Integrating Artificial Intelligence to Analyze Mental Health's Impact on Cancer Patients and Revolutionize Treatment Strategies for Technological and Medical Advancement

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Cancer is a major global health threat, ranking 3rd in causes of death with over 10 million fatalities in 2020. In Palestine, it poses a dire risk, claiming over 5,000 lives yearly with rising incidence. While cancer's causes range from environmental to genetic factors, treatments largely target tumors, overlooking psychological impacts. Studies show a high percentage of patients experience depression during/after treatment, facing challenges like financial strain and limited psychological care access. This research tackled the issue in two stages. First, fMRI revealed structural brain differences in control/response regions between cancer patients with good vs. poor mental health, highlighting mental health's critical role in effective treatment. Building on these findings, an AI application was developed incorporating social support and functional behavioral therapy techniques to improve patients' mental well-being representing the second stage. Implementing this application led to substantial quality of life and happiness improvements of up to 88.7% for patients. This underscores the importance of addressing mental health alongside medical interventions for enhanced wellbeing and recovery. The project demonstrates AI's transformative potential in personalizing cancer care through technology-medicine integration for better outcomes. By providing psychological support, significant benefits were achieved, showcasing a holistic approach's advantages. The findings pave the way for AI-driven solutions that optimize healthcare delivery, with technology augmenting medicine for improved patient experiences and deeper mind-body understanding in cancer treatment.

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