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Original Article

Role of ChatGPT and Google Bard in the Diagnosis of Psychiatric Disorders: A Comparative Study

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Abstract

Introduction

The incorporation of artificial intelligence (AI) in the medical decision-making matrix has captured interest across diverse medical domains. This study aimed to juxtapose the decision-making patterns of humans and artificial intelligence regarding psychiatric disorders.

Methods

A set of case stories composed of 20 questions and the ideal answers were developed by a psychiatrist (the first author) based on International Classification of Diseases or Diagnostic and Statistical Manual of Mental Disorders. The cases and replies were revised by other authors, and one by one, they were presented to ChatGPT and Google Bard. The results were presented in a table.

Results

Both ChatGPT and Google Bard reported a high rate of precision in the spot diagnosis of the cases. ChatGPT provided a correct diagnosis for 15 cases (75%), while Google Bard diagnosed 14 cases (70%) successfully.

Conclusion

ChatGPT and Google Bard's success in this study opens the door for deeper AI integration in psychiatric evaluations. As technology evolves, the boundary between human and AI decision-making may become less distinct, promising a new era in psychiatric care. Moving forward, we must approach AI in healthcare with enthusiasm, collaboration, and caution.

1. Introduction

The healthcare realm may undergo transformative changes with the introduction of artificial intelligence (AI), paving the way for enhanced patient treatment. OpenAI introduced a groundbreaking natural language model named Chat Generative Pre-Trained Transformer (ChatGPT) in November 2022, recognized for producing responses that closely mimic human interaction across a multitude of tasks. Google Bard AI also functions as a textual AI conversational tool, utilizing machine learning and natural language interpretation. It is even equipped to provide solutions to intricate inquiries. These tools (ChatGPT and Google Bard) have swiftly risen to global prominence, driven by their impressive ability to emulate human conversation and cognition. Furthermore, their medical response accuracy and dependability have been scrutinized and affirmed [1-3]. One standout merit of ChatGPT in the realm of medical decision-making revolves around its proficiency in sifting through intricate medical data. It may stand as a helpful tool for health practitioners, offering rapid insights from patients' records, medical studies, and healthcare guidelines [1,4]. A notable feature of ChatGPT is its inherent impartiality. Since it functions based on algorithms and data, the system may potentially bypass human prejudices, theoretically promising more balanced advice. Additionally, ChatGPT can be pivotal in the diagnosis and differentiation phase, synthesizing information from symptoms, past medical records, and risk factors. It may comprehensively process this data to produce an array of potential medical conditions, guiding medical professionals in their judgments. This may enhance the precision of diagnosis, minimizing misdiagnoses or delays [4]. The incorporation of ChatGPT and Google Bard in the medical decision-making matrix has captured interest across diverse medical domains. Several disciplines have penned articles emphasizing the significance and plausible uses of ChatGPT and Google Bard in their areas [2,5].

This study aimed to juxtapose the decision-making patterns of humans and AI, delving into the possible advantages and constraints of integrating AI tools into healthcare decision-making on a case-by-case basis.

2. Methods

A set of case stories composed of 20 questions and the ideal answers were developed by a psychiatrist (the first author) based on International Classification of Diseases (ICD) or Diagnostic and Statistical Manual of Mental Disorders (DSM). The cases and replies were revised by other authors, and one by one, they were presented to ChatGPT (updated September 2021) and Google Bard (updated January 2023). The results were analyzed and judged by the authors and then presented in a table.

3. Results

Both ChatGPT and Google Bard reported a relatively high rate of precision in the spot diagnosis of the cases. ChatGPT provided a correct diagnosis for 15 cases (75%), while Google Bard diagnosed 14 cases (70%) successfully. Both ChatGPT and Google Bard failed to recognize a case of Genophobia, they regarded it as a case of Major Depressive Disorder (Table 1). A case of Schizophreniform Disorder was miss-diagnosed as Post-Traumatic Stress Disorder by Google Bard and as a Major Depressive Disorder by ChatGPT. A case of narcissistic personality disorder was correctly diagnosed by Google Bard and misdiagnosed as a Generalized Anxiety Disorder by ChatGPT. Both ChatGPT and Google Bard failed to address the exact diagnosis when there is comorbidity. In case 4, both ChatGPT and Google Bard only focused on trichotillomania, and they both escaped the comorbid intellectual disability diagnosis. In addition, in a case (case 16) of a combined Major Depressive Disorder-recurrent episode with gender dysphoria, they diagnosed the case as only gender dysphoria.

4. Discussion

The recent study comparing the diagnostic abilities of artificial intelligence models, specifically ChatGPT and Google Bard, to those of human medical professionals in psychiatry may offer a fascinating insight into the future of healthcare. The data showed both ChatGPT and Google Bard displaying a relatively high (75% and 70%) precision in spot diagnosis. This not only underscores the potential of AI in understanding and correlating intricate patterns with extensive medical data but also alludes to the profound changes that the healthcare realm might soon undergo [6]. Of course, if you feed ChatGPT and Google Bard with the symptoms according to ICD or DSM, you will get a diagnosis – but what is the value that goes beyond your clinical estimation, and how do you capture relationship issues, transference and countertransference that also informs your clinical judgement?

One compelling advantage of using AI in psychiatric diagnostics is its inherent impartiality. Unlike humans, AI models, such as ChatGPT and Google Bard, operate based on algorithms, allowing them to theoretically deliver a diagnosis devoid of intrinsic biases. This absence of bias can lead to more consistent and, potentially, more accurate results. However, it is worth noting that the structured environment of the study might not completely mimic real-world complexities. In daily practice, variations in symptom presentation, patient history, and other nuanced details can introduce diagnostic challenges [7].

Nevertheless, rather than viewing AI as a potential replacement for human expertise, it is more pragmatic to envision it as a complementary tool. The human touch in medicine, characterized by empathy, experiential understanding, and a holistic approach to patient care, when combined with the data processing of AI, can significantly enhance the diagnostic process. Such a collaborative approach can bridge potential gaps in human judgment and offer a comprehensive patient evaluation [8].

However, as promising as these results are, it is equally essential to be aware of the limitations. The study's scope, bound by a fixed set of case stories, may not factor in real-world variables like cultural contexts or varying symptom presentations. Moreover, there is an inherent opacity in AI's decision-making,

Table 1. Full description of the cases and corresponding recommendations.

Case description	Chat GPT recommendation	Google bard recommendation	Physician's decision
A 9-year-old boy, faced acute stress after his father's sudden murder. His sister, a junior doctor, sought help for the patient who was initially shielded from the truth by being told his father had traveled. The family was concerned about his reaction due to his closeness to his father. In the first therapy session, the psychiatrist aimed to honestly address the traumatic event, acknowledging the patient anxiety and using relaxation techniques. The patient had been exposed to death through video games. The therapist encouraged emotional expression, provided coping strategies, and planned to involve the school. The patient developmental history was unremarkable, and he appeared anxious during the initial assessment.	Acute Stress Disorder	Acute Stress Disorder	Acute Stress Disorder
A 14-year-old boy was brought to the clinic by his mother for evaluation of behavioral changes and declining academic performance. He has been withdrawn and isolated, and had paranoid delusions and auditory hallucinations. He also reported that his older brother raped him 2-3 years ago, and he now has homicidal ideation towards his brother.	Schizophrenia with Paranoid Features.	Post-traumatic stress disorder (PTSD), paranoid schizophrenia, and major depressive disorder.	Schizophrenia
A 15-year-old girl in 9th grade was referred by her mother after seeking a psychiatrist online. The girl's chief complaint was persistent OCD symptoms related to bodily fluids, leading to obsessions and compulsions involving hygiene. She expressed difficulty being accepted by her family due to her appearance, interests, and career aspirations. Her relationship with her father was strained, partly due to his alcoholism and lack of involvement. Academic performance was poor, with a preference for music over studies. She aspires to a music career, not medicine, and discusses LGBTQ+ topics with friends. A comprehensive evaluation is needed for an accurate diagnosis and treatment plan.	Obsessive-Compulsive Disorder (OCD).	Obsessive-Compulsive Disorder (OCD).	Obsessive-Compulsive Disorder (OCD).
A 7-year-old girl, the youngest of her siblings, was referred due to persistent hair-pulling behaviors, evolving over three months from eyelashes to her entire scalp and eyebrows. Her family reported aloofness, memory issues, restlessness, and difficulty socializing, with older siblings teasing and maltreating her. Developmentally, she experienced delays in milestones, talking, and learning. During the mental state examination, she appeared reserved, anxious, with messy hair and absent eyelashes, wearing dirty clothes. She displayed minimal spontaneous speech, shyness, and slowed responses, suggesting significant social and cognitive impairments.	Trichotillomania	Trichotillomania	ICD 11: 6B25.0 Trichotillomania ICD 10: F71 Moderate mental retardation F63.3 Trichotillomania DSM 5: 312.39 Trichotillomania (Hair-Pulling Disorder)
A 17-year-old Arabic girl, presented with constant fidgeting, inability to concentrate, excessive talking, impulsivity, irritability, and sleep disturbances. She had a history of hyperactivity in school and difficulty with social interactions. Her developmental history noted delayed milestones and school expulsion due to hyperactivity. During the mental state examination, she appeared hyperactive, had rapid speech, poor attention span, and lacked insight into her condition	Attention-Deficit/Hyperactiviy Disorder (ADHD).	Attention- Deficit Hyperactivity Disorder (ADHD) with conduct disorder.	ICD 11:6A05.1 Attention-Deficit/Hyperactivity Disorder, predominantly hyperactive-impulsive presentation ICD 10: F90.0 Disturbance of activity and attention: attention deficit disorder with hyperactivity DSM 5: 314.01 ADHD, predominantly hyperactive/impulsive presentation.
An 18-year-old Muslim housewife presented low mood, tearfulness, social withdrawal, loss of interest in activities, guilt, and self-esteem issues. Her depression was primarily linked to conflicts with her in-laws, who criticized her. Additionally, she exhibited severe anxiety and physical symptoms, including palpitations and muscle spasms, related to her fear of sexual intercourse. Despite liking her husband, the anxiety around sex has led to avoidance. Her emotional distress was evident, impacting her daily life.	Major Depressive Disorder.	Major Depressive Disorder.	DSM 5: 300.29 Other specific phobia (Genophobia).

Table 1. Continued…

A 12-year-old Arabic girl, living in a harmonious family, was referred to our clinic due to abnormal behavior. Her issues began five months ago when she had an episode of hysterical shouting and spasms, associated with school-related stress. She exhibited anger, sadness, and aggression, with loss of interest in school, leading to a decline in academic performance. Despite a diagnosis of depression, medication didn't help, and she became more isolative, attacking others when prevented from attending school. Her mental state examination revealed depression, psychomotor retardation, and intense fixation on school.	Major Depressive Disorder with school refusal.	Post-traumatic stress disorder (PTSD).	DSM 5: 295.40 Schizophreniform Disorder.
An 18-year-old girl, the eldest in her family, sought help for a range of symptoms present over three years. She has been experiencing persistent sadness, anger, frustration, and hopelessness. Her mood was irritable, and she's lost interest in her studies. Additionally, she struggled with low self-esteem, guilt, and fixation on past failures. She exhibited sensitivity to rejection, difficulty concentrating, insomnia, changes in appetite, and physical complaints. She mentioned occasional thoughts of death. Her relationship with her mother has strained due to favoritism towards her younger brother, which intensifies her frustration. The client was evaluated in January 2020, revealing a cooperative demeanor during the examination.	Major Depressive Disorder (MDD).	Major Depressive Disorder (MDD).	DSM 5: 300.4 Persistent Depressive Disorder (Dysthymia)
A 16-year-old Kurdish boy from Kalar has been referred for evaluation due to a pattern of repeatedly fleeing from home since 2012. His behavior included aggressive actions towards family members, denial of these actions, and a tragic accusation of killing his 7-year-old sister, which he denies. He also exhibited lying tendencies, a history of illicit activities, headaches with fainting during emotional arousal, and feelings of sadness due to being misunderstood. The patient denied hallucinations, delusions, or suicidal thoughts. While showing signs of anxiety and depression, his mental state examination revealed normal cognitive function.	Conduct Disorder	Conduct Disorder	DSM 5: 312.82 Conduct Disorder Adolescent-Onset Type
A 3-year-old boy, the child of two busy doctors, was brought to the clinic by his mother. The parents faced challenges balancing their demanding work schedules during the COVID-19 pandemic, leading the child to develop a screen addiction. He primarily watched children's songs on TV and played games on an iPad. Although he initially showed advanced language and cognitive skills, he later exhibited concerning behaviors, included a lack of response to verbal communication, avoidance of eye contact, repetitive actions, and limited social interaction. The mother expressed guilt over perceived neglect, while the father downplayed the issue.	Autism spectrum disorder (ASD).	Autism spectrum disorder (ASD).	DSM 5: 299.00 autism spectrum disorder
An 18-year-old male in high school, experienced intense anxiety in social situations, particularly fearing judgment and embarrassment. Symptoms included physical manifestations like blushing and trembling, leading to avoidance of social interactions and situations where he may be the center of attention. His close relationship was with his PlayStation console, which he used as an escape. The separation of his parents when he was six may have contributed to his condition. While he appeared composed externally, his anxiety was evident through his anxious demeanor and hesitancy to connect.	Social anxiety disorder (SAD).	Social anxiety disorder (SAD).	DSM 5: 300.23 Social Anxiety Disorder (Social Phobia)
A 9-year-old boy, the middle child in the family, faced severe behavioral problems. He exhibited aggression, cruelty to animals, bullying, theft, truancy, and smoking. His father's death when he was four has left the family vulnerable, with his mother struggling with depression and PTSD. The child's behavior was a significant concern, as he displayed delinquent tendencies, carried weapons, and associated with older children. The family was referred to a child outpatient unit, and intervention was urgently needed to address the child's conduct disorder, provide support for his mother's mental health, and stabilize the family's situation.	Severe conduct disorder	Conduct disorder	DSM 5: 312.81 Conduct Disorder Childhood-Onset Type.
A 14-year-old girl, brought to a child outpatient clinic, experienced anger, irritability, frequent temper outbursts, and defiance towards authority figures. These behaviors extended to her family and teachers, impacting her school performance. She sought refuge in loud music, causing distress to family members. While academically capable, her attitude towards authority affected her grades. Her mental state examination revealed an angry demeanor, withdrawal, and a sense of being coerced into therapy. Further evaluation and intervention are warranted to address her behavioral issues and improve her functioning.	Oppositional Defiant Disorder (ODD).	Oppositional Defiant Disorder (ODD).	DSM 5: 313.81 Oppositional Defiant Disorder.

Table 1. Continued…

A 6-year-old girl and her mother, accompanied by her aunt, visited my private clinic on December 4, 2021. The family recently lost the father due to a COVID-19 infection while they were living in Dubai. They've returned to Suli and are now living with extended family. The mother consulted me as they don't know how to explain to the girl that her father is gone. The grandparents even wanted to take her to the grave directly. In terms of her development, the girl was exceptionally bright, speaking at 8 months, walking at 1 year, and fluently speaking Arabic, Kurdish, and English by age 3. She started school at 5 and was academically advanced for her age, being placed two years ahead of her peers in Suli. In her mental state examination, she displayed high energy, intelligence, and social skills, often speaking beyond her years and exhibiting sharp attention and cognitive abilities.	Adjustment Disorder with Mixed Disturbance of Emotions and Conduct.	Giftedness	No psychiatric diagnosis has been applied
A 12-year-old 7th grader, has two older brothers, two older sisters, and a younger sister. Her father is a 47-year-old policeman, while her mother is a 44-year-old housewife. She was referred to our child department by her parents. Her symptoms began three years ago, characterized by brief episodes of loss of consciousness, often triggered by emotional stress during her parents' conflicts. These episodes last 2-3 minutes, accompanied by tongue protrusion, drooling, and arm contractions. S regains consciousness afterward, sometimes experiencing temporary leg paralysis. After an incident with her sister, she regressed to a 5-year-old behavior, unable to recognize family members, playing with dolls, and exhibiting tantrums. She reported hallucinations. Her developmental history was unremarkable, and her mental state showed childish behavior, mood swings, and circumstantial speech.	Conversion Disorder	Dissociative identity disorder.	Conversion Disorder
A 17-year-old Arabic boy, a 12th-grade student presented with excessive worry, declining academic performance, sleep disturbances, and physical symptoms, hindering his ability to focus on studies. He attributed his problems to external factors, blaming his family and teachers. The divorce of his parents and a turbulent family environment likely contributed to his anxiety. Therapeutic intervention was essential to address his anxiety, teach coping strategies, and encourage a more realistic self-perception, aiming to improve his academic performance and overall well-being. Family support and stability are also crucial elements in his treatment.	Generalized Anxiety Disorder	Narcissistic personality disorder	DSM 5: 301.81 narcissistic personality disorder
A 20-year-old individual assigned male at birth, yet feels as female and experiencing same-sex attractions, presented in December 2021 with a history of gender and sexual identity struggles. Traumatic encounters, including inappropriate advances from a male teacher, contributed to severe depression, anxiety, guilt, and recurrent suicidal thoughts. Previous psychiatric interventions, such as the misguided use of antipsychotic medication, were ineffective. The patient and their mother sought a more empathetic approach to address these concerns.	Gender Dysphoria	Gender Dysphoria	DSM 5: 296.99 Major Depressive Disorder, Recurrent Episode
A 10-year-old boy was referred for psychiatric evaluation due to suspected autism, as previously suggested by various medical professionals. However, the assessment did not reveal clear autism spectrum disorder (ASD) features. Instead, the child exhibited deficits in reasoning, problem-solving, and adaptive functioning. His developmental history was marked by a difficult birth with complications, followed by delayed developmental milestones. The child displayed uncooperative behavior during the evaluation but maintained eye contact with his parents and the clinician.	Developmental or intellectual disability.	Intellectual disability.	DSM 5: 318.1 Severe intellectual disability.
A 14-year-old boy, originally from a troubled family, was raised in a foster care orphanage in Sulaimani city. His parents' tumultuous relationship led to his mother seeking refuge in a women's shelter, leaving him in the care of an elderly woman. Eventually, his mother returned, but the family troubles persisted, including violence and his father's alcoholism. The situation escalated, resulting in an incident where the boy witnessed masked men harming his mother. Subsequently, he was separated from her and spent time with strangers. He now suffers from nightmares, anxiety, anger outbursts, and persistent memories of the traumatic event.	Post-traumatic stress disorder (PTSD).	Post-traumatic stress disorder (PTSD).	DSM-5 post-traumatic stress disorder (PTSD).

often termed the 'black box' phenomenon; the exact rationale behind an AI's diagnosis is not always transparent, which can be a hindrance in clinical settings where understanding the reasoning is pivotal [9].

5. Conclusion

The success of ChatGPT and Google Bard in this study could pave the way for more in-depth research into the integration of AI tools in psychiatric evaluations. As technology progresses and algorithms become even more refined, the distinctions between human and AI diagnostic decision-making might become increasingly nuanced, heralding a new epoch in psychiatric care. In wrapping up, while the horizon looks promising, it is vital that as we navigate the landscape of AI in healthcare, we tread with a mix of enthusiasm, collaboration, and caution.

Declarations

Conflicts of interest: The author(s) have no conflicts of interest to disclose.

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