Proceedings of the Nutrition Society (2024), **83 (OCE4)**, E337 doi:10.1017/S0029665124005755

Nutrition Society Congress 2024, 2–5 July 2024

Utilization of Extended Reality (XR) technology in nutrition studies: A systematic review

A. Mullath Ullas[1], A. Owolabi[2], J. McArdle[3] and B. Ellahi[4]
[1]*Chester Medical School, University of Chester, UK*
[2]*Research Fellow, Faculty of Medicine, Dentistry and Life Sciences, University of Chester, UK*
[3]*Director of Health and Clinical Strategy, Marketing, Tourism and Destinations, University of Chester, UK*
[4]*Professor, Public Health and Nutrition, Faculty of Health and Social Care, University of Chester, UK*

Extended reality (XR), which includes Virtual Reality (VR) as well as Augmented Reality (AR) technologies, has emerged as an innovative tools with potential applications in both the health and education sectors. For nutrition studies, XR technology offers alternative approaches to addressing challenges related to the prevention and management of chronic conditions such as overweight, obesity, diabetes, and cardiovascular diseases (CVD)[(1)]. By simulating immersive environments and interactive experiences, XR technology presents the opportunity to influence dietary behaviours, modify eating habits, to improve health by reducing weight and body mass index (BMI). This review aims to explore the application of XR technology in nutrition studies, particularly focusing on dietrelated non-communicable diseases (obesity, diabetes, and cardiovascular diseases), with an emphasis on managing relevant health outcomes.

A comprehensive search utilising multiple databases including PubMed, Cochrane, Web of Science, Scopus, CINAHL, Medline, and ProQuest was conducted (December to March 2024). Key search terms encompassed XR technology (e.g., virtual reality, augmented reality, Oculus, mobile app, immersive) in conjunction with nutrition-preventable terms (obesity, overweight, diabetes, CVD and health outcomes BMI). Following the search, duplicates were removed, and articles were screened against predefined inclusion criteria. Data extraction focused on study details, participant characteristics, interventions, outcomes, and results.

845 articles were identified, and five met the inclusion criteria[(3,4,5,6,7)]. These included one randomised cross-over study[(4)] and four randomised controlled trials[(1–3,5)]. Of these articles, four studies explored VR-based approaches[(2–5)], while one study used AR technology[(1)]. The primary outcomes assessed across these studies focussed on the efficacy of VR and AR interventions in various domains, including portion size reduction, hunger, eating behaviour, food preferences, and weight management. Two studies showed improved portion size self-efficacy with VR interventions[(2,5)]. One study reported that even though eating a virtual meal does not appear to significantly reduce hunger in healthy individuals, meal duration was significantly shorter in the virtual meal, than in the actual or real meal, which led to a higher eating rate[(4)]. The use of XR interventions also showed the potential to support optimal portion size selection and reduction in implicit food preferences[(1,3)].

XR interventions may be effective in addressing various aspects of eating behaviour and portion control. These findings suggest potential applications in nutrition education and obesity management, especially for those for whom technology usage is the norm, by offering innovative approaches for intervention and behaviour change. Further research in this domain is needed to elucidate the efficacy, feasibility, and long-term impact of XR/VR-based interventions in the prevention and management of chronic conditions.

References

1. Malik N, Prado WL, Lappan S *et al.* (2022) *Int J Environ Res Public Health* **19**(7), 4264.
2. McGuirt JT, Cooke NK, Burgermaster M *et al.* (2020) *Nutrients* **12**(9), 2899.
3. Rollo ME, Bucher T, Smith SP *et al.* (2017) *Int J Behav Nutr Phys Act* **14**(1), 65.
4. Pritschet S, Sajjadi P, Edwards C *et al.* (2022) *Obesity (Silver Spring)* **30**, 254–255.
5. Yoon H, Kim H & Kim SH (2023) *J Behav Addict* **12**, 337.
6. Glympi A, Odegi D, Zandian M *et al.* (2023) *JMIR Serious Games* **11**, e44348.
7. Manzoni GM, Pagnini F, Gorini A *et al.* (2009) *J Am Diet Assoc* **109**(8), 1427–1432.