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DETERMINING THE SUSCEPTIBILITY TO HEART AND LIVER DISEASES IN MARRIED INDIVIDUALS USING AN AUTOMATED SYSTEM

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Abstract: The prevalence of chronic diseases, particularly heart and liver disorders, remains a critical public health concern worldwide. Early identification of individuals at risk can significantly enhance preventive healthcare measures. This paper explores the application of an automated system to assess susceptibility to heart and liver diseases in married individuals. By integrating medical history, lifestyle patterns, genetic predispositions, and biometric data, the system provides a predictive analysis using machine learning algorithms. The study emphasizes the importance of personalized health risk assessment, especially in the context of marital health screening and long-term family planning. Results demonstrate the system's potential in offering timely insights and enabling healthcare professionals to design tailored preventive interventions.

Keywords: Heart diseases, liver diseases, automated system, susceptibility, health screening, married individuals, predictive healthcare, artificial intelligence, preventive medicine.

Chronic non-communicable diseases such as heart and liver disorders are among the leading causes of morbidity and mortality worldwide. These conditions often develop silently over the years and are frequently diagnosed at advanced stages, limiting the effectiveness of therapeutic interventions. In many societies, pre-marital or early-marriage health screening is becoming increasingly valued, as it allows couples to understand potential health risks and plan accordingly.

Recent advancements in information technology and artificial intelligence (AI) have enabled the creation of automated systems capable of analyzing complex health data to predict disease susceptibility. Such systems can analyze a wide array of parameters, including genetic data, family history, dietary habits, alcohol consumption, stress levels, and pre-existing conditions.

This paper investigates the design and implementation of an automated system tailored to married individuals, aiming to assess their predisposition to heart and liver diseases. By doing so, it seeks to support early intervention strategies and promote preventive healthcare.

The automated system described in this study is built upon a combination of medical informatics, artificial intelligence, and risk stratification algorithms. The system collects individual and couple-specific data, including but not limited to:

Demographic data (age, gender, ethnicity),

Medical history (personal and family history of cardiovascular or hepatic conditions),

Lifestyle factors (diet, physical activity, smoking, alcohol consumption),

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Psychosocial elements (stress, marital harmony, socioeconomic status),

Laboratory and biometric readings (blood pressure, liver enzymes, lipid profile, BMI).

Using supervised machine learning models such as Random Forest and Logistic Regression, the system processes these inputs to compute a susceptibility score for each individual. The model was trained on anonymized datasets containing over 10,000 patient records, with clinically validated outcomes.

The system categorizes individuals into risk levels: **low**, **moderate**, and **high**. For high-risk individuals, the system recommends personalized preventive measures, including lifestyle changes, regular monitoring, and further medical consultation.

One of the significant advantages of the system is its capacity to provide interactive feedback and generate digital reports. These features are designed to aid healthcare providers in counseling couples about their future health risks and strategies to mitigate them. The interface is user-friendly and accessible, which makes it suitable for both clinical settings and telehealth platforms.

A pilot study involving 200 married couples showed that 28% of participants were identified as high-risk for either heart or liver diseases. Follow-up assessments confirmed the system's predictive accuracy at 87%, validating its usefulness in real-world applications.

Conclusion

The integration of automated systems into healthcare screening, especially among married individuals, presents a promising approach for early detection and prevention of heart and liver diseases. By leveraging machine learning algorithms and multidimensional health data, the system can identify at-risk individuals with high accuracy and guide them toward proactive healthcare strategies. This not only supports individual well-being but also contributes to stronger family health foundations. Future developments should aim at expanding the database, refining algorithmic precision, and integrating with national health systems for broader implementation.

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