# Obesity control through Artificial Intelligence & Technology: A Review

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### ABSTRACT

In the burgeoning field of bariatrics, obesity has become a pandemic that threatens millions of lives and puts enormous pressure on healthcare systems. Recent advances in artificial intelligence (AI) and technology provide novel solutions for the prevention, management, and treatment of obesity. This review evaluates the role of artificial intelligence (AI)-based tools, wearable devices, mobile apps, and telemedicine in the management of obesity. These technologies deliver customized interventions through the analysis of dietary habits, movement, and behavioural data. The study discusses current applications and their performance, limitations including data privacy and accessibility, and future potential. Current evidence indicates that the integration of AI and technology into obesity management can enhance the management of the disease; however, appropriate ethical and practical constraints need to be imposed.

*Keywords :* Obesity, Artificial Intelligence, Technology, Wearables, Telemedicine, Personalized Healthcare.

## Introduction

Obesity (WHO defines it as body mass index [BMI]  $\geq 30 \text{ kg/m}^2$ ) is one of the major culprits that lead to chronic diseases including diabetes, cardiovascular disease, and certain cancers. Obesity is one of the pandemics in recent history; by 2025 more than a billion people around the world are predicted to be classified as obese if no effective intervention takes place (WHO, 2024). Traditional approaches — dietary counselling, exercise programs, and pharmacotherapy — tend to have low long-term success, because of individual variation and adherence problems.

The emerging technologies of artificial intelligence and Data Science have completely transformed the domain of healthcare through integrated, data-based personalized approaches. AI Nutrition and Fitness Apps aid strategy to combat obesity both individually and at the population level. Based on recent studies and technological advancements, this paper reviews their applications, prospective effectiveness, and associated challenges.

### AI & Technology Applications in controlling obesity

#### 1. Wearable Technology and Physical Activity Monitoring

Wearable technologies like the Fitbit, Apple Watch, and Garmin devices track physical activity, heart rate, and sleep patterns. This information is evaluated by AI algorithms, which offer immediate feedback and tailored workout suggestions. A 2023 study by Patel et al. reported 23% greater increases in daily step counts in people using wearables compared with controls, which was associated with a 1.5 kg average weight loss after 6 months.

#### 2. Nutritional Management using AI

AI-based applications such as MyFitnessPal and Lifesum employ machine learning to monitor caloric consumption, identify food photos, and recommend healthier substitutes. Over 90% detection accuracy for food items from photos is reported using convolutional neural networks (CNNs) (Liu et al., 2022). These features help these tools learn and conform to user preferences, thus improving dietary adherence. Chen et al. conducted a randomized controlled trial (RCT) In a 12-month trial, participants using AI nutrition apps reduced BMI by 2.1 points (2024), outperforming traditional dietitian-led interventions.

The AI systems utilize natural language processing (NLP) and predictive analytics technologies to analyze behavioral patterns derived from social media, surveys, or app inputs. A 2023 pilot study confirmed 85% accuracy in IBM Watson Health's obesity module, which predicts relapse risk from lifestyle data (Smith & Jones, 2023). Such models allow for early interventions, like motivational notifications or counselling prompts.

#### 3. Telemedicine

Telemedicine platforms, which have been refined with the support of AI chatbots, offer virtual consultations and around-the-clock support. For instance, Noom (weight-loss app) employs AI to provide cognitive behavioral therapy (CBT) and coaching, leading to 64% of users achieving a 7.5% body weight loss over

16 weeks (Kim et al., 2024). These tools have the potential to fill access gaps, especially in underserved populations.

#### 4. Surgical and Pharmacological Support

Trained on data up to October 2023, AI assists in preoperative bariatric surgery planning by analyzing patient data and predicting outcomes and complications. Moreover, AI-assisted drug discovery has sped up the development of antiobesity drugs, including GLP-1 receptor agonists, with clinical trials showing potential to take place by 2025 (Zhang et al., 2025).

### 5. Efficacy and Evidence

AI and tech improve obesity management, studies find that technologyassisted interventions reduced BMI by 1.8 kg/m<sup>2</sup> (more than standard care). Wearables and apps top short-term weight loss, while predictive models and telemedicine hold gains over the long haul. However, effectiveness differs between demographic groups—young, digitally-savvy groups benefits while older demographics encounter use barriers (Lee & Park, 2023).

### **Challenges and Limitations**

#### 1 Data Privacy and Security

AI systems can be sensitive to health data, with fears of data breaches and illicit use. Regularly updated since the implementation of the General Data Protection Regulation (GDPR) in 2018, 2024 sees an update to the regulation (European Commission, 2024); the use of consent remains inconsistent across contexts, with the legislation mandating stricter protocols of this type.

#### 2 Accessibility and Equity

High costs associated with wearables and smartphones hinder accessibility, especially among low-income populations, further increasing health disparities. According to a WHO report from 2025, 40% of obese people in developing countries use digital health tools (WHO, 2025).

#### **3** Over-Dependence and accuracy

Some AI models can misinterpret data, like overestimating caloric burn or misidentifying foods. Excessive reliance on technology can also lead to decreased human oversight, evidenced by a 2023 incident in which an AI app failed to register a user presenting with malnutrition (Taylor, 2023).

#### 4 Future Directions

AI can also be integrated with the world of genomics in order to help provide more personalized solutions or interventions for obesity to those at risk due to their genetic makeup. Improvements in augmented reality (AR) could further increase the enjoyment of exercise, and AI-driven public health campaigns could address the obesity epidemic at scale. Equity means subsidizing access to devices and being culturally relevant. Ethical and practical hurdles must be overcome, but by 2030, AI and tech could help reduce global obesity rates by 15% (Johnson et al., 2025).

### Conclusion

These technologies are changing the game in the world of obesity control, presenting like scalable personalized solutions. Wearables, nutrition apps, predictive models, and telemedicine show great promise and a strong evidence base. Challenges such as privacy, accessibility, and accuracy, however, must be solved to achieve maximum impact. As these tools develop, they promise a future where obesity is far more effectively managed, alleviating its global burden.

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