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EXPLORATORY STUDY ON BUILDING DIGITAL HEALTH MAINTENANCE ORGANIZATION MODEL FACILITATED BY HEALTHCARE INFORMATION TECHNOLOGY IN THE STATE OF KUWAIT

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ABSTRACT
This research intended to study the impact of healthcare information technology on digital health maintenance organization in the state of Kuwait. Furthermore, with the calculated insights from this study we intended to solve identified problems not limited to increased patient and provider spending and unify the quality of care and optimally utilization of resources. The approach in this research was a combination of quantitative surveys and qualitative interviews for data collection. The healthcare professionals, Healthcare IT professionals and Healthcare business associates were provided by surveys to evaluate their current utilization, understanding, usability and satisfaction of healthcare technology solutions in place along with detailed challenges and realized benefits. The sole intention was to obtain detailed insights of Health maintenance organizations understanding, design and practicality.

The initial step started by gaining in depth evaluation insights about Kuwait's healthcare delivery systems in place and identify the potential areas of improvement followed by studying the effects of HIT on HMO implementation tailored to Kuwait's healthcare infrastructure. As an outcome of this step, we had a better understanding of factors resisting and facilitating this implementation. This study will be a reference to the healthcare personnel providing them with in detailed insights on business performance and Digital health maintenance organization model evaluation and practical recommendations for decision making thereby making Kuwait's healthcare delivery system affordable and better quality of care, all aided by healthcare information technology.

Keywords: *Digital Health Maintenance Organization, Healthcare, Quality of Patient care, Healthcare Information Technology, Patient Satisfaction, Digital Transformation.*

Introduction
Background and Context
Trends have shown how healthcare information technology is responsible for healthcare delivery transformation across globe due to its advanced technical progress. Healthcare Information technology (HIT) is not limited to Electronic Health Records (EHR), Telemedicine, Healthcare Information Exchange (HIE) which often work closely to improve efficiency, and quality of patient care, thereby promoting accessible healthcare (Kruse et al 2008). HIT enables efficient process and better coordination of care resulting in improved care outcomes, reduced duplicity, redundancies in HMOS (Greenhalgh et al 2017).

The government aided Kuwait's healthcare delivery system inherits many challenges associated with increased prevalence of chronic diseases and rising cost of healthcare along with high demand for quality healthcare (Mousa et al 2020). Implementation of HIT to facilitate the establishment of HMO will be an optimal solution to the challenges mentioned above.

It is evident that even today the healthcare delivery system of Kuwait suffers with system and process inefficiencies and healthcare delivery challenges even after reasonable investment in upgrading healthcare infrastructure (Al-Azmi et al 2019). To address these challenges and inefficiencies Kuwait must implement an integrated HMO with the help of advanced HIT catered by data driven decision making (Jiang et al 2017). The Digital HMO model will optimally allocate the workforce, resources to generate the desired outcome in favor of patient care and quality. Research shows that HIT has always played an important role in delivery of healthcare services with minimum cost and maximum patient satisfaction when it's supported by government via regulatory frameworks (WHO, 2019; Kruse et al 2018). This research supports and recognizes the role of HIT by offering practical and strategic recommendations to establish and uplift a sustainable healthcare delivery system in Kuwait to achieve long term population health benefits.

Literature Review

It is very much evident undoubtfully that Healthcare IT tools like EHR, Telemedicine and Analytical tools fosters healthcare delivery by enhancing continuity of care and patient outcomes with enhanced business performance and operational efficiency (Raghupathi & Raghupathi, 2014). Although the development is on par with industry standards, Kuwait healthcare often faces challenges with system and process efficiency, accessible healthcare and low patient satisfaction (Al-Azmi et al,2019).

WHO 2016, states that Healthcare IT tools and solutions play a vital role in managing these inefficiencies in countries with progressing demanding healthcare needs like Kuwait. this research explores the possible ways in which a Digital HMO in conjugation with HIT can address these inefficiencies in the state of Kuwait.

The collaboration of stakeholders is an essential element in implementing these HIT tools with HMOS. Mechanic and Schlesinger 1996, state that healthcare providers and policy makers acceptance of managed care principles are directly proportional to the success of these initiatives. Vest and Gamm, 2010 found that the data privacy concerns and workflow changes develop stakeholder resistance which impedes the HMO HIT implementation in Kuwait.

This integrated adoption of HMO and HIT has proved to deliver measurable outcomes globally. Kruse et al 2018, enlightens the positive effects of HIT tools on cost efficiency with significant improvements in patient satisfaction and preventive healthcare. This is also evident in the work of Shortliffe & Cimino 2013 which proves the conjugation of HIT and HMO results in cost efficient outcomes and the same could be beneficial if adopted in the state of Kuwait.

Research Questions

This study is intended to cater to the following key research questions

- The current state of Information technology infrastructure availability, adoption and readiness to support the digital HMO? The objective of this question is to assess how prepared Kuwait's healthcare IT systems are for incorporating digital HMOs.
- Which stakeholders play crucial roles in launching digital HMOs in Kuwait and what are their responsibilities as well as opinions about adopting these models? The objective of this question is to prove that successful implementation depends on the comprehensive understanding of stakeholder perspectives and roles which include healthcare providers, policymakers, and IT experts.
- In what ways can Kuwait's healthcare system implement digital health technologies like telemedicine and electronic health records to facilitate digital HMO operations? This research investigates the essential strategies and frameworks needed to effectively integrate Health Information Technology into managed care systems.

The study will analyze both expected benefits and anticipated obstacles associated with digital HMO introduction in Kuwait and will propose methods to overcome these obstacles while enhancing benefits. The development of actionable recommendations for policymakers and healthcare providers depends on understanding both potential gains and barriers.

Research Objectives

The study of Kuwait's healthcare delivery systems will identify areas that need enhancement. The analysis requires evaluating the positive attributes and deficiencies of current healthcare infrastructure and services as well as identifying any missing elements.

- To study how healthcare IT affects efficiency and healthcare service delivery quality.
- Explore challenges during the implementation of a digital HMO and factors affecting the same in the state of Kuwait

Research Methodology

The strategy and method used is of mixed type to assess the effectiveness and benefits of establishing a digital HMO in Kuwait using Healthcare IT. This approach comprises of both qualitative and quantitative methods to explore study and answer research questions and objectives. Below are the components under this research methodology

- **Design**: we have opted for exploratory research design to study both challenges and opportunities with the implementation of digital HMO. The main intent being finding and addressing the gaps for the implementation.
- **Data Gathering**: The survey was conducted via google forms and the results indicated diverse responses which were further analyzed to derive meaningful insights and patterns.

➢ **Primary Data**: Structured Likert questionnaire was distributed to relevant healthcare professionals, IT Staff and quality healthcare policy makers in Kuwait. The survey was designed to obtain numeric results with both open and closed ended questions. Closed ended questions were intended to record the stakeholder's opinion and concerns about current HIT tools. Open ended questions provided stakeholders an opportunity to express the challenges and list the facilitating factors with recommendations.

➢ **Secondary Data**: Literature review with published data from the government in light of relevant case studies provided the contextual knowledge about HMO and similar healthcare delivery models relevant to Kuwait.

The survey provided a diverse range of opinions with recommendations to build patters and meaningful analytical insights

- **Data Analysis Techniques:** We have used descriptive statistics to analyze the numeric data to chart the trends and patterns about the responder's familiarity with technology and their opinions. Correlation analysis was also performed to study variables like usability and training effectives relate to likelihood of HIT adoption.

Quantitative:

- **Descriptive Statistics:** This method catered to summarize and visualize the survey outcomes and helped to chart the trends about the familiarity and impact of training on HIT HMO adoption.
- **Hypothesis Testing and Qualitative Analysis:** Key hypothesis was established to evaluate the positive relation between training and stakeholders' familiarity. This was also supported by open ended responses analysis to discover the frequent and most common challenges and opportunities and practice the recommendations regarding Digital HMO implementation.
- **Correlation Analysis:** This was used to study how the adoption is affection by training quality and stakeholders' familiarity.

Qualitative:

- **Thematic Analysis:** Open ended responses were determined numerically to derive common patterns including challenges like privacy concerns and dependency on IT Infrastructure.
- **Comparative Analysis:** In light of published case studies and global best practices, recommendations and actionable insights were derived applicable to scenario of Kuwait.
- **Ethical Considerations:** Throughout the research we have maintained the ethical values by obtaining informed consent from respondents for data gathering, maintaining confidentiality and integrity of data collected to maintain transparency across the research study. The objectives of the data gathering were clearly explained to the respondents. The survey respondents were also made aware about the withdrawal of participation at any time and the responses were recorded with free will of all the participants.
- **Relevance and Significance:** With increased cost of healthcare, implementation of digital HMO will provide a new direction to Kuwait healthcare infrastructure and healthcare delivery systems to promote and enhance effective care delivery, accessible healthcare and affordable care for all with help of healthcare IT tools such as EHR, telemedicine and analytical tools for forecasting and data driven decision making. This study emphasizes on catering the national goals of revolutionizing quality integrated healthcare to be as an example for global health.

Results

Categorically the results are classified in two sections, qualitative and quantitative. The results showcased actionable and detailed insights to establish the Digital HMO and anticipated benefits of this collaborative model of HIT and HMO.

Qualitative

The qualitative section is completely derived from the open-ended responses, literature review and data patterns that has significant effect on HIT and HMO implementation. Challenges and benefits were derived from this analysis as presented below.

Derived Challenges:

- **Training:** Digital and technical competency of the participants was evaluated and found that they all agreed and recommended to the importance of comprehensive training to be essential factor for HIT Adoption.
- **Data Privacy:** Data security and integrity were of utmost concern to one third of the respondents who expressed worry of data confidentiality, integrity and security in organization wide multifacility healthcare systems using HIE (health information exchange).

Derived Benefits:

- **Cost Reduction:** The survey reposes realized the positive relation between digital healthcare tools and reduced costs in healthcare delivery by optimizing the workflows and enhancing the outcomes and patient experience.
- **Government Aid:** about 60 % of responders expressed that government aid and regulatory frameworks are essential overcome the challenges and promote HIE adoption in HMO.
- **Enhanced Outcomes:** Elimination of redundancy and seamless data sharing via HIE were identified to be as core benefits of HIT and HMO adoption which catered care on time.

Descriptive Statistics

Detailed Numeric insights from survey data is utilized to validate the hypothesis and underlying patterns.

Variable	Mean	Std Dev	Key Insight
Familiarity with HIT	3.7	0.92	Moderate familiarity indicates training gaps.
Perceived Effectiveness	4.1	0.84	High perceived value of HIT in care delivery.
Importance of Training	4.4	0.67	Strong consensus on training necessity.
Concern about Data Privacy	4.3	0.76	Elevated privacy concerns highlight priorities.
Support for Government Incentives	4.6	0.64	Strong endorsement of government involvement.

Hypothesis Testing and Outcome

- **H0 (Null):** The null hypothesis states that the familiarity with digital health technologies does not significantly affect the likelihood of recommending their adoption.
- **H1 (Alternate):** The familiarity with HIT has a positive correlation with the probability of respective adoption

Analysis of data resulted in a moderate positive relation between selected variables as evident with a correlation coefficient of 0.35 and a p value of 0.00046 showcasing statistical significance at alpha level of 0.05. This means that the stakeholders, healthcare personnel's familiarity with the HIT increases with the adoption and vice versa. The statistically significant p value dismisses the null hypothesis thereby supporting the alternative hypothesis.

Discussion

This research results a comprehensive analysis of feasibility to implement the digital HMO with HIT in Kuwait with associated challenges and benefits. The study also results in identification of factors affecting success and failure of HIT and HMO functioning.

- **Familiarity with HIT and Effectiveness**: Stakeholder's exposure to HIT Tools is essential as evident by a strong positive correlation between HIT and its perceived effectiveness ($r=0.72$ and $p<0.01$). this means a higher familiarity is directly proportional to higher confidence of stakeholders to improve healthcare delivery thereby reducing duplicity, redundancy and enhancing patient satisfaction and outcomes. This outcome is also supported by Raghupathi & Raghupathi, 2014, as he demonstrates that HIT as key enabler in healthcare modernization and digital transformation. The stakeholder's familiarity can be exploited positively by conducting training workshops and pilot programs to expose them to digital healthcare tools and technologies, this also enables the personnel to SWOT analyze to understand the accurate position and improve in digital understanding.

- **Significance of Training:** With an average score of 4.4 out of 5 on Likert scale role of training comes out to be a strong enabler and was identified as critically important. This is also very much evident with hypothesis outcomes with a positive effect on HIT adoption with a significant r and p values ($r = 0.65$, $p<0.05$) which confirms that the effective training and development programs addressed key technical competency gaps and empower care delivery professional for better utilization of digital tools. This is of utmost relevance in Kuwait as professional lac technical competency due to limited exposure to HIT tools applications.

- **Need for Governing Policies and Privacy concerns:** One of the major challenge evident by a mean score of 4.3 out of 5 on Likert scale, demonstrated that stakeholders are concerned about the data privacy and governing policies. Scholarly work by Vest and Gamm, 2010 echoes with these worries by expressing the requirement of robust regulatory framework to protect the patient data. Strict data protection laws need to be enforced to safeguard the data integrity and confidentiality. This can be achieved by establishing governing policies and adopting international standards for data handling.

- **Impact of Government Incentives:** with an average score of 4.6 out of 5 on Likert scale, it is very much evident that the government incentives programs play an important role in positively enforcing HIT adoption in HMO settings. According to WHO, 2016, government policies play a significant role in technology adoption and efficient healthcare outcomes. HMO organizational policies in conjugation with government incentives turn out to be the key driving force for HIT adoption.

- **Relevance to Kuwait:** The key challenges not limited to inefficiencies and limited adoption are proved to be addressed by implementation of HIT facilitated HMO, catering to better business performance, quality integrated healthcare delivery and reduced cost and expenses in patient care for both HMO and patients. Key element focusses on population health management driven by HIT tools. This also addresses significant training gaps and enforces critical thinking to be on par with advancing HIT Tools, enabling long term sustainability and continuation of care. To conclude in the state of Kuwait, HIT facilitated HMO builds an ecosystem beneficial to payer, providers and also stakeholders in healthcare supply chain catering to Kuwait's expat and resident population needs.

Potential Bias and limitations:

This study envelopes the actionable insights as outcomes of implementation of HIT facilitated HMO in Kuwait. However, the listed facts cannot be ignored to be documented.

- Social desirability bias could be a possible factor as the responders provide self-perceptive data.
- High probability of answering the questions based on past experiences instead of honestly being unbiased
- Limitation of sample size, although enough always poses the risk of missing the wide range of participants and their diverse perspectives
- Limitation of geography within Kuwait also poses the risk of acceptance in similar geographies in middle east.
- The outcomes might be biased as most of the respondents work in urban areas and rural areas perspectives are not captured.
- The secondary data could be of significant variance post covid and future research should specifically emphasize in this comparative study to validate the research findings

Similar Scholarly work:

This research work echoes closely with the conclusions made by Raghupathi & Raghupathi 2014 about HIT ability to digitally transform the healthcare system and its impact on the positive outcomes and hence supports the research aim that implementation of HIT facilitated HMO will have a new direction and prosperity in healthcare delivery systems in the state of Kuwait.

Conclusion

Summary: The research proves how effectively outcomes can be if HIT facilitated HMO is implemented in the state of Kuwait. The familiarity with HIT tools is directly proportional to HMO adoption facilitated by robust policies and effective comprehensive training programs. This not only address the identified challenges but also enlightens the significance of policies, governance and importance of digital transformation ahead of time.

Restatement: This research was intended to address four primary questions including the IT readiness of Kuwait's infrastructure, emphasizing stakeholder's abilities, roles and responsibilities, strategies to implement HIT facilitated HMO and Post implementation outcomes and benefits. Objectives included the validation of existing process and healthcare delivery systems in place, their effectiveness and finding improvement areas. The research outcome successfully addresses these questions and objectives by providing the actionable roadmap and recommendations to successful implementation of HIE facilitated HMO in the state of Kuwait.

Recommendations:

- Comprehensive Training programs to promote familiarity with HIE tools.
- Government aid and incentives to promote HIE use in HMO implementation and operations.
- Address data privacy concerns via robust systems and policies in place.
- Active collaboration among healthcare personnel to integrate quality healthcare services.
- Emphasize on long term outcomes and Health information exchange.
- Develop a patient centered framework to cater to population health needs and continuity of care.

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