Brief Report
Volume 14:1, 2023

Journal of Health & Medical Informatics

ISSN: 2157-7420 Open Access

Patient Health Safety Improvements Using Ontologies

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Introduction

Urologists all over the world continue to see bladder cancer (BC) as a major issue despite significant advancements in medicine. It is anticipated that the standard age-specific mortality rate for BC will be 4.7 per 100,000 people. It is particularly important in predicting treatment side effects (SEs) in urological carcinology because of its frequency, anatomical pathological polymorphism, difficulty in precise staging, and high prognostic uncertainty. The early detection, prediction, prevention, and treatment of these diseases' long-term complications should help cut costs and spur the growth of new organizations that typically offer patients a better quality of life and are safer and more efficient than traditional practices.

Malignant growth is currently the main source of death since it is a multifactorial sickness. The management of numerous comprehensive diseases is significantly influenced by the amount of information and information commitment to the theories in this field. Oncotherapy options have significantly increased since the deciphering of the human genome and the adoption of evidence-based medicine principles. With ever-increasing precision, we are now able to predict the patient's health risks, particularly potential future cancers [1,2].

Description

We hope to be able to determine the efficacy of the selected treatment option before it is even prescribed by referring to the most recent research in this field. Thus, we can avoid medicines that have been considered to be less viable, more costly, and really testing. In order to prevent or delay the infection, such a proactive approach to dealing with endorsement is enthusiastically recommended prior to its onset. This advancement is essential for the significant improvement in oncology known as accuracy or customized medication, which empowers the patient to choose the proper treatment.

Semantic web technologies that are driven by ontologies might be a good way to manage BC knowledge, such as oncotherapy procedures and the clinical processes that go along with them. By formal modeling and conceptualizing domain knowledge, they support computer-based processing and reasoning in a wide range of clinical applications. The automatic generation of new information and reasoning might be aided by these features. The development of a decision-making tool to assist oncologists in the treatment prescribing process, particularly in this paper, is the primary objective of our work, and this reasoning serves it. An effective decision support system (DSS) ought to enable the application of BC-related scientific findings to medical cases in this setting. This includes theoretical and empirical domain-specific knowledge in addition to archived cases of patients who have been diagnosed with the epidemic and treated for it. The compilation of all of this diverse knowledge into a single semantic knowledge-base (KB) serves as the foundation for the ontological evidence-based strategy that we present in this work [3-5].

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Received: 02 January, 2023, Manuscript No. jhmi-23-91206; **Editor assigned:** 05 January, 2023, PreQC No. P-91206; **Reviewed:** 16 January, 2023, QC No. Q-91206; **Revised:** 23 January, 2023, Manuscript No. R-91206; **Published:** 30 January, 2023, DOI: 10.37421/2157-7420.2023.14.460

To model the patients' medical case and capture the necessary parameters for making the appropriate diagnosis, we made use of contextual information like interrogation, clinical examination medical tests, and other complementary examinations.

This is based on specific cancer knowledge and the patient's health. When selecting treatments, the patient's preferences are taken into consideration in addition to the stage, grade, risk category, functional index, and other medical conditions affecting the patient. Some of the most common treatments for this pathology include surgery, specifically Transurethral Resection of the Bladder Tumor (TURBT), cystectomy, and pelvic lymph node dissection. In addition, BC is frequently treated with immunotherapy, chemotherapy, and radiation therapy. However, these procedures can result in mouth sores, fatigue, altered kidney or liver function, diarrhoea, dry mouth, altered fingernails or toenails, altered blood mineral levels, decreased appetite and taste, anemia, dry skin, dry eyes, and hair loss. They can also cause muscle pain, constipation, stomach pain, nausea, and redness, swelling, peeling, or tenderness on the hands or feet. Additionally, eye problems might occur. These include vision impairment, vision loss, or other visual changes. Blood in the urine, irritability, and a burning sensation in the bladder are the most common symptoms. The patient's medical history and the treatment they receive will both influence the type and severity of SEs.

Conclusion

It makes use of ontologies and semantic models to make it easier to manage knowledge and results from cancer research. This was especially connected to improving the well-being of the patient by assisting the physician in selecting therapy with fewer SEs taking into consideration the particular clinical case and segment data. Our findings demonstrated the effectiveness of our strategy in predicting risks prior to initiating prescribed treatment, not only to improve prescriptions with fewer side effects and to assist in selecting complex therapy approaches but also to reduce the likelihood of adverse effects. Additionally, automated, evidence-based medical tools must be developed in order to advance cancer treatment management. Recent domain studies gave us the necessary medical cases and information. Due to the formal representation of clinical knowledge and evidence, we were also able to use clinical reasoning about the collected knowledge, which is very similar to the human cognitive processes that oncologists typically use to evaluate the SEs of a particular treatment. In contrast to the human cognitive process, automated reasoning made it possible to connect a lot of evidence, proofs, and contextual information about the patient's medical case. Subsequently, specialists could be flawlessly helped with deciding the propriety and adequacy of patient treatment by alluding to this instrument.

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How to cite this article: Kindo, Akako. "Patient Health Safety Improvements Using Ontologies." *J Health Med Informat* 14 (2023): 460.