surgical units, and over 93% hold at least a bachelor's degree. Regarding computer literacy, 33.5% have been using computers for 5-10 years, 57.6% use computers both at work and home, and 47.5% know how to use EMR. Findings also show varying levels of agreement regarding EMR suitability for work, with significant relationships found between respondents' demographic characteristics and their perceptions of EMR.

Ekhlas Abu Sharikh dkk, 2019	The impact of eletronic medical records funstion on the quality health services	Jordan	Cross-sectional study	This article aims to examine how the implementation of electronic medical records impacts the quality of healthcare services in Jordan.	Questionnaire	The research findings highlight that over half of the respondents are male (50.9%), with the majority holding a bachelor's degree (73.5%). Approximately 46.6% are under 30 years old, and 37.7% are nurses. A significant portion (55.7%) work at the Royal Medical Services Hospital, while 33.3% have worked there for less than 5 years. The results of multiple linear regression indicate a strong positive correlation (R = 0.543) between electronic medical records and healthcare service quality. Moreover, the coefficient of determination (R^2 = 0.295) suggests that electronic medical records explain about 29.5% of the variation in service quality. Thus, the initial hypothesis is rejected in favor of the alternative, affirming that electronic medical records significantly impact healthcare service quality.
Mohammad J. Jaber dkk,	Nurses' Views on the Use, Quality, and Satisfaction with Electronic Medical Record in the Outpatient Department at a Tertiary Hospital	Jordan	Cross-sectional study	This study aims to describe nurses' perspectives on the use, quality, and satisfaction of Electronic Medical Records (EMR) in daily outpatient practice. Additionally, the relationship between EMR usage, quality, and user satisfaction is assessed in this research.	Questionnaire	The study presents nurses' mixed perspectives on Electronic Medical Record (EMR) usage, quality, and satisfaction. Positive views are reported on EMR usage, particularly regarding order entry frequency. However, lower positive perceptions are observed regarding the management of nursing care with EMR, notably in writing nurse care notes. Respondents generally hold positive views on EMR system quality, although satisfaction levels vary, with issues and disruptions being a concern. Correlations reveal significant positive associations between EMR usage, system quality, and user satisfaction, with the strongest correlation found between EMR usage and system quality.
Mohammad Alboliteeh, 2022	Cross-sectional Study of Nurses'	Saudi Arabia	Cross-sectional study	The research aims to understand nurses' perceptions of the	Questionnaire	No significant differences were found in demographic profiles and perceptions of Usefulness (PU), Perceived Ease of Use, and Intention to Use based on gender (p >

	Perception Toward Utilization A Cross-sectional Study of Nurses' Perception Toward Utilization and Barriers of Electronic Health Record and Barriers of Electronic Health Record			utilization and barriers to using Electronic Health Records (EHR).		0.671). However, age showed significance in PU (p = 0.045), while training impacted PU (p = 0.039) and intention to use (p = 0.007). Experience duration didn't influence PU, Perceived Ease of Use, and Intention to Use. The main barriers to EHR utilization include lack of training (77.9%), resistance to adoption (65.1%), and insufficient technical support (57.8%).
Mattijs S. Lambooij dkk, 2017	Use of electronic medical records and quality of patient data: different reaction patterns of doctors and nurses to the hospital organization	Netherlands	Cross-sectional study	This article examines the differences between doctors and nurses in their responses to the implementation and use of Electronic Medical Records (EMR) in their hospitals and how this affects their perceptions of data quality in the EMR.	Questionnaire	The study highlights differences between nurses and doctors in assessing the influence of organizational factors on EMR implementation success. Doctors emphasize ease of use with more support from administrative and IT departments, bottom-up communication, and an innovative culture. Conversely, nurses value authentic leadership, IT support, and bottom-up communication but find EMR less compatible with a closed culture. Compatibility with daily routines is crucial for doctors with authentic leadership and bottom-up communication, while nurses prioritize IT support and an innovative culture. Both doctors and nurses perceive improved patient data quality with easier EMR use. Control variables show varied reactions between doctors and nurses, notably in the extent of compatibility with daily routines and data quality perception.

Elizabeth Schenk, 2018	Impact of Adoption of a Comprehensive Electronic Health Record on Nursing Work and Caring Efficacy	UK	Cross-sectional study	This study aims to measure the differences in nursing work and care efficacy in three units within one hospital, before and 1 year after the implementation of a comprehensive EHR.	Questionnaire	Post-EHR implementation, nurses spent less time on Case Management but more on Surveillance, Teaching, Guidance, and Counseling, as well as Care and Procedure. Significant decreases were noted in Case Management ($\chi2$ = 31.1, P <0.001), while increases were observed in Surveillance ($\chi2$ = 10.0, P = 0.002), Teaching, Guidance, and Counseling ($\chi2$ = 5.4, P = 0.02), and Care and Procedure ($\chi2$ = 5.6, P = 0.02). Record documentation took up the most time before (18.6%) and after (21.3%) EHR implementation ($\chi2$ = 9.9, P = 0.002). Post-EHR, there was more time spent on providing emotional support ($\chi2$ = 116.5, P <0.001) but less on copying/managing orders ($\chi2$ = 33.1, P <0.001).
Abby Swanson Kazley et al, 2014	Association of Electronic Health Records with Cost Savings in a National Sample	USA	Cross-sectional study	To determine whether the use of advanced electronic health records (EHR) in hospitals is associated with lower inpatient care provisioning costs.	Questionnaire	The analysis comprised 5,047,089 patient cases, with 29.9% treated in EHR-utilizing hospitals. Among 550 hospitals, 18.9% employed EHR systems. The average total admission cost was $10,790, with costs for EHR hospitals at $10,203 and non-EHR hospitals at $11,010. After controlling for factors, average costs per admission were $7,938 for non-EHR hospitals and $7,207 for EHR hospitals. EHR presence significantly correlates with lower admission costs, with patients in EHR hospitals averaging $731 less in costs. Other significant cost predictors include patient demographics, disease severity, hospital characteristics, and insurance type

The results of research conducted from several articles indicate that hospitals that have fully adopted Electronic Health Records (EHR), where most medical records are computerized, have better outcomes in terms of patient medical record quality and delayed information delivery upon patient discharge.[14] These results have positive implications for healthcare service efficiency and effectiveness. Full adoption of EHR seems to enhance both patient care quality and information management processes. The implications of this research emphasize the importance of encouraging hospitals to adopt EHR technology effectively to improve healthcare service quality. A profile overview of respondents involved in EHR adoption-related research is provided. The majority of respondents are female, hold positions as head nurses, and have less than ten years of work experience. Most of them hold bachelor's degrees and have varying levels of computer literacy.[15] These findings suggest a relationship between respondents' demographic characteristics and their perceptions of EHR. Factors such as experience, computer knowledge, and knowledge of how to use EHR can influence perceptions and acceptance of this technology. This underscores the importance of appropriate training and education to maximize the benefits of EHR adoption.[16]

Discussion

The adoption of electronic medical records (EHR) has a significant impact on healthcare service quality. Results indicate that EHR can explain approximately 29.5% of the variation in healthcare service quality. This underscores the importance of EHR in enhancing patient care quality.[17] These positive impacts may involve efficiency, accuracy, and accessibility of medical information. Therefore, investing in EHR systems can be considered a crucial investment in improving healthcare services. Nurses' positive and negative views regarding the use, quality, and satisfaction with Electronic Medical Records (EMR) are also examined. Results show that the majority of respondents have positive views on EMR usage in nursing care management.[18] Additionally, factors such as age, training, and certain barriers, such as lack of training, resistance to EHR adoption, and lack of technical support, can influence perceptions and intentions to use EHR.[19] Besides training factors, organizational factors, such as support from administrative departments, IT departments, communication, and organizational culture, can affect perceptions and usage of Electronic Medical Records (EMR) by doctors and nurses.[20]

The implementation of Electronic Health Records (EHR) impacts the time spent by nurses on various types of care interventions. There are changes in nurse time allocation for various tasks after EHR implementation. This can have implications for patient care efficiency and quality.[21] This research indicates that EHR implementation can alter nurse job dynamics, and time management needs to be considered to maximize its benefits. Furthermore, the presence of Electronic Health Records (EHR) in hospitals shows that patients treated in hospitals with EHR have lower average costs than those treated in hospitals without EHR. This indicates that EHR can contribute to reducing healthcare service costs. The implication is that investment in EHR technology can have economic benefits by reducing treatment costs. Overall, these studies highlight the importance of adopting EHR technology in the healthcare sector, with positive impacts on service quality, data quality, efficiency, and costs. However, factors such as training, organizational support, and technical barriers need to be addressed to maximize the benefits of this technology in clinical practice.

Conclusion

The conclusion drawn from the presented research is that the adoption of Electronic Health Records (EHR) has significant positive impacts on various aspects of healthcare services. Hospitals that have fully adopted EHR demonstrate better outcomes in terms of patient medical record quality, information delivery delays, and patient admission costs. Additionally, EHR adoption can also enhance efficiency, accuracy, and accessibility of

medical information, which in turn can improve the quality of patient care.

Conflict of Interest Declaration

No potential conflict of interest is relevant to this article.

Acknowledge

Not mentioned.

Funding

Personal Funding.

References

1. Surakka T. The Nurse Manager's Work in The Hospital Environment During the 1990s and 2000s: Responsibility, Accountability and Expertise in Nursing Leadership. J Nurs Manag. 2008 Jul;16(5):525–34. Available from: https://doi.org/10.1111/j.1365-2834.2008.00901.x
2. Suprayitno E, Haeriyah YS, Barus LS, Sihombing F, Saputra B, Yuningsih A, et al. Buku Ajar Ilmu Dasar Keperawatan (Berdasarkan Kurikulum Pendidikan Ners Indonesia Tahun 2021). Eureka Media Aksara; 2023. Available from: https://repository.penerbiteureka.com/publications/565656/
3. Murtola LM, Lundgrén-Laine H, Salanterä S. Governance of Managerial Information Needed by Nurse Managers in Hospitals – A Literature Review. In: Eriksson-Backa K, Luoma A, Krook E, editors. Exploring the Abyss of Inequalities [Internet]. Berlin, Heidelberg: Springer Berlin Heidelberg; 2012. p. 104–18. (Communications in Computer and Information Science; vol. 313). Available from: http://link.springer.com/10.1007/978-3-642-32850-3_10
4. Christensen B, Ellingsen G. Towards a Structured Electronic Patient Record for Supporting Clinical Decision-Making. In: Rocha Á, Correia AM, Tan F. B, Stroetmann K. A, editors. New Perspectives in Information Systems and Technologies, Volume 2. Cham: Springer International Publishing; 2014. p. 297–306. (Advances in Intelligent Systems and Computing; vol. 276). Available from: http://link.springer.com/10.1007/978-3-319-05948-8_29
5. Huriati H, Shalahuddin S, Hidayah N, Suaib S, Arfah A. Literatur Review: Mutu Pelayanan Keselamatan Pasien di Rumah Sakit. In: Forum Ekonomi. 2022. p. 186–94. Available from: https://journal.feb.unmul.ac.id/index.php/FORUMEKONOMI/article/view/10572
6. Giraud A. Accreditation and The Quality Movement in France. BMJ Qual Saf. 2001;10(2):111–6. Available from: https://doi.org/10.1136/qhc.10.2.111
7. Harahap NC, Handayani PW, Hidayanto AN. Barriers and Facilitators of Personal Health Record Adoption in Indonesia: Health facilities' perspectives. Int J Med Inf. 2022;162:104750. Available from: https://doi.org/10.1016/j.ijmedinf.2022.104750
8. Jarvis B, Johnson T, Butler P, O'Shaughnessy K, Fullam F, Tran L, et al. Assessing the Impact of Electronic Health Records as an Enabler of Hospital Quality and Patient Satisfaction. Acad Med. 2013;88(10):1471–7. Available from: https://doi.org/10.1097/ACM.0b013e3182a36cab
9. Jamal A, McKenzie K, Clark M. The Impact of Health Information Technology on the Quality of Medical and Health Care: A Systematic Review. Health Inf Manag J. 2009 Oct;38(3):26–37. Available from: https://doi.org/10.1177/183335830903800305
10. Chaudhry B, Wang J, Wu S, Maglione M, Mojica W, Roth E, et al. Systematic Review: Impact of Health Information Technology on Quality, Efficiency, and Costs of Medical Care. Ann Intern Med. 2006 May 16;144(10):742. Available from: https://doi.org/10.7326/0003-4819-144-10-200605160-00125
11. O'Reilly D, Tarride JE, Goeree R, Lokker C, McKibbon KA. The Economics of Health Information Technology in Medication Management: A Systematic Review Of Economic Evaluations. J Am Med Inform Assoc. 2012;19(3):423–38. Available from: https://doi.org/10.1136/amiajnl-2011-000310
12. Nguyen L, Bellucci E, Nguyen LT. Electronic Health Records Implementation: An Evaluation of Information System Impact and Contingency Factors. Int J Med Inf. 2014;83(11):779–96. Available from: https://doi.org/10.1016/j.ijmedinf.2014.06.011
13. Darmon D, Sauvant R, Staccini P, Letrilliart L. Which Functionalities Are Available in The Electronic Health Record Systems Used by French General Practitioners? An Assessment

Study Of 15 Systems. Int J Med Inf. 2014;83(1):37–46. Available from: https://doi.org/10.1016/j.ijmedinf.2013.10.004

14. Plantier M, Havet N, Durand T, Caquot N, Amaz C, Biron P, et al. Does Adoption of Electronic Health Records Improve the Quality of Care Management in France? Results from The French E-SI (PREPS-SIPS) Study. Int J Med Inf. 2017;102:156–65. Available from: https://doi.org/10.1016/j.ijmedinf.2017.04.002
15. Kahouei M, Zadeh JM, Roghani PS. The Evaluation of The Compatibility of Electronic Patient Record (EPR) System With Nurses' Management Needs in a Developing Country. Int J Med Inf. 2015;84(4):263–70. Available from: https://doi.org/10.1016/j.ijmedinf.2014.12.006
16. Abed El-Rahman M, Al Kalaldeh MT, Malak MZ. Perceptions and Attitudes Toward NANDA - I Nursing Diagnoses: A Cross-Sectional Study of J ordanian Nursing Students. Int J Nurs Knowl. 2017 Jan;28(1):13–8. Available from: https://doi.org/10.1111/2047-3095.12100
17. Sharikh EA, Shannak R, Suifan T, Ayaad O. The Impact of Electronic Medical Records' Functions on The Quality of Health Services. Br J Healthc Manag. 2020 Feb 2;26(2):1–13. Available from: https://doi.org/10.12968/bjhc.2019.0056
18. Schenk E, Schleyer R, Jones CR, Fincham S, Daratha KB, Monsen KA. Impact of Adoption of A Comprehensive Electronic Health Record on Nursing Work and Caring Efficacy. CIN Comput Inform Nurs. 2018;36(7):331–9. Available from: https://doi.org/10.1097/CIN.0000000000000441
19. Jaber MJ, Al-Bashaireh AM, Alqudah OM, Khraisat OM, Hamdan KM, AlTmaizy HM, et al. Nurses' Viewson The Use, Quality, and Satisfaction with Electronic Medical Record in the Outpatient Department at a Tertiary Hospital. Open Nurs J. 2021 [cited 2023 Oct 8];15(1). Available from: https://opennursingjournal.com/VOLUME/15/PAGE/254/
20. Lambooij MS, Drewes HW, Koster F. Use of Electronic Medical Records and Quality of Patient Data: Different Reaction Patterns of Doctors And Nurses to the Hospital Organization. BMC Med Inform Decis Mak. 2017 Dec;17(1):17. Available from: https://doi.org/10.1186/s12911-017-0412-x
21. Kazley AS, Simpson AN, Simpson KN, Teufel R. Association of Electronic Health Records with Cost Savings in a National Sample. Am J Manag Care. 2014;20(6):e183–90. Available from: https://pubmed.ncbi.nlm.nih.gov/25180501/