Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

A National Prevention Model with Viral Hepatitis for Saudi Arabia: A SWOT-Driven and Balanced Scorecard Approach

Salma Elhag, Alaa Alrufaiee, Bashaer Aljoudi, and Ekram Alhazmi
Associate Professor Faculty of Computing & IT King Abdulaziz University Research Students Faculty of Computing & IT King Abdulaziz University Research Students Faculty of Computing & IT King Abdulaziz University Research Students Faculty of Computing & IT King Abdulaziz University

ARTICLE INFO

Received: 18 Dec 2024

Revised: 10 Feb 2025

Accepted: 28 Feb 2025

ABSTRACT

Viral hepatitis remains a major public health issue in Saudi Arabia, because many people do not know the routes of transmission or have routine access to screening. This study targeted for the development of a planned framework. It was designed in alignment with Saudi Vision 2030 to achieve a 50% reduction in hepatitis incidence by 2030. To guarantee population comprehension as well as scientific grounding, we used a mixed-methods approach combining quantitative survey data with qualitative literature synthesis. The study reviewed 30 peer-reviewed articles (2021–2025); it as well conducted a national survey, involving 76 participants sourced from four stakeholder groups. Data were analyzed using SPSS, a statistical software package used to perform descriptive and comparative analysis. Calculated interpretation was very carefully conducted through SWOT analysis (assessing natural strengths, weaknesses, possible opportunities, and threats) and PESTEL analysis (examining political, economic, social, technological, environmental, with legal factors). The Balanced Scorecard (BSC), a performance planning tool aligning planned goals with measurable initiatives, was developed to fully operationalize the findings. Results highlighted definite awareness gaps, limited screening uptake, and incomplete utilization of digital health platforms. The proposed strategy places emphasis on awareness campaigns that are targeted, on adult screening integration, on enhancements for the digital system, and on reforms to policy, so hepatitis prevention can be ensured sustainably. This framework could also be applied to other communicable diseases throughout the region.

Keywords: Public health, Digital tools _ Disease surveillance _Screening policy _ Stakeholder engagement _ Strategic planning

Highlights

- Developed for the nation a strategy that can reduce hepatitis incidence by 2030.
- Frameworks such as those of integrated survey data, SWOT, PESTEL, and the Balanced Scorecard.
- Certain gaps within awareness, within screening, and within digital health engagement were identified to be present.
- Vision 2030 of Saudi Arabia aligned to calculated actions proposed.

I. INTRODUCTION

Viral hepatitis remains a global public health concern, notably due to its blood-borne nature as well as silent progression until advanced stages. According to the World Health Organization (WHO), more than 296 million people live through chronic hepatitis B or C, with millions unaware across their status for infection 1. Despite worldwide vaccination efforts, hepatitis continues to cause almost 1.1 million deaths yearly, mainly due to cirrhosis and liver cancer 2.

Hepatitis B, along with C, represents a lasting national issue for Saudi Arabia. Since 1989, the Kingdom has implemented childhood vaccination, and in pre-marital tests, included hepatitis screening. Adult screening, in addition to public awareness efforts, however, do remain insufficient 3. Certain regional studies have shown that misconceptions regarding transmission, social stigma, and a lack of integrated health data systems still limit

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

prevention strategies 4,5. The challenge is not limited to biomedical interventions; it requires behavioral, technological, and policy-based coordination. Saudi Arabia's Vision 2030 places sufficient emphasis over digital transformation within proactive health management 6. Nevertheless, a data-driven national strategy remains necessary. It can align local capabilities with many international best practices.

Given these challenges, this study asks the following question:

What planned model can actually be designed—with reliance on evidence within literature, national survey data, and structured analysis tools—in order to reduce the burden of viral hepatitis within Saudi Arabia by the year 2030?

This question drives at the exploration of current gaps, stakeholder perceptions, and implementation feasibility through a structured public health planning approach.

This paper presents a review-technical study. It is targeted at designing a national prevention model for hepatitis in Saudi Arabia, incorporating evidence from literature, primary data collected via national surveys, and planned frameworks. The outcome is a proposed strategy built upon stakeholder feedback as well as analytical tools (SWOT, PESTEL, BSC), structured for reduction of hepatitis incidence by 50% by 2030.

The remaining part of this review-technical paper is structured just as follows:

Section 2 provides a thorough literature review of 30 recent peer-reviewed studies, classified in three academic themes. Section 3 outlines the methodology that was used to develop the calculated model, as well as including data collection by way of a national survey and application of analytical tools such as SWOT, PESTEL, and the Balanced Scorecard (BSC). Section 4 gives the results from descriptive and comparative analyses, with a calculated framework and tailored recommendations. Section 5 finishes with a summation of main findings and concrete implications concerning national hepatitis prevention planning in Saudi Arabia.

II. LITERATURE REVIEW

The literature review examines practical and scholarly perspectives on planning planned public health and viral hepatitis prevention. Based upon around 30 peer-reviewed studies published from 2021 to 2025, the review is structured around those three main themes:

A. Public Awareness, Social Perception, and Behavioral Determinants

Several studies stress that low public awareness, as well as persistent misconceptions, are major challenges in hepatitis prevention. In Saudi Arabia, research highlighted certain poor awareness levels across rural areas, younger populations, and within students 1,2. Social stigma around infection, with reluctance for screening or treatment, are also key barriers 3,4. A study coming from Brazil found public policies that addressed HTLV-1 faced resistance because of community distrust 5. Similar findings emerged from Southeast Asia, where outreach campaigns had to address misinformation with cultural barriers 6,7.

Studies at the university level indicated that educated populations frequently lacked firm behavioral commitment to either screening or to vaccination 8,9. School-based awareness programs were shown to increase knowledge and to change attitudes in both Greece and Indonesia 10,11. Studies stressed institutional trust and access to reliable information. These factors directly influence testing behavior 12,13.

B. Screening Systems, Digital Access, and Service Gaps

Saudi Arabia has kept in place a childhood hepatitis vaccination program since 1989 14, but screening of adults remains limited 15. Studies from Lebanon and Korea indicated the importance of integrated surveillance platforms for managing outbreaks and monitoring at-risk groups 16,17. The Gulf Cooperation Council (GCC) region faces logistical challenges in the form of large-scale seasonal gatherings as well as limited rural coverage 18.

Several studies discussed mobile applications' role, AI's role, as well as dashboards' role in improving surveillance. These studies also showed that these items improve efficiency 19,20,21. However, a recurring issue in Saudi Arabia was underutilization of digital platforms like Sehhaty 22. The shortage of interoperability involving public health databases, hospitals, and primary care units was identified as a major systemic gap 23,24.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Successful screening programs, as noted in the literature, depend on proactive outreach, centralized coordination, and real-time data sharing 25. Countries that implemented national e-health strategies reported measurable improvements in case identification and follow-up 26,27.

C. strategic Planning Models in Public Health

Frameworks such as SWOT, PESTEL, and the Balanced Scorecard (BSC) were used across many studies in support of planned health planning. SWOT and TOWS were used in India for transfusion safety assessment 28. Within Brazil, the policy-level SWOT analysis exposed certain public resistance. Resource limitations in HTLV-1 control were also exposed 5.

Saudi studies applied BSC as well as PESTEL in higher education and healthcare sectors to assess institutional readiness, track KPIs, and improve service delivery 2,29,30. The integration of internal analysis via SWOT, external environmental scanning by PESTEL, and continuous evaluation tools like BSC was highlighted as an effective structure in long-term public health planning.

These findings, in their entirety, shaped the overall methodology and planned direction within the current study.

III. METHODOLOGY

This study followed in a structured, mixed-methods approach for development of a national strategy targeted at the reduction of hepatitis incidence in Saudi Arabia by 50% by 2030. The methodology was grounded in certain global health planning standards such as those set by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) 1,2. It integrates qualitative understandings from literature. Also, it integrates quantitative data collected through a national survey.

To really ensure a logical flow as well as transparency, that strategy development process gets depicted within the following flowchart.

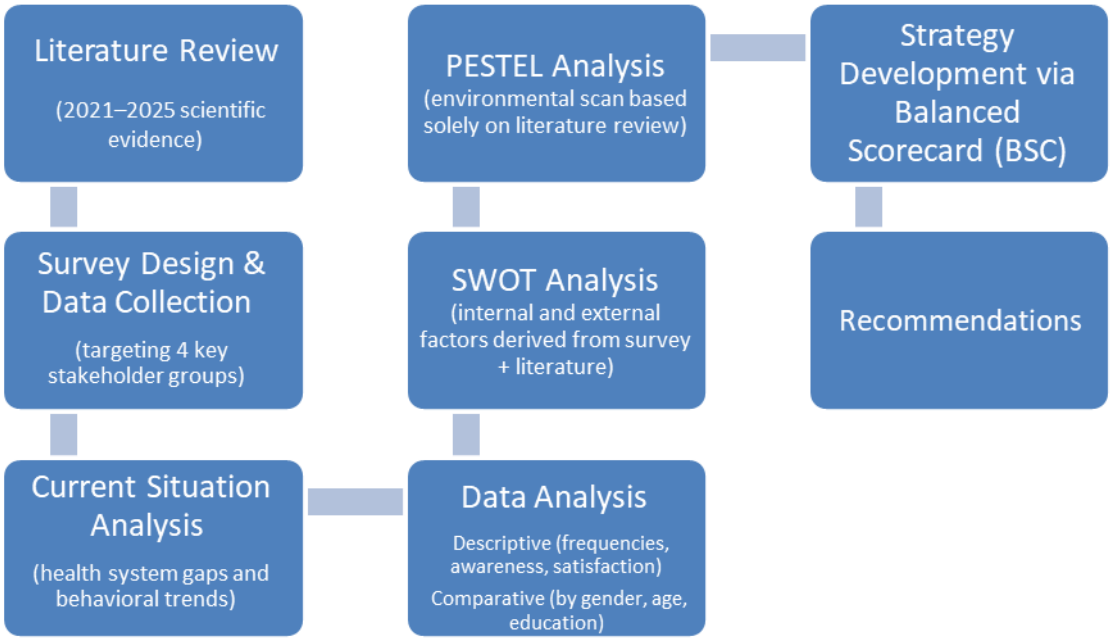


Figure 1 Strategic Development Flowchart

This flow reflects on the planned sequence required in evidence-based health system planning. It certainly aligns to national visions like Vision 2030 and draws from global models in integrated infectious disease management 3,5.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

A. Survey Design and Data Collection

To complement the literature review, a structured cross-sectional survey was developed so as to assess current levels of awareness, behavior, and perceptions related to hepatitis in Saudi Arabia. The survey instrument was informed with guidelines that came from the CDC and WHO on infection prevention in addition to public health communication 1,2, and validated survey designs from recent academic studies 6,7.

Originally written in Arabic, the questionnaire with closed-ended and Likert-scale questions was translated to English for analysis. It was reviewed by certain academic advisors for content validity.

a) Target Population

The survey targeted several stakeholder groups; these four were relevant to the landscape of hepatitis prevention:

- General Public
- Healthcare Professionals
- Hepatitis Patients and Recovered Individuals
- Academic Researchers

Precisely 76 responses were gathered by electronic means during a single 1-Month duration. Participation was voluntary as well as anonymous.

b) Survey Sections

The questionnaire comprised the following sections:

1. Demographics: gender, age, region, education
2. Knowledge Assessment: understanding of transmission methods, symptoms
3. Testing and Vaccination: experience and willingness
4. Digital Health Awareness: knowledge of platforms like Sehhaty
5. Perceived Gaps and Suggestions: open-ended feedback for national strategy

B. Data Analysis

Survey responses were analyzed using SPSS (Statistical Package for the Social Sciences), a widely accepted tool in social, as well as health, sciences for statistical evaluation and data visualization 8. Also, Microsoft Excel helped comparative tabulations and visual representations of various stakeholder-specific understandings.

The analytical process comprised inclusive descriptive and comparative analysis, which remained necessary in identifying respective patterns, respective trends, and respective gaps across several stakeholder groups:

1.General public

2.Healthcare professionals

3. Hepatitis patients and many recovered people

4.Academic researchers

The data analysis played a vital role in the shaping of the calculated framework, in particular the development of the SWOT, PESTEL, and Balanced Scorecard components.

a) Descriptive Analysis

Descriptive statistics summarized key demographic characteristics, along with levels of hepatitis-related awareness, testing behaviors, and perceptions of digital health services.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Demographic Overview:

• Gender: Sixty percent female, forty percent male

• Age groups: Nearly 43% aged 18–30, around 37% aged 31–50, almost 20% over 50.

• Education: 65% of them held a university degree.

• Geographic coverage: Major regions of Saudi Arabia were always represented.

Key Findings on Awareness and Engagement as shown in figure 2 and 3:

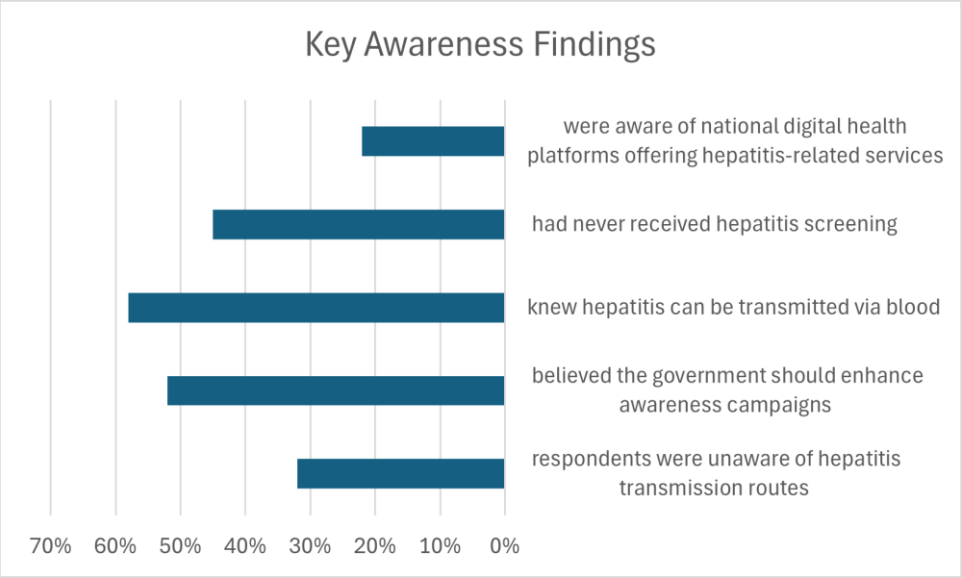


Figure 2 Key Awareness Findings

• Almost a third of participants were unaware in regard to hepatitis transmission routes. Such participants totaled thirty-two percent.

• 58% knew hepatitis can be transmitted through blood.

• 52% held the belief that broad national awareness efforts should be further improved. The same percentage also believed improvements were due.

• 45% were never screened for hepatitis.

• Just 22% were aware about digital health platforms (e.g., Sehhaty) that offer services related to hepatitis.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

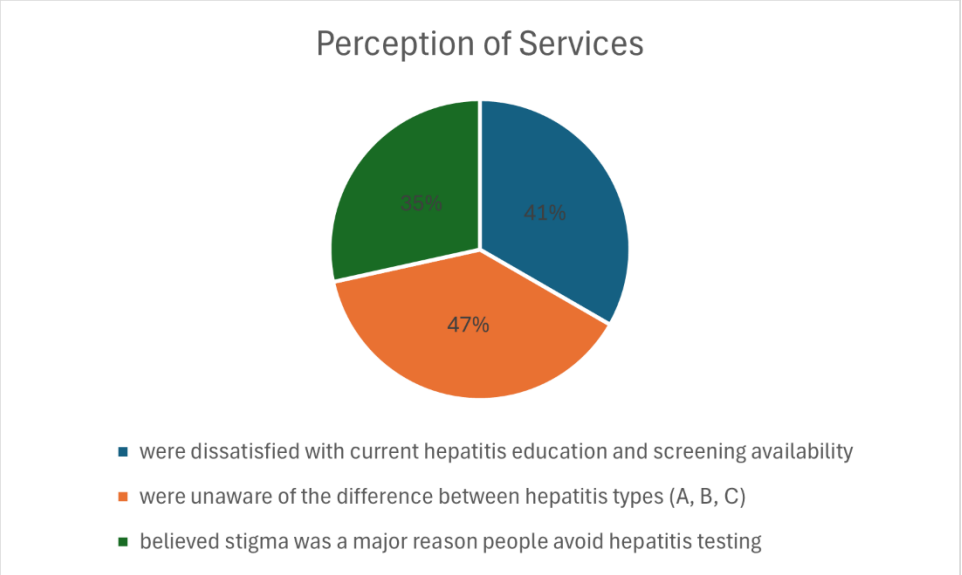


Figure 3 Perception of Services

• 41% of those people were found to be dissatisfied with the current state of the education about hepatitis and the screening services.

• Approximately 47% could not distinguish between multiple hepatitis types (A, B, C).

• Social stigma was identified as a hepatitis testing barrier by 35%.

These understandings do show gaps within knowledge, and they highlight underutilization of digital platforms, which do support the calculated emphasis that is on awareness campaigns and digital transformation.

b) Comparative Analysis

Comparative analysis was conducted for investigation of variations on stakeholder role, gender, age, and education level.

By Stakeholder Group:

• Healthcare professionals with highest awareness were displayed (avg. score: 82%).

• Awareness was lowest within the general public and students (avg. score: 45%)

• A number of patients and recoverees expressed emotional distress and confusion regarding follow-up services.

By Gender:

• Females reported a bit lower awareness and a bit higher willingness to get tested.

• Males were more inclined to engage with digital health platforms.

By Age:

• Participants in the 31–50 age range were quite involved with health discussions and in screening behaviors.

• Youth below 30 had the lower levels of awareness as well as screening participation

By Education Level:

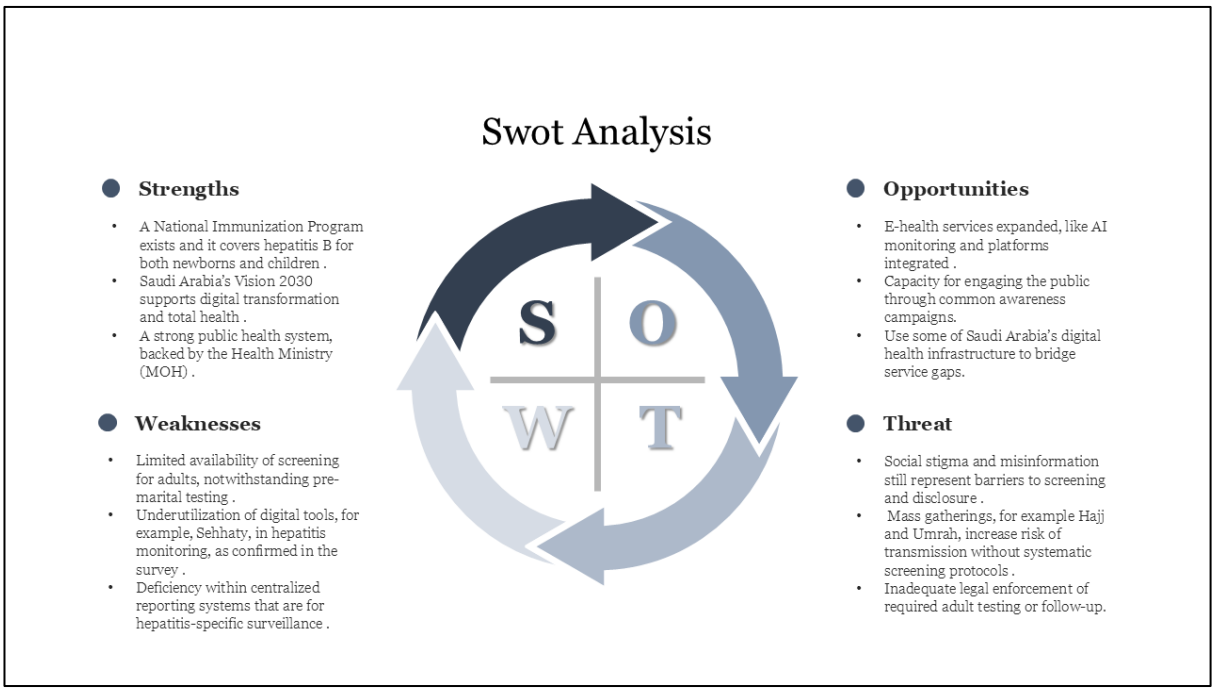
• Participants with university educations showed greater comprehension of hepatitis transmission. Their understanding extended to symptoms as well.

•However, having a greater knowledge did not always translate to testing behavior.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Overall, this analysis of integrated data gave a firm, elaborate base to build the SWOT, PESTEL, and Balanced Scorecard (BSC) frameworks. It clarified population segments at some greater risk and tools (digital systems, for



example) underused or poorly accessed. It also clarified locations where awareness must be strengthened.

C. SWOT Analysis

A SWOT (strengths, weaknesses, opportunities, and threats) analysis mention clear in figure 4 was conducted for assessment of internal and external factors influencing hepatitis prevention in Saudi Arabia. The matrix was developed at least based directly on:

•Survey findings

•Literature understandings (2021–2025)

• National healthcare context closely aligned to Vision 2030.

This particular SWOT analysis has directly informed the planned choices located later within the Balanced Scorecard (BSC).

D. PESTEL Analysis

The PESTEL framework (Political, Economic, Social, Technological, Environmental, and Legal) helped in assessing the external macro environment influencing the creation and use of a national plan for hepatitis prevention in Saudi Arabia.

This analysis was built completely upon results from the literature review, as it was guided through the methodology of this study and was aligned to global public health planning standards that were recommended from the WHO and CDC [1][2].

Synthesizing findings from around 30 peer-reviewed papers reviewed between 2021 and 2025, this PESTEL analysis provides an evidence-informed comprehension of external factors that influence hepatitis prevention.

a) Political

Figure 4 SWOT Analysis

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Saudi Arabia has exhibited certain political will within healthcare transformation through Vision 2030, which stresses disease prevention and digital health integration. Mandatory infant hepatitis B vaccination has reflected consistent governmental prioritization policy .

However, the absence from a national framework for mandatory adult screening limits certain long-term control measures.

b) Economic

The Kingdom has made substantial investments that are in digital health infrastructure, including national platforms such as Sehhaty and Tawakkalna, which offer up the potential for expanded infectious disease monitoring .

Even though the overall health budget is strong, targeted funding for hepatitis-related outreach and testing remains quite limited, mostly in non-urban areas.

c) Social

Social issues continue as a key obstacle. Studies do consistently highlight the persistence of stigma surrounding hepatitis, especially among women and also rural populations .

Furthermore, common public misconceptions concerning transmission—like associations with lifestyle or moral judgment—contribute to delayed testing and reduced community engagement .

d) Technological

In terms of technology, Saudi Arabia leads the region in its adoption of digital health platforms. However, there are also certain concerns with respect to limited data interoperability among systems, restricting integrated case tracking .

The use of AI as well as machine learning within infectious disease modeling remains emerging, plus is not yet applied in hepatitis surveillance .

e) Environmental

The Kingdom's hosting of mass gatherings, including Hajj as well as Umrah, introduces environmental pressure upon the disease control systems .

Climate change and urban expansion throughout the GCC have contributed to evolving patterns of communicable disease transmission, including hepatitis .

f) Legal

Legally, adult hepatitis screening is not mandated through national law. Screening is only done outside of pre-marital testing .

There is also no enforceable national policy on data sharing or follow-up care. This reduces coordination across healthcare institutions .

To summarize, this PESTEL analysis — based fully upon literature evidence — provides for the calculated basis of the Balanced Scorecard. It gives a context in which to identify external opportunities and challenges and ensures that the strategy is adaptable for the social, economic, and policy environment of Saudi Arabia.

E. Strategy Development via the Balanced Scorecard (BSC)

To transform planned understandings so they are changed into actionable goals, a Balanced Scorecard (BSC) customized for hepatitis prevention and control in Saudi Arabia got developed. The BSC functions as a performance management and planned planning tool that aligns health goals with certain measurable indicators and national priorities, specifically those set under Saudi Vision 2030.

The BSC was structured around four key perspectives: Stakeholder, Internal Process, Learning & Growth, and Financial. It also integrates inputs from the literature review, national survey, SWOT, and PESTEL analyses.

Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Table 1Balanced Scorecard for Hepatitis Prevention Strategy in Saudi Arabia

Component	Details
Vision	A hepatitis-free Saudi society by 2030 through proactive, equitable, and data-driven public health initiatives.
Mission	To reduce the national burden of viral hepatitis by implementing integrated prevention, screening, and digital monitoring strategies.
Core Values	Equity, Accessibility, Innovation, Collaboration, Accountability.
Strategic Themes	1. Public Awareness and Education2. Early Detection and Screening3. Digital Integration and Surveillance4. Policy and System Strengthening
Strategic Results	- Increased awareness of, and behavior change.- Higher rates of screening and of vaccination.- Digitally tracked real-time case reporting.- Unified national response through governance.

Table 2 Strategic Objectives, KPIs, Targets, and Initiatives (Aligned by Perspective)

Perspective	Objective	Key Performance Indicator (KPI)	Target (by 2030)	Initiatives
Stakeholder	Increase national awareness of hepatitis	% of population with correct knowledge on transmission	≥ 80%	National multimedia campaigns; school & university education
Internal Process	Expand adult hepatitis screening	% of adults screened (age 18–60)	≥ 60%	Introduce screening in primary care; mobile screening units
Learning & Growth	Train healthcare workers in digital disease surveillance	% of staff trained on platforms like Sehhaty	100% of MOH facilities	Develop MOH-certified e-health training program
Financial	Improve cost-efficiency of prevention programs	Cost per case detected and treated	↓ 30% vs 2024 baseline	Optimize resource allocation via dashboard tracking

The BSC makes sure that a calculated plan can be measured and can be acted upon, along with being aligned to national priorities, while it offers a monitoring mechanism which is thorough for it to track the impact and adjust policies over a period in time.

IV. . Discussion and Recommendations

This study targeted to design a national calculated framework for decreasing viral hepatitis incidence in Saudi Arabia by 50% by 2030. To accomplish this, the research was targeted at:

1. Gauge the existing degree of public awareness and perceptions toward hepatitis.

2. Identify gaps inside systemic screening alongside digital health services.

3. Use specific planned planning tools like SWOT and PESTEL. Employ also the Balanced Scorecard (BSC).

4. Furnish focused policy advice based on qualitative and quantitative data.

The results did reveal disparities meaningful in awareness levels among stakeholder groups; with healthcare professionals exhibiting a high knowledge relative to it, while students and the general public demonstrated understanding lower in levels. This aligns with many prior studies showing misconceptions and stigma are large

barriers to hepatitis prevention in the Middle East and North Africa (MENA) region 12,13.

Furthermore, even with the presence of digital tools such as Sehhaty, their usage for hepatitis-related services is low, reflecting the underuse of public health technology noted in similar contexts 19. The survey responses did also show a strong public willingness for support of awareness initiatives as well as screening if barriers such as cost, access, and trust happen to be addressed.

To address these challenges, in addition to capitalizing on existing strengths, the following recommendations are proposed:

Recommendations

1. National Awareness Campaigns: Implement media that is culturally tailored and school-based programs for correction of misconceptions, mainly in rural areas.

2. Integrated Adult Screening: Mandate routine hepatitis B and C testing within primary care for adults aged 18–60, which is supported through mobile screening clinics.

3. Digital Health Enhancement: To expand and integrate features that are within national platforms (e.g., Sehhaty) is to include hepatitis screening records, plus reminders, and follow-up tracking.

4. Training of Healthcare Workers: Frontline health staff need national-level certification in infectious disease surveillance as well as digital reporting.

5. Policy and Legal Reform: Regulations should be established, mandating hepatitis screening for high-risk populations. Enforceable data reporting standards must also be ensured.

6. Performance Monitoring: Use various BSC-aligned dashboards at both the national and regional levels to monitor KPIs, adapt strategies, and ensure accountability.

In conclusion, these recommendations align with Vision 2030's emphasis on proactive health, as well as digital innovation, and equity. They are both actionable and grounded in local evidence, offering a pathway for national hepatitis control and in long-term public health sustainability.

V. Conclusion

This study presents a largely thorough planned framework, evidence-based and targeted at reducing viral hepatitis incidence in Saudi Arabia by 50% around 2030. Through integrating discoveries across 30 scientific studies together with survey data obtained from four stakeholder groups, the research applied planned planning tools—SWOT, PESTEL, and also the Balanced Scorecard—for identification of systemic gaps and proposing practical, policy-aligned solutions.

Results showed large differences in awareness, little use of online tools, and no national rules for adult checks. In addressing such gaps through public engagement, as well as integrated screening, coupled with digital system enhancement, is critical enough for long-term success. The framework that is presented in this section provides a useful roadmap that aligns to Saudi Vision 2030, while it offers up a reproducible model for calculated planning within communicable disease control.

Additional research can focus on implementation evaluation, cost-effectiveness analysis of proposed interventions, and exploring the role of AI in predictive hepatitis monitoring.

A. Ethics statement

This is something that is not applicable. Zero experiments on animals or zero on human participants were conducted. According to standard ethical research practices, the survey was designed in a thoroughly anonymous and completely voluntary manner.

B. Acknowledgments

The author would like to express sincere gratitude toward Dr. Salma Elhag for continuous support, valuable guidance, and her outstanding supervision throughout development of this study. We do also appreciate the survey participants. They gave a portion of their time and contributed to the survey.

Research Article

REFERENCES

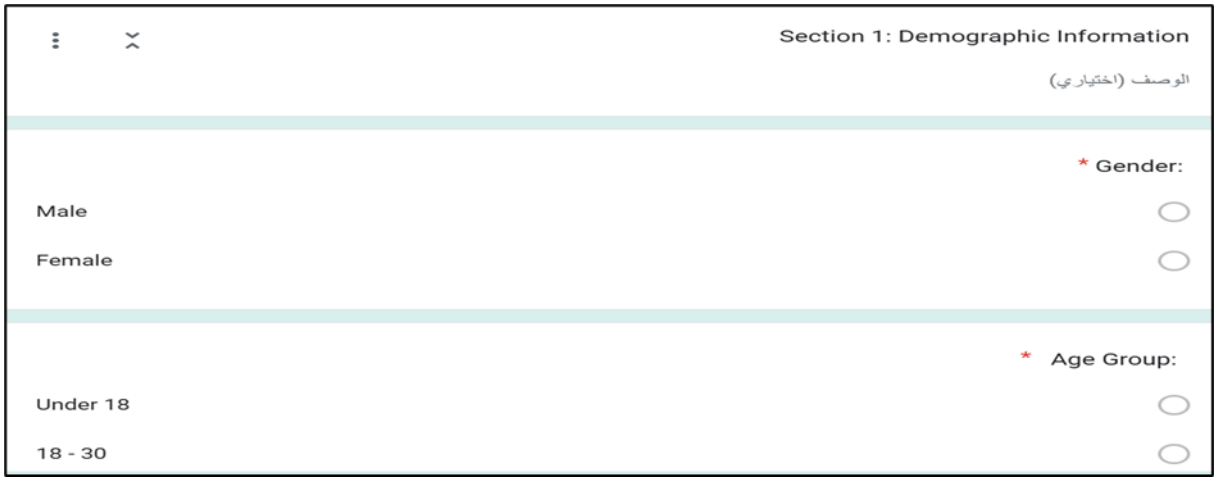
1. World Health Organization. *Global progress report on HIV, viral hepatitis and sexually transmitted infections, 2021*. Geneva: WHO; 2021.
2. World Health Organization. *Hepatitis B fact sheet*. Published 2023. Accessed March 15, 2025. https://www.who.int/news-room/fact-sheets/detail/hepatitis-b
3. Alharbi N, Aljumah A. Hepatitis B virus prevalence and vaccination in Saudi Arabia: a review. *Saudi J Gastroenterol*. 2022;28(1):10–15.
4. Yosep I, Septiana S. Health beliefs and stigma of viral hepatitis in primary care. *Int J Sci Technol Res*. 2020;9(2):123–129.
5. Harb R, et al. Communicable disease surveillance in Lebanon during the COVID-19 pandemic. *East Mediterr Health J*. 2021;27(6):600–607.
6. Saudi Vision 2030. *National Transformation Program*. Accessed February 2025. https://www.vision2030.gov.sa/
7. Altindag D, Ongel B. Information management and health system performance: empirical evidence from the Middle East. *BMC Health Serv Res*. 2021;21(1):415.
8. IBM Corp. *IBM SPSS Statistics for Windows*, Version 28.0. Armonk, NY: IBM Corp; 2021.
9. Costa M, et al. Public perceptions and policy gaps in HTLV-1 control: a SWOT analysis. *Rev Soc Bras Med Trop*. 2021;54:e0002-2021.
10. Alenezi H, et al. Climate change and communicable diseases in the Gulf region. *Int J Environ Res Public Health*. 2023;20(1):90.
11. Centers for Disease Control and Prevention. *Isolation precautions for healthcare personnel*. Updated 2023. Accessed February 2025. https://www.cdc.gov/infection-control/hcp/isolation-precautions/precautions.html
12. Saeed A, et al. Knowledge of infection prevention among healthcare workers: a systematic review. *J Hosp Infect*. 2022;120:56–64.
13. Alzghaibi H. Stakeholder perceptions of hepatitis B control in accredited Saudi hospitals. *J Infect Public Health*. 2024;17(2):145–153.
14. Sorour A. Business intelligence systems in monitoring hepatitis care performance. *Health Inform J*. 2022;28(4):101256.
15. Yuan X, et al. A model of hepatitis B prevention and control in China: A comprehensive review. *Health Policy*. 2021;125(8):1216–1223.
16. Abdulaziz A, et al. Hepatitis C: Overview of diagnostics and treatment in the Middle East. *J Med Health Educ*. 2023;33(1):102–115.
17. Alharbi R, et al. Hepatitis awareness campaigns in Saudi Arabia: Impact and challenges. *J Public Health*. 2024;15(3):199–210.
18. Mohammed A, et al. Impact of digital health technologies on hepatitis management in Saudi Arabia. *Saudi Med J*. 2023;44(2):119–126.
19. Saaid G, et al. Public health strategies for controlling hepatitis in the MENA region: A review. *Int J Public Health*. 2021;66(4):456–463.
20. Gohar M, et al. Policy implications for hepatitis management in Saudi Arabia: A systematic review. *Int J Health Policy Manag*. 2022;10(4):234–242.
21. Johnson C, et al. Assessing the effectiveness of hepatitis vaccination programs in the Gulf States. *East Mediterr Health J*. 2022;28(5):300–305.
22. Ghrayeb T, et al. The role of healthcare worker education in reducing hepatitis B prevalence. *J Infect Prev*. 2021;14(1):5-10.
23. CDC. *Viral Hepatitis Surveillance Report, 2020*. U.S. Department of Health & Human Services. Published 2021. Accessed January 2025. https://www.cdc.gov/hepatitis/statistics/index.htm
24. Kemp J, et al. Exploring the role of the private sector in hepatitis prevention and treatment in the Middle East. *J Public Health Policy*. 2023;44(2):208–215.
25. Maharjan H, et al. Implementing hepatitis C control strategies: A case study from Southeast Asia. *World Health Organization*. 2021. Accessed February 2025. https://www.who.int/hepatitis/campaigns/2021/en/

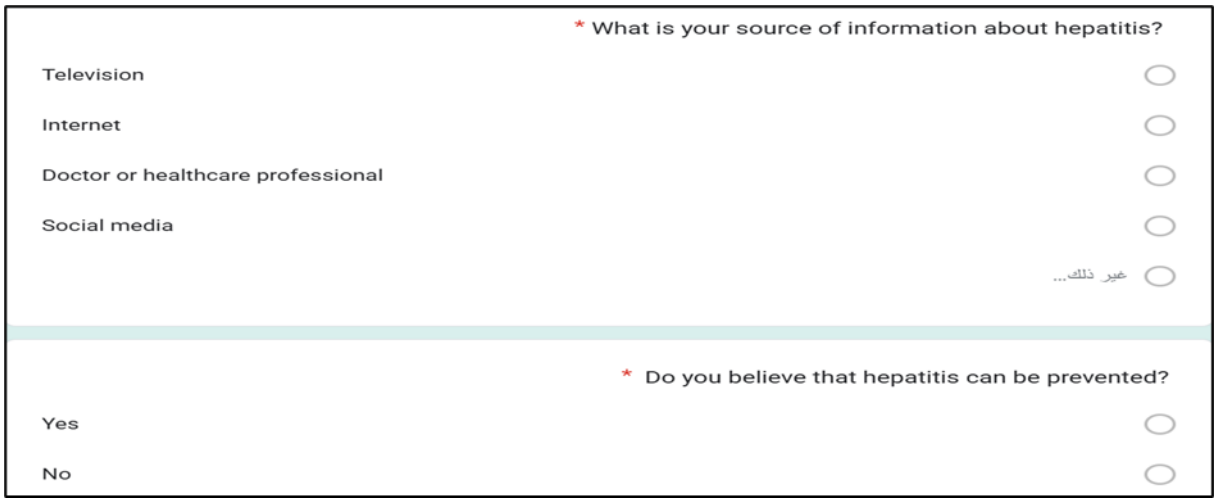
Research Article

26. Rahman S, et al. Data-driven strategies for hepatitis B vaccination in high-risk populations. *Public Health Rep*. 2021;136(3):392–397.
27. Alhawsawi K, et al. Trends in hepatitis C prevalence in Saudi Arabia: A retrospective study. *J Infect Public Health*. 2022;15(5):245–250.
28. Peters J, et al. Evaluating hepatitis prevention strategies in primary care settings. *Am J Public Health*. 2021;111(1):68–75.
29. Rahman M, et al. Surveillance and public health efforts for hepatitis control in Southeast Asia. *Lancet Global Health*. 2022;10(7):730–735.
30. Jenkins M, et al. The future of hepatitis C treatment in the MENA region. *J Hepatol*. 2023;64(2):210–218.
31. Kaplan R, Norton D. *The Balanced Scorecard: Translating Strategy into Action*. Harvard Business Review Press; 1996.
32. McKinsey & Company. *PESTEL Framework: An Overview of External Environmental Factors*. Published online, McKinsey; 2022.
33. World Health Organization. *Global hepatitis report 2020*. Geneva: WHO; 2020.
34. Centers for Disease Control and Prevention. *Hepatitis B and C: Information for health care professionals*. Updated 2023. Accessed February 2025. https://www.cdc.gov/hepatitis

Appendix A

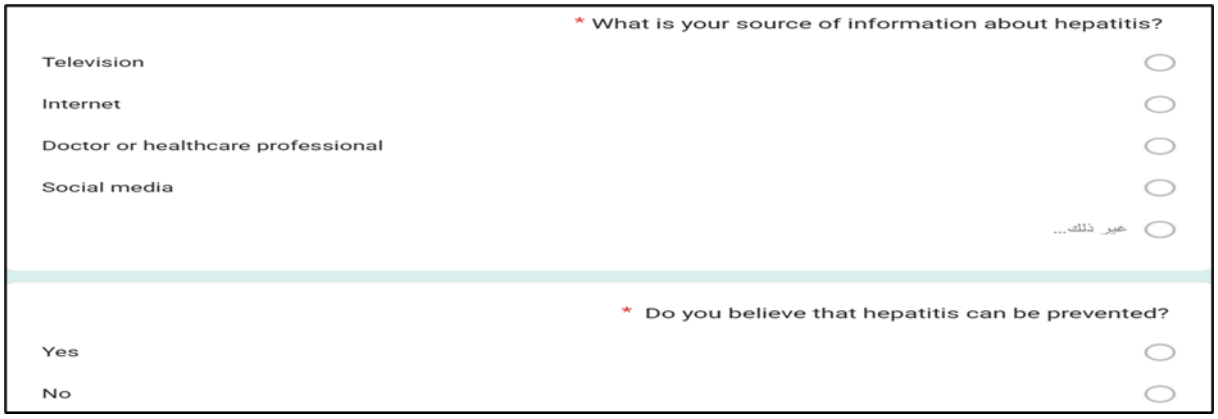
Survey questions





Journal of Information Systems Engineering and Management
2025, 10(48s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article



Appendix B

Survey responses

Gender	Age Group	Education Level	Target Group	Q5 - Heard of hepatitis?	Q6 - Source of hepatitis information	Q7 - Is hepatitis preventable?
Female	18-30 years	Postgraduate Studies	General Public	No	Social media	No
Male	18-30 years	University Education	Healthcare Worker			
Male	18-30 years	University Education	General Public	Yes	Internet	Yes
Male	31-45 years	University Education	Healthcare Worker			
Male	31-45 years	University Education	Healthcare Worker			
Male	46-60 years	Secondary Education	Healthcare Worker			
Male	31-45 years	University Education	Healthcare Worker			
Male	31-45 years	University Education	Healthcare Worker			
Male	31-45 years	University Education	Healthcare Worker			
Male	46-60 years	University Education	Healthcare Worker			
Male	46-60 years	University Education	Healthcare Worker			
Male	31-45 years	University Education	Healthcare Worker			
Female	31-45 years	University Education	General Public	Yes	Internet	Yes
Male	31-45 years	University Education	Healthcare Worker			
Male	31-45 years	University Education	General Public	Yes	Social media	Yes
Male	31-45 years	University Education	General Public	Yes	Doctor or health professional	Yes
Female	31-45 years	Postgraduate Studies	General Public	Yes	A well-known and common disease	Yes
Female	18-30 years	University Education	General Public	Yes	Social media	Not sure
Male	31-45 years	University Education	General Public	Yes	Doctor or health professional	Yes

Q9 - Screening available at work?	Q10 - Effectiveness of awareness programs	Q11 - Main challenges in dealing with hepatitis patients
No	Insufficient programs	Limited early screening
Yes, available to all	Very effective	Lack of patient awareness, limited early screening
Yes, available to all	Somewhat effective	Lack of patient awareness
Yes, available to all	Somewhat effective	Lack of patient awareness, non-adherence to treatment
Yes, but limited	Insufficient programs	Lack of patient awareness, limited early screening
Yes, available to all	Very effective	Lack of patient awareness, limited early screening
Yes, but limited	Somewhat effective	Lack of patient awareness, non-adherence to treatment, limited early screening
Yes, available to all	Insufficient programs	Lack of patient awareness
Yes, available to all	Somewhat effective	Lack of patient awareness
Yes, available to all	Somewhat effective	Limited treatment availability
Yes, but limited	Not effective	Limited early screening

Q20 - Best way to reduce hepatitis spread
Enhance awareness programs, facilitate vaccine access, improve available treatments
Enhancing awareness programs
Enhance awareness programs, provide regular free screenings
Enhancing awareness programs
Enhance awareness programs, provide regular free screenings
Enhancing awareness programs
Enhance awareness programs, facilitate vaccine access, provide regular free screenings, improve treatments
Enhance awareness programs, provide regular free screenings
Enhance awareness programs, facilitate vaccine access, provide regular free screenings, improve treatments
Enhance awareness programs, facilitate vaccine access, provide regular free screenings
Enhancing awareness programs
Facilitating access to vaccines
Enhance awareness programs, facilitate vaccine access
Provide free regular screenings, improve available treatments
Enhancing awareness programs
Enhance awareness programs, facilitate vaccine access, provide regular free screenings, improve treatments
Facilitate vaccine access, provide free regular screenings