Conceptualizing AI Chatbots for Sustainable Weight Loss Applying Carnivore and Low Carbohydrate Diets

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**Abstract.** The increasing prevalence of obesity and metabolic disorders has led to a growing interest in personalized dietary interventions that promote sustainable weight loss. Among these, carnivore, and low-carbohydrate (low-carb) diets have demonstrated efficacy in enhancing metabolic health, reducing insulin resistance, and supporting long-term weight management. However, adherence to such dietary regimens remains a challenge due to limited nutritional knowledge, lack of personalized guidance, and behavioral barriers. This paper conceptualizes the integration of artificial intelligence (AI) chatbots as digital health tools to enhance adherence, optimize dietary choices, and support individuals pursuing sustainable weight loss through carnivore and low-carb diets. AI-powered chatbots, leveraging natural language processing (NLP), machine learning (ML), and real-time data analysis, can provide users with personalized meal recommendations, metabolic feedback, and behavioral coaching. These systems can adapt dietary guidance based on individual metabolic responses, nutrient tracking, and lifestyle factors, thereby optimizing weight loss outcomes. Key features of the proposed chatbot framework include automated meal tracking, macronutrient and micronutrient assessments, adaptive goal setting, and evidence-based insights into ketosis and metabolic adaptation. Additionally, chatbots can employ behavioral reinforcement strategies such as habit formation, motivational interviewing, and community support to improve adherence and long-term engagement. Beyond their functional benefits, AI chatbots also present ethical considerations, including data privacy, the accuracy of nutritional recommendations, and potential risks related to over-restriction or nutrient deficiencies. By harnessing AI’s capabilities, this framework offers a scalable, cost-effective, and intelligent approach to weight management. Future research should focus on evaluating the efficacy, user engagement, and long-term health impacts of AI chatbot-assisted dietary interventions to enhance their implementation and effectiveness.

# Introduction

The global rise in obesity and related metabolic disorders presents one of the most pressing public health challenges of the 21st century. By 2022, the global obesity crisis had reached alarming levels. The World Health Organization (WHO) reported that over 1 billion people worldwide were living with obesity, including 890 million adults [1]. This was a stark increase from the 650 million adults recorded in 2016, showing just how quickly obesity rates were climbing. The data also revealed that in 2022, 43% of adults aged 18 and older were overweight, and 16% were living with obesity [1]. Even more concerning was the fact that the prevalence of obesity among children and adolescents had quadrupled since 1990 [2].

These figures highlight the urgent need for comprehensive strategies to tackle obesity across all age groups. Effective interventions and policies are crucial to combat this growing health issue and promote healthier lifestyles worldwide.

In 2025, obesity remains a significant health issue in Malaysia. Here are some key statistics:

* Obesity Prevalence: Approximately 30% of adults in Malaysia are classified as obese [1].
* Childhood Obesity: Around 15% of children aged 5-19 are affected by obesity [1].
* Economic Impact: The economic burden of obesity-related healthcare costs is estimated to be around RM 10 billion annually [1].

Efforts to combat obesity in Malaysia include public health campaigns promoting healthier lifestyles, improved nutritional education, and policies aimed at reducing the consumption of sugary drinks and high calorie foods [2]. This troubling trend significantly adds to the global burden of chronic diseases like type 2 diabetes, heart disease, and certain cancers. Traditional weight management methods, which often rely on broad dietary guidelines and standardized interventions, have shown limited long-term success, especially in maintaining weight loss and improving metabolic health. As a result, there's a growing recognition of the need for personalized dietary plans that consider individual metabolic responses, lifestyle factors, and behavioural tendencies.

Among the various dietary strategies gaining popularity, carnivore, and low-carbohydrate (low-carb) diets stand out for their potential to enhance metabolic health and support sustainable weight loss. These diets, which focus on minimal carbohydrate intake and higher consumption of animal-based or high-fat, moderate-protein foods, have been linked to better insulin sensitivity, reduced inflammation, and positive changes in body composition. However, sticking to these restrictive diets can be challenging due to factors like limited nutritional knowledge, the complexity of meal planning, and a lack of personalized, real-time guidance, which can reduce their long-term effectiveness. To tackle these challenges, researchers are increasingly looking at digital health technologies as tools to support dietary adherence and personalized care. AI-powered chatbots, equipped with natural language processing (NLP), machine learning (ML) algorithms, and real-time data analysis, offer a scalable and adaptive solution for enhancing engagement with dietary interventions [3]. These chatbots can provide personalized meal recommendations, metabolic feedback, and behavioral coaching, helping individuals stick to carnivore and low-carb diets and improve their health outcomes.

The main goal of this study is to design an AI chatbot framework to support people aiming for sustainable weight loss through carnivore and low-carb diets. The researchers plan to address key adherence challenges by using AI to offer tailored dietary guidance, automated meal tracking, and continuous feedback on nutrient intake. Additionally, the chatbot will include behavioral reinforcement strategies like motivational interviewing, habit formation techniques, and community support to boost long-term engagement and adherence. Another important aspect of this research is to explore the ethical considerations of AI-driven dietary interventions. Issues such as data privacy, the accuracy and reliability of nutritional advice, and the potential health risks of overly restrictive diets need careful evaluation. By addressing these concerns, the study aims to create a comprehensive, ethically sound framework for integrating AI chatbots into digital health systems. Ultimately, this research seeks to bridge the gap between personalized nutrition science and digital health innovation, providing a practical and intelligent approach to combating obesity and metabolic disorders through improved dietary adherence and user engagement.

# Literature review

The carnivore diet, which involves consuming only animal-derived foods, and low-carbohydrate diets, which drastically limit carbohydrate intake, have garnered interest for their potential advantages in managing weight and enhancing metabolic health. These diets aim to trigger ketosis, a metabolic state where the body primarily burns fat for energy, potentially improving insulin sensitivity and promoting weight loss [4]. Eddie Abbew, a former British bodybuilding champion and psychiatric nurse, has been an outspoken supporter of the carnivore diet. He uses his social media presence to share personal experiences and community testimonials, emphasizing the diet's positive impact on chronic health issues and overall well-being [5].

Research on the carnivore diet is still in its early stages, but some studies have shown promising results. For instance, a study conducted by Harvard University surveyed over 2,000 individuals following the carnivore diet and found significant improvements in weight loss, mental clarity, and overall health [6]. Another study published in the journal Nutrients assessed the nutrient composition of the carnivore diet and found that while it met several nutrient reference values, it fell short in others, such as thiamin, magnesium, and vitamin C.

Low-carbohydrate diets, on the other hand, have been more extensively studied. A meta-analysis published in the American Journal of Clinical Nutrition found that low-carbohydrate diets were effective for weight loss and improving metabolic health markers, such as blood glucose and insulin levels [7]. Another study published in the Journal of the American Medical Association found that low-carbohydrate diets led to greater weight loss compared to low-fat diets over a 12-month period.

Artificial Intelligence (AI) chatbots are increasingly being used to support dietary interventions by offering personalized advice and real-time feedback. These AI-driven chatbots can create nutritionally balanced and varied weight-loss diet plans, although there is still room for improvement in their algorithms to ensure the best distribution of macronutrients [8]. In Southeast Asia, there is a growing acceptance of AI-assisted weight management apps. Research has shown that these apps are not only feasible but also effective in helping adults with overweight and obesity improve their eating habits [9]. A study conducted in Singapore found that a significant number of users were willing to use AI-assisted weight management apps, highlighting their potential in this region [10]. AI chatbots are designed to simulate human conversation, making them user-friendly and accessible. They can provide tailored dietary recommendations based on individual preferences, health goals, and nutritional needs [11]. For example, a chatbot might suggest meal plans, track nutritional goals, and offer 24/7 health guidance [12]. One of the key benefits of AI chatbots is their ability to provide real-time feedback. This means that users can receive immediate advice and support, which can be crucial for maintaining dietary discipline [13]. Additionally, these chatbots can integrate with wearable devices to offer a comprehensive overview of a user's health, combining data on physical activity, sleep patterns, and nutrition. This personalized approach can help users stay motivated and adhere to their diet plans more effectively. Despite their advantages, AI chatbots are not without limitations. Studies have shown that while they can generate nutritionally adequate diet plans, there are still challenges in achieving optimal macronutrient balance [14]. This highlights the need for ongoing algorithmic refinement to improve their effectiveness. AI chatbots are proving to be valuable tools in dietary interventions, offering personalized guidance and real-time feedback.

# METHODOLOGY

Recent literature highlights the expanding role of artificial intelligence (AI) chatbots in dietary management, especially for individuals pursuing weight loss through specific dietary regimens such as carnivore and low-carbohydrate diets. These AI-driven tools provide real-time, personalized dietary feedback, nutritional education, and behavioral reinforcement strategies to improve adherence and optimize health outcomes [15],[16]. While prior studies suggest AI chatbots can generate nutritionally balanced meal plans and improve eating behaviors, concerns regarding their accuracy and potential to disseminate harmful advice, particularly for vulnerable users, persist [17],[18].

Given this context, this study proposes to examine the effectiveness and user acceptance of AI chatbot-assisted dietary interventions in supporting sustainable weight loss, specifically among adults adopting carnivore and low-carbohydrate diets. Based on prior findings, the following hypothesis is suggested:

**H1:** *AI chatbot-assisted dietary interventions positively influence adherence, nutritional literacy, motivation, and weight loss outcomes among individuals following carnivore and low-carbohydrate diets.*

To structure this inquiry, four independent variables are proposed:

1. **Personalized Nutritional Guidance** — the degree to which the chatbot tailors meal plans and feedback based on user preferences and metabolic data [19].
2. **Real-Time Behavioral Feedback** — the chatbot’s capacity to offer immediate prompts, coaching, and habit reinforcement to users [20].
3. **Nutritional Literacy Support** — the provision of evidence-based dietary education to improve users’ understanding of macronutrients, micronutrients, and ketosis principles [21].
4. **Motivational Features and Community Support** — the integration of goal-setting tools, motivational interviewing techniques, and peer interaction within the chatbot environment [22].

To empirically test the proposed hypothesis and examine the influence of these independent variables, a mixed-methods research design is recommended. The study should employ a randomized controlled trial (RCT) as its quantitative core, involving adult participants pursuing carnivore or low-carbohydrate diets over 12 weeks. Participants would be randomly assigned to either an AI chatbot intervention group or a control group receiving standard dietary advice via static resources.

Quantitative data would be collected through pre- and post-intervention surveys, biometric tracking (weight, BMI, and metabolic markers), and app usage analytics. Complementing this, qualitative semi-structured interviews would be conducted with a subset of participants to explore subjective experiences, perceived benefits, and challenges. This triangulation approach will strengthen the study’s validity and provide both statistical and experiential insights into AI chatbot effectiveness.

# DISCUSSIONS

The proposed conceptual framework (refer to Figure 1) shows the integration of an AI-driven dietary intervention system named CarnLow, designed to support sustainable weight loss through carnivore and low-carbohydrate diets. At its core, the framework relies on the OpenAI ChatGPT Turbo 4 API as the AI engine and Streamlit Apps as the user interface platform, which together power the CarnLow chatbot. This AI chatbot provides tailored dietary support and interacts with users in real-time.

The model identifies four independent variables that form the foundation of the intervention’s evaluation. These include: Personalized Nutritional Guidance, which ensures that meal recommendations align with individual preferences and metabolic needs; Real-Time Behavioral Feedback, offering immediate prompts and adjustments based on user progress; Nutritional Literacy Support, which educates users about macronutrient balance, ketosis, and healthy eating practices; and Motivational Features and Community Support, incorporating goal-setting, motivational interviewing, and peer-based engagement tools.

The dependent variable in this framework is Sustainable Weight Loss, representing the primary outcome influenced by the four independent variables. This model highlights how AI-based interventions can holistically address dietary, behavioral, and motivational aspects of weight management, offering a scalable, personalized solution for individuals adopting low-carbohydrate dietary approaches.

OpenAI  
ChatGPT Turbo 4 (API)

Streamlit Apps

**Evaluation**(*Independent Variables*)

* Personalized Nutritional Guidance
* Real-Time Behavioral Feedback
* Nutritional Literacy Support
* Motivational Features and Community Support

**Sustainable Weight Loss** (*Dependent Variable*)

### **FIGURE 1.** A proposed conceptual framework of CarnLow

The development plan for the AI chatbot CarnLow, as illustrated in the diagram (refer to Figure 2), outlines a seamless communication flow between three core components: the User (Application Interface), the Streamlit App (Frontend + Backend), and the OpenAI ChatGPT Turbo 4 API. The user initiates interactions through a simple, user-friendly application interface built with Streamlit, which serves as both the frontend display and the backend processing environment.

When a user inputs a query such as requesting meal recommendations, behavioral feedback, or nutritional advice the Streamlit App captures this request and securely forwards it to the OpenAI ChatGPT Turbo 4 API. The API processes the natural language input using advanced AI and natural language processing (NLP) models, generating personalized, context-aware responses aligned with the principles of low-carbohydrate and carnivore diets.

Once the API formulates a response, it returns this information to the Streamlit App, which then delivers it to the user via the application interface in real-time. This iterative communication loop ensures users receive timely, tailored feedback and guidance. The plan emphasizes data security, system reliability, and responsiveness to create an intuitive AI-powered dietary assistant capable of supporting personalized, sustainable weight management.

User  
(Application Interface)

Streamlit App  
(Frontend + Backend)

OpenAI ChatGPT

Turbo 4 (API)

User inputs query

Receives response

Sends query to API

Sends response to Streamlit app

Update UI and displays response

### **FIGURE 2.** A proposed CarnLow AI chatbot development plan

# CONCLUSION

In conclusion, the proposed conceptual framework of the CarnLow AI chatbot marks a significant step forward in integrating artificial intelligence with digital health tools for effective weight management, particularly for those following carnivore and low-carbohydrate diets. This innovative framework emphasizes four key elements: personalized nutritional guidance, real-time behavioral feedback, nutritional literacy support, and motivational features with community engagement. These components work together to promote sustainable weight loss.

By utilizing OpenAI’s ChatGPT Turbo 4 API and implementing it through a Streamlit-based application, the CarnLow system will offers an interactive and personalized user experience. This proposed setup is designed to adapt to individual dietary and behavioral needs, ensuring users receive tailored advice and support. The architectural plan for CarnLow highlights a secure and efficient data communication workflow between users, the Streamlit application, and the AI engine. This design allows for real-time processing and feedback, which is crucial for keeping users motivated and committed to their dietary plans [23]. The system also prioritizes user accessibility and data security while providing evidence-based nutritional insights, behavioral support, and educational resources.

With obesity rates on the rise, especially in regions like Malaysia, and an increasing interest in AI-assisted health interventions, CarnLow AI chatbot meets a critical need for scalable and personalized digital solutions. Future research should focus on assessing the platform’s usability, user satisfaction, and long-term health outcomes through empirical studies. Additionally, it is essential to continuously address ethical considerations related to data privacy and the accuracy of nutritional advice to ensure responsible and effective AI-driven health interventions.

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