

Research Article / Arařtırma Makalesi

Can artificial intelligence replace dietitians? A conversation with ChatGPT

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Abstract

In this study, an interview was conducted with Generative Pre-Train (ChatGPT) to determine whether artificial intelligence can replace dietitians and its potential contributions to the field of Nutrition and Dietetics. Qualitative research method was used in the study and data was obtained using interview technique. The study includes 8 questions asked to version 3.5. of ChatGPT. Based on the answers given to the questions, ChatGPT has shown that it can benefit dietitians by providing basic nutritional information and helping to create nutrition plans. Nonetheless, artificial intelligence cannot fulfill the official duties and responsibilities of dietitians and cannot create disease- and individual-specific nutrition programs. ChatGPT, which is reported to provide theoretical resources as a contribution to Nutrition and Dietetics education, lacks personal experience and practical skills. Although ChatGPT contributes to dietitians, educators, and students in the field of nutrition and dietetics in different dimensions, it cannot replace dietitians. More research on the use of generative language models developed by artificial intelligence is necessary.



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INTRODUCTION AND AIM

Generative Pre-Train (ChatGPT) is the largest publicly available language model developed by OpenAI to generate responses like human responses using deep learning techniques. Using a wide range of text data, ChatGPT captures the nuances and complexities of human language, producing appropriate and contextually relevant responses across a wide range of prompts (1). ChatGPT is trained on web texts but makes incorrect associations while dealing with the details of documents. In the field of healthcare, ChatGPT can support patient engagement, medical education, and clinical decision support (2).

According to the International Confederation of Dietetic Associations and the Dietitians Association of Türkiye, the professional dietitian plans programs for individual and collective nutrition according to the principles of nutrition science to further the growth, development, and lifelong health of the individual and society, to increase quality of life and to prevent and treat disease. Dietetics is a health profession that investigates health problems arising from imbalances or insufficiencies in nutrients and provides public education to further physiologically, psychologically, and socially healthful lifestyles (3,4).

Artificial intelligence robots such as ChatGPT, in a variety of languages, can be used by nutrition and dietetics professionals in their daily work in the public health sector, in clinical settings, and academia (5). Despite the growing interest in ChatGPT, studies evaluating its use in clinical practice are limited, and debate continues regarding the power and potential dangers of ChatGPT. It is thought that the answers given by ChatGPT may change over time. With different question directions, biases may appear in the answers. Integrating ChatGPT into electronic health record systems supports treatment planning and improves patient outcomes. However, it is important to view ChatGPT as a valuable tool that enhances rather than replaces healthcare professionals' expertise (6).

In this study, an interview was conducted

with ChatGPT to determine whether artificial intelligence can replace dietitians and what its contributions can be to the field of Nutrition and Dietetics.

MATERIALS AND METHOD

In this qualitative study, ChatGPT a machine-learning model that can generate human-like text, was employed as an interviewee instead of a human subject. ChatGPT (version 3.5) was asked a total of eight questions determined by the authors (Tablo 1). The question flow was based on the answer to our first question about whether ChatGPT could replace dietitians. The questions were created after reaching consensus among the authors. In the rest of the interview, national and international professional definitions of dietitian were used (3,4). The answers were recorded unchanged and were discussed in the light of current literature by the researchers. Ethics committee approval is not required for this research.

RESULTS

Table 1 presents ChatGPT's answers to the research questions regarding which areas ChatGPT can support dietitians and which subjects it can contribute to the science/education of Nutrition and Dietetics. Figure 1 summarizes ChatGPT's responses.

DISCUSSION AND CONCLUSION

The answers to the questions asked to ChatGPT in this study surround the view that ChatGPT provides guidance with general nutritional information but is not a suitable tool for creating or implementing personal nutrition programs to optimize health and prevent and treat diseases; for this and individual must work with a dietitian or healthcare professional who considers factors such as the person's health status, needs and goals. It is argued in the literature that although ChatGPT can provide general guidance and information on nutrition, it cannot provide health advice for personal health conditions (7). In response to this study's questions, ChatGPT stated it can support dietitians in answering nutrition questions asked by clients. A recent study identified the questions dietitians were

Table 1. ChatGPT's Answers to Research Questions

Questions	ChatGPT Responses
Question 1 Can ChatGPT replace dietitians?	<i>No, ChatGPT cannot replace dietitians. ChatGPT can provide general information and offer some general diet and nutrition advice, but it cannot assess your health or create personalized nutrition plans. It's important to work one-on-one with a dietitian or nutritionist to maintain a healthy diet and lifestyle. These professionals can evaluate your health history, nutritional needs, and goals to create a nutrition plan that best suits you.</i>
Question 2 Can ChatGPT fulfill the duties and responsibilities of dietitians in the 'Regulation on Job and Job Descriptions of Health Care Professionals and Other Professionals Working in Health Services'?	<i>No, ChatGPT cannot fulfill such official and legal duties and responsibilities. The duties and responsibilities defined in official documents such as the 'Regulation on Job and Job Descriptions of Healthcare Professionals and Other Professionals Working in Health Services' are generally issues that require legal or healthcare expertise. ChatGPT may provide general information and respond to general questions but cannot perform official duties and responsibilities. It is important to consult authorities or experts on such matters.</i>
Question 3 Can ChatGPT apply food and nutrition science to promote health, prevent and treat disease to optimize the health of individuals, groups, communities and populations?	<i>ChatGPT can provide general nutritional information and guidance, but it is not a suitable tool for creating or implementing nutritional programs specifically designed to optimize health and prevent and treat disease. To achieve such goals, it is important to work with an expert dietitian or healthcare professional who takes into account factors such as a person's health status, needs, and goals. ChatGPT can help provide general guidance and information but cannot provide health advice for individual health conditions.</i>
Question 4 Can ChatGPT assist dietitians?	<i>Yes, ChatGPT can assist dietitians in various ways.</i> <i>Serving as a Source of Information: Dietitians must have extensive knowledge of nutrition and health. ChatGPT can help dietitians access information by providing general information on topics such as general nutrition principles, nutritional content, diet and health relationship.</i> <i>Answering Clients' Questions: Dietitians are responsible for answering clients' questions about nutrition and health. ChatGPT can help dietitians help more clients by answering common nutrition questions dietitians are asked. Providing Information on Current Information and Research: New information and research is constantly emerging in the field of nutrition and dietetics. By providing dietitians with this up-to-date information, ChatGPT can keep their practices up to date.</i> <i>Assisting in Creating Nutrition Plans: ChatGPT can assist dietitians to efficiently and effectively generate nutrition plans that suit specific nutritional needs or health conditions. Note that the information provided by ChatGPT is generalized and may not take into account personal health status or needs. Therefore, dietitians' clinical experience and ability to assess individual clients are indispensable.</i>
Question 5: Can ChatGPT contribute to Nutrition and Dietetics education?	<i>Yes, ChatGPT can contribute to Nutrition and Dietetics education. Students can obtain general Nutrition and Dietetics information, nutritional principles and issues and can use ChatGPT reinforce existing knowledge. However, ChatGPT cannot provide personal experience or hands-on skills, so it can be used only as a theoretical resource in training. Students must study and practice under expert guidance to improve their skills.</i>
Question 6: Can ChatGPT contribute to the field of Nutrition and Dietetics? How?	<i>Yes, ChatGPT can make indirect contributions to the field of Nutrition and Dietetics.</i>

most frequently; these questions were asked to dietitians and ChatGPT and the answers were evaluated by experts and graded on scientific accuracy, applicability and understandability. Results showed that ChatGPT succeeded in answering nutrition questions frequently asked to dietitians (8). ChatGPT provides information about public health issues such as infectious

diseases, chronic diseases, and environmental health hazards, answers questions about health promotion and disease prevention strategies, and explains the role of community health workers and health educators. However, disadvantages to using ChatGPT in public health include limited accuracy of responses, low ability to establish relationships across contexts,

Table 1. (continue) ChatGPT's Answers to Research Questions

	<p><i>Providing Information and Resources: ChatGPT can provide general information on basic concepts and in the field of Nutrition and Dietetics. This offers researchers a baseline level of knowledge.</i></p> <p><i>Innovative Ideas and Research Methods: ChatGPT can provide innovative ideas and guide research methods. For example, it can propose a new approach to a particular nutritional problem.</i></p> <p><i>Literature Review and Summarization: ChatGPT can assist in scanning and summarizing the existing literature, offering researchers a more comprehensive understanding of a particular topic.</i></p> <p><i>Data Analysis and Interpretation: ChatGPT can assist in analyzing and interpreting research data for researchers to more efficiently understand and interpret their results. Note that ChatGPT's contributions generally rely on existing knowledge and do not generate new scientific work. Therefore, in order to make a real contribution to the field of Nutrition and Dietetics, the information provided by ChatGPT must be supported by broader research and applications.</i></p>
<p>Question 7: Can you summarise an open access article on sustainable nutrition published in a scientific journal that academics in the field of nutrition and dietetics benefit the most from?</p>	<p><i>The article 'Towards a More Sustainable Nutrition: Complementary Feeding and Early Taste Experiences as a Basis for Future Food Choices' (1) published in MDPI's journal *Nutrients* discusses how sustainable nutrition can be promoted in early childhood. The article emphasises that sustainable nutrition is important for human health as well as environmental, economic and socio-cultural aspects. In Europe, the Mediterranean Diet and the New Nordic Diet are shown as diets that reflect the principles of sustainable nutrition. These diets reduce the ecological impact of the production chain by promoting regional and seasonal products, as well as vegetable-based, organic and less processed foods. (https://www.mdpi.com/2072-6643/13/8/2695).</i></p> <p><i>However, the article 'Seven Food System Metrics of Sustainable Nutrition Security'(2) published in *Sustainability* proposes a new methodology for assessing sustainable nutrition security. This methodology identifies seven metrics to characterise sustainable nutrition outcomes of food systems: food nutrient sufficiency, ecosystem stability, food accessibility and affordability, socio-cultural well-being, food security, resilience and waste and loss reduction. These metrics can be used to assess the potential impact of food system interventions to improve sustainable nutrition and human nutrition outcomes. (https://www.mdpi.com/2071-1050/8/3/196).</i></p>
<p>Question 8: Can you write these articles as references in APA format?</p>	<p><i>Sure, here are the bibliography entries in APA format:</i></p> <p><i>1. Mazzocchi, A., De Cosmi, V., Scaglioni, S., & Agostoni, C. (2021). Towards a more sustainable diet: Complementary feeding and early taste experiences as a basis for future food choices. <i>Nutrients</i>, 13(8), 2695. https://doi.org/10.3390/nu13082695</i></p> <p><i>2. Gustafson, D., Gutman, A., Leet, W., Drewnowski, A., Fanzo, J., & Ingram, J. (2016). Seven food system metrics of sustainable nutrition security. <i>Sustainability</i>, 8(3), 196. https://doi.org/10.3390/su8030196</i></p>

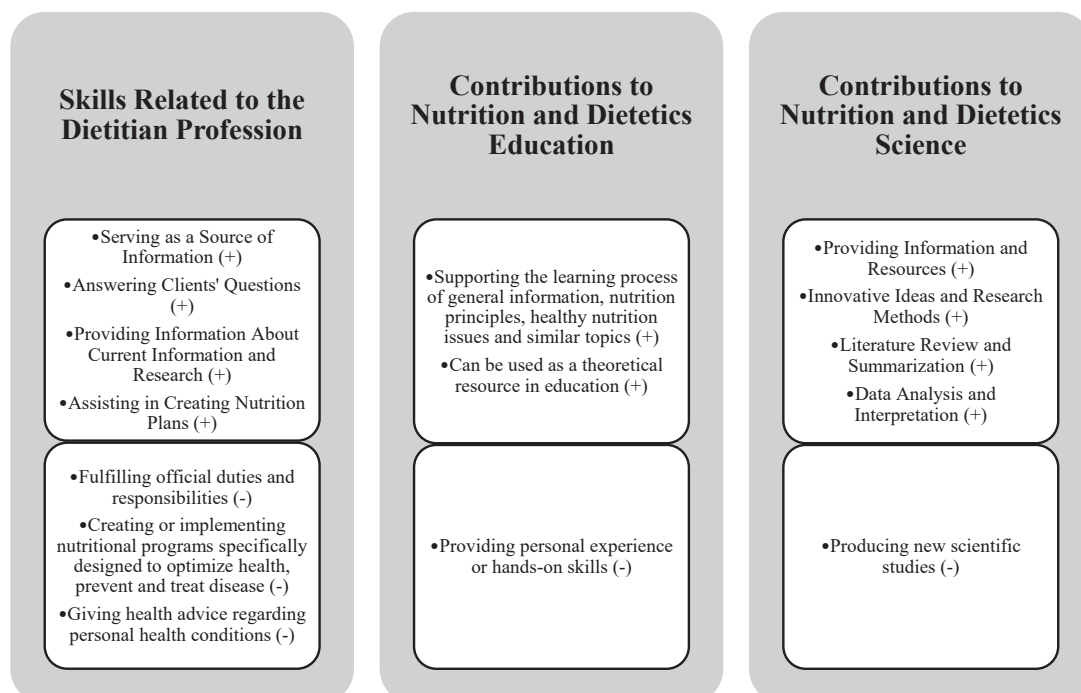
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and lack of direct interaction with other health professionals (9). It has been stated that the menus in a nutrition plan created by artificial intelligence are also effective in creating a meal plan within the energy needs of the individual as determined by the United States Department of Agriculture. However, it was emphasized that more studies should be conducted to increase nutritional diversity (10). To test the capabilities of ChatGPT, a daily nutrition plan was asked to be created for an individual with Type II diabetes, and it was determined that this plan was relatively compatible with the recommendations of the American Diabetes Association. In the nutrition plan, main meals included non-starchy vegetables and lean protein foods, low amounts of carbohydrate foods (e.g. sweet potatoes, chickpeas and quinoa) were planned, and a menu inspired by ketogenic diets was planned. ChatGPT also presented step-by-step recipes for the dishes on the lunch menu (5). According to the guidelines of the American Diabetes Association and the American Association of Clinical Endocrinology, 20 questions were asked to ChatGPT in the evaluation of obesity in Type II diabetes and categories including different treatment options, and its answers were evaluated by endocrinologists. ChatGPT

has taken a systematic approach to answering questions but emphasizes the need to consult a healthcare professional for patient-specific treatment. ChatGPT gave answers by the guidelines in the evaluation of obesity in type II diabetes. However, compliance with the guideline was found to be lower in the answers given to questions regarding nutritional, medical and surgical approaches aimed at body weight loss. In the study, it was emphasized that despite ChatGPT's comprehensive and understandable answers, it should not be used instead of the patient-oriented approach of healthcare professionals (11). In another study focusing on the potential use of ChatGPT in the treatment of obesity in addition to traditional medical treatment, it was concluded that ChatGPT can offer suggestions on issues such as nutrition plans, exercise programs and psychological support, but these suggestions are general; only health professionals can develop them for individuals. Ethical and security concerns regarding the use of artificial intelligence technology must also be considered. Arslan maintains that ChatGPT can support the treatment of obesity but only under the supervision of health professionals (12). In a case study of a patient with Type I diabetes conducted

Figure 1. ChatGPT's Contribution, Support And Skills Regarding Nutrition And Dietetics Science, Education And Dietitian Profession



with ChatGPT, when ChatGPT was asked for nutritional recommendations according to the Nutrition Care Process Terminology, it gave 6 answers that were relatively compatible with the patients' nutrition, containing general data, but also which were incorrect (5). A study on protein-energy malnutrition concluded that ChatGPT can support PEM treatment by providing nutritional recommendations and food options, but it offers limited information regarding diagnosis and treatment (13). A study concerning robo-diets created by ChatGPT for individuals with food allergies concluded that diets planned by ChatGPT were faulty on allergens and nutritional and energy requirements (14). When asked for recommendations for hemodialysis patients, ChatGPT provided relatively detailed and accurate answers (reducing potassium and phosphorus intake, limiting fluids, increasing high-quality protein intake, monitoring carbohydrate intake, and consulting a dietitian with expertise in the field). However, when a 1-week nutrition plan was requested, it was observed that foods that were not suitable for hemodialysis patients (such as spinach, and avocado) were unexpectedly included in the menus (5). In a study evaluating the effectiveness of four different artificial intelligence models (ChatGPT 3.5, ChatGPT 4, Bard AI, and Bing Chat) in distinguishing between the potassium and phosphorus content in the composition of foods, each artificial intelligence model was fed a total of 240 foods selected from the Mayo Clinic Kidney Diet Handbook for chronic kidney failure patients. AI apps classified foods by high or low potassium and phosphorus content, and the results were compared to recommendations from the Mayo Clinic Kidney Diet Handbook. Among the models tested, ChatGPT 4 performed well in determining potassium content, correctly classifying 81% of foods. It also correctly identified 60% of low-potassium foods and 99% of high-potassium foods. The accuracy rates of ChatGPT 3.5, Bard AI and Bing Chat models were found to be 66%, 79% and 81%. The study concluded the AI models are potentially effective tools in renal nutrition planning. However, it has been emphasized that it should be developed under the control of healthcare professionals (15). The common conclusions of these studies

are that ChatGPT cannot fulfill the official duties and responsibilities of dietitians, cannot implement nutritional programs specifically designed to optimize health and prevent and treat diseases, and cannot provide health advice specific to individuals.

According to the responses given to questions about whether ChatGPT can contribute to the field of Nutrition and Dietetics science and education, ChatGPT can support experts and students by providing theoretical knowledge and sources, offering innovative ideas and research methods, conducting literature reviews, and analyzing and interpreting data. However, ChatGPT cannot apparently contribute to field applications or produce new scientific studies. A study that used ChatGPT to review literature on health-related topics detected rampant plagiarism. The study stated that artificial intelligence can contribute to literature review, but lacks ethical principles and often plagiarizes (16). When used consciously by health professionals, ChatGPT can reduce the workload of experts in scanning and summarizing the literature and raise awareness about nutrition and dietetics, and this can bolster the dietetics profession. However, its integration with commercial applications and its lack of originality may cause a decrease in clinical judgment ability, which may create bias in the articles of students and researchers working in the field of nutrition and dietetics (5). ChatGPT cannot evaluate the reliability of the output, as the output is based on the probability of linkages of phrases and sentences rather than on mining-specific databases. Therefore, presenting false or unfounded information in a convincing and linguistically fluent manner, can confuse people who are not knowledgeable about the subject (17). All these results show that ChatGPT may not be reliable in providing theoretical information. In this study, according to the responses received from the questions asked to ChatGPT; it stated that it could contribute to the field of nutrition and dietetics by reviewing and summarising the literature. When asked to cite an open-access article published on sustainable nutrition in a scientific journal that academicians in the field of nutrition and dietetics benefit the most, it sampled two articles and then prepared

this bibliography in American Psychological Association (APA) format. When the relevant source and summary were checked by the researchers, it was concluded that the data was correct. In the study conducted by Eysenbach, ChatGPT summarised the articles on a specific topic; however, when the sources and Digital Object Identifiers (DOI) numbers of the articles were examined by the researcher, it was found that they were incorrect (18). This result showed that the competence of ChatGPT in literature search, summarising and citing sources was inconsistent.

The most significant limitation of this study is the use of the ChatGPT-3.5 version. Although there have been significant improvements in the quality of outputs between ChatGPT-3.5 and ChatGPT-4 versions, expert opinions suggest that it would be naive to expect that ChatGPT-4 will now guarantee the production of safe diets and be less prone to errors (14).

Though there are several potential risks associated with the use of ChatGPT in nutrition and dietetics, it can make significant contributions to the field. Working together, experts and researchers can explore these opportunities and take action to eliminate potential risks.

It has been concluded that ChatGPT can support health professionals, especially dietitians, in scanning current literature, providing information about the dietitian profession, and creating nutrition plans for clients. However, it produces biased and erroneous answers regarding the protection and maintenance of health and the treatment of disease. ChatGPT is a nascent artificial intelligence and can only serve as a support for dietitians; it cannot replace them. Although ChatGPT shows promising prospects in clinical applications, further research is needed to identify, refine and improve its capabilities.

Author Contributions

The authors contributed equally to the article.

Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

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