

Design and Implementation of an Employee Health Management Information System

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Abstract

This study developed an information system for employee health management aimed at enhancing workplace health and increasing corporate competitiveness. The employee health management information system (EHMIS) integrates health data analytics, risk assessments, and personalized health intervention measures to promote a healthier workforce. The platform emphasizes data privacy, seamless integration with existing human resources systems, and provides tools for monitoring health trends, reducing absenteeism, and improving overall productivity. The building process includes needs assessment, system architecture design, information security, functionality integration, and evaluation. The implementation strategy prioritizes employee engagement and continuous improvement, effectively assisting companies in human resource management and ongoing health promotion for employees.

Keywords: Employee health management, Information system, Employee health status, Workplace health, Information security.

1. Introduction

Employee health management in the workplace involves assessing, detecting, recording, tracking, and analyzing employees' health status and risk factors. Through planning, organizing, and managing processes, it aims to maintain the health of individuals or groups of employees, ensuring early prevention and detection, and promoting physical and mental health. Implementing employee health management can enhance a friendly and healthy work environment, reducing the risk of absences, salary suspension, or departure from the workplace due to poor health. It also lowers employee turnover, boosts morale and cohesion, and makes recruiting more attractive (Ellis & Gordon, 2021; World Health Organization, 2022).

Employee health management allows for understanding the health status of new and current employees, timely adjustment and arrangement of their work, improvement of the work environment, and enhancement of employees' health knowledge and habits (Zhu & Chang, 2021). Occupational safety and health regulations require health checks based on the nature of work, with specific timings, frequency, and items. The vast amount of information requires data integration and information system establishment to improve manual data errors and time consumption. With the rapid development of information technology, introducing an information system into employee health management can provide timeliness, accessibility to services, and increase management efficiency (Hu, Jian, Zhou, & Liu, 2023), allowing

enterprises to grasp employees' health status, remind check-up times regularly, report abnormal alerts, and record employee care. The establishment of an information system can effectively manage employee health information and, coupled with health promotion activities, create a friendly and comfortable workplace. The purpose of this study is to establish an employee health management information system that integrates data from employee health checks, regular health examinations post-employment, personal information, medical reports, daily habits, work nature, and stress conditions. It also provides alerts for abnormal data, reminders for regular health checks, and ensures information privacy security, creating a platform for managing employee health data.

2. Literature Review

Health management refers to the assessment, recording, tracking, and reminding of health-related risk factors for individuals or groups, and it is an ongoing process to maintain health (Wu, 2018). Employee health management involves collecting, analyzing, tracking, and predicting information about employees' family history, eating habits, daily routines, work nature, and stress, providing health education, disease treatment consultations, and implementing health improvement guidance and suggestions to reduce the risk of illness early on (Wu, 2018). Health promotion and management of employees are crucial for the sustainable operation of enterprises (Zhu, 2022), organizational culture has a major impact on the mental health and wellbeing of employees (Monteiro, & Joseph, 2023), with regulations requiring physical examinations at employment and regular health checks thereafter based on employee age (Occupational Safety and Health Administration, 2019). With technological advancements, the establishment of health management platforms and information systems can integrate communication and information, achieving timely, comprehensive, and continuous health management (Su, Chen, Chen, & Lai, 2011), making smart health data management a current trend.

The six major processes of health management include (Sun, & Zhang, 2008): (1) Monitoring: collecting physical examination and health hazard data. (2) Evaluation: comparing collected personal health data with normal values or correct practices. (3) Analysis: analyzing the impact of controllable and uncontrollable health risk factors on individual health. (4) Prediction: predicting the risk of diseases based on personal examination data and clinical biochemical results (e.g., blood lipids, blood pressure). (5) Planning: tailoring health guidance plans based on current health conditions, setting expected control goals and guiding principles. (6) Implementation: executing health guidance plans, a key process in health management. Strategies for promoting employee health management include health checks, employee insurance, management of medical reports, care for abnormal values, mental and physical health lectures, health promotion activities, arranging occupational health physicians or nurses to inform risks, provide health guidance, and offer evaluations and suggestions for work adjustments or replacements (Zhu, Wu, Gu, Xie, & Liao, 2021).

3. Research Method

Methods-System Design Architecture. To achieve employee physical and mental comfort,

based on employee health management, occupational safety and health law requirements, and domestic and international literature, consider integrating data such as personal information (age, gender, height, weight, girth, body fat, blood sugar, blood pressure, family medical history), health check reports, reminders for annual physical examinations, vaccination records, and daily temperature monitoring. Compare physical examination reports with clinical biochemical normal values to provide employee health guidance, disease consultation, monitor abnormal report data, and conduct employee care. The employee health management information system is designed with six aspects, including daily health management, nutritional status, health data integration, mental health assessment, physical fitness evaluation, and supervisor care.

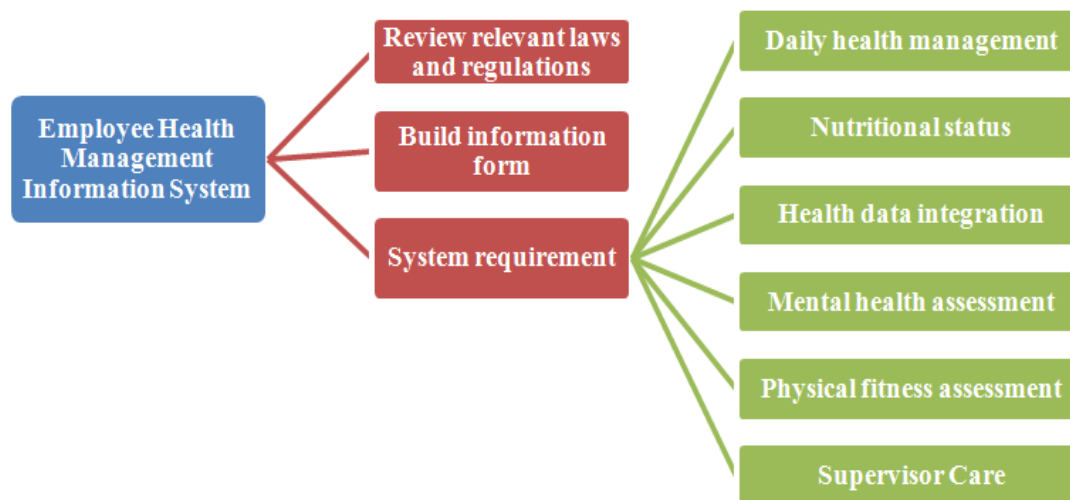


Figure 1. Design Architecture Employee Health Management Information System



Figure 2. The Process of Employee Health Management Information System

4. Finding and Discussion

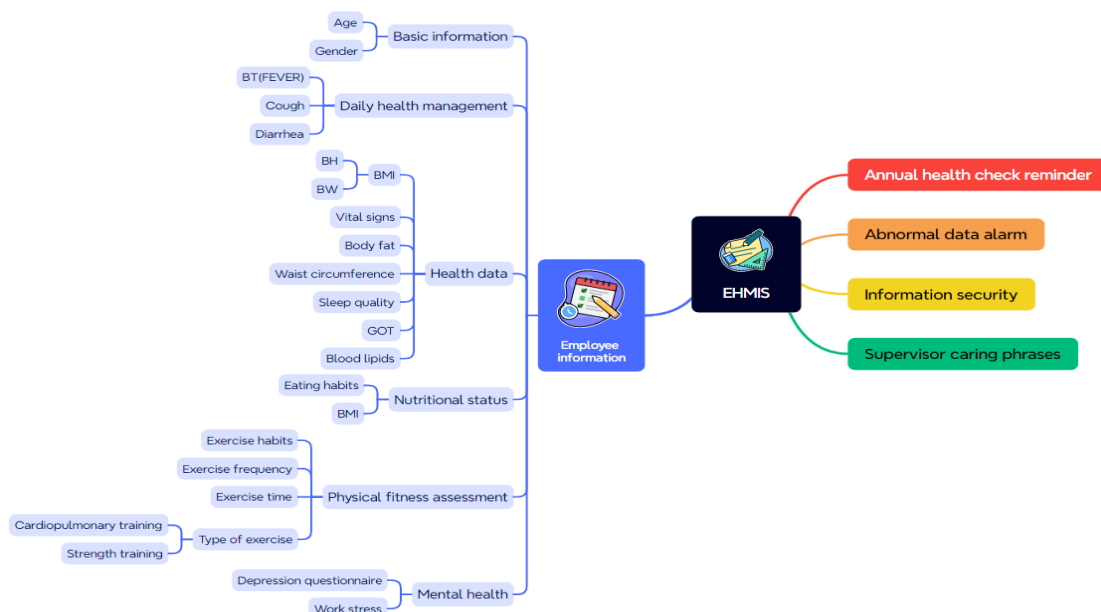
The development of the Employee Health Management Information System (EHMIS) has successfully integrated various data types, including initial health screenings, ongoing health assessments, personal demographics, medical history, lifestyle habits, job characteristics, and stress levels. Key findings from the implementation of the EHMIS include:

- Comprehensive Health Profiles:** The system has created comprehensive health profiles for employees, allowing for a more personalized approach to health management. This has been instrumental in identifying potential health risks and conditions early.
- Increased Health Awareness:** With regular updates and alerts, employees have become more aware of their health status and the importance of maintaining a healthy lifestyle. There has been a noticeable increase in participation in wellness programs and preventive health measures.
- Data-Driven Decisions:** The integration of diverse health data has enabled HR and health managers to make informed decisions regarding workplace health policies, wellness programs, and interventions. This has led to more targeted and effective health strategies.
- Privacy and Security:** Implementing robust data privacy and security measures has been critical. The system adheres to strict data protection regulations, ensuring that personal health information is securely stored and accessed only by authorized personnel.
- Reduced Absenteeism:** Preliminary data suggests that the system has contributed to a reduction in absenteeism rates. This is attributed to the proactive management of health issues and the promotion of a healthier workforce.

Table 1. Information system construction content

stage	Construction planning	Build content	System functions
System setting standards	System data input format	1. Basic information of employees 2. Physical examination report format 3. Prompt benchmark for abnormal inspection data 4. Check the normal value of the data 5. Depression Scale 6. Work Stress Scale 7. Supervisor caring phrases	
	Regulatory requirements	1.Regular health check-up time 2.Annual health examination items 3.Annual X-ray examination 4.Submit support manpower health inspection report	1.Report exception prompts 2.Report care for abnormal employees (supervisors can click on the care method in the system) 3.Report exception tracking 4.Ability to present historical data
System functions	Daily health management	1. Fever - daily body temperature monitoring record (combined with body temperature login data of swiping the card on and off work) 2. Cough/diarrhea - report it if it occurs 3. Employees proactively report fever/cough/diarrhea symptoms	When employees submit abnormal reports, the system can proactively notify their supervisors
	Nutritional status	1.Eating habits 2.BMI (Body High/ Body Weight)	
	Health data integration	1.BMI-Body Height / Body Weight 2.Vital signs (blood pressure) 3.Body fat	1. Comparison of normal values in clinical tests 2. Be able to make

		4. Waist circumference 5. Sleep quality 6. GOT 7. Blood lipids	health data reports 3. Abnormal prompts and warnings
	Mental health	1. Depression questionnaire 2. Work stress	
	Physical fitness assessment	1. Exercise habits 2. Type of (cardiopulmonary strength training) 3. Exercise time	Recommended exercise prescription (type, frequency and time of exercise)



The integration of comprehensive health data through the EHMIS represents a significant advancement in employee health management. However, several challenges and considerations have emerged:

- User Engagement:** Ensuring high levels of participation and engagement from employees is crucial for the success of the system. Continuous efforts to enhance user experience and demonstrate the benefits of the system are necessary.
- Data Accuracy and Consistency:** The reliability of health data is paramount. Ongoing efforts to validate and standardize data collection processes are essential to maintain the integrity of health assessments.
- Regular Updates and Revisions:** The dynamic nature of health data and privacy regulations requires the system to be adaptable. Regular updates and system reviews are

necessary, with information technology and legislation evolving over time.

- d. **Holistic Health Management:** The EHMIS focuses not only on physical health but also considers mental and emotional well being. Future enhancements could include features to support mental health, stress management, and work/life balance.
- e. **Long Term Impact:** While initial results are promising, assessing the long term impact of the EHMIS on employee health outcomes and organizational productivity will be important. Longitudinal studies and continuous performance monitoring are planned to evaluate the system's effectiveness over time.

In conclusion, the EHMIS has demonstrated the potential to transform employee health management through the integration of comprehensive health data, personalized health interventions, and data privacy security. Continued research and development are necessary to address the challenges identified and to fully realize the benefits of the system for both employees and organizations.

5. Conclusion

The successful planning and implementation of an Employee Health Management Information System require careful consideration of various factors, including functionality, compliance, technology, and user engagement. A well designed system can significantly contribute to the well being of employees, leading to a healthier, more productive workforce. Employee health management can detect health hazards early and reduce the risk of disability. By utilizing information systems to integrate and manage employees' health data, it simplifies the time spent on traditional manual management. Through proactive alerts and abnormal warning notifications, it actively cares for the health status of employees, reducing the frequency of leave due to poor health conditions. Employees are an important asset to a company, and by valuing the health of individuals and groups, a business can maintain its competitiveness and productivity.

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