DIGITAL TRANSFORMATIONS FOR HEALTH LAB

GOVERNING HEALTH FUTURES 2030

# The impact of digital transformations on young people's nutrition

André Thiombiano, October 2025

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# CONTENTS

# ABBREVIATIONS

| | |
|---|---|
| **AI** | Artificial Intelligence |
| **BMI** | Body Mass Index |
| **CNN** | Convolutional Neural Network |
| **DDOH** | Digital Determinants of Health |
| **DHL** | Digital Health Literacy |
| **DL** | Deep Learning |
| **ICT** | Information and Communication Technology |
| **LDL** | Low-Density Lipoprotein |
| **ML** | Machine Learning |
| **NLP** | Natural Language Processing |
| **RDN** | Registered Dietitian Nutritionist |
| **WHO** | World Health Organization |

# 1. INTRODUCTION

Nutrition is important for young people's optimal growth, development and prevention of various health conditions, such as obesity and noncommunicable diseases (NCDs) (Dietary Guidelines Advisory Committee, 2015). The term "young people" is broadly used to refer to individuals within the 10-24 age range, according to the World Health Organization (WHO, 2025). This encompasses both adolescents (10-19 years) and youth (15-24 years). Proper nutrition for young people is essential to prevent chronic diseases later in life (Darnton-Hill et al., 2004). Nutrition has emerged as a key modifiable factor in chronic diseases (WHO, 2003). Dietary intake is influenced by many factors, including individual characteristics like nutrition knowledge, self-efficacy and income, as well as societal elements such as food marketing and digital platforms, along with supportive environments that enable access to affordable healthy food (Sleddens et al., 2015; Story et al., 2008).

Digital technologies and platforms have integrated the Internet into our lives, especially for young people who spend significant amounts of time online, which brings various risks that often go unrecognized (Muñoz-Rodríguez et al., 2023). Digital platforms encompass communication channels and content created or accessed through digital technologies, including websites, social media, digital applications and online videos (Holly et al., 2024). As the Internet has rapidly increased in popularity, young people's lifestyles – including their dietary habits and levels of physical activity – have experienced significant changes (Liu et al., 2025). A major public health issue is young people's exposure to digital marketing for harmful products, such as unhealthy foods and sugar beverages (McGale, 2022).

Young people are a vulnerable population in terms of healthy eating and dietary behaviours (Tang et al., 2024a). The popularity of digital platforms among young people offers a unique opportunity to promote healthy eating habits (Tang et al., 2024a). Young people undergo significant physical, psychological and social changes, and this developmental period is crucial for establishing healthy eating behaviours that can persist into adulthood (Fielding-Singh, 2019; Movassagh et al., 2017; Winpenny et al., 2018). Innovative computer and mobile-assisted information and communication tools can effectively create smart digital health interventions aimed at combating childhood obesity (Lau et al., 2011; Tate et al., 2013). In developed nations, more than 90 per cent of young people have been reported to have access to the Internet either at school or at home (Dobbins et al., 2009). They viewed the Internet as their main source for obtaining health information (Borzekowski & Rickert, 2001; Webb et al., 2010). Recent research, conducted in many countries (including the US, Canada and Norway), indicates that almost half of Internet users search for information related to diet and nutrition (Goodman et al., 2011; McCully et al., 2013; Wangberg et al., 2009). Social networking sites such as YouTube,

Facebook and Twitter are the fastest-growing sources of health and nutrition information for young people (Watson & Wyness, 2013). The integration of digital technologies into young people's lifestyles and daily behaviours presents an opportunity to transform contemporary approaches to support healthy eating (Hsu et al., 2018; Kouvari et al., 2022; Lozano-Chacon et al., 2021; Montgomery et al., 2020; Naderpoor et al., 2022). While these platforms offer valuable opportunities for individuals to connect with each other, digital technologies can also facilitate the spread of misinformation, particularly concerning diet and other health-related behaviours (Tang et al., 2024b). Studies indicate that social media platforms can pose risks to young people by exposing them to inaccurate or inappropriate content (Chen & Wang, 2021; Wang et al., 2019). Predatory marketing practices of online grocery retailers also significantly hinder efforts to reduce the consumption of unhealthy food and beverage products (Chester et al., 2020; Consavage Stanley et al., 2021).

"Digital determinants" is a relatively new concept that refers to the direct and indirect ways in which the integration of digital technologies – that is, digital transformations – impact equity in health and well-being (Kickbusch et al., 2021). Digital transformations are increasingly acknowledged as significant factors that impact health (Kickbusch & Holly, 2023). *The Lancet* and *Financial Times* Commission on Governing Health Futures 2030 identified three levels of digital determinants in healthcare. The first level refers to the direct use of digital technologies and data in healthcare delivery. The second level addresses the influence of the broader digital ecosystem on health outcomes. Lastly, the third level considers the indirect effects of digitalization on other issues, such as social and commercial determinants of health (Digital Determinants of Health. 2021). The promotion of good nutrition through digital media aligns with the wider cultural shift in how people access health information. Moving away from printed material, such as pamphlets, to online platforms, means that consumers are reached where they habitually seek information (Pollard et al., 2015; Zarnowiecki et al., 2020).

This literature review consolidates and synthesizes existing evidence to offer a comprehensive overview of how digital determinants influence nutrition. The integration of digital technologies into the field of nutrition is experiencing an unprecedented surge, transforming how individuals manage their dietary choices, access nutritional information and engage with health professionals. This dynamic landscape encompasses a wide array of tools such as mobile applications for meal tracking, wearable devices that monitor physical activity and biometrics, telemonitoring, artificial intelligence applied to nutrition and online platforms that facilitate telehealth consultations with registered dietitians. With the prevalence of these technologies, it becomes increasingly crucial for researchers and policymakers to grasp the multifaceted implications of these digital transformations. Understanding the current landscape involves not only examining the effectiveness of these tools in promoting healthier eating habits and improving overall nutritional outcomes, but also analysing the negative impact and disparities in access to technology among different populations. The goal of this paper is to review the existing evidence regarding

the impact of digital determinants on young people's nutrition and to identify priority areas for action. This thorough literature review is designed to deliver insightful recommendations for targeted policy action and propose avenues for in-depth research exploration.

# 2. METHODS

This literature review explores how digital determinants influence young people's nutrition, using the Digital Determinants of Health (DDoH) conceptual framework proposed by Chidambaram (Chidambaram et al., 2024). It adopts a structured narrative approach, combining a systematic literature search with a thematic analysis. The review is based on an adaptation of the DDOH model, which considers the intrinsic characteristics of digital environments (accessibility, digital literacy, algorithmic design, personalization, user experience, etc.) as independent determinants of health outcomes. These dimensions were used as axes of analysis to assess their potential impact on the eating behaviours, dietary choices and nutritional health of young people (aged 10-24).

Articles were searched in the PubMed, Web of Science and Google Scholar databases, covering the period from 2000 to 2025. Searches were conducted in English and French. The search strategy used the following keywords, combined by Boolean operators : (“digital health’” OR “eHealth” OR “mobile apps” OR “social media” OR “digital accessibility” OR “telenutrition” OR “digital literacy” OR “telemonitoring” OR “artificial intelligence” OR “digital platform” OR Internet”) AND (“nutrition” OR “diet” OR “dietary choices” OR “food behaviour” OR “eating behaviours” OR “obesity” OR “malnutrition”) AND (“youth” OR “adolescents” OR “young people”).

Studies included those dealing with young people's exposure to digital environments, or tools with a potential influence on their nutrition. Qualitative, quantitative, mixed studies, or systematic reviews and studies conducted in a variety of contexts (including low- and middle-income countries) were included. Studies not meeting these criteria – such as those with no direct link to nutrition or digital platforms and studies focusing solely on nutrition or dietary care without a digital interface– were not considered for this review.

Titles and abstracts were manually reviewed to select relevant articles. Selected articles were read in full and analysed using a structured extraction, including the type of digital technology, digital platform, target audience, digital mechanisms influencing nutrition and nutritional outcomes observed. Data analysis followed a thematic approach based on the dimensions of the DDOH. Each article was coded according to the following categories: digital accessibility; digital literacy; telenutrition and telemonitoring; artificial intelligence; and social media. The results were then grouped and summarized to highlight trends, opportunities, risks and gaps.

# 3. FINDINGS

## 3.1. Digital accessibility and nutrition information availability

Nutritional outcomes in young people are affected by a variety of factors. Sedentary lifestyles and a lack of physical activity significantly contribute to weight gain (Agustina et al., 2021; Steinbeck, 2001). Dietary choices and eating habits, particularly the regular intake of fast food and sugary drinks, also play a role in influencing body mass index (BMI) (Della Torre et al., 2016; Jia et al., 2021). Furthermore, the socio-economic status of the family and the surrounding living environment are also important influences (Maffeis, 2000; Parrino et al., 2016). Emerging evidence indicates that these multifactorial determinants may be influenced by digital technology access and usage patterns, presenting both risks and opportunities for young people's health. The widespread adoption of digital technologies and platforms has significantly contributed to rising levels of sedentariness, physical inactivity, unhealthy dietary habits and excessive screen time (Nedjar-Guerre et al., 2023). While digital technologies have been linked to negative behavioural trends among adolescents, such as reduced physical activity and unhealthy eating habits, their widespread adoption also presents unique opportunities. By harnessing digital tools, these deliver evidence-based health information and personalized guidance to promote healthier lifestyles (Gibbs et al., 2020; Patton et al., 2016).

The Internet provides technology for accessing information and communication, which has become integral to the lives of young people (Alpaslan et al., 2015). More than five billion people currently own mobile devices, with over half of these being smartphones (Silver, 2019). As the number of smartphone users increases, the popularity and accessibility of information through applications are also likely to rise (Paramastri et al., 2020). However, digital accessibility varies greatly by country income group, the rural-urban divide and household wealth. Only 33 per cent of children and young people worldwide have Internet access at home. There is a considerable disparity between high-income and low-income countries, with coverage at 87 per cent compared to just six percent, respectively (Atzatzev, 2020). Many people use mobile applications for nutrition to manage their diets and maintain their ideal weight. The abundance of health and nutrition apps available, on Google Play and Apple’s App Store, demonstrates the growing awareness about the importance of adopting a healthy lifestyle (Klasnja & Pratt, 2012). Nutrition applications often include features for sending daily tips and reminders to users, to inform and motivate them to make healthier choices and enhance their nutrition (Tonkin et al., 2017). Access to digital media and devices among adolescents in sub-Saharan Africa varies significantly across different settings and for some young people, the most common way to connect digitally is through using someone else's phone (D. Wang et al., 2023). The main factors positively associated with the access were higher maternal

education of mothers and greater household wealth. While digital platforms hold potential for interventions, due to fairly high levels of access, further investigation is required to evaluate their effectiveness for delivering health and nutrition programmes to young people in these regions. This digital divide poses a significant barrier to accessing nutrition services and information, particularly in low and middle-income countries. This divide is heavily influenced by social determinants, such as income levels, employment status, housing conditions, education and the overall economic landscape of a region. As a result, many individuals may struggle to obtain essential nutrition resources and support.

Digitalization is viewed as a beneficial advancement for health, providing new opportunities to enhance universal health coverage and improve the availability and quality of health services, especially for populations that have been traditionally underserved (World Bank Group, *Digital in Health*, 2023). Digital access enables young people to quickly access information, including educational resources on nutrition. Health and nutrition knowledge has been recognized as a global goal for all populations to help foster healthy food relationships (Velardo, 2015). Research indicates that nutrition knowledge can lead to positive dietary and health behavioural changes in users of digital devices, through short-term nutrition education, health coaching, reminders and/or diet tracking tools (Paramastri et al., 2020). Nutrition knowledge involves understanding key principles and guidelines concerning dietary choices and their effects on health (Garcia, 2023). Individuals with sufficient nutrition knowledge can effectively evaluate nutrition information by applying their understanding of dietary principles, nutritional guidelines and appropriate portion sizes (Miller & Cassady, 2015).

The influence of Internet usage on the nutritional outcomes of young people is complex and multifaceted, often yielding a range of results that are not easily categorized. Digital accessibility can also expose them to misleading nutrition information, which may be harmful to their health. Some studies suggest that extensive Internet exposure can lead to unhealthy eating habits, while others indicate that it may also provide access to valuable nutritional information and healthier choices. Research suggests that excessive or problematic Internet use is linked to an increased risk of young people being overweight or obese(Aghasi et al., 2020; Tsitsika et al., 2016). Young people are 10.2 per cent more likely to be overweight due to digital platform usage and excessive use increases this likelihood by 14.6 per cent (Liu et al., 2025). While excessive use of digital platforms could lead to health issues, their accessibility offers opportunities for managing and treating health conditions.

## 3.2. Telenutrition as a lever for nutritional improvement

The Academy of Nutrition and Dietetics has acknowledged telenutrition as a valuable tool for dietitians. It defines telenutrition as "the interactive use of electronic information and telecommunications technologies by a Registered Dietitian Nutritionist (RDN) to implement the Nutrition Care Process with patients or clients at a remote location, by the RDN's applicable state license" (Brunton et al., 2021; Gnagnarella et al., 2022). Recently, there has been a growing interest in telenutrition applications for the long-term monitoring and management of nutrition in chronic diseases (Lewinski et al., 2022). Electronic devices used for telehealth monitoring include video conferencing tools, software applications, websites, email, mobile phones and Bluetooth communication resources (Barbosa et al., 2021; Wing et al., 2006). Telenutrition is increasingly recognized as a strategy to overcome barriers and enhance access to nutrition care (Elamin & Cohen, 2021). This contemporary approach not only addresses nutritional issues, but also affects various aspects of health, including weight management in obesity (Castelnuovo et al., 2010, 2011). Face-to-face nutritional interventions effectively promote weight and dietary changes while fostering a sense of empowerment, connection and support (Mitchell et al., 2017; Ring Jacobsson et al., 2016). Telenutrition and counseling interventions, as part of a healthcare programme, have a significant impact on health status in terms of weight reduction, hemoglobin A1C, blood pressure and serum lipids (Huang et al., 2019; Kelly et al., 2016).

In-person nutrition counselling can incur significant costs and require considerable time commitments, making it an option that may not be accessible to all individuals (Marshall et al., 2003). Dietitians and nutritionists are increasingly incorporating online consultations, instead of traditional in-person meetings, as virtual care emerges as a valuable strategy for enhancing health and well-being in today's dynamic lifestyles (Bookari et al., 2023). Web-responsive applications and audiovisual methods offer alternatives to face-to-face nutrition care, allowing for a broader reach. These web-based interventions can lead to short-term dietary and eating behaviour changes more effectively than standardized interventions (Al-Awadhi et al., 2021; Hamel & Robbins, 2013). Patients value telenutrition counseling for its flexibility, which saves travel time and ensures continuity of care, especially for those living in remote areas (Gnagnarella et al., 2022). Telenutrition is thought to offer improved healthcare outcomes for patients compared to traditional care. It also helps to eliminate geographic barriers in health management.

Digital platforms offer a promising alternative for expanding access to healthcare for young people. A systematic review highlighted the significant potential of digital platforms for universal health promotion, particularly among school-age children and young people (Oh et al., 2022). The growth of digital technologies tools, including mobile apps and wearable technology, has enabled individuals to track their nutritional intake, monitor sodium levels and receive personalized dietary recommendations in real time (Eid, 2024). In weight loss interventions, telemonitoring serves as a valuable tool for ongoing

assessment of weight measurements, dietary adherence and lifestyle changes, such as physical activity. This method is thought to boost motivation through reflection and consistent monitoring. Obesity remains a significant global health issue, with rates increasing over the past few decades, as indicated by world health statistics (World Health Organization, 2024). Numerous studies have demonstrated telemonitoring as having a significant impact on both dietary adherence and weight loss outcomes (Luley et al., 2011). Self-monitoring by digital platforms and technologies, combined with regular coaching, significantly improved diet, physical activity and health behaviours. The results revealed notable impacts on weight loss, blood pressure and HbA1c levels).

## 3.3. Application of Artificial Intelligence Algorithms on Nutrition

Healthcare systems worldwide encounter major obstacles in attaining the “quadruple aim’ in healthcare: improving population health, enhancing the patient experience, boosting caregiver satisfaction and curbing the increasing costs of care (Berwick et al., 2008; Bodenheimer & Sinsky, 2014; Feeley, 2017). In recent years, artificial intelligence (AI) has become a transformative force in healthcare, providing innovative solutions to enhance patient management and clinical workflows (Bajwa et al., 2021). AI is the science and engineering of creating intelligent machines using algorithms or a set of rules. These machines aim to replicate human cognitive functions, such as learning and problem-solving (McCarthy,J. (2007). AI's strength lies in its ability to learn and recognize patterns and relationships from large, multidimensional, multimodal datasets. For example, AI systems could convert a patient's entire medical record into a single number that signifies a likely diagnosis (Deng et al., 2009). AI-driven technologies, such as machine learning (ML) and deep learning (DL), have shown significant potential in improving diagnostic accuracy, personalizing treatment plans and optimizing resource allocation within hospital environments (Maleki Varnosfaderani & Forouzanfar, 2024).

Nutrition is a multifaceted discipline that examines the relationships between diet, health and disease (Ross et al., 2020). AI-based approaches for malnutrition management offer promising opportunities for early detection, risk stratification and personalized nutritional interventions (Janssen et al., 2024). The treatment of malnutrition requires a multidisciplinary approach, which can burden the healthcare system. As a result, many cases of malnutrition among young people go unnoticed, leading to further complications and an increased economic impact on productivity and prosperity (Saunders & Smith, 2010). ML algorithms can analyse large datasets that include clinical, biochemical and imaging parameters, identifying high-risk patients with greater accuracy compared to traditional assessment methods (Singer et al., 2024). Additionally, deep learning techniques, especially convolutional neural networks (CNNs) and natural language processing (NLP), can enable the automated extraction of nutritional risk factors from

electronic health records and medical imaging, offering clinicians real-time, actionable insights (Theodore Armand, Nfor, et al., 2024). By integrating AI into nutritional care, healthcare providers can take a more proactive and personalized approach, ensuring timely interventions that mitigate the harmful effects of malnutrition (Kittrell et al., 2024).

In nutrition, AI involves using sophisticated algorithms, ML and DL methods to examine and interpret various datasets regarding nutritional information, eating patterns, genetic and dietary data and other health-related factors (Kosaraju et al., 2022; Szabo de Edelenyi et al., 2008). By utilizing these technologies, AI supports informed decision-making aimed at improving both individual and public health outcomes (Armand et al., 2024; Oliveira Chaves et al., 2023; Theodore Armand, Kim, et al., 2024). Furthermore, collaborative filtering techniques play a significant role in generating personalized nutrition recommendations (Zitouni et al., 2022). Meanwhile, advanced deep learning methods, such as CNNs and transfer learning models like ResNet and EfficientNet, facilitate the identification and classification of meals through food imagery. These technologies not only help in recognizing dietary patterns but also enable a more accurate assessment of nutritional content (Izbassar & Shamoi, 2024; Kaur et al., 2023). A prominent application of artificial intelligence in the field of nutrition is the creation of smart, personalized dietary solutions. Research has shown that machine learning algorithms can effectively analyse individual dietary habits, health metrics and genetic data to provide customized dietary recommendations. These innovative applications are designed to promote compliance with dietary guidelines and ultimately enhance overall nutritional health and well-being (Honda & Nishi, 2021; Iwendi et al., 2020; Kirk et al., 2022; Maurya et al., 2019; Mogaveera et al., 2021; Santhuja et al., 2023; Sookrah et al., 2019; Van Erp et al., 2021; Zhu & Wang, 2023).

Evaluating nutrient intake is a critical component of nutrition research and the integration of artificial intelligence techniques significantly boosts the accuracy and efficiency of this process. AI can automate nutrient analysis through various channels, such as dietary records and food images, leading to more streamlined data collection. Moreover, this technology helps mitigate self-reporting biases, providing researchers with more reliable and comprehensive insights into dietary habits (Folson et al., 2023; Lo et al., 2019; Lu et al., 2020; Mezgec et al., 2019; Shi et al., 2024; Van Asbroeck & Matthys, 2020). AI plays a crucial role in predictive modeling for disease prevention in the field of nutrition. Machine learning techniques are employed to create predictive models that uncover patterns linked to disease risk. These models typically integrate dietary information, lifestyle factors and health indicators to predict accurately the likelihood of various health outcomes (Bhat & Ansari, 2021; Bond et al., 2023; Chang et al., 2022; G. Mitchell et al., 2021; Kim et al., 2021; Ma et al., 2022; Salinari et al., 2023; Singer et al., 2024). AI is increasingly impacting the diagnosis and management of nutrition-related health conditions. Digital technologies and AI present innovative approaches to managing chronic, highly disabling conditions like diabetes mellitus, obesity and metabolic disorders. These advanced tools address the

challenges of suboptimal outcomes and difficult disease management associated with these conditions (Salinari et al., 2023).

## 3.4. Social media and nutrition

The rise of social media platforms has transformed health communication, giving rise to a "platform society" where these digital spaces actively shape and influence social structures (Van Dijck et al., 2018). Recently, nutrition education programmes have increasingly turned to digital tools, especially mobile phone applications and social media, for delivery (DiFilippo et al., 2015; Yonker et al., 2015). Social media provides effective platforms for promoting health and nutrition, largely due to the widespread popularity of food-related content (Lim et al., 2022; Rogers et al., 2022). Social media includes interactive, web-based platforms that enable networking and two-way communication, distinguishing them from traditional one-way media channels (Chou et al., 2013; Kapoor et al., 2018). With over 3.4 billion active users worldwide, social media enables mass communication while also allowing precise targeting of individuals with shared interests or characteristics (Bennett & Glasgow, 2009; Chou et al., 2013; Kemp, 2019). Given their high smartphone and social media engagement, adolescents and young adults are especially receptive to these digital solutions, making them an ideal audience for health-focused digital interventions (Klassen et al., 2018a). Health promoters have increasingly turned to social media as a powerful tool for advancing nutrition education and awareness through digital communities. Social media offers unique learning opportunities, fostering support among like-minded individuals, building vibrant online communities and enabling users to set personal health goals while tracking their progress effectively (Balatsoukas et al., 2015; Klassen et al., 2018a, 2018b). For example, research indicates that individuals who engage with health messages through private Facebook discussion groups experience significantly greater reductions in BMI, waist circumference, total cholesterol levels and low-density lipoprotein (LDL) cholesterol compared to those who do not participate in such groups (Ashton et al., 2017).

Social media plays a dual role in shaping nutrition and eating habits, presenting a paradox for nutrition and wellness: while it offers unprecedented access to credible dietary guidance, healthy recipes and wellness resources, its benefits are often negated by widespread misinformation and unrealistic body ideals. This dual impact significantly influences eating behaviours, body image perceptions and overall health outcomes. Social media can contribute to an environment that promotes unhealthy dietary habits and fosters feelings of body dissatisfaction (Fardouly et al., 2017). Individuals often share heavily curated and edited content on social media, presenting an idealized version of a lifestyle that may not accurately represent their true selves (Rounsefell et al., 2020). Exposure to images of this kind can distort body perception, triggering unhealthy eating

behaviours like restrictive dieting or overeating, while fueling an excessive reliance on external validation (Barklamb et al., 2020).

Food, health and nutrition content on social media is shaped and influenced by food industry brands and lifestyle personalities (also called social media influencers). These actors primarily use these platforms for commercial promotion, operating in a space with minimal content regulation (Freeman et al., 2016). The research underscores the urgent need for policy interventions to restrict young people's exposure to unhealthy food marketing on social media (Aldossari & Al-Mahish, 2021). Nutritional misinformation and fad diets circulating on social media often mislead children, increasing the risks of disordered eating and harmful dietary practices (Ertz & Le Bouhart, 2022). Food and beverage companies increasingly leverage social media's influence to market unhealthy products directly to young consumers (Prybutok et al., 2024). This trend is especially concerning among youth, who often gravitate toward novel foods perceived as healthy regardless of their nutritional value (Pham et al., 2019). These campaigns employ sophisticated tactics from influencer collaborations to interactive content that effectively manipulate young people's food preferences (Aldossari & Al-Mahish, 2021; Sacks & Looi, 2020). Currently, no regulations govern who can share health and nutrition-related information on social media (Kreft et al., 2023). Regulating nutrition-related marketing content, such as banning junk food promotions, restricting misleading claims about supplements and weight-loss programmes, or requiring disclosure statements, could help reduce the risk of consumer deception (Denniss et al., 2023).

The proliferation of social media has given birth to a new breed of online personalities: the influencer. Influencers are individuals who have built massive followings on various social media platforms and possess the power to shape the opinions, attitudes and behaviours of their audience (De Veirman et al., 2017). Many followers place significant trust in the influencers they admire and advertisers capitalize on this relationship by paying these influencers to endorse and promote their products (Pilgrim & Bohnet-Joschko, 2019). Certain self-proclaimed health and nutrition influencers profit from spreading misinformation on social media (Lofft, 2020). Social media platforms are utilized by significantly more influencers than qualified healthcare professionals (Antheunis et al., 2013), with social media emerging as a leading source of information on food and nutrition. Research indicates that social media users often accept nutrition-related information without verifying the source's expertise, yet they are more likely to question claims that lack clear explanations (Kreft et al., 2023).

Social media holds significant potential to transform public health nutrition by fostering citizen engagement, enhancing health system efficiency, creating dynamic platforms for science communication, supporting policy implementation and encouraging healthier lifestyle choices. While this perspective highlights social media's transformative capacity, it also acknowledges its limitations in effectively addressing complex public health nutrition challenges (Mendoza-Herrera et al., 2020). Social media-based interventions show potential for modifying health behaviours, improving lifestyle factors and positively

impacting metabolic markers associated with NCDs (Balatsoukas et al., 2015; Jane et al., 2017). Social media interventions show promise in NCD prevention by increasing physical activity levels, reducing sugar and fat intake, enhancing user engagement in digital health programmes and delivering effective nutrition and diabetes education (Balatsoukas et al., 2015; Gabarron et al., 2018; Jane et al., 2017; Johns et al., 2017; Richardson et al., 2010; Tapper et al., 2014; Williams et al., 2014).

## 3.5. Digital literacy

Food systems directly influence population health through multiple pathways and are recognized as key drivers of an interconnected crisis involving obesity, undernutrition and climate change (Swinburn et al., 2019). The food environment specifically denotes the component of the food system that serves as the immediate interface through which people engage with and access food for consumption (Turner et al., 2018). Digital and physical food environments are intricately linked, exerting a mutual influence that shapes diet quality and health outcomes for children, adolescents and their parents (Granheim et al., 2022). Digital technologies have revolutionized food retail environments by facilitating convenient and efficient contactless transactions, including online ordering and delivery of food and beverages, groceries and prepared meals (Fernandez & Raine, 2021; Granheim et al., 2022). Young people need to cultivate a range of digital literacy skills to understand the origins and journey of their food from production to plate, interpret visual and textual cues that influence their nutrition and effectively use online platforms to select, order and purchase groceries and ready-to-eat meals (Carroll et al., 2022; Consavage Stanley et al., 2022).

Digital literacy is universally acknowledged as a critical competency in today's digital era (Siddiq et al., 2016). It is recognized as an essential twenty first century skill and a key transversal competence (Binkley et al., 2012; Care & Luo, 2016). Digital literacy, as defined by the United Nations, encompasses the ability to effectively find, evaluate, create and communicate information using digital technologies and platforms (United Nations Standing Committee on Nutrition, 2020). It includes competencies that are variously referred to as computer literacy, information and communication technology (ICT) literacy, information literacy and media literacy. Digital literacy plays a vital role in enhancing the effectiveness of digital nutrition personalization (Andi Nursiah, 2025) and is an essential element impacting the effectiveness of AI-based nutrition personalization. Digital literacy enhances nutrition literacy, helping individuals to avoid unhealthy diet trends and misinformation, leading to people making healthier and more informed choices.

Digital literacy is essential for the development of young people across diverse domains. It enables meaningful participation in online education, both formal and informal, and provides access to vital information to support young people's health and well-being (Meherali et al., 2021). Digital literacy skills are a crucial determinant of an individual's

ability to effectively search for, evaluate and utilize nutrition information across digital platforms. These skills enable people to navigate the digital environment confidently, to access reliable sources and make informed decisions about their nutrition and health. Digital health literacy (DHL) has risen to a top priority for healthcare organizations and governments as digital technologies become increasingly integrated into healthcare. Enhancing DHL is essential for engaging consumers in managing their health and wellness in the digital age. DHL refers to the ability of an individual to effectively interface and interact with digital technology, encompassing all the skills they require to find, understand, appraise and apply health information specifically from electronic sources (Islam, 2019).

Digital literacy involves a broad set of skills that enable individuals to navigate the digital world with confidence. Beyond basic usage, digital literacy also encompasses skills such as critical thinking, the ability to critically evaluate online information, such as nutrition tips, health advice and food-related data, to make informed decisions by identifying biases and questioning assumptions. Additionally, it involves practical skills like searching for reliable sources, understanding digital privacy and security and efficiently using online platforms to perform everyday tasks, such as ordering groceries, managing online banking, or communicating with healthcare providers. Most young people incorporate digital tools into their daily routine (Brown & Bobkowski, 2011). However, many young adults still lack these skills, having not learned them at school or from their families (Nawaila et al., 2019). Generally, they are influenced by their peers regarding their behaviour and online interactions. Developing digital literacy is essential in today's connected society, empowering people to access resources, participate fully in digital life and make healthier, more informed choices. Several factors can influence digital literacy among young people, including age, education, family background and income (Urbancikova et al., 2017). Research shows that females tend to have lower levels of digital literacy (Nooorrizki et al., 2022). These disparities can create barriers to accessing nutritional information on digital platforms and technologies. The nutritional health of young people could be influenced by lower digital literacy.

# 4. DISCUSSION

This literature review highlights the growing impact of digital determinants on young people's nutrition, exploring both the opportunities offered by digital transformation and the major challenges it poses. The data analysed reveal five digital determinants which are having a particularly significant impact on young people's nutritional status: digital accessibility, the development of telenutrition, the integration of AI algorithms, the predominant influence of social networks and the crucial importance of digital literacy. These factors combine to create a complex landscape in which digital technologies and platforms can improve the nutritional health of young people whilst also accentuating certain inequalities that need to be addressed. This literature provides an overview of the impact of the current digital environment on young people's nutrition.

A conceptual framework on five key determinants, based on the literature review findings, is designed to present both the opportunities and challenges of digital technologies and platforms on young people's nutrition. These five factors are not exhaustive, but they require more attention than others. This conceptual model describes the digital determinants represented by five key factors, which are: digital accessibility, telenutrition, AI, social media and digital literacy and their impact on digital nutrition.

In terms of opportunities, digital platforms and technologies facilitate interactive nutrition education through mobile applications, web platforms, gamified learning modules and e-learning systems, all of which enhance engagement and knowledge retention. AI and web-based resources provide reliable information about nutrition, helping to balance out misinformation exposure. Furthermore, digital communities on social media and specialized forums foster peer support and collective learning, reinforcing positive dietary habits. Advances in AI enable tailored nutritional recommendations based on individual health metrics. Real-time tracking of macronutrient and micronutrient intake improves dietary awareness, while image recognition technologies assist in meal identification and nutrient analysis. People can monitor biomarkers like sodium levels and blood glucose using wearables and smart devices.

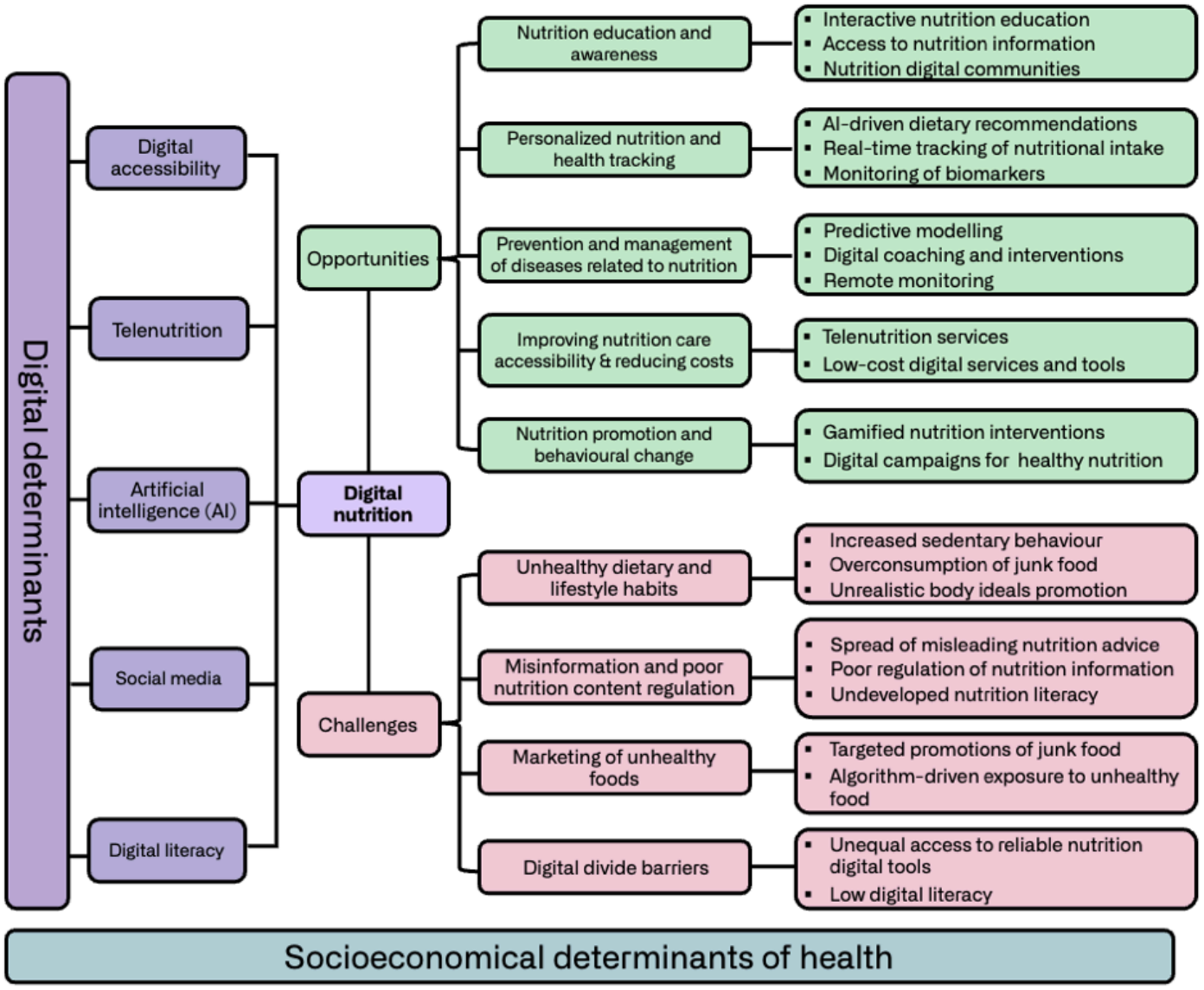
Digital platforms and technologies support young people with chronic diseases like obesity, diabetes and metabolic disorders through telemonitoring. AI tools are used for predictive analytics of malnutrition by considering health metrics. These innovations enhance adherence to therapeutic diets and facilitate early intervention in health issues, reducing long-term complications associated with chronic diseases. Telenutrition services bridge gaps in nutrition care access for remote and underserved areas. Its flexibility and reduction of care costs democratize nutrition monitoring. Automated dietary assessment tools, used in research, minimize biases of self-reported data, improving the accuracy of nutritional research and intervention monitoring. Evidence-based digital interventions have demonstrated efficacy in promoting healthier eating patterns, with measurable outcomes including reductions in BMI, waist circumference and LDL cholesterol. Scalable digital

campaigns further amplify public health messaging, fostering widespread dietary improvements.

Despite these advancements, digital environments also introduce risks that may compromise youths' nutritional health. Prolonged screen time contributes to sedentary lifestyles, while some digital marketing content encourages mindless consumption of energy-dense, nutrient-poor foods. Social media perpetuates unrealistic body standards, leading to body dissatisfaction, food restriction and disordered eating behaviours, which could lead to adverse mental health outcomes. The proliferation of unverified claims about nutrition, including fad diets and unsubstantiated supplement promotions, poses a significant challenge. Social media platforms often lack robust fact-checking mechanisms, making it challenging for young users to distinguish between evidence-based guidance and misleading content. Influencer culture further exacerbates this issue by promoting restrictive eating patterns under the guise of wellness trends. Algorithm-driven advertisements expose youth to promotions for ultra-processed foods, while influencer endorsements normalize excessive consumption of sugary and high-fat products. Current regulatory frameworks remain insufficient in restricting such targeted marketing practices, particularly toward adolescents. The reach of digital nutrition interventions among low-income and rural populations are limited by disparities in technology access. Additionally, variable digital literacy levels, as well as suboptimal nutrition literacy, hinder the ability of some youth to critically evaluate online nutrition information, or to utilize health tracking tools.

The digital determinants and their impact on young people's nutrition are influenced by social determinants: the conditions in which people are born, grow, live and work, as well as to social, economic and environmental forces that impact their lives. There are also key, commercial determinants of health which refer to the conditions, actions and omissions by the private sector which influence our social, physical and cultural environments. These factors combined – income, commercial influences, employment, housing, education and access to healthcare – play a crucial role in the impact of digital determinants on young people's nutrition. Understanding the relationship between social, commercial and digital determinants is essential for reducing digital nutrition disparities and improving population health, particularly among young people.

**Figure 1: Conceptual model of the five digital determinants' impact on young people's nutrition**



# 5. RECOMMENDATIONS

This paper shows that digital technologies and platforms offer a wide range of opportunities to enhance young people's nutrition. Digital tools are increasingly integrated into young people's lives and can be used to positively influence habits and choices that promote good nutrition, specifically and health in general. As the literature has shown, the benefits of digital transformations are not equally distributed and the use of digital technologies can also undermine nutrition. Interventions and policies are required to ensure that digital technologies support more equitable nutrition outcomes. With this in mind, the following recommendations are formulated for policymakers, health and education organizations. They aim to improve the use of digital technologies and platforms to promote young people's well-being through healthy nutrition.

The following recommendations and actors of implementation are suggested based on the five digital determinants found in this literature review:

- Bridge the digital divide to reduce inequalities in access to digital platforms and technology. Public policies must focus on improving access to technology for marginalised populations to ensure equitable inclusion.

  **Responsible actors**: Governments, policy makers, non-profit organizations and community organizations.

- Improve the quality of nutrition and dietary information available on digital platforms. Strict regulation of digital platforms must be put in place to guarantee the reliability of data and combat nutritional misinformation. For instance, health and nutrition influencers need to be qualified and declare such qualifications when sharing technical information or advice.

  **Responsible actors**: Regulatory agencies, digital companies, health and nutrition influencers and professional associations for dietitians.

- Create appropriate legislative frameworks for telenutrition promotion. Governments must draw up clear policies favourable to the integration of telenutrition into national healthcare systems.

  **Responsible actors**: Local government, health ministries and healthcare regulatory bodies

- Promote health and nutrition professionals' continuing education on utilizing digital technologies to share knowledge and provide health services. It is essential to develop the digital skills of dieticians and nutritionists so that they can develop telenutrition competencies and maximize their impact.

  **Responsible actors**: Educational institutions, professional organizations for nutritionists and healthcare training programmes

- Regulate and validate digital tools such as artificial intelligence applied to nutrition and health. Algorithms must be tested and validated in a variety of contexts to ensure their robustness and universal applicability and also to minimize potential bias and discrimination within models and datasets used to train AI.

  **Responsible actors**: Research institutions, regulatory agencies, technology developers and health organizations.

- Ensure transparency and ethics are included in digital platforms and technologies. Users must be fully informed of how their data is being used and mechanisms must be put in place to ensure that it is used responsibly and ethically.

  **Responsible actors**: Digital platform companies, privacy advocacy groups, regulatory agencies and consumer protection organizations.

- Be proactive in social media regulation. Platforms must work closely with public health experts to moderate and control the quality of the food and nutrition-related content they broadcast.

  **Responsible actors**: Social media companies, public health agencies,  and health communication experts.

- Incorporate digital platforms and technologies into the training curricula for young people. Incorporating modules on digital literacy, critical thinking and evaluating online information into school and university curricula is vital to building young people's resilience in the face of misinformation, particularly related to nutrition and health in general.

  **Responsible actors**: Educational authorities, schools, universities and curriculum developers.

- Actively support research and innovation in the field of AI and telenutrition, ensuring that they are adapted to a variety of socio-economic contexts.

  **Responsible actors**: Governments, private sector investors, research institutions and health organizations

# 6. CONCLUSION

This literature review revealed the significant impact of digital determinants on young people's nutrition, highlighting both the opportunities and challenges associated with digital transformation. Findings indicate that digital accessibility, telenutrition, artificial intelligence, the influence of social media and digital literacy, play crucial roles in influencing young people's eating behaviours, dietary choices and health. However, persistent inequalities and ethical issues require urgent attention to ensure these determinants impact young people's nutrition in a positive way.

The rise of digital tools such as smartphones and the Internet has transformed young people's access to nutritional information, encouraging education and self-monitoring. However, disparities remain between high- and low-income regions, limiting access to resources and resulting in variable quality of information. Telenutrition offers effective remote consultations for the management of nutritional diseases, but its adoption faces regulatory and training challenges, particularly in low- and middle-income countries. AI improves personalized nutritional recommendations, but raises ethical issues concerning data confidentiality and potential bias. Social networks can promote healthy eating, but also spread misinformation, increasing the risk of poor food choices among young people. Developing a positive nutritional digital culture is essential to improving nutritional health in the long term.

This analysis underlines the need for robust public policies that promote digital inclusion and which ensure the quality of available information about nutrition. At the same time, it is imperative to develop the digital skills of healthcare professionals so that they can maximize the impact of digital interventions. Regulating online content and promoting media literacy are also essential to protect young people from the risks associated with misinformation.

Future research needs to focus on long-term evaluation of the effectiveness of digital interventions on nutrition and on ensuring that they are equitably accessible. Furthermore, in-depth reflection on ethical issues, particularly around AI and social networks, will be essential to ensure beneficial and inclusive evolution. Moreover, implementation research on telenutrition in low and middle-income countries is required to enhance nutrition care accessibility in these areas.

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**About DTH-Lab**

DTH-Lab is a global consortium of partners working to drive implementation of The Lancet and Financial Times Commission on Governing Health Futures 2030's recommendations for value-based digital transformations for health co-created with young people. DTH-Lab operates through a distributive governance model, led by three core partners: Ashoka University (India), DTH-Lab (hosted by the University of Geneva, Switzerland) and PharmAccess (Nigeria).

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DIGITAL TRANSFORMATIONS FOR HEALTH LAB

GOVERNING HEALTH FUTURES 2030

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