

# **Food Literacy: The Link Between School-Based Food Literacy and Dietary Patterns in Young Adulthood**

*A Thesis Presented as part of fulfillment for the Award of Master of  
Science in Food Business Management and Technology*

*By*

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*For Research Carried Out Under the Guidance of*

**Cal McCarthy**

**Submitted to the Department of Applied Sciences**

**Technological University Dublin – Tallaght Campus**

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# Declaration

I confirm that the content presented in the submission for assessment in pursuit of the M.Sc. degree is solely the result of my own effort. I have not incorporated material from others except where duly cited and acknowledged within my work. Furthermore, none of the content in this thesis has been utilized in the pursuit of another degree or qualification, either at this institution or any other.

Signed: 

Date: 17.06.2024

Student Name (Isabella Scur)

# Acknowledgements

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Lastly, I would like to thank all my friends, colleagues, and everyone who contributed to this thesis in various ways. Your support, whether through discussions, feedback, or simply being there, has been crucial to the completion of this work.

*This thesis is dedicated to my family. Whose unwavering support, encouragement, and belief in my abilities have been the driving force behind my academic journey. Your sacrifices and guidance have shaped me into the person I am today*

# Abstract

In response to Ireland's high rates of overweight and obesity, this thesis examines the urgent need to integrate food literacy into the school curriculum. The significant prevalence of these health issues both in Ireland and across Europe highlights the necessity for a comprehensive educational approach that empowers individuals to make informed and healthy dietary choices from an early age.

This research is based on a survey conducted in May 2024, involving 99 young adults aged 19 to 24. The survey explored their attitudes and perceptions regarding food literacy, dietary habits, food label knowledge, and motivations behind their food choices, and what they had learned about food in school. The findings indicate a noticeable willingness among participants to embrace food literacy within the curriculum.

Participants identified several key motivators for supporting food literacy in schools, including public health concerns, and the cultivation of responsible and mindful eating habits. A significant portion expressed a desire for a more comprehensive understanding of nutrition, food labels, food components and, the long-term consequences of dietary choices. The survey also revealed barriers to understanding food labels, highlighting the need for higher consumer education efforts.

In conclusion, the results underscore the importance of incorporating food literacy into school curriculums as a proactive measure to address the challenges of overweight and obesity and the diseases that they can cause. Implementing targeted educational campaigns, policy advocacy, and curriculum development focused on food education can significantly contribute to the promotion of healthier lifestyles, sustainable food practices, and overall population well-being in Ireland. This thesis advocates for policymakers to prioritize food literacy in schools, recognizing its pivotal role in shaping the future health and economic sustainability of the nation.

# List of Abbreviations

ADHD	Attention Deficit Disorders
BMI	Body Mass Index
CSO	Central Statistics Office
CVD	Cardiovascular Disease
EU	European Union
EFCNI	European Foundation for the Care of Newborn Infants
FH	Food Habits
GDPR	General Data Protection Regulation (EU)
GDP	Gross Domestic Product
GNR	Global Nutrition Report
HFSS	High Fat, Sugar, and Salt
HSE	Health, Safety and Environment
MS	Microsoft Form
NCDs	Non-Communicable Diseases
OAF	Obesity Related Diseases
PUFA	Polyunsaturated Fatty Acids
SFA	Saturated Fatty Acids
RECAP	Research on European Children and Adults Born Preterm

THE	Total Health Expenditure
UPF	Ultra-Processed Food
UPFD	Ultra-Processed Food and Drink
WHO	World Health Organization
WOF	World Obesity Federation

# Table of Contents

<b>Declaration .....</b>	<b>ii</b>
<b>Acknowledgements .....</b>	<b>iii</b>
<b>Abstract .....</b>	<b>v</b>
<b>List of Abbreviations .....</b>	<b>vi</b>
<b>Table of Contents .....</b>	<b>viii</b>
<b>List of Tables .....</b>	<b>x</b>
<b>List of Figures .....</b>	<b>xi</b>
<b>Chapter 1: Introduction .....</b>	<b>1</b>
1.1 Nutrition and Health Status of the EU Population.....	2
1.1.1 Nutrition and Health Status of the Irish Population .....	11
1.1.2 Food Portion Impacts of Overweight and Obesity.....	16
1.1.3 Eating Behaviour and Globalization .....	18
1.1.4 Food Environment and Food Marketing .....	20
1.1.5 Food Portions .....	21
1.1.6 Knowledge about Food and Food Labels.....	26
1.1.7 Food Portions .....	26
1.1.8 Food Portions in Schools Throughout Europe .....	26
1.2 Rationale for this Research .....	28
<b>Chapter 2: Methods .....</b>	<b>29</b>
2.1 Introduction to Research .....	30
2.2 Study Design.....	30
2.3 Participant Recruitment and Consent .....	30
2.4 Questionnaire Design .....	32
2.5 Data Analysis .....	33
2.6 Ethical Considerations .....	33

<b>Chapter 3: Results .....</b>	<b>35</b>
3.1 Participant Profile .....	36
3.2 Section One: Awareness by the Irish Population of Food .....	37
3.2.1 Awareness by the Irish Population of Food Label and Food Components.....	37
3.3 Section Two: Food Literacy in School .....	48
<b>Chapter 4: Discussion .....</b>	<b>54</b>
4.1 Aim of Research and Overview of Key Findings .....	55
4.2 Health Status of the EU and Irish Population .....	55
4.3 Exploring Food Knowledge and Label Understanding – Insights from Survey Responses .....	56
4.4 Food Literacy and Education in Irish Schools – Insights from Survey Responses .....	57
4.5 Importance of Food Literacy and Implementation of Food Education in School-Based .....	58
4.6 Limitations of this Research .....	59
<b>Chapter 5: Conclusion and Future Work.....</b>	<b>61</b>
6.1 Conclusion.....	62
6.2 Future Work .....	63
<b>Appendices .....</b>	<b>65</b>
Appendix A – Copy of Research Questionnaire .....	66
Appendix B – TU Dublin Ethics Approval Document .....	74
<b>References.....</b>	<b>75</b>

# List of Tables

<b>Chapter 1: Introduction</b>		<i>Page</i>
Table 1.1	The share of the overweight population by sex and age in 2019.	3
Table 1.2	Examples of countries predicted to have over 88% of the entire population (adults and children) experiencing overweight or obesity by 2060.	14
Table 1.3	Economic impact of overweight and obesity in Ireland.	18

# List of Figures

<b>Chapter 1: Introduction</b>	<i>Page</i>
Figure 1.1 Deaths attributable to dietary risk factors by cause of death for Risks related to dietary composition and weight levels 2010-18.	2
Figure 1.2 The relation between ultra-processed food and mortality in CVD individuals, 2021.	5
Figure 1.3 Frequency of consumption of fruit and vegetables in EU, 2019.	6
Figure 1.4 Global malnutrition according to the GNR 2020.	7
Figure 1.5 Percentage of live births with a gestational age <32 weeks and between 32-36 weeks in 2015.	8
Figure 1.6 Prevalence of overweight status of both males and females in Ireland based on adults 2000-20.	12
Figure 1.7 Prevalence of obesity status of both males and females in Ireland based on adults 2000-20.	12
Figure 1.8 Prevalence of overweight status of both males and females in Ireland based in children and adolescents 2000-20.	13
Figure 1.9 Prevalence of overweight status of both males and females in Ireland based in children and adolescents 2000-20.	13
Figure 1.10 Average rates of mortality attributed to diets and weight and the associated diseases causing the deaths in Ireland.	15
Figure 1.11 Scheme for estimating the economic impact of overweight and obesity economic impact = direct impact + indirect impact.	16
Figure 1.12 Scheme for estimating the economic impact of overweight and obesity economic impact = direct impact + indirect impact.	16
Figure 1.13 Estimated economic costs in 2020 to 2060 in country income group US\$ billions at 2019 prices.	17
Figure 1.14 Food literacy framework.	24
Figure 1.15 Participating children by school level and member state 2021 and 2022.	26

## **Chapter 2: Methods**

Figure 2.1	Survey monkey sample size calculation.	31
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## **Chapter 3: Results**

Figure 3.1	Breakdown of participants according to age group.	36
Figure 3.2	Breakdown of participants according to gender.	36
Figure 3.3	Participants' overall health status.	37
Figure 3.4	Frequency of food label checking among participants.	38
Figure 3.5	Aspects of nutrition facts panel on food labels checked by participants during grocery shopping.	39
Figure 3.6	Participants' level of confidence in understanding the information presented on food labels.	40
Figure 3.7	Barriers encountered by participants in understanding food labels.	40
Figure 3.8	Participants' awareness of recommended daily calorie intake for adults.	42
Figure 3.9	Level of familiarity of participants in understanding the Term “%Daily Value”.	42
Figure 3.10	Participants understanding of the differences and health effects associated with saturated fats and trans fats.	43
Figure 3.11	Participants understanding of the significance and health benefits of dietary fiber in food.	44
Figure 3.12	Participants' awareness of food sources of dietary fiber.	44
Figure 3.13	Participants' understanding of the significance and health benefits of correct daily intake of protein.	45
Figure 3.14	Level of confidence of participants in understanding the information presented on the traffic light label.	46
Figure 3.15	Level of familiarity of participants in understanding the meaning behind the colours of the traffic light label.	47
Figure 3.16	Influence of traffic light label colours on participants' purchasing decisions.	48

Figure 3.17	Participants' beliefs regarding the addition of health ratings to food labels.	48
Figure 3.18	Average of participants' schools that provided formal education or courses on nutrition, healthy eating, or food choices.	49
Figure 3.19	Rate of effectiveness of food education received in school in preparing participants for making healthy food choices.	50
Figure 3.20	Aspects emphasized in food education by participants' schools.	51
Figure 3.21	Participants' beliefs regarding the influence of food education acquired during school years on their adult food choices.	52
Figure 3.22	Participants' beliefs on increasing emphasis on nutritional education in schools based on their experiences.	52
Figure 3.23	Participants' opinion on government investment in educational programs for understanding food labels and nutritional education to promote healthier eating habits.	53

# **Chapter 1: Introduction**

*The first wealth is health*

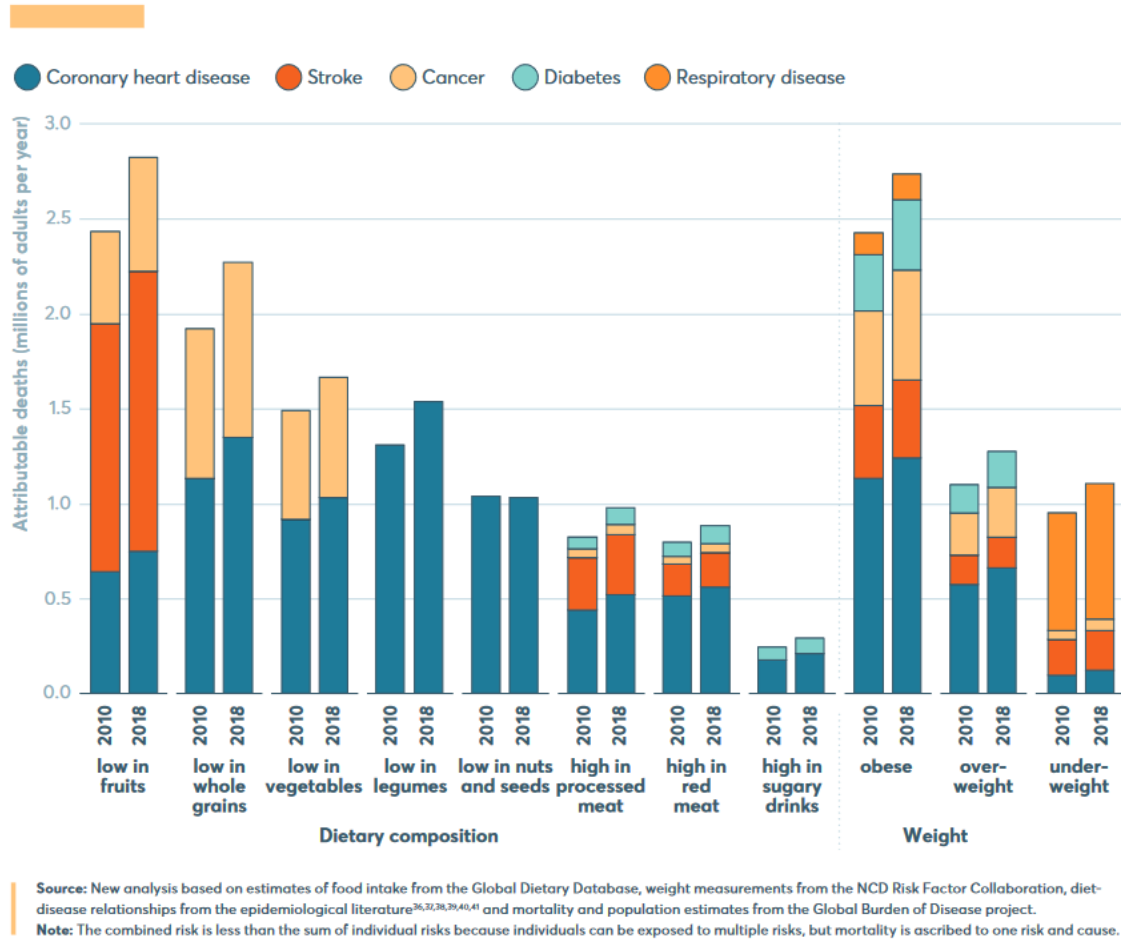
- Ralph Waldo Emerson

## 1.1 Nutrition and Health Status of the EU Population

According to the Global Nutrition Report, approximately half of the global population (48%) consumes either too many or too few calories, resulting in imbalanced weight levels. This imbalance includes individuals experiencing overweight (26%), obesity (13%), and underweight (9%). In 2018, poor diets were accountable for over 12 million avoidable deaths, constituting 26% of all adult deaths. This represents a 15% increase in the number of avoidable deaths due to diet compared to 2010, surpassing the population growth rate of 10% (Global Nutrition Report, 2021).

### The dietary health burden is increasing

Deaths attributable to dietary risk factors by cause of death for risks related to dietary composition and weight levels, 2010 and 2018



**Figure 1.1:** Deaths attributable to dietary risk factors by cause of death for risks related to dietary composition and weight levels, 2010 and 2018 (Taken from Global Nutrition Report, 2021).

Unhealthy eating habits rank as one of the primary risk factors for non-communicable diseases (NCDs), contributing to the annual deaths of 41 million individuals. This figure

accounts for 74% of all global fatalities (World Health Organization, 2023).

NCDs involve a wide range of health issues that deeply affect people's lives and put a strain on healthcare systems globally. These conditions include heart disease, diabetes, chronic lung diseases, mental health disorders, neurological issues, and cancer (European Commission, n.d.).

The table 1.1 below displays the percentage of the population categorized as overweight in 2019 in Europe, sorted by age group. A noticeable trend shows that people tend to be overweight as they get older. Specifically, the age group '18 to 24' exhibited the lowest percentage of overweight individuals (25.0%), whereas the '65 to 74' age group showed the highest proportion (65.7%). Notably, exceptions to this trend were observed in Denmark, Ireland, Sweden, Norway, and Turkey, where the highest percentage of overweight individuals was found in the '54 to 64' age group (Eurostat, 2021).

**Share of overweight population by sex and age, 2019**  
(%)

	Males		Females		Total					
	18 years or over	18 years or over	18 years or over	18 to 24	25 to 34	35 to 44	45 to 64	65 to 74	75 years or over	
<b>EU</b>	60.2	45.7	52.7	25.0	39.3	49.7	59.8	65.7	59.3	
Belgium	56.2	44.6	50.2	26.2	36.2	49.0	57.3	62.6	52.7	
Bulgaria	64.3	46.3	54.9	23.2	37.2	48.8	63.4	70.2	62.6	
Czechia	69.8	50.6	60.0	20.9	43.3	57.8	68.7	76.4	67.8	
Denmark	57.8	43.3	50.4	26.0	40.0	50.1	59.6	57.6	50.5	
Germany	60.7	46.5	53.5	28.2	40.8	52.3	60.0	66.1	57.4	
Estonia	61.7	52.3	56.7	26.5	35.9	51.5	67.0	75.7	67.8	
Ireland	62.3	46.4	54.4	39.7	52.1	52.9	61.5	59.7	57.5	
Greece	66.8	49.1	57.6	23.4	39.7	50.4	66.0	74.7	68.8	
Spain	61.7	45.9	53.7	25.1	37.4	49.6	60.4	68.3	66.0	
France	52.9	42.0	47.2	22.3	37.8	43.7	53.9	57.2	53.6	
Croatia	73.2	58.5	64.8	27.3	45.1	59.8	69.3	78.7	70.0	
Italy	55.3	37.1	45.7	18.0	31.2	39.7	49.9	58.8	55.0	
Cyprus	59.4	40.8	49.8	23.5	32.7	49.2	61.6	65.7	64.7	
Latvia	60.1	56.9	58.3	22.3	38.9	52.4	67.8	73.5	71.7	
Lithuania	60.2	53.9	56.8	20.1	40.0	48.2	69.1	74.0	65.5	
Luxembourg	58.5	38.4	48.4	24.1	36.5	46.7	56.9	62.5	57.1	
Hungary	67.3	53.3	59.9	31.3	43.9	55.4	68.4	76.4	67.3	
Malta	71.0	58.0	64.8	38.6	56.6	66.1	73.3	73.7	72.5	
Netherlands	55.1	45.1	50.0	25.0	39.4	49.8	57.4	60.2	54.3	
Austria	60.6	44.1	52.2	27.2	39.0	48.3	59.9	66.4	58.7	
Poland	66.9	50.2	58.1	26.6	43.4	55.3	67.8	73.7	65.4	
Portugal	60.9	51.5	55.9	27.6	38.9	52.3	62.9	70.4	63.6	
Romania	66.9	50.9	58.7	25.4	42.8	55.4	70.2	72.3	62.3	
Slovenia	66.3	49.8	58.1	26.1	42.7	53.3	66.1	72.9	68.8	
Slovakia	67.3	50.5	58.7	23.8	42.0	58.0	68.3	77.3	73.0	
Finland	62.5	55.8	59.0	30.4	45.9	58.9	65.9	69.1	65.7	
Sweden	57.1	45.7	51.3	27.5	39.7	50.3	60.9	60.1	52.4	
Norway	57.7	43.3	50.6	28.2	40.8	50.9	61.0	57.6	49.2	
Serbia	62.7	45.0	53.6	24.1	42.1	51.8	62.4	65.1	53.8	
Turkey	59.8	57.8	58.8	26.9	44.8	65.1	74.3	73.3	59.8	

Source: Eurostat (online data code: hlth\_ghis\_bm1e)

eurostat 

**Table 1.1:** The share of the overweight population by sex and age in 2019 (Taken from Eurostat, 2021).

Adult obesity is expected to increase by over 60% between 2020 and 2035. By the year 2035, projections suggest that one out of every five women and one out of every seven men will be grappling with obesity, defined as a Body Mass Index (BMI) equal to or exceeding 30 kg/m<sup>2</sup>. This prevalence is expected to affect over 1.9 billion people worldwide (World Obesity Atlas, 2024).

Governments around the world are increasingly recognizing obesity as a major public health issue (Ashoori *et al.*, 2021). Obesity significantly raises the risk of chronic illnesses and, for some people, is linked to a variety of psychological problems (Eurostat, 2021).

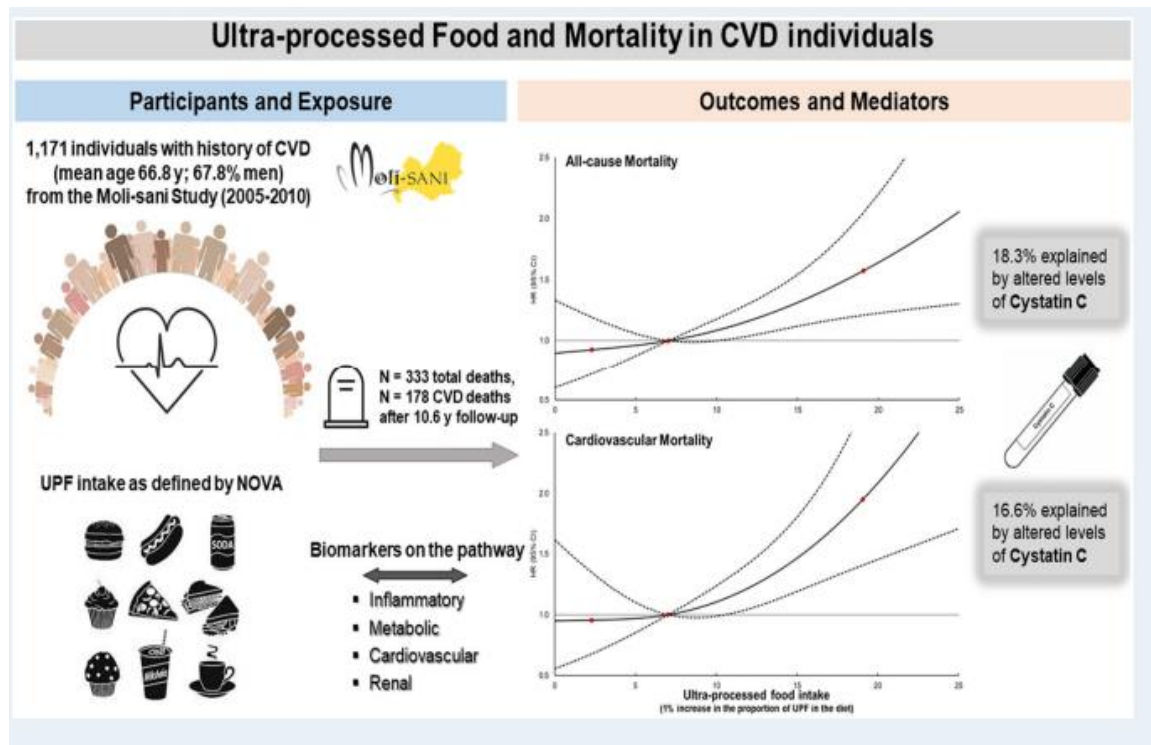
Multiple studies have explored public health concerns, revealing that these issues often arise from consumers' irrational choices when selecting unhealthy food items. The root cause of unhealthy food consumption is attributed to significant changes in individual eating behaviours over the past five decades (Zafar *et al.*, 2022).

These changes are evident in the increased consumption of fats, artificial sweeteners, and animal-derived foods in people's diets. The evolving dietary landscape points to a broader trend of adopting a 'Western diet' globally. This pattern is marked by a high intake of ultra-processed foods and drinks (UPFD), such as refined carbohydrates, sugars, fats, processed foods, and animal products. However, it also includes a significant lack of fruits and vegetables (Clemente-Suárez *et al.*, 2023).

A study of dietary patterns across Europe provides valuable insights by analysing total food consumption, energy intake, and the proportion of ultra-processed food consumption. Ultra-processed foods are defined as industrial products with five or more ingredients, undergoing extensive processing and often containing additives, preservatives, and artificial flavours. On average, European adults consume 328 grams of ultra-processed foods per day, which makes up 12.0% of their daily food intake. The average energy intake from these foods is 562 kcal per day, accounting for a significant 27.2% of their total energy intake (Mertens *et al.*, 2021).

The results shown in Figure 1.2 below are from a study involving 184,816 participants. The findings suggest that a high intake of Ultra-Processed Foods (UPF) is linked to a

58% rise in the risk of cardiovascular disease (CVD) mortality and a 52% higher likelihood of death from heart disease or cerebrovascular incidents. In addition, the study found an association between increased consumption of UPF and renal function. This highlights the multifaceted impact of UPF on health outcomes, affecting not only cardiovascular health but also renal function (SAFE - Safe Food Advocacy Europe, 2021).

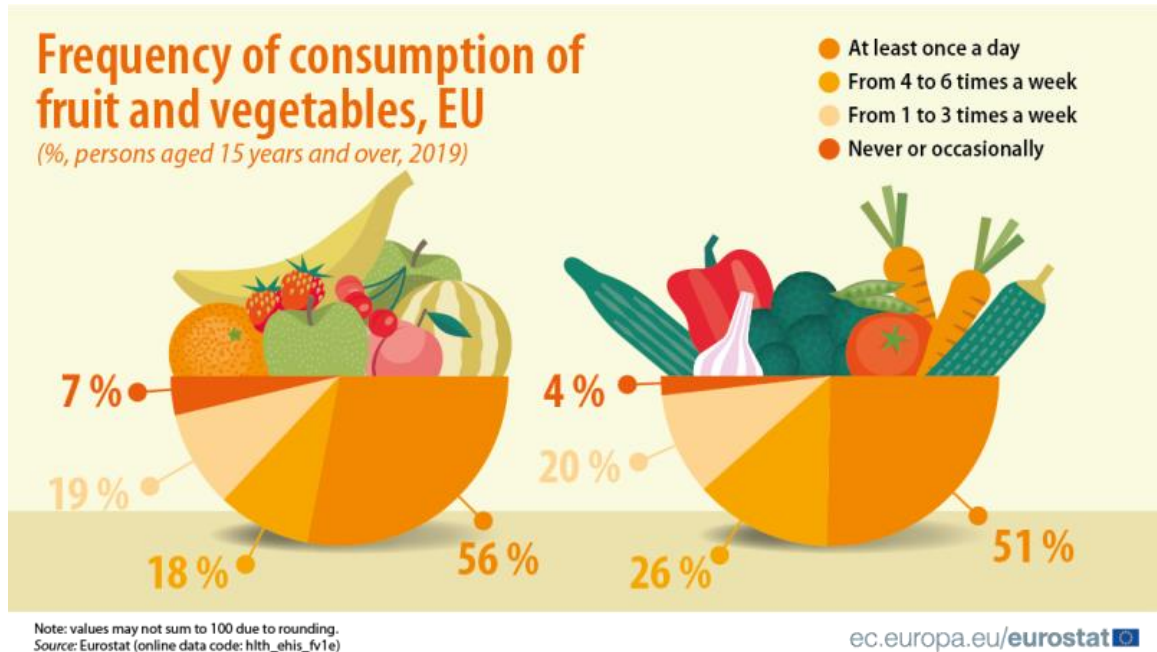


**Figure 1.2:** The relation between ultra-processed food and mortality in CVD individuals (Taken from (SAFE - Safe Food Advocacy Europe, 2021).

On the other hand, while discussing UPF, it is crucial to note that the consumption of fruits and vegetables does not align with the guidelines set out by the European Union (EU). According to WHO recommendations, aiming to consume over 400 grams of fruits and vegetables daily can increase general well-being. This equates to approximately five portions per day (World Health Organization, 2020).

Figure 1.3 below illustrates the frequency of fruit and vegetable consumption in the EU. According to the data, approximately half of the population (51%) consumes vegetables at least once daily. Another 26% engage in vegetable consumption 4 to 6 times a week, while 20% consume them 1 to 3 times a week, with 4% reporting never or rarely

consuming. Regarding fruit consumption, 56% consume fruits at least once daily, 18% consume from 4 to 6 times a week, 19% consume 1 to 3 times a week, and 7% never or rarely consume fruits (Eurostat, 2019).



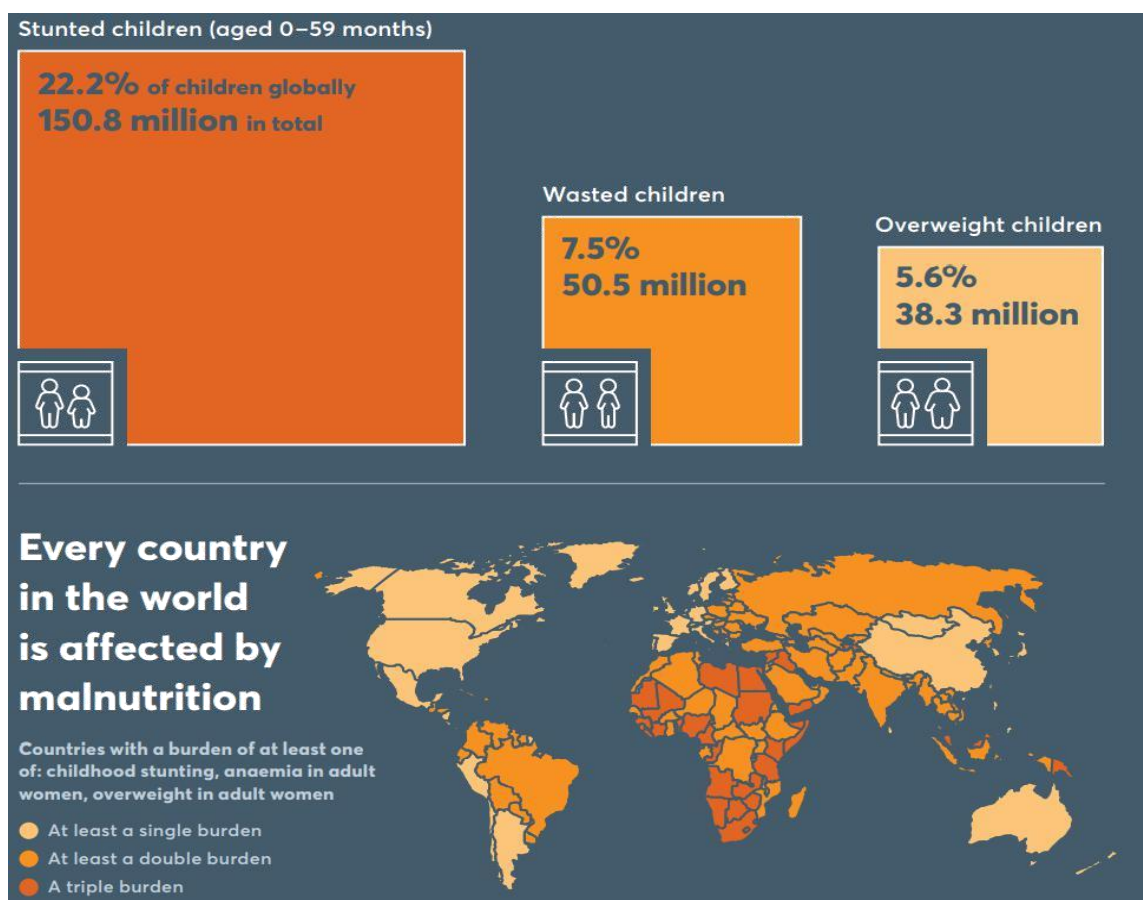
**Figure 1.3:** The frequency of consumption of fruit and vegetables in the EU (Taken from Eurostat, 2019).

As dietary preferences often form during childhood, schools play a pivotal role in shaping children's eating habits. According to Verdonchot *et al.*, (2020), educational institutions serve as effective environments for introducing healthy dietary behaviours in young learners. During the transition from adolescence to adulthood, late teens and young adults experience significant lifestyle changes, such as moving to independent living. This phase marks a period where individuals assume more responsibility in planning, selecting, and preparing meals compared to their younger counterparts. Understanding food and nutrition becomes increasingly important during this developmental phase. The knowledge and skills acquired during this period significantly influence dietary choices and impact long-term health consequences (Ashoori *et al.*, 2021).

Several studies have revealed that a significant proportion of children fail to meet the recommended guidelines for food-based dietary intake, showing particularly lower consumption of fruits and vegetables but higher intake of meat and sugar (Kupka *et al.*, 2020). This trend results in elevated levels of saturated fatty acids (SFA) and salt,

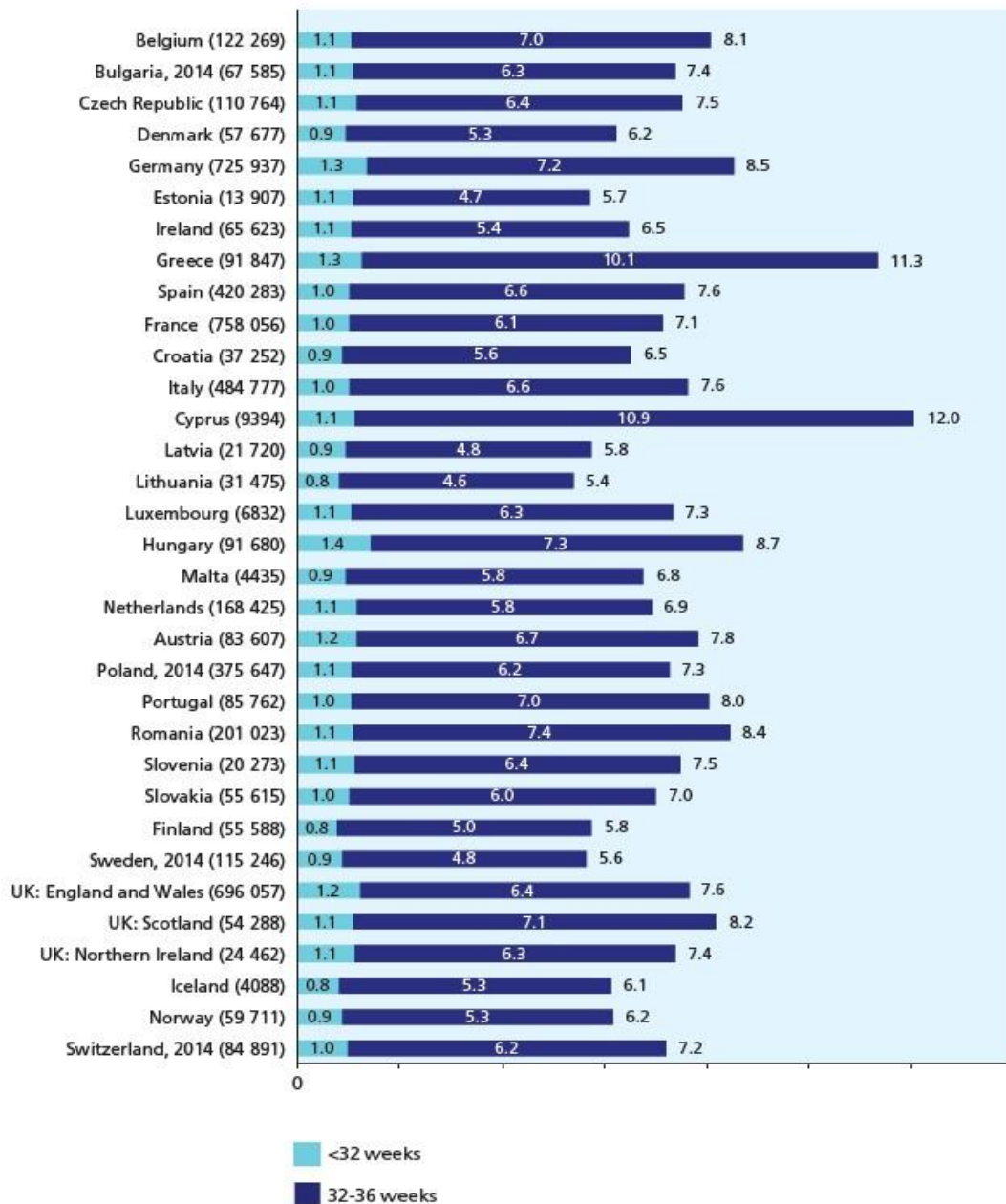
alongside insufficient intake of polyunsaturated fatty acids (PUFA), vitamin D, folate, and iodine (Monnard and Fleith, 2021).

The Global Nutrition Report from 2020, sheds light on two significant nutritional challenges faced by children, as illustrated in Figure 1.4. Firstly, the data indicates that 22.2% of children aged 0-59 months are affected by stunting, characterized by below-average height for their age, often indicative of chronic malnutrition with potential long-term consequences on both physical and cognitive development. Secondly, the report highlights that 7.5% of children are classified as wasted, suggesting severe malnutrition or illness, with weight falling below the expected range for their height. Wasting reflects periods of undernutrition, resulting in the reduction of muscle and fat tissue. Additionally, the report shows that 5.6% of children are overweight, suggesting a separate but equally worrying nutritional concern, indicating a dietary imbalance (Global Nutritional Report, 2020).



*Figure 1.4: Global malnutrition according to the Global Nutrition Report 2020 (Taken from Global Nutrition Report, 2020).*

Expanding upon the discussion of childhood nutrition, it becomes evident that addressing maternal and infant well-being goes beyond just what they eat and involves broader social factors. Alongside the challenges of stunting and childhood obesity, the problem of preterm births is a big concern in global health. In Europe, preterm birth is one of the top two causes of newborn deaths and leads to over half of childhood deaths later on. The rate of preterm birth varies from 5.4% to 12.0%, averaging 7.3% of all live births (EFCNI, 2023). The figure 1.5 below shows the percentage of live births born preterm every year in European countries.



**Figure 1.5:** Percentage of live births with a gestational age <32 weeks and between 32-36 weeks in 2015 (Taken from RECAP preterm Horizon, 2020).

In addition, it is crucial to recognize that preterm birth not only poses a significant risk to infant mortality but also impacts the long-term health and development of surviving children. Those children who do survive have a higher risk of future health-related and developmental problems. These can range from serious motor and sensory problems to attention deficit disorders (ADHD) and learning difficulties. Clinical complications may include chronic lung disease, acute respiratory and/or gastrointestinal problems, as well as visual losses or severe infections (Hodek *et al.*, 2011).

Experts have identified several factors that may elevate the risk of preterm birth, with lifestyle patterns being one of the determinants. These patterns include aspects such as an imbalanced diet and extremes in weight, like being underweight or overweight (obesity) (EFCNI, 2023).

While working for the government on a project to investigate federal spending on health care, Paul O'Neill found that infant mortality was a major problem. Despite being one of the richest countries, the United States had higher infant death rates than many European countries and some parts of South America, especially in rural areas. His research showed that to reduce preterm births and malnutrition, it's crucial to focus on women's nutrition even before they get pregnant. O'Neill emphasized that a woman's health before conception greatly impacts pregnancy outcomes. A healthy preconception phase leads to better pregnancies and healthier babies (The cycle of Paul's habit, 2023).

O'Neill pushed for early intervention, starting well before pregnancy, to improve women's dietary habits. He believed the government should promote food literacy among women, teaching them about nutrition and healthy eating. Recognizing this need, he supported including food literacy in school curriculums. By educating women on pre-pregnancy nutrition, O'Neill aimed to tackle malnutrition, which he saw as the key to healthier mothers and children (The cycle of Paul's habit, 2023).

O'Neill's research also revealed that poor teacher training was one of the causes of high infant mortality rates. If you had asked doctors or public health officials for strategies to reduce infant deaths, none would have proposed improving teacher education. They were unaware of the connection. However, by educating teachers, you enabled them to pass on this knowledge to students, who subsequently adopted healthier eating habits and, in

later years, gave birth to stronger babies. O'Neill's advocated for changes in higher education to give teachers a solid understanding of food and nutrition, enabling them to educate their students effectively. After starting his project, the U.S. infant mortality rate dropped by 68 percent from when O'Neill began his work (The cycle of Paul's habit, 2023).

Given the prevalence of unhealthy habits among children and the potential long-term effects, it is clear that evidence-based policies are needed. Integrating nutritional education into school curriculums is crucial for promoting healthier dietary choices (Chojnacka, Górnicka, and Szewczyk, 2021). Teaching children about food can reshape food systems because children often influence their families' purchasing decisions. As they grow, they become more independent and make their own choices, contributing to broader changes in eating habits (Ares *et al.*, 2023).

Nutrition education should start in primary school. Teaching young children about the link between food and health helps them develop lifelong positive attitudes toward nutrition. This early focus is crucial because it establishes healthy eating habits well before secondary school, where formal food education typically begins. By starting early, we can better address and prevent long-term health issues (Bennett, 2023).

Cultivating healthy nutritional skills and behaviours is essential. This involves not only teaching children what a healthy diet looks like but also helping them critically assess food choices and understand nutritional information. Empowering children with these skills can help them navigate a complex food environment and make choices that support their long-term health, contributing to their healthy growth and consequently reducing the high rates of overweight and obesity among children and adolescents (Bennett, 2023).

To effectively address the growing nutritional health issues, it is vital to improve both individual and societal understanding of nutrition (Koca and Arkan, 2020). This includes not only teach children but also educating teachers so they can effectively convey nutritional knowledge to their students. By equipping teachers with the right tools and knowledge, we can ensure that nutrition education is delivered effectively, setting the stage for healthier future generations (The cycle of Paul's habit, 2023).

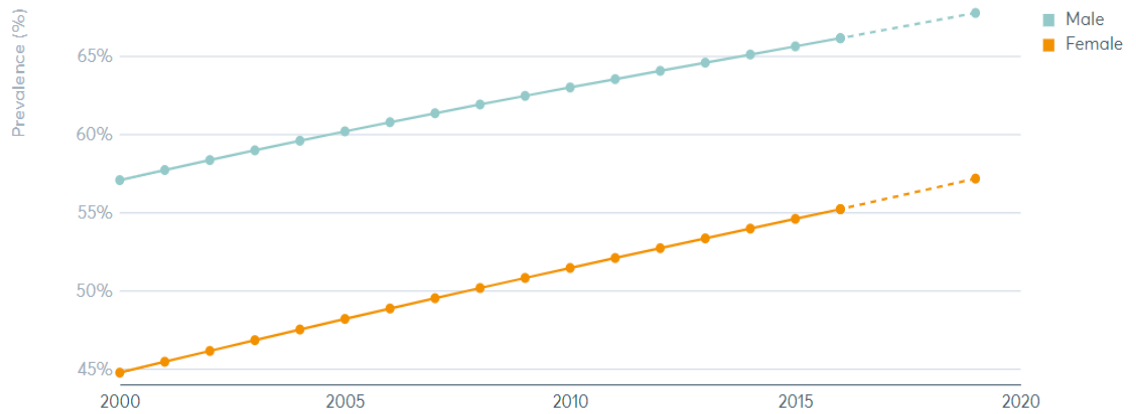
### **1.1.1 Nutrition and Health Status of the Irish Population**

According to the findings from the Global Nutrition Report 2020, the dietary habits of adults aged 18 years and over in Ireland reveal a notable gap between recommended and actual consumption of key foods. The report indicates that the average national intake of certain essential food groups falls significantly below the established targets (Global Nutrition Report, 2020).

For fruits, the recommended daily target is 200g, but the national consumption averages only 78.4g, representing just 39% of the recommended amount. Similarly, in the case of vegetables, with a target of 300g per day, the average national consumption is 116.6g, also reaching only 39% of the recommended intake. Legumes, with a daily target of 100g, see an even lower consumption, averaging 22.3g, which is only 22% of the recommended amount. Nuts, with a target of 25g per day, are consumed at an average of 12.9g, representing 52% of the recommended intake. Whole grains, with a recommended daily target of 125g, have an average national consumption of 58g, accounting for only 47% of the recommended amount. The gaps between current consumption and recommended targets highlight the significance of promoting healthier eating habits and raising awareness about the nutritional benefits of these food groups (Global Nutrition Report, 2020).

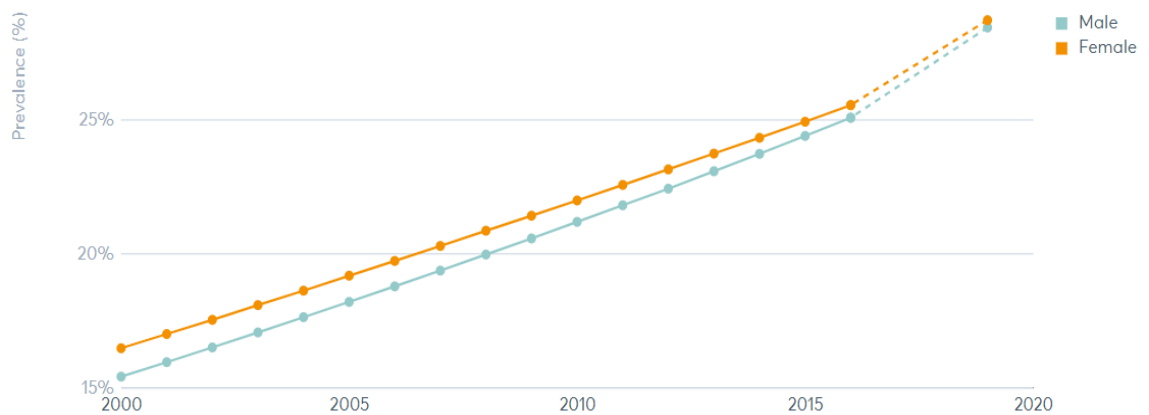
The increasing rates of obesity present a significant obstacle to the country's achievement of established health objectives. This health challenge is linked to dietary patterns characterized by an excessive intake of processed and nutritionally imbalanced foods. Figures 1.6 and 1.7 illustrate this concerning trend, highlighting the urgent need for intervention and targeted strategies to address the root causes of unhealthy eating habits in Ireland (Global Nutrition Report, 2020).

As illustrated in Figure 1.6, the data for 2020 reveals that 67.7% of the male population and 57.1% of the female population in Ireland were classified as overweight. (Global Nutrition Report, 2020). Overweight is characterized by a BMI equal to or greater than 25kg/m<sup>2</sup> (BMI $\geq$ 25) (MSD Manuals, n.d.).



**Figure 1.6:** Prevalence (%) of overweight status of both males and females in Ireland between 2000 and 2020. Prevalence (%) estimates in this report are based on adults aged 18 years and over. (Taken from Global Nutrition Report, 2020).

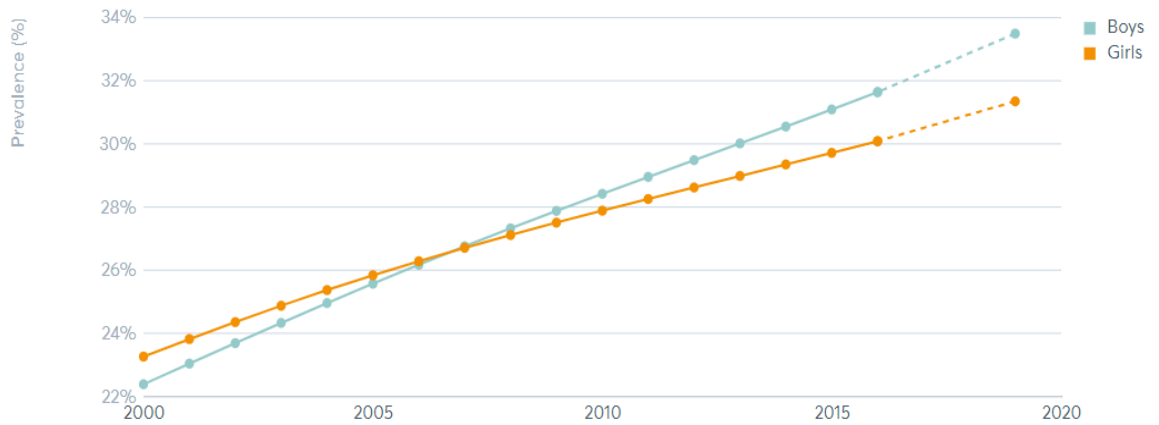
Figure 1.7 shows that in 2020, 28.4% of the male population and 28.7% of the female population in Ireland were identified as obese, as reported in the Global Nutrition Report, 2020. Obesity is characterized by a BMI equal to or greater than 30kg/m<sup>2</sup> (BMI $\geq$ 30) (MSD Manuals, n.d.).



**Figure 1.7:** Prevalence (%) of Obesity status of both males and females in Ireland between 2000 and 2020. Prevalence (%) estimates in this report are based on adults aged 18 years and over. (Taken from Global Nutrition Report, 2020).

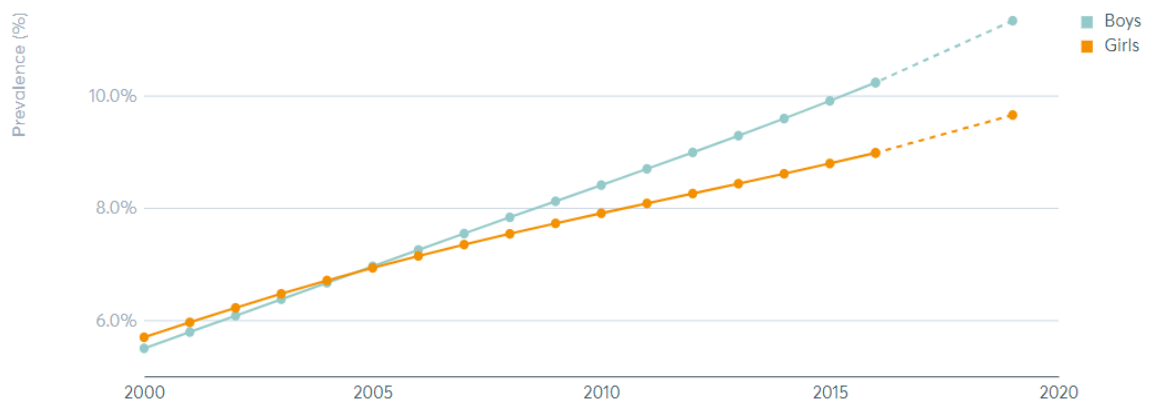
Childhood obesity and overweight rates in Ireland pose a significant challenge to achieving optimal health outcomes for the younger generation. Unhealthy dietary habits, marked by an excessive consumption of processed and nutritionally deficient foods, are major contributors to this concerning issue. Figures 1.8 and 1.9 highlight the scale of the problem (Global Nutrition Report, 2020).

Figure 1.8 highlights significant statistics, indicating that in 2020, 33.5% of boys and 31.3% of girls in Ireland were classified as overweight, according to data from the Global Nutrition Report, 2020.



**Figure 1.8:** Prevalence (%) of Overweight status of both males and females in Ireland between 2000 and 2020. Prevalence (%) estimates in this report are based in children and adolescents aged 5-19 years. (Taken from Global Nutrition Report, 2020).

Figure 1.9 shows that in 2020, 11.3% of boys and 9.7% of girls in Ireland were identified as obese, based on data from the Global Nutrition Report, 2020.



**Figure 1.9:** Prevalence (%) of Obesity status of both males and females in Ireland between 2000 and 2020. Prevalence (%) estimates in this report are based in children and adolescents aged 5-19 years. (Taken from Global Nutrition Report, 2020).

For adults, the considerable proportions of overweight individuals and the substantial rates of obesity underscore the difficulties in reaching optimal health outcomes. Similarly, among children, the notable percentages of both overweight and obese cases

highlight the crucial need for early intervention and the promotion of healthier dietary habits from an early age (Global Nutrition Report, 2020).

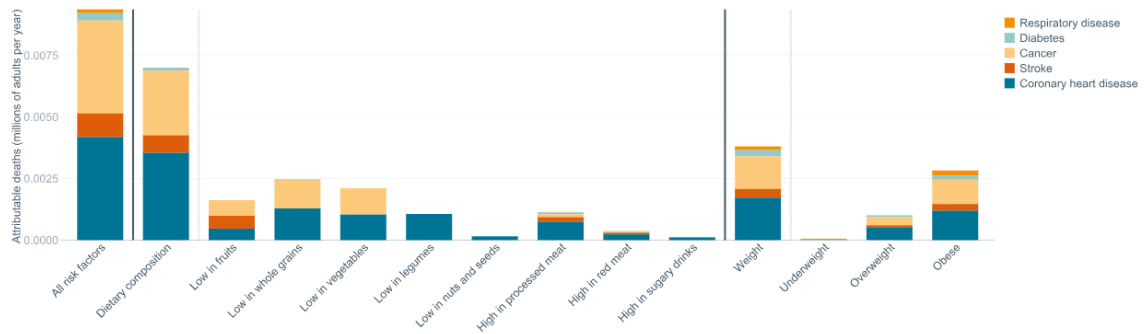
The table 1.2 below illustrates examples of countries expected to exhibit extremely high prevalence levels, with over 88% of their entire populations (including adults and children) experiencing overweight or obesity by 2060. According to the World Obesity Federation (WOF) report, by 2060, the prevalence levels of overweight and obesity in Ireland are projected to reach 89% (World Obesity Federation, 2022).

	Overweight prevalence 2060		Overweight prevalence 2060
Samoa	97%	Jamaica	90%
Oman	95%	Montenegro	90%
Costa Rica	94%	Syrian Arab Republic	90%
Turkey	94%	Egypt	89%
Malaysia	94%	Lebanon	89%
Algeria	93%	Ireland	89%
Dominican Republic	93%	Qatar	89%
Saudi Arabia	93%	Panama	89%
Botswana	92%	Guatemala	89%
El Salvador	92%	Mexico	89%
Jordan	92%	Libya	89%
Iran	92%	Bolivia	88%
South Africa	92%	Brazil	88%
United States of America	91%	Bahamas	88%
Paraguay	90%	Kuwait	88%

**Table 1.2:** Examples of countries predicted to have over 88% of the entire population (adults and children) experiencing overweight or obesity by 2060 (Taken from WOF, 2022).

When exploring its impact on public health, Figure 1.10 below shows fatalities linked to dietary composition. This ranges from diets lacking in fruits, vegetables, and whole grains to those heavy in processed meats, red meats, and sugary drinks. It also includes deaths related to different weight categories, from being underweight to overweight and obese. A diet that deficiencies balance significantly contributes to the development of various diseases, eventually leading to loss of life (Global Nutrition Report, 2020).

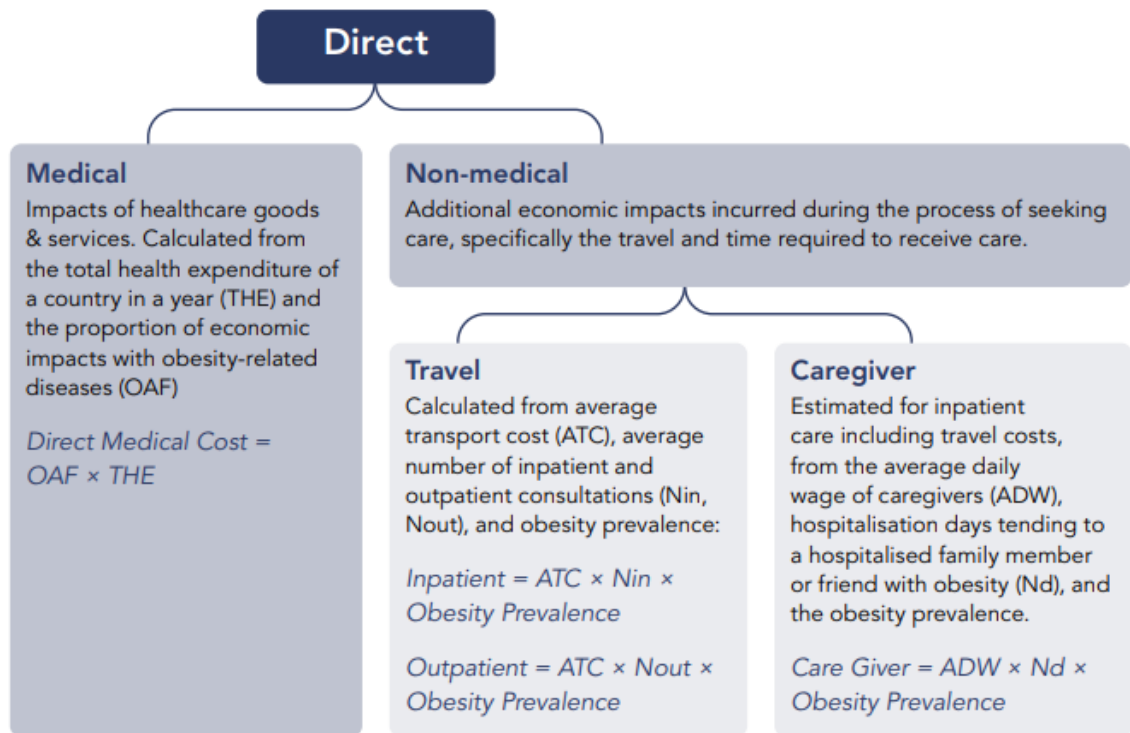
Mortality attributable to dietary composition and weight



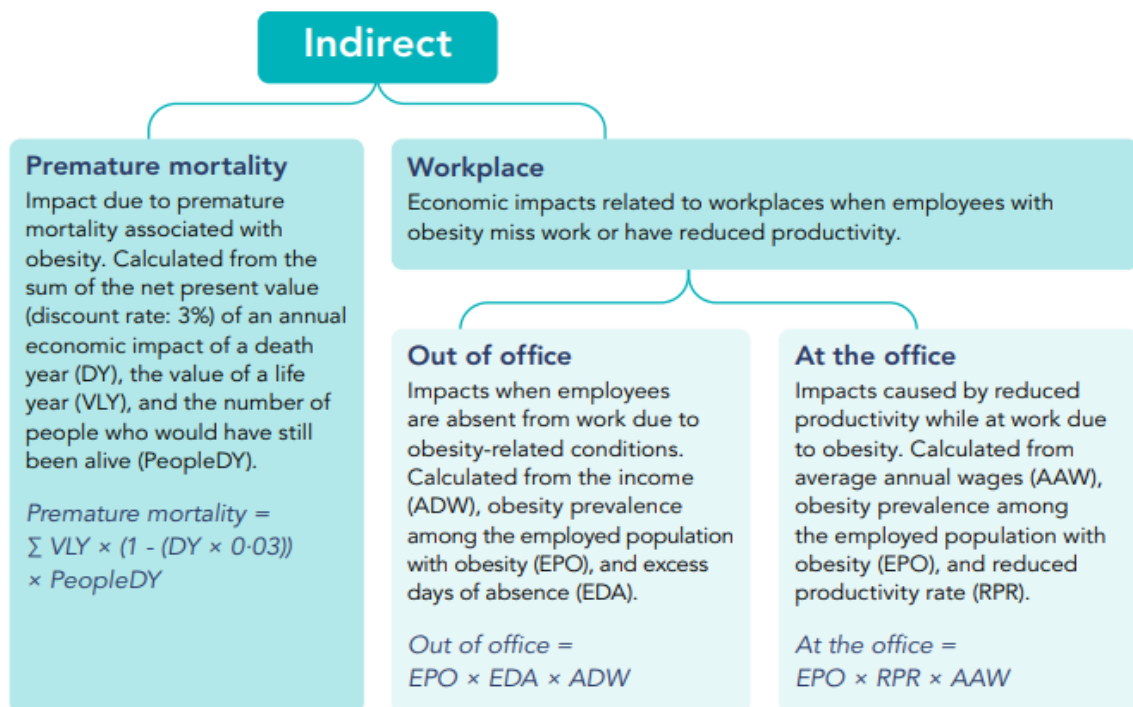
**Figure 1.10:** Average rates of mortality attributed to diets and weight and the associated diseases causing the deaths in Ireland (Taken from Global Nutrition Report, 2020).

### 1.1.2 Economic Impacts of Overweight and Obesity

The economic impact of obesity is calculated by considering both direct and indirect factors. The direct factors include medical aspects, derived from the total health spending (THE) of a country in a year and the proportion of economic impacts with obesity-related diseases. Additionally, non-medical expenses are taken into account, which includes the economic impacts involved in seeking care, such as travel costs and the time needed to receive care. The indirect costs of obesity involve various factors, including workplace-related economic impacts. These indirect costs manifest when employees with obesity miss work or experience reduced productivity, both inside and outside the office. Out-of-office impacts occur due to employees being absent because of obesity-related conditions, while at-the-office impacts arise from reduced productivity at work due to obesity. The impact of premature mortality is considered as indirect costs as well (World Obesity Federation, 2022).



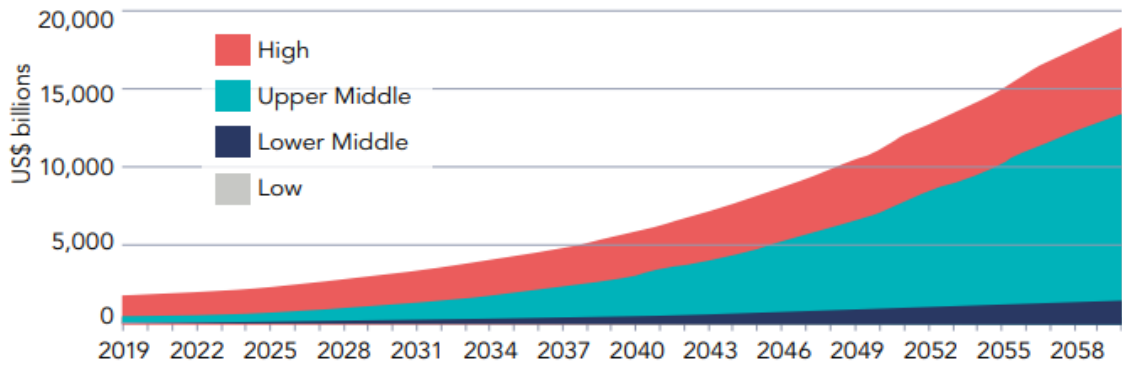
**Figure 1.11:** Scheme for estimating the economic impact of overweight and obesity economic impact = direct impact + indirect impact (Taken from World Obesity Federation, 2022).



**Figure 1.12:** Scheme for estimating the economic impact of overweight and obesity economic impact = direct impact + indirect impact (Taken from World Obesity Federation, 2022).

Without interventions, the economic and societal impacts of overweight and obesity are expected to be significant worldwide. With increasing population levels, changes in age

distributions, and assuming current trends in obesity prevalence continue, the global economic problem of overweight and obesity is projected to rise. Starting from just under US\$2 trillion in 2020, it is expected to exceed US\$3 trillion by 2030 and reach a shocking US\$18 trillion by 2060 (all at 2019 prices). This surge in costs will particularly impact upper middle-income countries and higher-income countries, impacting every region globally (World Obesity Federation, 2022).



**Figure 1.13:** Estimated economic costs in 2020 to 2060 in country income group US\$ billions at 2019 prices. (Taken from World Obesity Federation, 2022).

In 2019, the financial consequences of overweight and obesity in Ireland were approximated at US\$6.61 billion, equating to US\$1353 per person and constituting 1.7% of the Gross Domestic Product (GDP). Direct costs comprised 30.3%, while indirect costs accounted for the remaining 69.7% of the overall expenses (World Obesity Federation, 2022).

Looking ahead to 2060, it is anticipated that in Ireland the economic repercussions will surge to US\$50.34 billion. This projection translates to US\$8773 per capita, making up 2.1% of the GDP and signifying a 7.5-fold escalation in the total costs (World Obesity Federation, 2022).

## Breakdown of economic costs over time (standard model)

	2019	2030 (projected)	2060 (projected)
<b>Total economic cost (direct + indirect costs):</b>	<b>\$6.61bn</b>	<b>\$11.61bn</b>	<b>\$50.34bn</b>
<b>Total economic cost as % of GDP:</b>	<b>1.66%</b>	<b>1.70%</b>	<b>2.07%</b>
<b>Total economic cost per capita:</b>	<b>\$1,353</b>	<b>\$2,213</b>	<b>\$8,773</b>
Total direct costs:	\$2bn	\$3bn	\$7.9bn
Direct medical costs:	\$2bn	\$3bn	\$7.9bn
Direct-non-medical costs:	\$0bn	\$0bn	\$0bn
Total indirect costs:	\$4.61bn	\$8.61bn	\$42.45bn
Premature mortality costs:	\$3.21bn	\$6.56bn	\$38.47bn
Absenteeism costs:	\$0.92bn	\$1.35bn	\$2.63bn
Presenteeism costs:	\$0.49bn	\$0.71bn	\$1.35bn

All figures are in US\$

**Table 1.3:** *Economic impact of overweight and obesity in Ireland (Taken from World Obesity Federation, 2022).*

As discussed previously, the economic impacts of overweight and obesity are multifaceted, encompassing healthcare costs, productivity losses, and societal burdens. Transitioning to the economic impacts of surviving premature birth, we delve into a distinct realm of challenges. Premature infants who survive face numerous health-related complications as mentioned, including chronic lung disease, acute respiratory and gastrointestinal issues, visual impairments, and severe infections. These clinical complications not only necessitate extensive medical interventions but also contribute to substantial healthcare expenditures over the course of their lives. Additionally, the developmental challenges experienced by premature survivors, such as motor and sensory impairments, ADHD, and learning difficulties, require specialized educational support and rehabilitation services. These services incur additional costs and may involve individualized education programs, special classrooms, therapy sessions, and assistive devices (Hodek *et al.*, 2011).

### 1.1.3 Eating Behaviour and Globalization

Several studies have delved into public health concerns, uncovering a consistent theme: consumers frequently exhibit irrational behaviours when choosing unhealthy food items

(Zafar *et al.*, 2022). The way consumers approach food is one of the key components of their overall behaviour. It includes both the actions and attitudes related to meeting nutritional needs. Eating behaviour includes an extensive range of aspects, including choosing foods and dishes, how groceries are purchased and organized, methods for storing food, how meals are prepared, the composition of meals, and when and where meals are consumed (Kokkoris and Stavrova, 2021).

Over the past few decades, our relationship with food and how we consume it has suffered significant transformations. Globalization, urbanization, advances in information technology, and shifts in societal norms have all played roles in shaping these changes. As a result, the eating behaviours of the population have been notably impacted, with implications for the increase in non-communicable diseases, including mental health concerns (Mingay *et al.*, 2021).

Globalization has profoundly impacted food choices, eating habits, and nutrient intake. Modern food systems exhibit differences in the availability and accessibility of safe, nutritious food. The increasing availability of processed, refined, and heavily promoted food products has extended choices but often comes at the expense of nutritional value compared to whole foods. Supermarkets and convenience stores strategically display inexpensive, low-nutrient items, often targeting vulnerable groups. The trend of larger portion sizes, convenient snacks, and take-out meals has changed social dining customs, which traditionally revolved around home-cooked meals enjoyed with family (Mingay *et al.*, 2021). In today's "nutrition transition," there's a growing consumption of high-calorie, nutrient-deficient foods rich in fats and sweeteners across the developing world (Hawkes, 2007).

Urbanization and the increase in parental work obligations have resulted in less time spent at home and changes in lifestyle routines. Time limitations drive dependence on convenient, but typically less nutritious, food options. Evidence suggests urban residents consume a higher proportion of meals outside the home environment. These societal changes may also reduce the passing down of food-related knowledge and culinary skills from older to younger generations, resulting in a loss of traditional culinary customs and rituals (Mingay *et al.*, 2021).

The negative transformations in food habits underscore the necessity for public health initiatives to prioritize the promotion of healthy food-related behaviours on a broad scale, aiming to reshape our perceptions and attitudes towards food and eating. However, due to the financial costs and less tangible outcomes, there is often a reluctance to invest in health promotion efforts that aim to cultivate a positive food culture. This is in contrast to the significant investments made in curative approaches (Mingay *et al.*, 2021).

#### **1.1.4 Food Environment and Food Marketing**

While individuals' eating habits are often seen as a matter of personal choice, they are significantly influenced by their food environments. In "obesogenic" (obesity-promoting) food environments, the combined actions of producers, retailers, food marketers, and others ensure that high-fat, sugar, and salt (HFSS) foods are widely available. These unhealthy foods are often cheaper than healthier options (World Health Organization, 2016).

Food advertising plays a crucial role in connecting products with consumer demand. The evidence is clear: food ads shape our preferences and purchasing choices, making it harder to maintain a healthy diet (Folkvord and Hermans, 2020).

The connection between food marketing and obesity is clear when we consider how the retail food environment shapes our eating habits. Food marketing significantly influences what we eat, and this is directly linked to obesity and being overweight. In today's world, there are more food retailers than ever, which means we have access to more calories and a wider variety of foods. This leads to overeating and higher obesity rates (Pineda *et al.*, 2024).

In addition to using extensive data analytics to profile and target digital media users, including children, many "stealth" marketing techniques exploit the creative and social aspects of digital platforms. Additionally, food companies often partner with popular vloggers to promote their products. These clever marketing tactics make unhealthy food options more appealing and accessible to the population, contributing to an environment that promotes obesity (World Health Organization, 2016).

### **1.1.5 Food Portions**

Over the past few decades, obesity and overweight rates have increased, and this rise has coincided with an increase in food portion sizes both at home and in restaurants. This suggests that larger portions may contribute to the obesity epidemic. Although proving a direct causal link between increasing portion sizes and obesity is challenging, evidence indicates that portion size does influence how much we eat. Several well-controlled, laboratory-based studies have demonstrated that when older children and adults are given larger portions, their energy intake significantly increases (Ello-Martin, Ledikwe, and Rolls, 2005).

Eating out has become more common due to globalization, convenience, and industry growth. Pricing plays a role in food choices, with larger portions driven by consumer demand for value. Many restaurants offer large portions at a low cost per unit as a marketing tactic. This is possible because food costs represent only a small fraction of the overall meal cost, and agricultural subsidies have made certain foods, like vegetable oil and sugar, very affordable (Ledikwe, Ello-Martin, and Rolls, 2005).

The tendency to overeat in response to large portions is a common phenomenon, occurring regardless of current weight status, age, sex, or eating behaviour. Even by the age of 2, children may be susceptible to the intake-enhancing effects of large portion sizes, highlighting how early exposure to these distorted norms can set the stage for long-term dietary habits (Livingstone and Pourshahidi, 2014).

Controlled studies demonstrate that when older children and adults are given larger portions, their energy intake significantly increases. In Ledikwe, Ello-Martin, and Rolls' study, serving men and women varying package sizes of potato chips led to increased snack intake. For example, when served a 170 g package, women consumed 18% more (200 kJ) and men 37% more (511 kJ) than with an 85 g package. Despite feeling fuller, participants did not adjust subsequent dinner intake to compensate for the extra energy consumed (Ledikwe, Ello-Martin, and Rolls, 2005).

### **1.1.6 Knowledge about Food and Food Labels**

Understanding the connection between diet-related issues and inadequate knowledge about food and the food system underscores the critical role of education and awareness in promoting healthier dietary habits. One key aspect highlighted in this context is the impact of a limited understanding of nutrition on food choices. Individuals with insufficient knowledge about the nutritional content of various foods may encounter challenges in making informed decisions about their diets (Silva *et al.*, 2023).

On a practical level, food label information stands out as crucial for empowering people in their food choices. The main goal of such labelling is to provide individuals with detailed insights into product ingredients, making it easier to opt for healthier food options when making purchases. Additionally, food labels play a key role in educating the public about healthy foods and serve as a protective measure against unsafe food products (Zafar *et al.*, 2022).

Expanding on this concept, it is essential to encourage individuals to actively interact with food label information. However, it is essential to acknowledge that comprehending and interpreting food label information requires a certain level of knowledge. Although food labels are invaluable in educating the public about healthier product choices, the inclusion of scientific terminology in nutritional information can be a barrier. This may discourage individuals from consulting labels while making health-conscious decisions at the point of purchase (Zafar *et al.*, 2022).

De Sousa *et al.*, (2020) conducted a study highlighting the common challenge consumers face in understanding nutritional information and basic principles presented on food labels. Terms like "trans fat-free (0%)," "functional food," "diet," and "light" proved particularly confusing for consumers, highlighting the complexity and lack of clarity around these terms. Another study by De Sousa, found that despite extensive consultation, only a small 3.8% of participants reported a complete understanding of these declarations. This gap between consultation and comprehension underscores a significant consumer knowledge deficit, raising questions about the effectiveness of current labelling formats and the need for improved consumer education initiatives (De Sousa *et al.*, 2020). Furthermore, another study conducted in 2017 identified common barriers for consumers when it comes to reading food labels, such as time limitations,

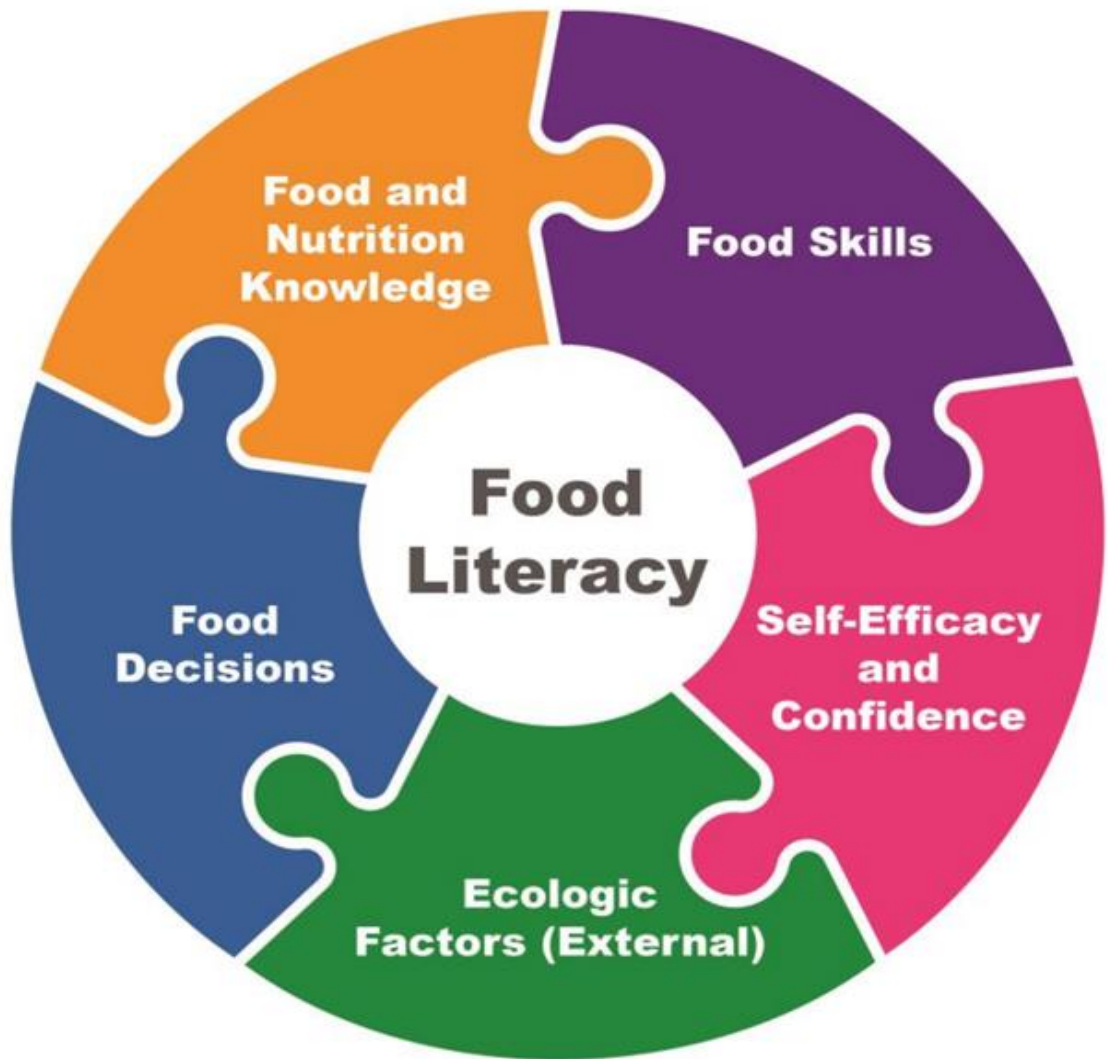
lack of interest, and difficulties in understanding terminology (Goyal and Deshmukh, 2017).

Therefore, implementing initiatives focused on improving food literacy across the population becomes crucial. Through educational efforts, we can bridge the gap between the population and food label information, cultivating a culture of informed decision-making and encouraging consumers to read and make informed choices, knowing what is healthy and understanding the meaning of each item on the label (Lee, Kim, and Jung, 2022).

### **1.1.7 Food Literacy**

Food literacy helps individuals navigate the complexities of the modern food scene. It involves a set of skills and knowledge about food, enabling people to boost their overall health through food (Scazzocchio *et al.*, 2021).

Food literacy, as a multidimensional concept, encompasses a broad range of skills extending beyond basic understanding. It includes competencies related to food planning, shopping, budgeting, storage, and preparation. Additionally, food literacy considers the social aspects of eating and factors in environmental sustainability (Ashoori *et al.*, 2021). It involves having knowledge of various foods and nutrition to make healthy food choices, as well as understanding socio-ecological factors such as the availability of healthy food options, the climate and conditions in which food is grown, and the social determinants of health (Cancer Care Ontario, n.d.).



**Figure 1.14:** Food literacy framework (Taken from Cancer Care Ontario, n.d.).

Implementing food literacy programs in schools holds the potential to significantly improve the overall health of society by training individuals with the knowledge and skills necessary to make informed dietary choices. By implementing a culture of healthy eating habits from an early age, these programs can play a crucial role in reducing the prevalence of health problems such as overweight, obesity, and associated chronic diseases, ultimately leading to a reduction in mortality rates associated with diet-related diseases, including infant mortality resulting from complications related to inadequate maternal nutrition and early childhood eating practices (Scazzocchio *et al.*, 2021).

The challenge lies in initiating nutrition education programs at an early stage to promote the adoption of healthy lifestyles. Schools are perfect for implementing strategies to

improve students' diets and promote healthy food choices (Scazzocchio *et al.*, 2021). Unfortunately, in many countries, health education, including nutritional education, is not a priority in schools (Chojnacka, Górnicka, and Szewczyk, 2021).

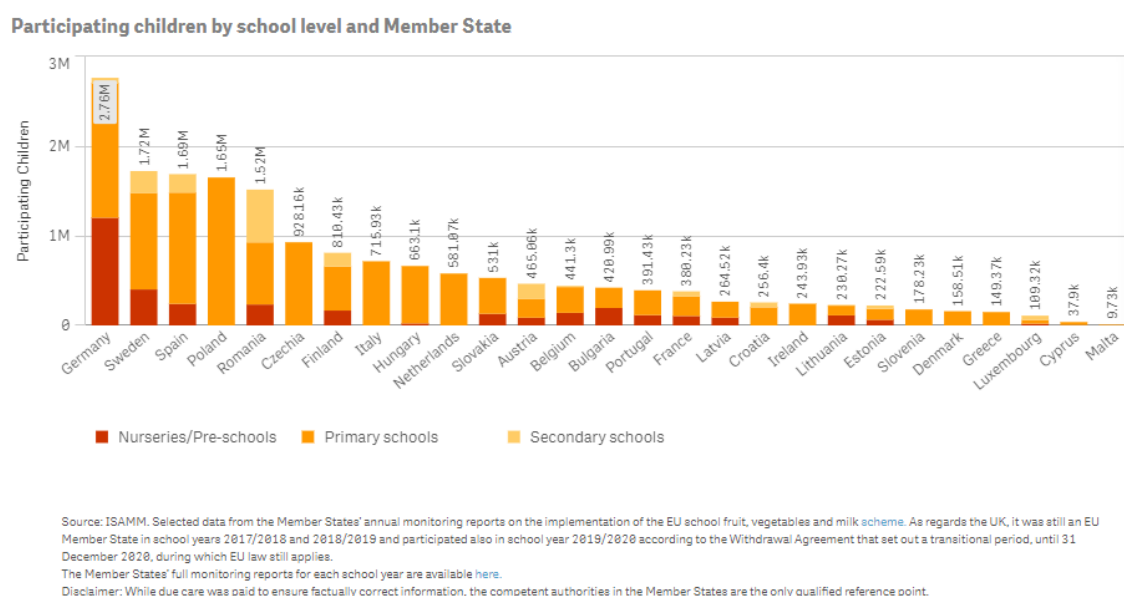
The World Health Organization has promoted the adoption of school nutrition policies designed to limit the availability of less healthy foods and drinks (World Health Organization, 2024). The literature on food education policy is limited, and the available content tends to be broad. Existing studies cover policies in primary or secondary education, covering various levels of governance from EU food policy mapping to analyses of national food education policies. These studies might evaluate policy implementation, focus on national policy analysis, or compare policies across multiple countries. However, there is a clear gap in research regarding primary food education policy, content analysis of current food education curriculums, and international examples of food education policy methods (Smith, Wells, and Hawkes, 2022).

### **1.1.8 Food Literacy in Schools Throughout Europe**

Food literacy is not a legal requirement in the high school curriculum in Europe, but it is a topic that has been gaining attention and support in recent years. There are various initiatives and programmes that aim to promote food literacy among secondary school students in Europe, such as: EU School Fruit, Vegetables and Milk Scheme, and Schools4Health Programme (Bond, 2021).

The EU School Fruit, Vegetables and Milk Scheme facilitates the provision of milk, fruits, and vegetables to millions of children, spanning from preschool to secondary school, across the European Union. It has been in effect since 2017 and is designed to aid both the distribution of these food items and the implementation of educational initiatives. In terms of distribution, the scheme supports providing schoolchildren with fruits, vegetables, milk, and specific milk products. Member countries collaborate with their health and nutrition authorities to create a list of approved products, aligning with the scheme's goal of promoting a healthy diet among children. Additionally, the program has activities like farm visits, school gardens, tasting and cooking workshops, themed days, and educational games (European Commission, School Scheme Explained, 2024).

The figure 1.15 below illustrates the data from the EU School Fruit, Vegetables, and Milk Scheme, specifically highlighting the count of participating children. This monitoring data provides insights into the number of students engaged in the program and is collected and reported by the national authorities of the countries participating in the scheme (European Commission, School Scheme Explained, 2024).



**Figure 1.15:** Participating children by school level and Member State 2021 and 2022 (Taken from European Commission - EU school fruit, vegetables, and milk scheme: monitoring data, 2022).

In Ireland, only primary schools take part in the EU School Fruit, Vegetables, and Milk Scheme. According to monitoring data from 2022, a total of 243,930 students are involved in the program. Nurseries, preschools, and secondary schools do not participate in the program (European Commission, School Scheme Explained, 2024).

The Schools4Health program works with schools to assess, implement, and see how well strategies promoting healthy eating, physical activity, and mental well-being work. A primary objective is to make things better for learning and understanding health in school communities (EuroHealthNet, 2024).

The program aims to create an educational environment where students develop lifelong habits contributing to overall health. Operating in Belgium, Denmark, Greece, Hungary, Latvia, Netherlands, Romania, Slovenia, and Spain, Schools4Health envisions a future where students are not only well-educated but also equipped for a healthy and fulfilling

life. According to the Schools4Health website, the project involves only a few countries because it is a pilot initiative that aims to test and evaluate the transferability and scalability of good practices on health promotion in schools (EuroHealthNet, 2024).

These programs are very beneficial, but they alone are insufficient to address the obesity and overweight epidemic prevalent today. Addressing these challenges requires a comprehensive approach, and an essential component is the integration of food literacy into school curricula. By educating students about nutrition, healthy eating habits, practical skills, and by fostering often and constant learning about food and their components, schools can play a crucial role in preventing diseases from an early age. This proactive educational strategy not only promotes individual well-being but also contributes to reducing the long-term economic burden associated with health conditions linked to poor dietary habits. Therefore, investing in food literacy in schools is a strategic step toward a healthier and economically sustainable future (Ashoori *et al.*, 2021).

## **1.2 Rationale for this Research**

The aim of this research stems from the urgent need to address the escalating public health challenges associated with poor dietary habits, particularly the increasing prevalence of obesity and overweight conditions among young adults. As societies grapple with the multifaceted impacts of unhealthy eating patterns, there is a persuasive need to explore the role of early education in fostering food literacy as a potential mitigating factor. Focusing on the pivotal age group of 19-24, a critical phase of transition into independent adulthood, this study aims to unravel the link between school-based food literacy initiatives and the prevalence of obesity and overweight issues in young adults. By examining the effects of educational interventions on food knowledge and behaviours, the research seeks to provide crucial insights that could inform targeted strategies to combat the growing challenges of poor dietary choices, obesity, and overweight conditions in this demographic.

## **Chapter 2: Methods**

## **2.1 Introduction to Research**

After examining the existing literature in the field of food literacy, it becomes apparent that there is a notable absence of exploration in this area. Additionally, the absence of food literacy in the current school curriculum has been duly noted.

Recognizing this research gap, a survey, primarily consisting of quantitative questions, has been created. This survey will be distributed among males and females aged 19 to 24 in Ireland in 2024. The main goal of this research is to delve into the broader domain of food literacy, considering the lack of formal education in this land within schools. The study aims to shed light on adults' comprehension and decision-making concerning their diets, providing valuable insights into the current scenery of food literacy in Ireland.

## **2.2 Study Design**

An online survey using Microsoft Forms (MS Forms) was used to collect quantitative data regarding the population's attitudes and perceptions regarding their diets and food knowledge. The survey was distributed to participants during the period of 01.05.2024 to 17.05.2024.

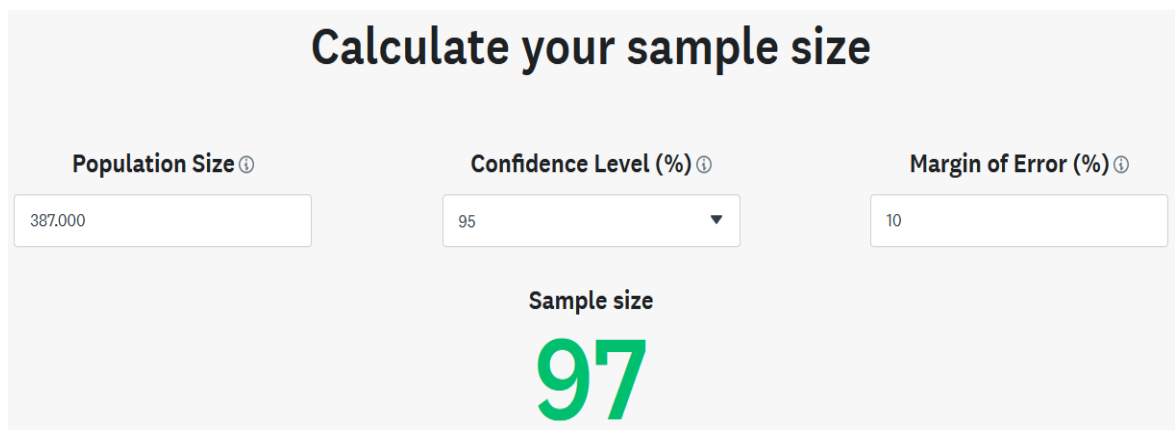
## **2.3 Participant Recruitment and Consent**

Participation in the study was entirely voluntary. Prospective participants were informed that their involvement was optional, and they had the freedom to choose whether or not to participate. Participants received a comprehensive overview of the project, encompassing the research purpose, survey format, and expected duration. Clear information was provided about their right to withdraw from the study at any point without consequences. Participants were also informed about the anonymity of personal information, clarifying how individual responses would be collected to prevent identification.

The recruitment strategy for this study was to target young adults, including both males and females, within the age range of 19 to 24 years, as defined by the Central Statistics

Office (CSO) for young adulthood. This specific age range has been chosen to ensure the collection of accurate and pertinent responses. Selecting participants in a different age group could introduce variables associated with a different educational era, considering the technological advancements and the expansion of studies in this field over time. The decision to concentrate on young adults is also grounded in the recognition that food literacy is a relatively recent concept. This approach is designed to capture insights from individuals who can vividly recall their recent school-based learning experiences, contributing to a study that is both focused and relevant to the current educational context.

The sample size was determined using the SurveyMonkey sample size calculator ([Sample Size Calculator: Understanding Sample Sizes | SurveyMonkey](#)) (refer to *Figure 2.1*). Considering the population of 387,000 individuals aged between 19 and 24 in Ireland in 2024 (World Population Review, 2024), and applying a 95% confidence interval with a 10% margin of error, it was determined that a minimum of 97 participants were required to ensure the study's data collection had sufficient accuracy and statistical power.



**Figure 2.1:** Survey monkey sample set size calculation based on the 387 thousand aged between 19 and 24 living in Ireland, as per most recent figures, with a 95% confidence level and 10% margin error (Taken from Survey Monkey: Sample size calculator, 2024).

The survey was disseminated across various networks, encompassing both professional and personal connections like colleagues, friends, classmates, and family.

The final sample set was  $n = 108$ .

## 2.4 Questionnaire Design

The survey was structured with quantitative questions and divided into two sections, each dedicated to a specific theme designed to address the research questions. These themes centre on crucial aspects such as familiarity with food labels and encounters with food education during school. The main goal of the research was to comprehend participants' attitudes and perceptions regarding food, while also exploring whether they had received food literacy education in school.

Participants were provided with concise information about the study and were subsequently asked to provide their consent to the initial question. The questionnaire was then segmented into two sections.

1. In the first section of the survey, participants were initially queried about basic demographic information, including age and gender. Subsequently, participants were prompted to assess their overall health status. Following this, the survey delved into participants' familiarity with information on food labels, probing into their understanding of these labels, the frequency with which they check them, and the specific aspects they pay attention to when making grocery purchases. The section concluded by exploring participants' decision-making regarding purchases influenced by traffic light labels, and their opinions on whether health ratings should be incorporated into food labels. This approach aimed to gather nuanced insights into participants' demographics, health awareness, and behaviours related to food labelling.
2. In the second section of the survey, participants were directed toward questions about their food education experiences during their school years. The primary purpose of this section was to gain insights into participants' knowledge and encounters with food education in schools, exploring how these experiences may have formed their current perceptions on nutrition and healthy eating. Regardless of whether participants received formal education on nutrition, their reflections on nutritional education within the school setting were deemed significant. Additionally, participants were asked for their opinions on whether the

government should invest in nutritional education, aiming to capture their perspectives on the broader societal impact of such educational initiatives.

Access to the full questionnaire is available via the link below and A copy of the questionnaire is also available in the appendices (See *Appendix A*).

<https://Survey>

## **2.5 Data Analysis**

Microsoft Forms analyses data as responses are submitted by participants. The data was reviewed first to ensure all participants were within the age range and gave consent. Gender was collated into a table format and broken into numbers and percentages. The remainder of the data was collated into bar charts to represent the results.

## **2.6 Ethical Considerations**

This research necessitated the collection of participant data through an online survey, requiring ethical approval. Approval was successfully obtained from the TU Dublin Research Ethics Committee, with the reference number 2024\_007, and official approval was granted on the 30 of April 2024.

The research was submitted for ethical approval to the TU Dublin Ethics Committee on 20 of February 2024, under the guidance of the research supervisor. The TU Dublin ethics approval document is available in the appendices (see *Appendix B*).

In adherence to legal requirements and a comprehensive review of resource utilization and potential participant risks, ethical approval was categorized as Category 2. Category 2 Ethical Approval, defined as research involving direct or indirect human participation with results not intended for public disclosure, was deemed appropriate for this study. Obtaining ethical approval involved furnishing detailed information about the research's purpose, methodology, consent procedures, and participant risk assessment.

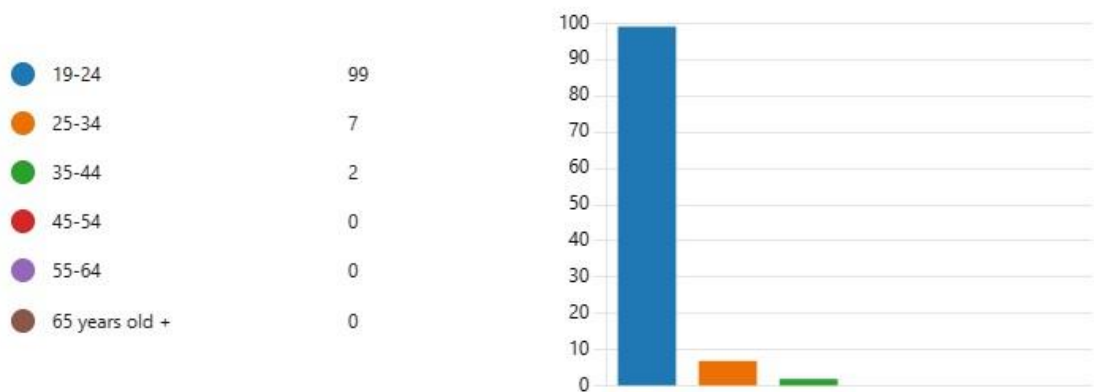
Identifying the essential role of human participants in this research, careful consideration was given to ethical aspects of each survey question. Questions with the potential to reveal participants' identities, such as location of residency, job title, and employer details, were intentionally excluded from the survey. This decision, made not only from an ethical perspective but also in alignment with the General Data Protection Regulation (EU) 2016/679 (GDPR), aimed to protect participant privacy. The survey questions, focusing on food knowledge, dietary habits and food literacy, were classified as low risk.

## **Chapter 3: Results**

### 3.1 Participant Profile

108 individuals contributed to the study. Out of the 108 individuals who participated in the study, 9 did not meet the age criteria, resulting in the termination of their surveys at that point.

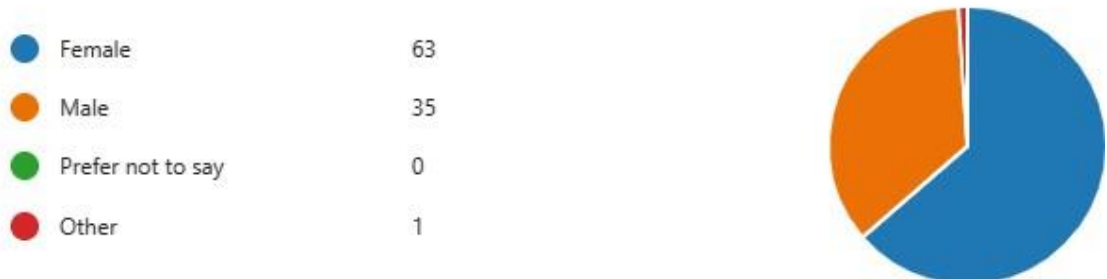
2. What age category do you belong to?



*Figure 3.1: Breakdown of participants according to age group.*

Among the total participants meeting the criteria (99), there were 63 females, 35 males, and 1 individual who identified as other.

4. What gender do you identify as?



*Figure 3.2: Breakdown of participants according to gender.*

### 3.2 Section One: Awareness by the Irish Population of Food

Participants were asked to describe their overall health status using the following terms: very good, good, fair, and poor (Figure 3.3). Of the respondents, 36 participants described their health as very good, 41 as good, 20 as fair, and 2 as poor.

5. How would you describe your overall health status?



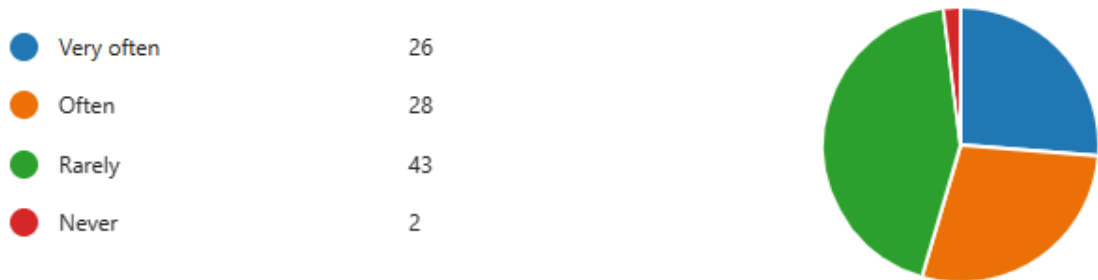
*Figure 3.3: Participants overall health status.*

These results indicate that the majority of participants perceive their health positively, with only a small fraction reporting poor health.

#### 3.2.1 Awareness by the Irish Population of Food Label and Food Components

Participants were asked to describe how often they check food labels when purchasing groceries. As seen in Figure 3.4, 26 participants check food labels very often, and 28 check them often. On the other hand, 43 participants rarely check food labels, and 2 do not check them at all.

6. How often do you check food labels when purchasing groceries?



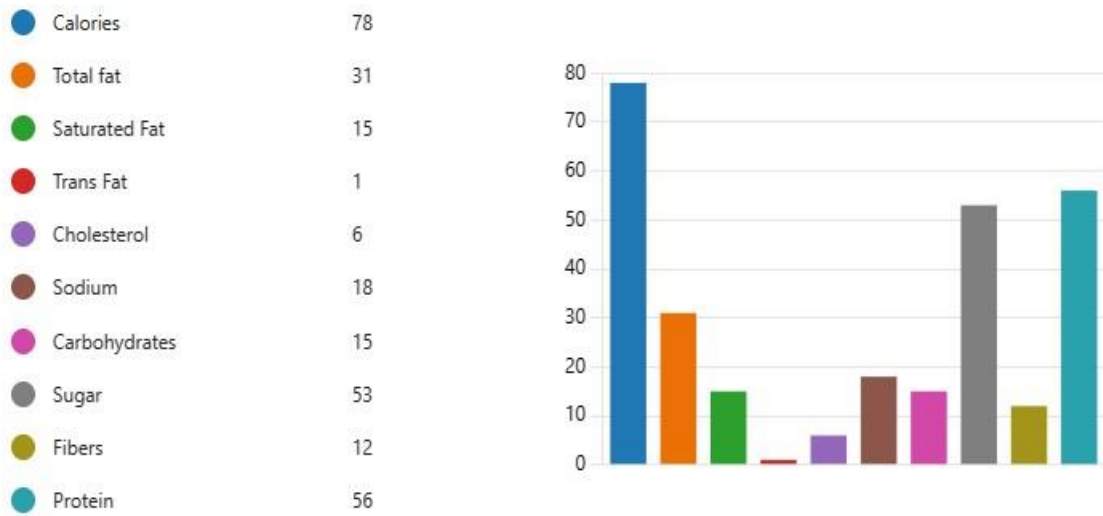
*Figure 3.4: Frequency of food label checking among participants.*

These results shed light on participants' habits regarding checking food labels when purchasing groceries. It is hopeful to see that a total of 54 participants (26 who check very often and 28 who check often) prioritize checking food labels regularly.

However, it is concerning that a significant portion of participants, 43 in total, reported rarely checking food labels. This may indicate a missed opportunity for these individuals to be aware of the nutritional content of the foods they consume regularly.

Figure 3.5 shows participants attitudes toward 10 aspects present on food labels. Participants were asked to select all the aspects that they considered when checking food labels. The 10 choices include calories, total fat, saturated fat, trans fat, cholesterol, sodium, carbohydrates, sugar, fibers, and protein. Participants were able to choose multiple terms.

7. What do you consider when looking at the "Nutrition Facts" panel? (Select all that apply)



**Figure 3.5:** Aspects of nutrition facts panel on food labels checked by participants during grocery shopping.

The most common items participants check on food labels are calories, with 78 participants indicating they check this aspect, followed by protein with 56 participants, sugar with 53, and total fat with 31. Conversely, fewer participants focus on other components, such as sodium (18 participants), saturated fat and carbohydrates (both 15 participants), fibers (12 participants), cholesterol (6 participants), and trans fat content (1 participant).

Through these results, it is evident that people prioritize checking the calorie content on food labels. However, it is important to note that food being low in calories does not necessarily mean that is a healthier food.

In the next question, participants were asked about their level of understanding of the information presented on food labels. They had five choices: "extremely confident," "somewhat confident," "neutral," "somewhat not confident," and "extremely not confident." The results shown in Figure 3.6 indicate that 13 participants are extremely confident, 51 are somewhat confident, 15 are neutral, 18 are somewhat not confident, and 2 are extremely not confident.

8. How confident are you in understanding the information presented on food labels?

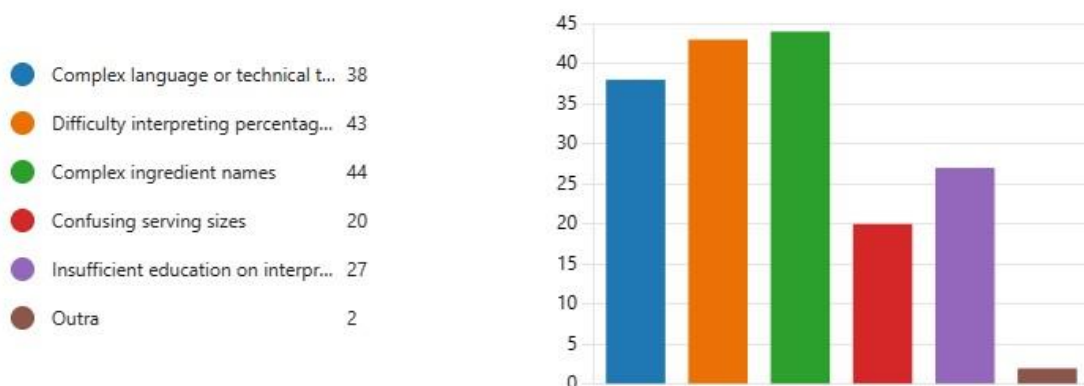


**Figure 3.6:** Participants' level of confidence in understanding the information presented on food labels.

Based on the results, we can see that most people are confident in understanding food labels. However, there are still some issues with comprehending this information, as indicated by the next set of results.

In the following questions, participants were asked about the barriers they encountered in understanding food labels. The barriers included "Complex language or technical terms," "Difficulty interpreting percentages (Daily Value %)," "Complex ingredient names," "Confusing serving sizes," "Insufficient education on interpreting food labels," and "Other." Participants were able to choose multiple terms.

9. What barriers, if any, do you encounter in understanding food labels?



**Figure 3.7:** Barriers encountered by participants in understanding food labels.

The results in Figure 3.7 show that the most common issue, reported by 44 participants, is dealing with complex ingredient names. This suggests that many

people struggle to identify and understand the scientific and technical terms used for ingredients in food products.

Close behind, 43 participants find it challenging to interpret the Daily Value percentages (%DV). This confusion likely arises because it is not always clear what these percentages mean and how they relate to a person's overall daily nutritional needs.

Additionally, 38 participants have trouble with the complex language and technical terms on food labels. This often leads to confusion and misinterpretation, making it harder for consumers to make informed choices about the products they buy.

Another significant barrier is a lack of education on how to interpret food labels, as reported by 27 participants. This highlights a need for better public education and resources to help people understand the information presented on food packaging.

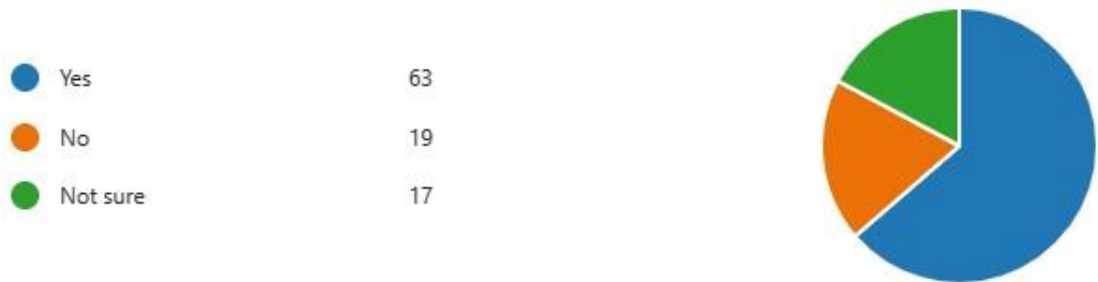
Serving size information also confuses many, with 20 participants finding it difficult to understand. Misunderstanding serving sizes can lead to incorrect judgments about the nutritional content of a product, affecting calorie and nutrient intake.

Finally, 2 participants mentioned other barriers not listed in the provided options, indicating that there may be additional, less common challenges that some people face when interpreting food labels.

Overall, while many participants feel somewhat confident in their ability to understand food labels, these significant challenges remain. Addressing these barriers through clearer labelling practices, better consumer education, and simplified terminology could help improve public comprehension and support healthier food choices.

Next, participants were asked if they were aware of the recommended daily calorie intake. 63 participants expressed confidence in being aware of it however, 19 participants admitted they were not familiar with this guideline, and 17 others were unsure (refer to figure 3.8).

10. Are you aware of the recommended daily calories intake for adults?

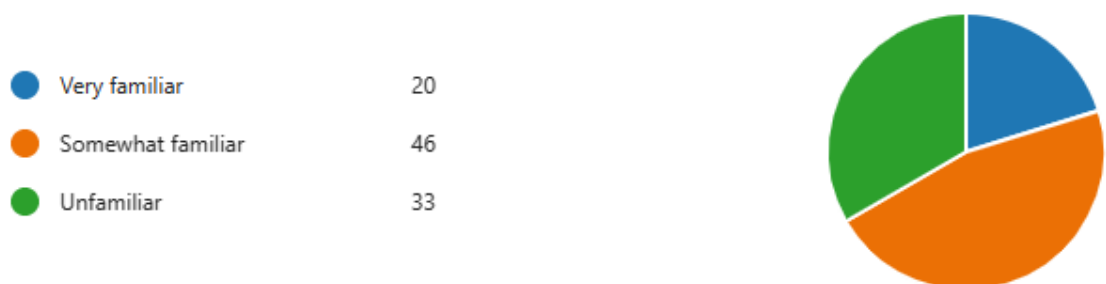


**Figure 3.8:** Participants' awareness of recommended daily calorie intake for adults.

This indicates a gap in knowledge and shows that there is still work to be done to ensure everyone has the information they need to make healthy choices about their diet.

In the following questions, participants were asked if they were familiar with the term "daily value %".

11. Are you familiar with terms like "% Daily Value" when reading food labels?



**Figure 3.9:** Level of familiarity of participants in understanding the term "%Daily Value".

The results in Figure 3.9 show a mixed level of understanding among participants. While it is positive that a considerable number (20 participants) reported being very familiar with this term, indicating a strong understanding, a larger group (46 participants) described themselves as somewhat familiar. This suggests that there is a fluctuating degree of understanding among participants regarding how to interpret daily value percentages on food labels. However, it is concerning that a notable portion (33 participants) stated they were unfamiliar with this term. This highlights

the importance of enhancing consumer education efforts to improve understanding of nutrition labelling concepts.

Moving on to the next question, participants were asked about their understanding of fats, and whether they know the difference and the health effects associated with saturated fat and trans fat. Among the respondents, as per Figure 3.10, 37 participants stated they understood the difference and the associated health effects, while 39 said they did not, and 23 were unsure.

13. Do you understand the differences and health effects associated with saturated fats and trans fats?

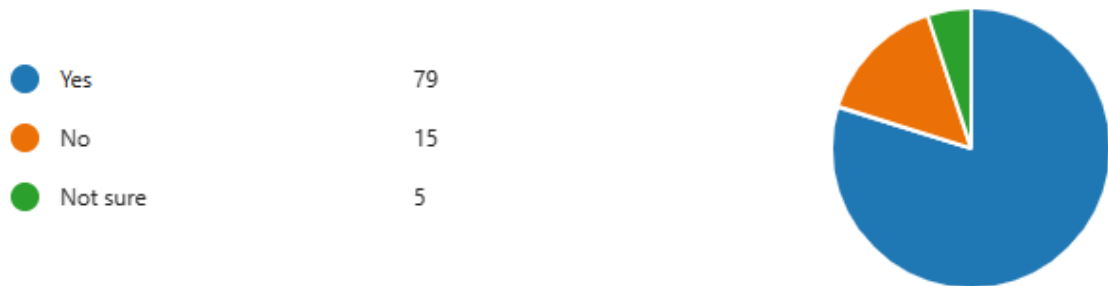


*Figure 3.10: Participants' understanding of the differences and health effects associated with saturated fats and trans fats.*

This lack of knowledge can have serious implications for public health, as both saturated and trans fats have different impacts on cardiovascular health.

The next question focused on dietary fiber, asking participants if they understood its significance and health benefits. The results showed in the Figure 3.11 are quite positive, with 79 participants stating they understand the importance and benefits of fiber in food. However, 15 participants said they did not understand, and 5 were unsure.

14. Do you understand the significance and health benefits of dietary fiber in food?

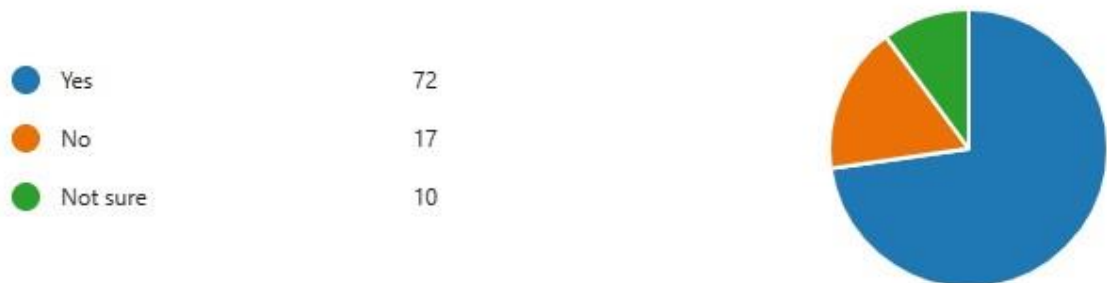


*Figure 3.11: Participants' understanding of the significance and health benefits of dietary fiber in food.*

These results are encouraging because they show that the majority of participants recognize the value of dietary fiber. However, it is still concerning that 20 participants (15 who said no and 5 who were unsure) lack understanding in this area. This indicates that there is still room for improvement in educating the public about the importance of dietary fiber.

Continuing with the topic of dietary fiber, the next question asked participants if they knew the food sources of dietary fiber. According to Figure 3.12, 72 participants indicated they were aware of food sources of fiber, while 17 said they did not know, and 10 were unsure.

15. Do you know food sources of dietary fiber?



*Figure 3.12: Participants' awareness of food sources of dietary fiber.*

This result is promising as it shows that the majority of participants (72 out of 99) are knowledgeable about where to find dietary fiber in their diet. However, it is

concerning that 27 participants (17 who said they don't know and 10 who are unsure) lack this knowledge.

Changing the subject, the following question focused on proteins. Participants were asked if they understand the significance and health benefits of the correct daily intake of protein. The responses were as follows: 78 participants said yes, 9 said no, and 12 were not sure (refer to figure 3.13).

16. Do you understand the significance and health benefits of the correct daily intake of protein?

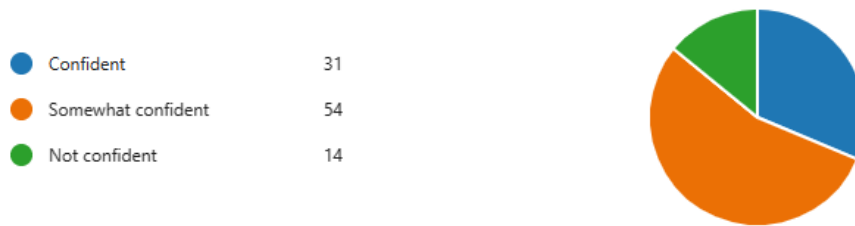


**Figure 3.13:** Participants understanding of the significance and health benefits of correct daily intake of protein.

The majority of participants (78 out of those surveyed) recognize the importance of consuming an adequate amount of protein each day. Proteins play a crucial role in various body functions. Understanding the significance of protein intake suggests that these individuals may be more likely to prioritize protein-rich foods in their diet, which can contribute to overall health and well-being.

In the next question, participants were asked about their confidence in understanding the traffic light label presented on the front of food packages. The responses indicated in Figure 3.14 show that 31 participants are confident, 54 are somewhat confident, and 14 are not confident.

17. How confident are you in understanding the traffic light label presented on the front of the package of the food?



**Figure 3.14:** Level of confidence of participants in understanding the information presented on the traffic light label.

This result suggests that while a significant number of participants feel confident or somewhat confident in their understanding of the traffic light label, there is still a notable portion who lack confidence. The traffic light label system is designed to provide quick and easy-to-understand information about the nutritional content of foods, with colours indicating whether a nutrient is high (red), medium (amber), or low (green).

The fact that 14 participants expressed a lack of confidence in understanding this labelling system indicates a potential need for clearer education or more widespread adoption and familiarity with this labelling format.

Moving forward, the next question focused on the traffic light label on food packaging. Participants were asked if they are familiar with the meaning behind the colours (e.g., red, yellow, green). The responses displayed in Figure 3.15 indicate that 35 participants are very familiar, 42 are somewhat familiar, and 22 are unfamiliar with the meaning behind the colours.

18. Regarding the traffic light label on food packaging, are you familiar with the meaning behind the colours (e.g., red, yellow, green)?



**Figure 3.15:** Level of familiarity of participants in understanding the meaning behind the colours of the traffic light label.

Overall, while there is a good level of familiarity with the traffic light label system among participants, 22 participants are unfamiliar with the meaning behind the colours which highlights a potential knowledge gap. This means that there is still room for improvement in educating the public about its meaning and significance.

To finish the discussion regarding traffic light labels, participants were asked whether the colours of these labels influence their food purchasing decisions. The responses indicate that 36 participants said yes, 55 said no, and 8 were not sure as per Figure 3.16.

19. When making food purchasing decisions, do the colours of the traffic light labels (e.g., red, yellow, green) influence your choices?



**Figure 3.16:** Influence of traffic light label colours on participants' purchasing decisions.

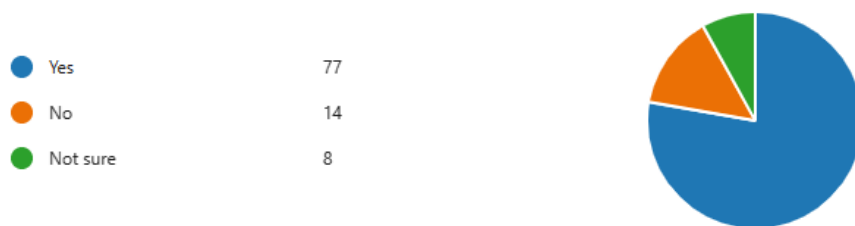
The majority of participants (55 out of those surveyed) reported that the colours of traffic light labels do not influence their food purchasing decisions. This suggests that, for a significant portion of consumers, other factors may play a more significant role in their food choices, such as taste preferences, price, brand loyalty, or nutritional knowledge beyond what is indicated by the label colours.

On the other hand, 36 participants did indicate that the colours of traffic light labels do influence their food purchasing decisions. This demonstrates that for some individuals, these labels serve as a useful tool for quickly assessing the nutritional content of food products.

The fact that 8 participants were unsure about the influence of traffic light labels on their food purchasing decisions reinforces the gap of awareness about these labelling systems among some consumers.

To conclude the section one, participants were asked whether they believe health ratings, indicating the overall nutritional value of a product, should be added to food labels. The responses indicate on the Figure 3.17 below show that 77 participants said yes, 14 said no, and 8 were not sure.

20. Do you believe that health ratings, indicating the overall nutritional value of a product, should be added to food labels?



**Figure 3.17:** Participants' beliefs regarding the addition of health ratings to food labels.

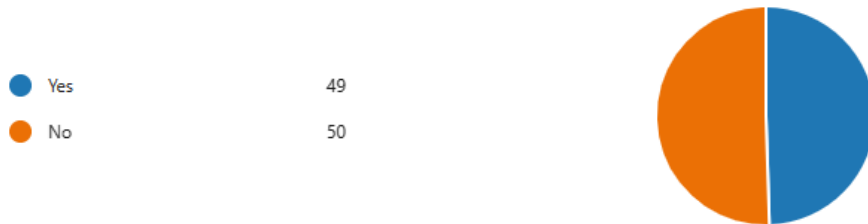
Overall, this result highlights the importance of providing clear and accessible nutritional information on food labels to allow consumers to make informed decisions about their diet. It also suggests that there may be an opportunity for policymakers and food regulatory authorities to consider implementing standardized health rating systems to improve transparency and promote healthier eating habits across the Irish population.

### 3.3 Section Two: Food Literacy in School

The responses to the first question in the second section, which focuses on food literacy in schools, show an even split among participants. As per figure 3.18 below

49 participants indicated that their schools provided formal education or courses specifically focused on understanding nutrition, healthy eating, or food choices during their time there. On the other hand, an equal number of participants, 50, reported that their schools did not offer such education.

21. Did your school provide any formal education or courses specifically focused on understanding nutrition, healthy eating, or food choices during your time there?



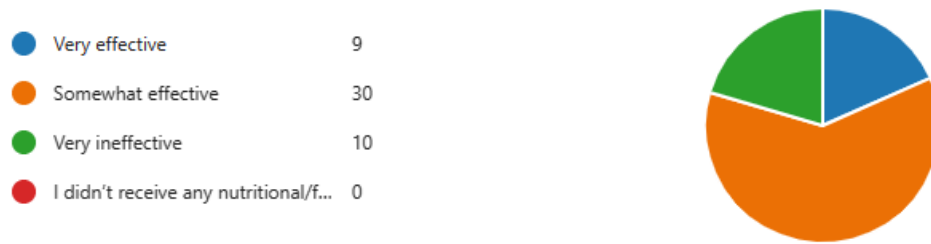
*Figure 3.18: Average of participants' schools that provided formal education or courses on nutrition, healthy eating, or food choices.*

While nearly half of the participants had access to programs aimed at promoting an understanding of nutrition and healthy eating habits, an equal number did not benefit from such initiatives during their school years. The difference in access to food literacy education suggests that not all students have the same opportunities to learn about nutrition and healthy eating. Schools play a crucial role in influencing the dietary habits and nutritional knowledge of students, and the absence of such education in this area for some can lead to gaps in their understanding and awareness of healthy eating practices, potentially resulting in future health problems.

The following three questions were answered by the 49 participants who indicated that their schools provided formal education on nutrition, healthy eating, or food choices. The remaining participants did not respond to these questions as they did not receive any food education during their school years.

The next question asked participants to rate the effectiveness of the nutrition or food education they received in school in preparing them to make healthy food choices. Out of the 49 participants who received such education, 9 rated it as very effective, 30 rated it as somewhat effective, and 10 rated it as very ineffective (refer to Figure 3.19).

22. How would you rate the effectiveness of the nutrition or food education you received in school in preparing you for making healthy food choices?



**Figure 3.19:** Rate of effectiveness of food education received in school in preparing participants for making healthy food choices.

This result provides insights into participants' perceptions of the quality and impact of their food education. While a small group (9 participants) found the education to be very effective, helping them make healthy food choices, the majority (30 participants) felt it was somewhat effective, indicating that while it had some positive impact, there is room for improvement. Additionally, the fact that 10 participants found the education very ineffective highlights a significant area of concern, suggesting that for some individuals, the education they received did not prepare them with the knowledge or skills needed to make healthy dietary decisions.

The following question described in Figure 3.20 is regarding the specific aspects covered in the school's food education. Participants could select multiple options, and the aspects included: "Understanding food labels," "Nutritional information," "Portion control," "Balanced meal planning," and "Dietary diversity." The responses were as follows: 8 participants indicated that their schools covered understanding food labels, 29 participants mentioned nutritional information, 16 participants indicated portion control, 27 participants highlighted balanced meal planning, and 15 participants mentioned dietary diversity.

23. To what extent did your school emphasize the following aspects as part of your education?



**Figure 3.20:** Aspects emphasized in food education by participants' schools.

These results suggest a mixed style of food education across different schools in Ireland. Nutritional information and balanced meal planning were the most commonly covered topics, mentioned by 29 and 27 participants, respectively. This indicates that these two areas might be considered foundational elements of food education programs in schools.

However, fewer participants reported that their schools covered understanding food labels (8 participants), portion control (16 participants), and dietary diversity (15 participants). These areas are also critical, especially food labels, for making informed food choices and maintaining a healthy diet, suggesting that there may be gaps in the comprehensiveness of food education curricula.

Continuing with questions about participants' food education experiences in schools, they were asked whether they believed that the knowledge about food acquired during their school years has influenced their food choices as adults. Among the respondents, 27 indicated that their food knowledge acquired in school has impacted their adult food choices, while 16 disagreed, and 6 were unsure of the influence as showed in the Figure 3.21.

24. Do you believe that knowledge about food acquired during school years has influenced your food choices as an adult?



**Figure 3.21:** Participants' beliefs regarding the influence of food education acquired during school years on their adult food choices.

Remaining the focus on food education participants received in schools, they were asked whether, based on their own experiences, they believe there should be an increased emphasis on nutritional education in schools. As per Figure 3.22, the majority, 95 participants, said yes. Only 1 participant disagreed, and 3 were unsure.

25. Do you believe there should be increased emphasis on nutritional education in schools, based on your own experiences?



**Figure 3.22:** Participants' beliefs on increasing emphasis on nutritional education in schools based on their experiences.

These responses suggest a recognition of the importance of nutritional education and its potential impact on lifelong healthy eating habits. The responses indicates that many feel their own education may have needed sufficient emphasis on nutrition, and they see the value in enhancing this aspect of the curriculum for future generations. This feedback underscores the critical role that schools can play in the development of a deeper understanding of nutrition and promoting healthier food choices among students.

The last question addressed participants opinion on government investment in educational programs focused on understanding food labels and nutritional education

to promote healthier eating habits. 95 participants believed that the government should invest in such programs. Only 1 participant disagreed, and 3 were unsure (refer to Figure 3.23).

26. In your opinion, do you believe that the government should invest in education programs focused on understanding food labels and nutritional education to promote healthier eating habits?



**Figure 3.23:** Participants' opinion on government investment in educational programs for understanding food labels and nutritional education to promote healthier eating habits.

The support for government investment highlights a collective desire for more comprehensive and accessible nutritional education. This feedback suggests that many participants feel current efforts may be insufficient and that improved education programs could significantly contribute to improving public health. Investing in these programs could provide individuals with the knowledge and skills necessary to make informed dietary choices, ultimately leading to better health outcomes for the population.

## **Chapter 4: Discussion**

#### **4.1 Aim of Research and Overview of Key Findings**

The aim of this study was to review the link between school-based food literacy and dietary patterns in young adulthood among the Irish population in 2024. Other objectives included gaining an understanding of how familiar the Irish population are with food labels, their knowledge about food components and diets, and what they have learned in school about food. The study also wanted to gather opinions on whether this education was sufficient and how it has affected their lives today. This research is important for several reasons, including identifying gaps in food education in schools, highlighting areas for improvement, and determining necessary actions. The findings of this study could contribute to future efforts aimed at decreasing the prevalence of overweight and obesity, as well as reducing the prevalence of non-communicable diseases, preterm births, and the mortality rate associated with these health issues.

#### **4.2 Health Status of the EU and Irish Population**

This research used various reports and studies to analyse the health status of the EU and Irish populations.

A Eurostat report from 2019 illustrates the prevalence of overweight individuals across different age groups in Europe and Ireland. Among individuals aged 18 to 24, the prevalence of overweight is 25% in Europe, while in Ireland it is notably higher at 39.7%, the highest among EU countries. Similarly, for those aged 25 to 34, Ireland has the second-highest percentage of overweight individuals at 52.1%, compared to the EU average of 39.3%. This trend continues across other age groups, in the 35 to 44 age group, the EU average is 49.7%, while Ireland is at 52.9%. For those aged 45 to 64, the EU average is 59.8%, with Ireland slightly higher at 61.5%. Among individuals aged 65 to 74, the EU average is 65.7%, compared to 59.7% in Ireland. For those 75 years or older, the EU average is 59.3%, while in Ireland it is 57.5% (Eurostat, 2021).

It is notable the higher prevalence of overweight among younger age groups in Ireland compared to the EU average, with individuals aged 18 to 24 and 25 to 34

exhibiting significantly higher percentages of overweight individuals (Eurostat, 2021). These findings highlight the urgent need for interventions and public health initiatives designed to address the factors contributing to the high prevalence of overweight in Ireland, particularly among younger age groups, to manage the long-term health consequences and reduce the problem of obesity-related diseases (McCárthaigh, 2021).

According to World Obesity Atlas 2024, adult obesity is expected to increase by over 60% until 2035. This trend is fuelled by the consumption of ultra-processed foods and drinks, characterized by high levels of refined carbohydrates, sugars, fats, and processed ingredients, coupled with a significant lack of fruits and vegetables in the diet. Unhealthy eating habits contribute to the rise in non-communicable diseases, which are responsible for an alarming number of annual deaths globally (World Obesity Atlas, 2024).

According to the Global Nutrition Report, poor diets were responsible for over 12 million avoidable deaths in 2018, constituting 26% of all adult deaths globally. This highlights the significant impact of dietary habits on public health outcomes (Global Nutritional Report, 2020).

The concerning results underscore the pressing need for concerted efforts to address the underlying factors driving poor dietary habits and nutrition-related health issues in Ireland and the EU (Donovan and McNulty, 2023). Without effective intervention strategies, such as improved access to healthy food options, nutrition education, and lifestyle interventions, the burden of obesity-related diseases is likely to escalate, placing significant strain on healthcare systems and compromising population health outcomes (Obesity - HSE.ie, n.d.).

### **4.3 Exploring Food Knowledge and Label Understanding - Insights from Survey Responses**

Analysing the results of the first section of the survey we can see that the participants varied in their engagement with food label checking, with a notable proportion checking labels very often or often, while others rarely did so or did not check them

at all. When considering aspects of food labels, participants showed varied levels of understanding, with some feeling extremely confident and others less so. Barriers to understanding food labels included complex language, technical terms, and insufficient education. While many participants were aware of recommended daily calorie intake and familiar with terms like "daily value %," others lacked this knowledge. Understanding of fats, dietary fiber, and protein varied among respondents, with some demonstrating a good knowledge and others expressing uncertainty. Familiarity with traffic light labels varied, with some participants indicating that the colours influenced their purchasing decisions. Overall, most participants supported the addition of health ratings to food labels, highlighting a desire for clearer nutritional information.

The results highlight areas where action is needed to improve understanding of food labels and promote healthier food choices. By addressing barriers such as insufficient education, and confusion surrounding food labels, we can empower individuals to make more informed decisions about their diets. Additionally, efforts to enhance nutritional education in schools and increase awareness of food and food labels can contribute to improved health outcomes across populations (Chojnacka, Górnicka and Szewczyk, 2021).

#### **4.4 Food Literacy and Education in Irish Schools: Survey Insights**

The survey's second section explores food literacy in Irish schools and the importance of food education, based on participant responses. Out of 99 participants, an equal split was observed regarding whether their schools provided formal education on understanding nutrition, healthy eating, or food choices during their time there. Among the 49 who received such education, responses varied regarding its effectiveness: 9 participants found it very effective, 30 somewhat effective, and 10 very ineffective. Subsequent questions explored the specific aspects covered in the school's food education, revealing varying levels of coverage across understanding food labels, nutritional information, portion control, balanced meal planning, and dietary diversity. Additionally, participants reflected on how their school food education influenced their adult food choices, with 27 acknowledging its impact, 16 disagreeing, and 6 unsure. Most participants (95) expressed a belief in the

need for increased emphasis on nutritional education in schools, emphasizing its importance. Furthermore, there was overwhelming support (95 participants) for government investment in educational programs focused on understanding food labels and nutritional education to promote healthier eating habits.

#### **4.5 Importance of Food Literacy and Implementation of Food Education in School-Based**

Nutrition and food are essential aspects of human life (Callahan, Rdn, and Rdn, 2022). In our study, we identified the participants' level of food literacy. Our results indicate that 50% of participants had some form of food literacy education in school. However, there are still schools that do not offer this crucial education. Additionally, even among those who did receive food literacy education, significant gaps remain. Most participants still do not fully understand food components and labels, and they encounter various barriers in making informed dietary choices.

As mentioned before, Ireland currently faces high levels of overweight and obesity, with significant implications for public health (Obesity - HSE.ie, n.d.). Food education plays a vital role in equipping individuals with the knowledge and skills necessary to make healthier food choices. Effective food education programs should cover a range of topics, including understanding food components and nutrition labels, the importance of balanced diets, and practical cooking skills (Smith, Wells, and Hawkes, 2022).

By implementing robust food education initiatives and creating supportive environments, we can empower individuals to adopt healthier eating patterns. This, in turn, can lead to a reduction in overweight and obesity rates, ultimately improving the overall health and well-being of the population (Smith, Wells, and Hawkes, 2022). Moreover, this approach can significantly reduce mortality rates linked to diet-related diseases. For example, many cases of infant mortality are caused by poor maternal nutrition and inadequate early childhood feeding practices (Rush, 2000). Ensuring that mothers and caregivers have access to proper nutrition and knowledge about healthy feeding practices can significantly improve infant health outcomes (von Salmuth *et al.*, 2021).

Food literacy is one of the keys to decreasing and controlling the current health challenges we face. Although it is not a legal requirement in the high school curriculum in Europe, there are some programs in place, but they still need more government support (Bond, 2021). As mentioned, there are already some food education programs; however, nutritional education is not necessarily a separate subject in the curriculum but is incorporated transversally into various subjects and school activities. For better understanding, food literacy should be a dedicated subject in schools so that everyone can have access to and understand the basics of food and nutrition. Integrating food literacy into the curriculum is essential. Introducing food education at an early age can lead to adults with better food knowledge and more conscientious dietary habits (Verdonschot *et al.*, 2020).

Without interventions, the economic and societal impacts of overweight and obesity are expected to be significant globally. With increasing population levels and current trends in obesity prevalence, the global economic burden of overweight and obesity is projected to escalate dramatically (World Obesity Federation, 2022). Addressing these challenges necessitates a comprehensive approach, with a crucial component being the integration of food literacy into school curricula. This proactive educational strategy not only promotes individual well-being but also contributes to reducing the long-term economic burden associated with health conditions linked to poor dietary habits. Therefore, investing in food literacy in schools is a strategic step toward a healthier and economically sustainable future (Ashoori *et al.*, 2021).

#### **4.6 Limitations of this Research**

While this study provides valuable insights into the attitudes and perceptions of young adults regarding food literacy and nutrition education, it is essential to acknowledge its limitations. Firstly, the sample size of 99 participants, while adequate for the scope of this research, may not fully represent the diverse range of opinions and experiences within the population. Additionally, the survey relied on self-reported data, which may be subject to recall bias or social desirability bias. These limitations highlight the need for further research with a larger sample to enhance the generalizability of the findings and provide a more comprehensive understanding of food literacy and nutrition education. Another limitation of the

survey was the absence of more open-ended questions. These questions could have provided a richer understanding of participants' perspectives on topics such as food education and their opinions. While the structured format of the survey allowed for efficient data collection and analysis, it may have inhibited participants' ability to fully express their thoughts and experiences. Incorporating open-ended questions in future research could facilitate a more nuanced exploration of these complex issues, allowing for a broader range of insights to be captured.

## **Chapter 5: Conclusion and Future Work**

## 6.1 Conclusion

To conclude, this research aimed to gain an understanding of the current dietary choice of the Irish population, while also examining the prevalence of obesity and overweight both in Europe and specifically in Ireland, along with attitudes and perceptions towards food and its components. Through this investigation, we gained valuable insights into the present and prospective scenery of the Irish diet. The assumptions made in the introduction regarding the deficiency in food literacy in Ireland were validated by the findings, further underlining the significance of this study.

The research revealed significant disparities between recommended dietary intake and actual consumption, underscoring the pressing need for targeted interventions to promote healthier eating habits and bridge the gap between nutritional knowledge and dietary choices. Moreover, the alarming rates of obesity and overweight, especially among young adults and children, emphasize the urgency of addressing these issues through multifaceted approaches that prioritize education, accessibility to nutritious foods, and environmental changes encouraging healthier lifestyles.

The discussions regarding the impact of globalization, urbanization, and societal customs on food habits shed light on the broader socio-cultural factors influencing dietary patterns. Understanding these dynamics is crucial for developing effective strategies to promote food literacy and healthier dietary behaviours. By acknowledging the complexities of food environments and the influence of marketing tactics on consumer choices, we can create interventions to empower individuals to make informed decisions about their diets.

The survey results provided insights into participants' understanding of food components and labels. While many participants demonstrate the ability to understand food and food labels, challenges persist. Importantly, the research highlighted how schools play a crucial role in shaping food literacy. Almost half of the participants mentioned that their schools provided formal education on nutrition and healthy eating, but an equal number indicated otherwise. Encouragingly, most

participants support enhancing nutritional education in schools, recognizing its significant influence on adult food choices.

These findings underscore the critical importance of integrating food literacy education into school curricula, beginning at the primary school level. Moreover, the overwhelming support from participants for government investment in educational programs focused on understanding food labels and nutritional education further emphasizes the need for concerted efforts in this direction.

Integrating food literacy education into school curricula emerges as a pivotal strategy for cultivation healthier generations and modifying the long-term health and economic consequences associated with poor dietary habits. By equipping individuals with the knowledge and skills necessary to navigate the modern food landscape, we can empower them to make healthier choices, thereby contributing to improved public health outcomes and overall well-being. To achieve better results, there is a critical need to enhance education aimed at equipping teachers with a comprehensive understanding of food and nutrition. By empowering educators with this knowledge, the goal is to enable them to more effectively educate their students and promote healthier eating habits, ultimately reducing healthcare costs in the future.

In conclusion, this research serves as a call to action for policymakers, educators, and health to prioritize food literacy initiatives and implement evidence-based policies aimed at fostering healthier dietary habits. By addressing the root causes of unhealthy eating behaviours and promoting a culture of food literacy from an early age, we can pave the way for a healthier, more resilient society for generations to come.

## **6.2 Future Work**

The findings of this study underscore the crucial role of schools in teaching food literacy and promoting healthier dietary habits among young individuals. As highlighted, there is a pressing need to integrate food literacy education into school curricula in Ireland. Early childhood nutrition education helps children understand

the link between food and health, fostering lifelong positive attitudes towards nutrition. Therefore, future work should focus on supporting policy changes to formalize food literacy as an essential subject in the school curriculum, starting at the primary school level. This would involve collaborating with policymakers, educational institutions, and relevant stakeholders to develop comprehensive educational frameworks that incorporate nutrition education, healthy eating practices, and food label literacy from early childhood. Advocacy efforts should prioritize policy changes and government support for food literacy initiatives at both national and regional levels. Collaborating with policymakers, advocacy groups, and public health organizations, stakeholders can advocate for legislative measures that mandate the inclusion of food literacy education in school curricula and allocate resources for the implementation of educational programs. By implementing food literacy into the formal education system, we can ensure constant and widespread impact, empowering future generations with the knowledge and skills necessary to make informed dietary choices.

Further research is needed to address the knowledge gaps and barriers identified in this study, particularly regarding food label literacy and understanding of nutritional information. Future studies should explore innovative approaches to enhance consumer education and engagement with food labels, such as interactive digital platforms, gamified learning experiences, and community-based workshops.

Additionally, investigating the effectiveness of current food literacy programs and identifying best practices can inform the development of evidence-based interventions that effectively address the needs and preferences of diverse populations.

## **Appendices**

## Appendix A – Copy of Research Questionnaire

\* Required

**1**

I consent to partake in this survey \*

Yes

No

**2**

What age category do you belong to? \*

19-24

25-34

35-44

45-54

55-64

65 years old +

**3**

What gender do you identify as? \*

Female

Male

Prefer not to say

Other

4

How would you describe your overall health status?

- Very good
- Good
- Fair
- Poor

5

How often do you check food labels when purchasing groceries?

- Very often
- Often
- Rarely
- Never

6

What do you consider when looking at the "Nutrition Facts" panel? (Select all that apply)

- Calories
- Total fat
- Saturated Fat
- Trans Fat
- Cholesterol
- Sodium
- Carbohydrates
- Sugar
- Fibers
- Protein

7

How confident are you in understanding the information presented on food labels?

- Extremely confident
- Somewhat confident
- Neutral
- Somewhat not confident
- Extremely not confident

8

What barriers, if any, do you encounter in understanding food labels?

- Complex language or technical terms
- Difficulty interpreting percentages (% Daily Value)
- Complex ingredient names
- Confusing serving sizes
- Insufficient education on interpreting food labels
- Other

9

Are you aware of the recommended daily calories intake for adults?

- Yes
- No

10

Are you familiar with terms like "% Daily Value" when reading food labels?

- Very familiar
- Somewhat familiar
- Unfamiliar

11

How confident are you in understanding the fat information presented on food labels?

- Confident
- Somewhat confident
- Unconfident

12

Do you understand the differences and health effects associated with saturated fats and trans fats?

- Yes
- No

13

Do you understand the significance and health benefits of dietary fiber in food?

- Yes
- No

14

Do you know food sources of dietary fiber?

- Yes
- No

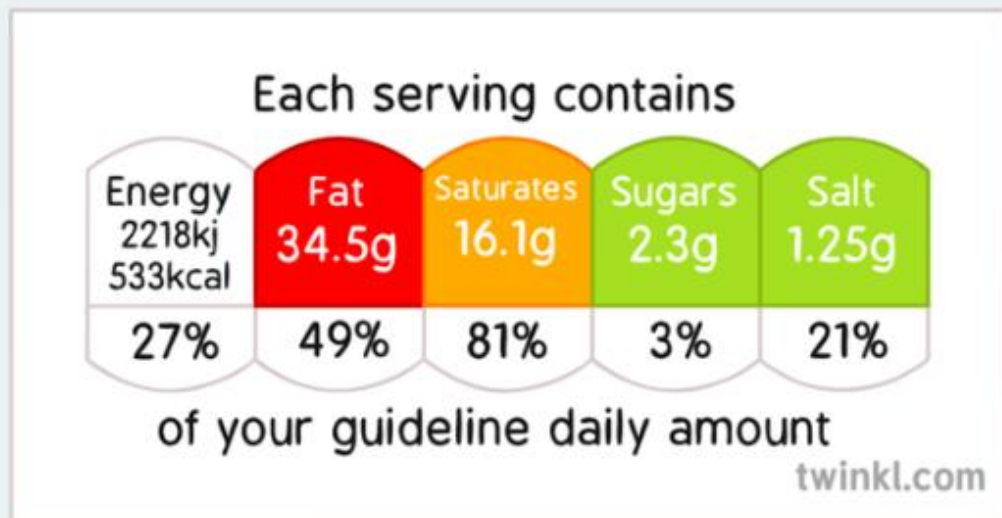
15

Do you understand the significance and health benefits of the correct daily intake of protein?

- Yes
- No

16

How confident are you in understanding the traffic light label presented on the front of the package of the food?



- Confident
- Somewhat confident
- Not confident

17

Regarding the traffic light label on food packaging, are you familiar with the meaning behind the colours (e.g., red, yellow, green)?

- Very familiar
- Somewhat familiar
- Unfamiliar

18

When making food purchasing decisions, do the colours of the traffic light labels (e.g., red, yellow, green) influence your choices?

- Yes
- No

19

Do you believe that health ratings, indicating the overall nutritional value of a product, should be added to food labels?



- Yes
- No

## Food Literacy in school

In this section, we aim to understand your experiences and knowledge related to food education during your school years and how it may have influenced your current approach to nutrition and healthy eating. Whether you received formal education on nutrition or not, your insights are invaluable in shaping our understanding of the role of food literacy in the lives of young adults.

20

Did your school provide any formal education or courses specifically focused on understanding nutrition, healthy eating, or food choices during your time there? \*

- Yes
- No

21

How would you rate the effectiveness of the nutrition or food education you received in school in preparing you for making healthy food choices?

**\* If your response to question 20 is "no," please skip to the following question.**

- Very effective
- Somewhat effective
- Very ineffective
- I didn't received any education

22

To what extent did your school emphasize the following aspects as part of your education?

**\* If your response to question 20 is "no," please skip to the following question.**

- Understanding Food Labels
- Nutritional Information
- Portion Control
- Balanced Meal Planning
- Dietary Diversity

23

Do you believe that knowledge about food acquired during school years has influenced your food choices as an adult?

**\* If your response to question 20 is "no," please skip to the following question.**

- Yes
- No

24

Do you believe there should be increased emphasis on nutritional education in schools, based on your own experiences?

- Yes
- No

25

In your opinion, do you believe that the government should invest in education programs focused on understanding food labels and nutritional education to promote healthier eating habits?

- Yes
- No

## Appendix B – TU Dublin Ethics Approval Document



TU Dublin,  
Tallaght,  
D24 FKT9,  
Ireland.

Date: April 30<sup>th</sup> 2024  
To: Cal McCarthy  
cc: Isabella Scur

<b>Ethics Reference No:</b> <i>Please quote this ref on all correspondence</i>	2024_007
<b>Project Title:</b>	Exploring adult food literacy; The influences of school-based learning and the importance of nutritional education.

Dear Cal,

Thank you for submitting your application.

**SCBSEC grants ethical approval for this project.**

The committee wishes you the best of luck with your research project.

*Yours Sincerely*

A handwritten signature in blue ink that reads 'Emma Caraher'. The signature is written on a light grey rectangular background.

**Emma Caraher, PhD**  
SCBSEC Chair,  
TU Dublin, Tallaght.  
Email: [emma.caraher@tudublin.ie](mailto:emma.caraher@tudublin.ie)

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