Chatting with Chat GPT: Are radiation-related chats safe for mass consumption?

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Background

Large language models (LLM) have significantly transformed the way we use the internet. By enabling personalized content creation, question answering, and even code generation, their use has exponentially grown in the last few months. However, it is essential to assess their performance and limitations, such as misinformation and bias. For this reason, we decided to assess a popular LLM about its image-based radiation information.

Purpose

We queried Chat GPT 3.0 (Dec 15, 2022 version) to obtain information on issues related to imaging-based radiation doses and compared the chat outputs with the information available on Radiology.Info (RSNA) and Radiation Protection of Patients (RPOP, IAEA) portals.

Materials and methods

IRB approval was not required since the study did not involve any patient data use. We obtained 43 radiation-related questions on the use and effect of medical imaging-based radiation doses with radiography, CT, interventional radiology procedures, and nuclear medicine, and in children and pregnant women. The questions were obtained from both Radiology.Info (n= 18), and RPOP (n= 25) web portals. We posed the same questions to Chat GPT and a physician and radiologist compared the Chat GPT responses versus the information on the two web portals for accuracy and level and details. We recorded the word counts for each information source. Descriptive statistics were performed.

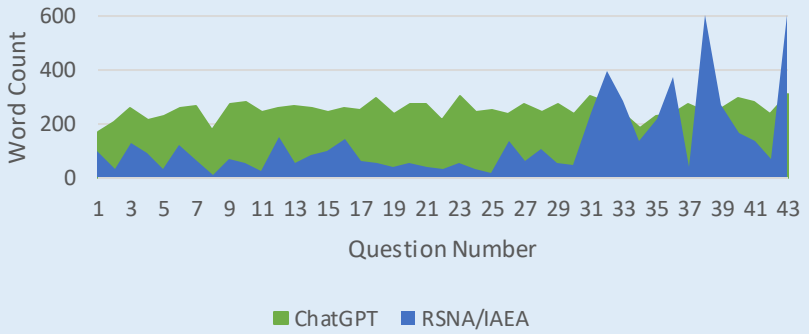
Results

Chat GPT provided answers for questions related to radiation dose safety and use matched information on both:

-Radiology.Info (correct answers to 17/18 questions)
-RPOP (correct answers to 23/25 questions).

Chat GPT response word counts were significantly greater than those on either website for most questions (251 vs 129 words).

All correct Chat GPT answers were deemed as sensible and understandable by both the physician and radiologist, but Chat GPT responses were more thorough and precise in 8/43 correct answers (i.e. on questions of radiation dosages, radiation dose quality assurance, and radioactivity).



Type of mistake

Radiation Knowledge (n=1)

- Incorrectly included radiation imaging modalities in a list for alternative imaging methods which do not use radioactivity

Clinical Knowledge (n=2)

- Outdated starting age for lung cancer screening
- Incorrect time phrame to get pregnant after the use of radionucleotide

Conclusions

For general public use, Chat GPT is a reliable source of information on radiation dose usage and safety in medical imaging. The Chat GPT provided information was sensible, understandable, and accurate on almost all aspects of radiography, CT, interventional procedures, and nuclear medicine.

A perspective for the future

This study was performed at the beginning of 2023. Since then, Chat GPT has undergone 6 updates, the development of ChatGPT 3.5 and ChatGPT 4.0, the ability to interact with third-party applications and its connection to the world wide web. Soon the ability to also interact with other non-text media will continue to change the way we consume and process information. Further evaluation will help evaluate whether these resources are safe for public consumption.

References

1.- https://www.iaea.org/resources/rpop/patients-and-public/x-rays

2.- https://www.radiologyinfo.org/en/patient-safety