

UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

**CONSUMPTION OF DIETARY SUPPLEMENTS AND TRUST IN
INFORMATION SOURCES WITH REGARD TO THE COVID-19
PANDEMIC**

Ljubljana, June 2022

MARIA-PAULA TOMAC

AUTHORSHIP STATEMENT

The undersigned MARIA-PAULA TOMAC, a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB LU), author of this written final work of studies with the title CONSUMPTION OF DIETARY SUPPLEMENTS AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC, prepared under supervision of PROF. DR. VESNA ŽABKAR.

DECLARE

1. this written final work of studies to be based on the results of my own research;
2. the printed form of this written final work of studies to be identical to its electronic form;
3. the text of this written final work of studies to be language-edited and technically in adherence with the SEB LU's Technical Guidelines for Written Works, which means that I cited and / or quoted works and opinions of other authors in this written final work of studies in accordance with the SEB LU's Technical Guidelines for Written Works;
4. to be aware of the fact that plagiarism (in written or graphical form) is a criminal offence and can be prosecuted in accordance with the Criminal Code of the Republic of Slovenia;
5. to be aware of the consequences a proven plagiarism charge based on the this written final work could have for my status at the SEB LU in accordance with the relevant SEB LU Rules;
6. to have obtained all the necessary permits to use the data and works of other authors which are (in written or graphical form) referred to in this written final work of studies and to have clearly marked them;
7. to have acted in accordance with ethical principles during the preparation of this written final work of studies and to have, where necessary, obtained permission of the Ethics Committee;
8. my consent to use the electronic form of this written final work of studies for the detection of content similarity with other written works, using similarity detection software that is connected with the SEB LU Study Information System;
9. to transfer to the University of Ljubljana free of charge, non-exclusively, geographically and time-wise unlimited the right of saving this written final work of studies in the electronic form, the right of its reproduction, as well as the right of making this written final work of studies available to the public on the World Wide Web via the Repository of the University of Ljubljana;
10. my consent to publication of my personal data that are included in this written final work of studies and in this declaration, when this written final work of studies is published.

Ljubljana, June 10th, 2022
(Month in words / Day / Year,
e. g. June 1st, 2012)

Author's signature: M.P. Tomac

TABLE OF CONTENTS

INTRODUCTION	1
Problem definition	1
Purpose and goals	2
Research methods	3
Thesis overview	4
1 BACKGROUND AND RELATED WORK ON CONSUMPTION OF DIETARY SUPPLEMENTS AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC	4
1.1 Interest in improving immune defense	5
1.2 Dietary supplement consumption	7
1.3 Changes in consumer behavior with regard to the COVID-19 pandemic	10
1.3.1 Effect of shock events on short-term consumer behavior.....	12
1.3.2 Extrinsic and intrinsic consumer motivation	16
1.4 Information sources and trust in information sources with regard to the COVID-19 pandemic	18
2 A STUDY ON DIETARY SUPPLEMENT CONSUMPTION AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC	21
2.1 Research methodology	21
2.2 Questionnaire	23
3 RESULTS OF A STUDY ON DIETARY SUPPLEMENT CONSUMPTION AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC	25
3.1 Demographic data	25
3.2 Changes in consumers' reported consumption of dietary supplements with regard to the COVID-19 pandemic	26
3.2.1 Descriptive statistics	26
3.2.2 Statistical tests	27
3.3 Extrinsic and intrinsic motives consumers have to use dietary supplements with regard to the COVID-19 pandemic	29
3.3.1 Descriptive statistics	29
3.3.2 Statistical tests	31
3.4 Differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19	32
3.4.1 Descriptive statistics	32
3.4.2 Statistical tests	33
3.5 Trustworthy, helpful and important information sources when it comes to consumption of dietary supplements and the COVID-19 pandemic	34
3.5.1 Descriptive statistics	35
3.5.2 Statistical tests	37

4	DISCUSSION.....	38
4.1	Interpretation of main findings	39
4.2	Conclusions and recommendations	41
4.3	Limitations and future work	43
	REFERENCE LIST	44
	APPENDICES	54

LIST OF FIGURES

Figure 1: Consumption of dietary supplements	27
Figure 2: Reasons for consumption of dietary supplements before March 2020	30
Figure 3: Reasons for consumption of dietary supplements after March 2020	30
Figure 4: Sources of information used for dietary supplements	33
Figure 5: Sources of information used for COVID-19.....	33
Figure 6: Trustworthiness of sources of information used for dietary supplements.....	35
Figure 7: Trustworthiness of sources of information on COVID-19	36

LIST OF TABLES

Table 1: Demographic data.....	26
--------------------------------	----

LIST OF APPENDICES

Appendix 1: Summary in Slovene language.....	1
Appendix 2: Questionnaire	3
Appendix 3: Language and Consumption of dietary supplements before March 2020 crosstabulation and Chi-Square test	10
Appendix 4: Language and Consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test	11
Appendix 5: Language and Consumption of dietary supplements specifically due to COVID- 19 crosstabulation and Chi-Square test	12
Appendix 6: Language and Frequency of consumption of dietary supplements before March 2020 crosstabulation and Chi-Square test.....	13
Appendix 7: Language and Frequency of consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test.....	14

Appendix 8: Language and Change in consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test.....	15
Appendix 9: Consumption of dietary supplements before and after March 2020 crosstabulation and Chi-Square test.....	16
Appendix 10: Frequency of consumption of dietary supplements before and after March 2020 crosstabulation and Chi-Square test.....	17
Appendix 11: Reasons for consumption of dietary supplements before March 2020 ANOVA test and multiple comparisons	18
Appendix 12: Reasons for consumption of dietary supplements after March 2020 ANOVA test and multiple comparisons	19
Appendix 13: Reasons for consumption of dietary supplements specifically due to COVID-19 ANOVA test and multiple comparisons	20
Appendix 14: Reasons for consumption of dietary supplements before and after March 2020 Paired samples t-test	21
Appendix 15: Language and sources of information on dietary supplements crosstabulation and Chi-Square test.....	22
Appendix 16: Language and sources of information on COVID-19 crosstabulation and Chi-Square test	30
Appendix 17: Trust in sources of information on dietary supplements and COVID-19 Paired samples t-test	38
Appendix 18: Helpfulness of sources of information on dietary supplements and COVID-19 Paired samples t-test	39
Appendix 19: Importance of sources of information on dietary supplements and COVID-19 Paired samples t-test	40

INTRODUCTION

Throughout the years, consumers have had a high (and increasing) interest in improving their health and wellbeing (Davis, 2014). They are particularly concerned with “boosting” their immune system by making conscious choices to better their dietary habits and lifestyles (FMCG Gurus, 2020; Glanbia Nutritionals, 2020). The increased focus on their health was further motivated by the start of the COVID-19 pandemic, which can be seen from the heightened online traffic on the topics of “immune boosters” (Wagner, Marcon, & Caulfield, 2020).

Problem definition

One of the methods that consumers have been using to improve their wellbeing is consumption of dietary supplements. This is evident from the constant improvements that the dietary supplement market is experiencing, both globally and nationally. More specifically, the Slovenian, Croatian and Macedonian national markets (which are the focus of this thesis), have all experienced substantial growth in the past decade (Kočevár-Korenjak, Mikačić, Jardas, & Espinosa, 2018; Statista, n.d.; Starling, 2010; Statista, 2015; Euromonitor International, 2016).

Most recently, the impact of the COVID-19 pandemic on consumer behavior has greatly affected dietary supplement consumption and market size. Dietary supplement manufacturers all over the world have reported record increases in sales, while consumers reported an increase in use of supplements both in quantity and variety (Grebow, 2021; Nutrition Business Journal, 2021; Gallen, n.d.; Council for Responsible Nutrition, n.d.; Aysin & Urhan, 2021).

All of this is a result of short-term behavioral changes that consumers experience as a consequence of certain shock events, such as pandemics, natural disasters or economic crises. Constant feelings of fear and uncertainty in the future are bound to have an effect on consumers’ everyday routines, consumption patterns and overall lifestyles. Behaviors that are often mentioned in these circumstances include panic buying, herd mentality and switching to satisfying the more basic, physiological needs, among others (Loxton et al., 2020).

Extrinsic and intrinsic motivation is another concept that greatly influences consumer behavior (Solomon, Bamossy, Askegaard, & Hogg, 2006). When it comes to consumption of dietary supplements, consumers have reported various reasons to take them, including prevention and treatment of diseases, supplementing missing nutrients in the diet, aesthetic reasons and decreasing costs of expensive healthcare (Conner, Kirk, Cade, & Barrett, 2003;

Okleshen Peters, Shelton, & Sharma, 2003). In the case of COVID-19, the motives are not much different. They include strengthening of the immune system, improvement of overall health and wellness and reduction of the risk of infection with an illness, among others (Decker, 2021).

In a world where information is freely and readily available, there is an undeniable effect that various sources of information can have on consumer behavior, especially when it comes to their health (Loxton et al., 2020; Simou, 2015). Trust in those sources can make a difference in a consumer receiving a health-related instruction and actually acting upon it (Simou, 2015). While the most used sources of information to seek health and dietary supplement information are the Internet and mass media, the most trust is placed in health professionals, friends and family and official government sources (Marrie, Salter, Tyry, Fox, & Cutter, 2013; Chaudhuri, Le, White, Thompson, & Demiris, 2013; Flash Eurobarometer 404 - TNS Political & Social, 2014; Healthcare Client Services, 2017; Wang et al., 2020; Ali et al., 2020).

Purpose and goals

The purpose of this master's thesis was to gain a deeper insight into consumers' reasons and attitudes towards dietary supplement consumption with regard to the COVID-19 pandemic. In particular, a comparison of dietary supplement consumption prior to and after the beginning of the COVID-19 pandemic. This was done in terms of frequency, quantity and motivations to consume dietary supplements.

This allowed us to develop an online questionnaire in order to get more detailed information on consumers' motivations regarding dietary supplement consumption. The questionnaire contents were adapted from already tested sets of questions and scales from relevant scientific works. It also provided us with an insight into where consumers learn and seek information about dietary supplements and the COVID-19 pandemic and which of these information sources they find to be the most trustworthy, helpful and important.

The goal of this thesis is to integrate theoretical findings from relevant scientific sources regarding consumers' consumption of dietary supplements, extrinsic and intrinsic motivation to do so as well as the changes in consumer behavior as a result of shock events and how that may influence their actions towards consumption of dietary supplements with practical findings gained from primary data collection. In order to analyze theoretical viewpoints, scientific literature was consulted, while for primary data collection a questionnaire was developed and distributed.

Research methods

The research methods of this master's thesis were split into two parts: theoretical and empirical. The theoretical part consists a critical literature review pertaining to relevant information to the topic of this thesis. Sources analyzed include applicable and reliable scientific works, articles, books and any other appropriate written material. This section describes related concepts and theories about changes in consumer behavior resulting from shock events, the relation to the COVID-19 pandemic and extrinsic and intrinsic consumer motivation, which will allow us to gain deeper knowledge of the topic. Usage of dietary supplements, reasons behind it and how has the pandemic affected it will also be referred to, as well as different types of information sources that consumers use to seek information, and which do they find to be trustworthy, most helpful and important.

For the empirical part of the thesis, the research instrument that was used to gather primary quantitative data is a questionnaire. The questions in the questionnaire were developed with respect to the research questions defined below. The initial objective of the research method was to collect answers from, preferably, a minimum of a hundred respondents. This goal has been surpassed, with the questionnaire collecting a total of 324 valid responses. The questionnaire was conducted and distributed online on various social media sites (Facebook), messenger applications (Facebook Messenger, Viber and WhatsApp) and e-mail. The targeted audience was Balkan inhabitants, specifically living in the Republic of Slovenia, the Republic of Croatia and the Republic of North Macedonia. Once all data was collected, appropriate statistical analysis was conducted with respect to the pre-defined research questions.

The research questions of this master thesis are the following:

- What are the changes in consumers' reported consumption of dietary supplements with regard to the COVID-19 pandemic?
- What extrinsic and intrinsic motives do consumers have to use dietary supplements with regard to the COVID-19 pandemic?
- What are the differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19?
- Which information sources do they find trustworthy, helpful and important when it comes to consumption of dietary supplements and the COVID-19 pandemic?

Subsequent to the four research questions, four main hypotheses are proposed, explained and investigated throughout the thesis.

Thesis overview

This master's thesis consists of five major chapters:

- **1. Introduction:** The introduction of the thesis includes the defined subject of the study, a description of the purpose and goals of the thesis, a description of the research methods used in the thesis, a presentation of the basic research questions and finally, a chapter content outline.
- **2. Background and related work:** The background and related work chapter presents several scientific fields that are related to the thesis topic, including: (i) Consumer interest in improving immune defense; (ii) Dietary supplement consumption; (iii) Changes in consumer behavior with regard to the COVID-19 pandemic including the effect of shock events on short-term consumer behavior, and extrinsic and intrinsic consumer motivation; (iv) Information sources and trust in information sources with a focus on the COVID-19 pandemic. The scientific sources include relevant and reliable works such as articles, books, studies and more.
- **3. Research methodology:** The chapter on research methodology presents a detailed overview of the theoretical and empirical research methods used throughout the thesis. The theoretical portion of this study includes the previously mentioned scientific literature review, while the empirical part includes primary data collection via a questionnaire followed by appropriate and detailed statistical analysis.
- **4. Results:** The results chapter presents the valid primary data collected with the designed questionnaire, organized by the research questions of the thesis. Each research question's data is divided into descriptive statistics and results of statistical tests, accompanied by appropriate tables and figures.
- **5. Discussion and conclusion:** In the final chapter, discussion and conclusion, an interpretation of main findings from the data analysis was presented. Each research question was answered along with a description of the main scientific contributions and limitations of the thesis.

1 BACKGROUND AND RELATED WORK ON CONSUMPTION OF DIETARY SUPPLEMENTS AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC

This section provides background information and an overview of studies related to the topic of this thesis. More specifically, the first subsection describes the increased interest of consumers in strengthening their immune defense and overall wellbeing, especially after the beginning of the COVID-19 pandemic. As dietary supplements are so readily available and often considered one of the “easier” ways of achieving a strong immune system, it is no wonder that their global and regional market size keeps developing rapidly – as described in

the second subsection. The beginning of the COVID-19 pandemic has been an unexpected shock for the entire world, and inevitably, it caused some changes in human behavior. The third subsection describes those changes in consumption of dietary supplements due to COVID-19 and the effects that shock-events, such as a pandemic, have on short-term consumer behavior. It additionally outlines information on consumer motivation (why consumers behave the way they do) and how different intrinsic and extrinsic motivators encourage consumers to reconsider their consumption of dietary supplements, with regard to the COVID-19 pandemic. Further, where consumers get their information on COVID-19 and dietary supplements, and how they perceive those sources may affect their propensity to act. The final subsection defines sources of information and how consumption of mass media affects consumer behavior, especially when it comes to health-related issues. It further analyzes which sources of information are considered most trustworthy, important and helpful by consumers when it comes to dietary supplement and COVID-19 information.

1.1 Interest in improving immune defense

The immune system is responsible for one of the most vital functions of the human body. Its purpose is to protect the body from adverse pathogens, such as bacteria, viruses or fungi, to neutralize harmful substances from the environment and to fight illness-causing cell changes (Institute for Quality and Efficiency in Health Care (IQWiG), 2006). Having a strong and well-functioning immune system should defend the body from infectious diseases and thus improve our wellbeing (National Cancer Institute, n.d.).

Knowing this, there has been a high interest in “boosting” one’s immune defense. According to Daniel Davis, the public is particularly curious about how their lifestyle choices are connected to their immunity – because there may be relations in how they affect their overall health (Davis, 2014). Furthermore, a report by FMCG Gurus stated that, throughout 2019, many consumers have made changes to their dietary habits and lifestyles with the purpose of improving their immunity and to be proactive about their health. Specifically, 61% of people in North America, 56% in Europe, 50% in Africa, 48% in the Asia Pacific and 45% in South America are making a conscious effort to make better diet and lifestyle choices (FMCG Gurus, 2020; Glanbia Nutritionals, 2020).

The interest in strengthening one’s immune defense and making choices in attempt to better the general lifestyle (e.g. consuming dietary supplements) has to do with the term “well-being”. While there is no unique, widely accepted definition to well-being, the general consensus among various works is that a state of well-being contains positive emotions (e.g. happiness or contentment) and a satisfaction with different aspects of an individual’s life. This can include satisfaction with anything from solid health and good living conditions to education and access to culture and leisure. Various disciplines analyze well-being in the context of their own field, resulting in the development of different well-being types, such as psychological well-being, physical well-being, social well-being or economic well-being

(National Center for Chronic Disease Prevention and Health Promotion, 2018; Ruggeri, Garcia-Garzon, Maguire, Matz, & Huppert, 2020; Lee & Seo Youn Ahn, 2016; Manchanda, 2017).

One important element that constitutes the general well-being of an individual is “consumer well-being”. As well as the general term “well-being”, consumer well-being lacks a unified definition, but the concept has kept developing throughout the years (Manchanda, 2017). In some of the earlier works, the focus when it comes to consumer well-being, has been on more objective conceptualizations – consumers’ cost, benefit and safety when it comes to a particular good or service. These included models such as the cost of living model – consumers’ contact with prices of goods and services and how their changes affect them. Later on, more emphasis was put on the subjective conceptualizations – the level of satisfaction or dissatisfaction a consumer has with a product or service and how well it satisfies their needs. These types of models now dominate the consumer well-being field, and most models have to do with consumer satisfaction within the various stages of the consumer/product life cycle (product acquisition, product preparation, consumption, ownership, maintenance and disposal). In other words, the different types of experiences that consumers have in the marketplace and how successfully they satisfy their consumption needs (Sirgy & Lee, 2008; Lee & Seo Youn Ahn, 2016).

Another characteristic that is often associated with consumer well-being is quality of life. In fact, all models mentioned above are based on the assumption that an increase in consumer well-being and satisfaction leads to an increase in an individuals’ quality of life (Sirgy, Lee, & Rahtz, 2007). Quality of life, in general, can be defined as a multidimensional concept which includes various different indicators, all interconnected (Swiss Federal Statistical Office, n.d.). According to OECD, these indicators can be divided into two groups: material living conditions (income, jobs and housing conditions) and immaterial dimensions (health, education, environmental quality etc.) (Organisation for Economic Cooperation and Development (OECD), 2014).

More specifically, health-related quality of life contains only those aspects of an individuals’ well-being which pertain to their health – its physical, social and mental domains (Torrance, 1987; Hays & Reeve, 2017; Karimi & Brazier, 2016). In order to achieve a higher health-related quality of life, and as a result a higher general quality of life, people often engage in various health behaviours. Health behaviors are any actions taken by individuals, intentionally or unintentionally, that affect their health in any way. They can include a myriad of actions, such as diet, sleep, smoking, physical activity and more (Short & Mollborn, 2015). Consuming dietary supplements in an attempt to strengthen ones immune system can also be considered one of those actions. In fact, a large German cohort study has shown that use of vitamin and mineral supplements is related to health conscious behaviors as well as an indicator of healthier lifestyle choices (e.g. regular exercise, non-smokers etc.) (Reinert, Rohrmann, Becker, & Linseisen, 2007).

Interest in immune boosting has only been additionally highlighted by the beginning of the COVID-19 pandemic. According to information from Google Trends, interest in phrases “immune boost” and “immune boosting”, has increased significantly in February 2020, around the time that the virus started to be a world-wide concern (Wagner, Marcon, & Caulfield, 2020).

Although the most effective method to prevent infectious diseases is vaccination, preventing over 2.5 million deaths a year, there is still substantially large demand for “easier” ways, including consumption of nutritional supplements (Rappuoli, Pizza, Del Giudice, & De Gregorio, 2014; Cassa Macedo, Vilela de Faria, & Ghezzi, 2019). A study by Cassa Macedo et al. (2019) aimed to get an idea on the information that the public is exposed to when it comes to boosting immunity. They analyzed 185 webpages that were a result of a Google search on “boost immunity”. They classified the webpages by type (blogs, commercial, government, non-profit, news, professional, scientific journal) and applied standard indicators of health information quality (specifically JAMA score and HONCode). The content of the webpages was analyzed by disease and type of “booster” mentioned. They found, that out of 37 different types of immunity “boosters” mentioned, 77% of the webpages mentioned diet, 69% mentioned fruit, vitamins (67%), antioxidants (52%), probiotics (51%), minerals (50%) and vitamin C (49%). Infectious diseases and respiratory conditions were the most commonly mentioned among the content of the 185 webpages, 83% and 60% respectively (Cassa Macedo, Vilela de Faria, & Ghezzi, 2019).

1.2 Dietary supplement consumption

There is no universal definition of dietary supplements and what they encompass, but for the purposes of this thesis they will be defined as products that contain one or more dietary ingredients. These dietary ingredients include vitamins, minerals, herbs or other botanicals, amino acids or any other substances that are used as an addition to the diet (Baran, 2014). They come in various forms, including liquids, powders, capsules, energy bars or tablets and can be bought without the prescription of a medical professional (over-the-counter) (National Institute on Aging, 2017).

Dietary supplements, also known as food supplements or nutritional supplements, have different intended purposes, as well as various (claimed) benefits for the human body. Their main predetermined purpose is to correct nutritional deficiencies, to retain a sufficient intake of a certain nutrient and to support particular physiological functions. Although they are not medicinal products and their intended use is not to treat or prevent illness, by consuming supplements and maintaining a healthy level of nutrients, illness prevention and treatment become extended results of it (European Food Safety Authority, 2021). But on the other side, consuming too much of a certain dietary ingredient can cause adverse effects such as

headaches, liver damage or interference with the effectiveness of other prescribed medication (Office of Dietary Supplements, 2020b).

The beginnings of dietary supplement use and increased interest in them can be traced back to the mid 20th century. In fact, the term “vitamine” was first mentioned in literature as early as 1912. This was around the time that scientists first discovered, isolated and synthesized a total of 13 vitamins that were deemed crucial for human health. It was also discovered that many illnesses were, in fact, a consequence of a lack of certain vitamins rather than infections or toxins. As the general public began to understand the important role that vitamins play in their health, the popularity of supplements began to grow. It was further aided by the gradual modernization of agriculture, when production of own fresh produce was slowly replaced with retail stores that sold prepackaged meals and produce, causing more nutritional gaps in diets. Medicine, supplement and food manufacturers took notice of the increased interest in nutritional supplementation which resulted in numerous advertising and marketing efforts. Many supermarket foods were now advertised as containing one or more vitamins (Bench, 2020; Heffernan, 2018; Semba, 2012). As a consequence, the global dietary supplement market has continued to flourish and grow, even more so with the support of increased scientific research and legislation on the topic of supplements. In the United States, the manufacturing of dietary supplements is regulated by the U.S. Food & Drug Administration which states that any supplements put on the market need to be labeled clearly and truthfully, as this was often not the case in earlier production and distribution (U.S. Food & Drug Administration, 2019). In the European Union, dietary supplement manufacturers and distributors need to reference an EU directive which provides a list of vitamins and minerals safe for consumption and manufacturing as well as conditions for correct labeling (European Food Safety Authority, 2021).

More recently, the growing popularity of dietary supplement consumption was incited by consumer interest in bettering their health as well as convenience. Longer life expectancy, increasingly more expensive healthcare and a faster pace of life which makes it difficult to meet nutritional requirements through regular food and drink intake are some of the drivers behind it (Kearney, 2010). Other reported motivators for dietary supplement consumption include a feeling of control over their health by doing something proactive to protect it or to give themselves a “boost”. Even though many are not sure of the efficacy of dietary supplements, they consider them to be quite safe – therefore, many consumers take supplements as a preemptive measure “just in case” (2CV for Food Standards Agency, 2018).

Since 1999 up until 2017, the global dietary supplement market has more than doubled in monetary worth growing from \$49.1 billion to \$127.8 billion, respectively. The biggest players in 2017 were the USA with 34% of the global dietary supplement market share, followed by Western and Eastern Europe with 19% all together (International Alliance of Dietary/Food Supplement Associations, 2018). More recently, in 2020, the global dietary

supplement market was worth a staggering \$140.3 billion with predictions of future growth at a compound annual growth rate (CAGR) of 8.6% from 2021 to 2028. The USA, but also North America and Europe, are expected to be the larger markets (Grand View Research, 2021).

According to a report by Fortune Business Insights, the European dietary supplement market was worth \$14.95 billion in 2019 and is expected to more than double by 2027, to a value of \$33.8 billion, at a CAGR of 9.3% (Fortune Business Insights, 2020). While countries of Western Europe, such as Italy and Germany, continue to lead the dietary supplement market, Eastern European countries have also shown a lot of potential. Up until 2020, the projected fastest growing dietary supplement markets were Romania, Turkey, Bosnia and Herzegovina, Russia and North Macedonia (Kočevar-Korenjak, Mikačić, Jardas, & Espinosa, 2018).

As pertaining to this thesis, the Croatian dietary supplement market has experienced substantial changes since the Republic of Croatia became a member of the European Union in 2013. The EU legislation on dietary supplements dictated certain rules regarding labelling, packaging, allergen clarifications and more which, until then, were not mandatory in Croatia. Consequently, many dietary supplement manufactures had to review their products and adapt to the new requirements. Regardless of these changes, the value of the Croatian dietary supplement market was, and still is, substantial in size. In 2015, it was valued at €11.3 million (Kočevar-Korenjak, Mikačić, Jardas, & Espinosa, 2018). More recently, in 2021, the vitamins and minerals segment of the dietary supplement market was valued at \$14.57 millions, with predictions to grow at a CAGR of 4.03% until 2025 (Statista, n.d.).

The Slovenian dietary supplement market has also shown immense growth over time. Titled by Euromonitor as a market that is “yet to meet maturity”, it was worth €11 million in 2009 following a 4% expansion (Starling, 2010). In more recent years, the dietary and food supplement market has continued to increase in size as Slovenian consumers become more aware of the lack of quality food in their day-to-day diet as well as the importance of sufficient vitamin and mineral intake. Due to the fast pace of everyday life, modern food processing and difficulty to acquire vitamin rich produce seasonally (for example in winter time) has increased consumers’ interest in getting those healthy nutrients elsewhere (Kapitanovič, 2019). That is why the Slovenian dietary supplement market has grown in value up to €33.8 million in 2015 with predictions of further growth to €36.6 million in 2020, according to Statista (Statista, 2015).

The North Macedonian vitamin and dietary supplement market, in 2016, has experienced a 5% growth in sales, in both categories, amounting up to over €12 million. This is due to Macedonian consumers following the increasingly popular trends in health and wellness. Dietary supplements are seen as a quick and easy solution to better their well-being and for prevention of diseases, according to Euromonitor International (Euromonitor International,

2016). Later on, in 2018, sales values continue to grow as fitness, wellness and beauty remain large areas of interest for a lot of Macedonian consumers (Euromonitor International, 2019). This can be supported by data from Statista, where the forecasted increase of the overall value of the North Macedonian dietary supplement market, has grown from €3.7 million in 2015 to €4.4 million in 2020 (Statista, 2015).

These increasing numbers are a result of the growing marked demand for vitamin and other dietary supplements, both globally and nationally. The growth is driven by increasing consumer interest in improving health and preventing diseases, more specific customization of supplements to cater to different needs from different segments, as well as a world-wide surge in healthcare costs causing consumers to seek more affordable alternatives. More specifically, the growth of demand for dietary supplements in Eastern Europe at a compound annual growth rate of 1.1% from 2014 to 2018 was driven by three big factors: increased care for health and wellness, convenience and the fast pace of modern life. Additionally, the amount of medical prescriptions of dietary supplements has grown as well – up to 28% in 2017 and 2018, globally (PwC Italia, 2020).

The popularity of dietary supplement consumption is also visible from numerous scientific works published over the years. One of these studies, done on an Australian university population (including students and staff) was published in the journal *Nutrition* in 2016. It was reported that 74% of the study participants have consumed at least one dietary supplement in the past 6 months. Of those that have consumed any dietary supplements, 69% have taken vitamin or mineral supplements (most commonly multivitamins or multiminerals – 42%). The most commonly consumed non-vitamin/mineral supplement was fish oil (39%) (Barnes, Ball, Desbrow, Alsharairi, & Ahmed, 2016).

Quite similar values were found during a survey done in 2019 by the Council for Responsible Nutrition on consumption of dietary supplements by American consumers. It has reported that 77% of American consumers have consumed supplements at some point in their lives. The types of dietary supplements most commonly consumed are vitamins and minerals (76%), herbals and botanicals (39%), sports nutrition supplements (28%) and weight management supplements (17%). Even more specifically, the top three most popular dietary supplements in the USA in 2019 were multivitamins (58%), vitamin D (31%) and vitamin C (28%) (Council for Responsible Nutrition, 2019).

1.3 Changes in consumer behavior with regard to the COVID-19 pandemic

As mentioned previously, during the past several decades, humanity has faced many hardships. For example, continuous population growth, various natural disasters and most recently the novel COVID-19 pandemic. With over 270 million confirmed cases worldwide, as of December 14, 2021, the COVID-19 pandemic is the largest challenge that mankind has faced since World War Two (World Health Organization, 2021; United Nations

Development Programme, n.d.). Healthcare systems all around the world are struggling to keep up with demands that arise from a global pandemic and people are more concerned about their health and how to strengthen it. In this environment, the dietary supplement category has kept developing and through the years has become one of the bigger players in the global market (International Alliance of Dietary/Food Supplement Associations, 2018).

Dietary supplement manufacturers all around the world have reported an impressive surge in supplement sales since the start of the COVID-19 pandemic. According to findings from a report by the Nutrition Business Journal, presented at the AHPA Botanical Congress in 2021, the U.S. dietary supplement market has experienced record sales in 2020 – an increase of \$7.08 billion since the previous year, a 14.5% growth. Considering that the U.S. supplement market had thus far generated a yearly increase of about \$2 – 2.5 billion, the \$7 billion jump is quite an increase in a single year. Supplement categories that enjoyed the highest growth in sales were vitamins at a 22.3% increase, herbal and botanical supplements at 17.3% and mineral supplements at 11.4% (Grebow, 2021; Nutrition Business Journal, 2021).

A change in dynamics of the dietary supplement market has also been noticed in European countries. Italy, the European market leader in dietary supplements since before the COVID-19 pandemic, has experienced additional increase in sales of certain nutritional supplements (Statista, 2021). At the peak of the Italian COVID-19 flare-up, vitamin C product sales have increased for a remarkable 237.8% in the first quarter of 2020, according to the Italian Association of Health Products Manufacturers and Distributors, Feder Salus. The second-best category of supplements in terms of sales increase were respiratory health supplements with a growth of 75.2%, followed by immunity boosting supplements with a surge of 64.5% (Gallen, n.d.).

The COVID-19 pandemic has also brought some new developments in consumer consumption and interest in dietary supplements, most likely due to increased stress and concern regarding their health. In fact, disease outbreaks such as this one often provoke changes in health-related behaviors in many people, including a healthier diet or an addition of dietary supplements to their routine – as was the case in the 2003 severe acute respiratory syndrome (SARS) epidemic in China (Zhao et al., 2020; Lau, Yang, Tsui, & Kim, 2005).

Increased curiosity about supplements can also be seen in an article by Hamulka et al. (2021), that presents interesting findings about relative search values on Google Trends associated with COVID-19 and the geographical distribution of those searches. It was discovered that, globally, terms that were commonly searched in relation to COVID-19 included: “vitamins”, “vitamin D”, “vitamin K”, “vitamin C”, “zinc” and “selenium” among others. Most commonly searched terms in European countries were “vitamins K”, “vitamin C”, and the mineral “selenium” (Hamulka, Jeruszka-Bielak, Drywien, Górnicka, & Zielinska-Pukos, 2021).

A similar study was done to investigate consumer interest in consumption of dietary supplements during the COVID-19 pandemic using data found on Google Trends. In the time period between January 1st, 2016 and August 30th, 2020 the search words “vitamin”, “COVID-19” and “immunity” among others, were searched in Google Trends (in Turkish and English). The results showed that the relative search values (RSV’s) for “vitamins” reached the highest possible value (100) in March 2020, at the start of the pandemic, but they also varied seasonally. More specifically, the categories of vitamins most commonly searched for in Turkey and worldwide were “vitamin C” and “vitamin D”. There was also a substantial number of searches that included a junction of “COVID-19” and “vitamins” (Çimke & Gürkan, 2021).

Another survey done by the Council for Responsible Nutrition (CRN), focusing on American dietary supplement users, found that 43% of the users have changed their supplement routine since the start of the pandemic. Out of those that modified their dietary supplement intake, 91% disclosed an increase in supplement consumption (Council for Responsible Nutrition, n.d.). According to the same survey, supplements that enjoyed the highest usage increase since the beginning of the pandemic are multivitamins (59%), vitamin C (44%) and vitamin D (37%) (Council for Responsible Nutrition, 2020).

A study done to examine consumption patterns of dietary supplements of Turkish citizens living in Asia, America, Europe and Turkey has reported a striking increase since the pandemic has begun. Consumption before and during the pandemic has increased in all geographical areas – from 29.5% to 71.9% in Asia, from 40.6% to 75.7% in America, from 30.8% to 68.7% in Europe and from 21.3% to 62.2% in Turkey. Categories of nutritional supplements that have experienced the largest increase in consumption are vitamin C (74.7%), vitamin D (58.2%) and multivitamins (34.2%). As many consumers have listed before, the leading reason for increased consumption was desire to strengthen their immune system to protect themselves from disease (Aysin & Urhan, 2021).

1.3.1 Effect of shock events on short-term consumer behavior

These happenings mentioned above result from short-term behavioral changes that individuals experience during certain shock events such as economic crisis, natural disasters or healthcare crises (Loxton et al., 2020). A crisis in general, as defined by the Washington State Department of Social and Health Services, is any disturbance or interruption of an individuals’ usual routine of behavior which cannot be solved with established problem-solving solutions or skills. It is characterized by three factors whose severity differentiate it from a problem or emergency – the stressfulness of the situation, difficulty in coping and timing of intervention (Washington State Department of Social and Health Services, n.d.).

A public health crisis, such as the global COVID-19 pandemic dominating the world since 2019, can be defined as a situation in which the health of the majority of the population is

jeopardized or in immediate danger. This can occur due to the inability of public healthcare systems to manage a sudden and unexpected health crisis, for a number of reasons; such as the scope, velocity, intensity or novelty of the threat. A health crisis can stem from anything from exposure to infectious diseases to chemical agents. In other words, from any element that has negative, toxic or debilitating consequences to an individuals' health (London, 2016).

Different consequences of different types of crisis, such as loss of stable income, new restrictions to follow or health concerns, are bound to make an impact on consumer's consumption patterns, well-being and coping mechanisms. There are two basic mechanisms in which a crisis can affect the consumer and their behavior – tangible and intangible mechanisms. Tangible mechanisms of a crises include direct effect on assets in an individual's life, such as loss of a job, decrease of wages or increase of prices. As a result, consumers are more mindful of the decisions and purchases they make, affecting their overall consumption patterns. Intangible mechanisms, on the other hand, refer to a more cognitive or emotional response consumers have. Times of crisis often provoke a sense of uncertainty, concern and fear for the future, which, even if the ramifications of a crises are not experienced directly, cause changes in behavior. These changes can include anything from consuming more or less of certain products to bigger adaptations in lifestyle (Koos, Vihalemm, & Keller, 2017).

Most of these changes in consumer behavior and their choice making can be attributed to an emotion that most commonly arises in these types of situations – fear. The emotion of fear, in general, can be defined as a normal human response to a real or imaginary threat whose main purpose is promotion of survival (Gullone, 2000; Fritscher, 2020). While there are many different types and ranges of fears, the type that pertains to this topic is incidental fear. Incidental fear (or any other incidental emotion) is an emotion that an individual carry with them to making a decision, while the emotion has nothing to do with the decision itself. In other words, an emotion that was caused by a different situation, but was brought to the decision-making process and was felt while the decision was being made (Christensen, n.d.).

Throughout the years, many researchers have studied the effects that the emotion of fear has on consumer behavior and the choices they make. Fear can influence anything from a consumers' processing of advertising messages, the success of persuasion tactics to the role of self-control in choices made and the perceived usefulness of particular health-related communications. As the emotion of fear is a major part of the human threat management system, it creates a sort of “tunnel-vision” – narrow attention to the present situation, negative expectations of the future and a tendency for immediate action, all in an attempt to recognize and eliminate the threat as soon as possible. When it comes to incidental fear, specifically, a study by Verrochi Coleman, Williams, Morales and White (2017), states that incidental fear, in certain situations, increases the likelihood of consumer choice and reduces

choice deferral, due to consumers' desire to act in the present (Verrochi Coleman, Williams, Morales, & White, 2017).

For example, a study done on Polish consumers regarding their behavior and responses to the economic crises performed in 2012 showed that they have adapted their spending habits both due to direct and indirect consequences of the situation. They have increased their spending on foodstuffs and fuel due to expectations of either price increase or income decrease. On the other hand, they were spending less on recreation and entertainment as well as taking out less loans and purchasing less durable expensive goods. Therefore, it can be noticed that the economic crisis has had a large effect on the Polish consumers' lifestyle and everyday routine as they have adapted their expenditures to focus on more basic needs such as food and fuel and reduced spending on leisure and pleasures (Jasiulewicz, 2012).

Similar changes in consumer behavior have also been noticed in connection to the novel COVID-19 pandemic. While most crisis or shock-events throughout history have been fairly localized, this pandemic has encompassed the whole world in quite a short time causing a unique situation for consumers to deal with. Governments have enforced numerous restrictions on everyday life in an attempt to contain the virus to the best of their abilities. These include obligatory self-isolation for incoming travelers or people that have been exposed to the virus, but also varied levels of social distancing, which contained individuals to their homes for months at a time. Consequently, consumers sense of uncertainty and fear of infection rose, causing them to alter their everyday routines, consumption patterns and overall lifestyles. Common behaviors that have been observed all over the world as a result of the COVID-19 pandemic, especially in connection to consumption habits, include changes in consumption timing, breadth and volume of purchases. More specifically, most commonly noticed behaviors included panic buying, herd mentality and a switch to satisfying the more basic, physiological needs, rather than indulging more luxurious wants, based on the Maslow's hierarchy of needs model (Loxton et al., 2020).

A study done on the drivers of disruption of economic activity in the United States throughout 2020, as a result of the COVID-19 pandemic, has researched whether the decline in commercial activity has been a consequence of government-imposed restrictions or the consumers' own fear of infection with disease. Using cellular phone records data of consumers' visitation to over 2.25 million businesses, it was found that consumer traffic fell by 60 percentage points, of which only 7 could be attributed to governmental restrictions. In many states, overall commercial traffic started declining before any legal restrictions were in action and consumers tended to switch their in-person visits from larger and busier businesses to smaller and less frequented ones. These decisions were highly connected to the number of COVID-19 caused deaths in particular counties and the individuals' fear of infection with the virus (Goolsbee & Syverson, 2021).

Another article on how COVID-19 drives fear in consumers and therefore motivates greed, stockpiling behavior and changes in purchase patterns states that general consumer behavior during the pandemic is largely influenced by fear, anxiety and stress. In wanting to gain a sense of control in the situation and give themselves a sense of security in the future, consumers often abandon their previous considerations for a product such as its appearance, negative reviews or word-of-mouth recommendations. Their main goal is to secure a substantial amount of goods, often opting for “unrecognized brands” that they usually would not choose, guided by the saying “something is better than nothing” (Satish, Venkatesh, & Raja Manivannan, 2021).

According to research by Yuen et al. (2020) there are four main factors that may influence these types of behaviors during the COVID-19 pandemic, especially panic buying. These factors are: perception, fear of the unknown, coping behavior and social psychological factors.

Perception is about how consumers perceive the current health crisis and every event in connection to it. It also encompasses two sub-factors: perceived threat (how risky do individuals perceive the situation to be – the higher the perceived threat of the virus the more likely is the development of behavioral changes) and perceived scarcity (fear of prevented or reduced accessibility to a product – again, the higher the perceived scarcity of a product or service the higher the chance of changes in consumption patterns).

Fear of the unknown includes the heightened feelings of uncertainty, fear and anxiety for the future following an extreme event that individuals do not know much about, such as the COVID-19 pandemic. These feelings might also influence consumers’ perception of the situation in a negative manner causing them to adapt their purchasing behavior and overall consumption patterns in order to give themselves a sense of comfort and security.

Next, coping behavior may also be a reason for increased changes in consumers’ consumption and purchase habits. During a shock-event such as a global pandemic, individuals often feel as if they are losing control over the situation which causes them great discomfort. If the source of discomfort is something that cannot be controlled (such as a virus or disease) consumers will turn to other aspects of their lives that they can control, such as consumption and shopping.

Lastly, there is the social psychological factors, defined by two sub-factors – social influence and social trust. Social influence includes the fact that individuals are often affected by beliefs, attitudes or opinions of their surroundings. When it comes to increased purchase patterns, consumers may be influenced to buy more by information seen in the media or on social networks, feeding into their already heightened feelings of uncertainty and fear. Social trust is a concept that would promote an individuals’ feelings of cooperation, consideration and confidence in their community and government. In other words, it would mean that a

higher sense of social trust would encourage consumers to not drastically increase the volume of their purchases, coming from a place of consideration and faith in their community (Yuen, Wang, Ma, & Li, 2020).

Consequently to developments in consumer behavior, the categories of consumer goods that have experienced the largest surge in consumption and purchase in the U.S., according to J.P.Morgan, are household cleaners and soap, vitamins and other dietary supplements, hair color and coffee. There was also a sudden surge of products such as spirits, food, beer and cider and personal care and health items, as of March 2020. According to Celine Pannuti, the Head of European Staples and Beverages Research, trends such as panic buying relaxed relatively quickly as consumers realized that they were not going to miss out on any products but emphasizes that demand for food items will remain somewhat higher than usual as people spend a lot more time at home. Trends such as avoidance of big brands and opting for more affordable alternatives will remain present. Products that have experienced a decrease in demand are cosmetics such as makeup and sun care, as working from home and reluctance to go for vacation become more common (J.P.Morgan, 2020).

1.3.2 Extrinsic and intrinsic consumer motivation

Another concept that has a great influence on consumer behavior and consumption patterns is motivation. In simplest terms, motivation is a set of processes that drives consumers to behave the way they do. Consumers experience motivation when a need is created that they wish to be satisfied. Until that need is met, there is a feeling of tension that pushes consumers to act and satisfy it. Motivation can also be explained through its strength and direction. Motivational strength is defined as the amount of energy a consumer is willing to spend to satisfy one need over another – essentially, how motivated they are to reach their goals. Motivational direction, on the other hand, is the path or route the consumer chooses to satisfy those needs as fast and as effectively as possible (Solomon, Bamossy, Askegaard, & Hogg, 2006).

There is also a distinction between internal (intrinsic) motivation and external (extrinsic) motivation. Internal motivation occurs when people are motivated by internal values. For example, engaging in an activity just because it brings positive feelings of satisfaction, encourages curiosity and learning as well as offers an opportunity to achieve their goals and satisfy their needs. Contrarily, external motivation occurs under external influences – engaging in an activity because it results in an independent, outside event or under the influence of other people's opinions. The most common example of external motivation is doing an activity in order to receive a reward or to avoid punishment (Deci & Ryan, 2008; Solomon, Russell Bennett, & Previte, 2013).

When it comes to consumption of dietary supplements, consumers may have various reasons to take them. Motives may be influenced by an array of factors, ranging from social and

psychological factors to level of knowledge and economic factors (Conner, Kirk, Cade, & Barrett, 2001). A concept that is often used to help understand the reasoning behind certain health related behaviors, including consumption of dietary supplements, is the theory of planned behavior (TPB) (Conner, Kirk, Cade, & Barrett, 2003). This theory explains that consumer behaviors are largely affected by behavioral intentions, which are then further affected by attitudes towards these behaviors, subjective norms and perceived behavioral control (Kan & Fabrigar, 2017). In other words, do consumers perceive behaviors to have a positive or negative effect on them, how their social surroundings affect their decision making and how simple or complicated a behavior is to perform (Conner, Kirk, Cade, & Barrett, 2003).

A study done on factors that may influence decisions to take dietary supplements, done on a cohort of 300 women, states that beliefs about a behavior might be the most important factor in the decision-making process. They discovered that the motivations behind users' consumption of supplements were strong beliefs that dietary supplements would better their health, that they will not do any harm and that that was an opportunity to do something positive for themselves. Other motivators to consume included low food quality, stressful lifestyle, issues with nutrition and diet as well as influence from various sources of information, such as health professionals, the media and books/magazines (Conner, Kirk, Cade, & Barrett, 2003).

Another survey by Okleshen Peters, Shelton and Sharma (2003) on factors that influence the consumption of dietary supplements states that consumers reported various reasons on why they consume supplements. The reasons included prevention or treatment of diseases, supplementing missing nutrients in the diet, aesthetic reasons and decreasing costs of expensive healthcare. Other interesting reasons that the consumers have reported were of psychological nature – taking dietary supplements as a form of “peace of mind”, i.e., the usage of dietary supplements as a way of insurance to prevent any potential future health issues. Even though the consumers cannot necessarily see any physical benefits from taking dietary supplements, just the notion of taking them gives them a sense of control and security regarding their health. It may also serve as a way of making up for an unhealthy or unsustainable diet/way of life (Okleshen Peters, Shelton, & Sharma, 2003).

Since the COVID-19 pandemic has started, motives for consumption of dietary supplements are not much different. According to a survey conducted by the Council for Responsible Nutrition, consumers have reported that they have increased their consumption of supplements in order to strengthen their immune system, improve their overall health and wellness, reduce the risk of infection with an illness as well as to gain a stronger sense of control over their wellbeing (Decker, 2021).

1.4 Information sources and trust in information sources with regard to the COVID-19 pandemic

Different sources of information may also have quite an impact on consumer behavior. In general, sources of information can be defined as any person, place or object that provides information and from which knowledge can be obtained (LIS BD Network, 2018). Most commonly they are divided into primary sources (thesis, conference proceedings, interviews etc.), secondary sources (edited works, books, articles that review other research etc.) and tertiary sources (dictionaries, encyclopedias, manuals etc.) (University of Minnesota Crookston, n.d.). Other classifications may include anything from traditional media (newspapers, television, radio etc.) and electronic media (webpages, social media, blogs etc.) to Word of Mouth and expert's opinions (Min, 2018). For the purposes of this thesis, the sources of information analyzed were adapted from another survey on trust in information sources by Brown-Johnson et al. (2018) and they include television, radio, Internet, social media, health professionals, public bodies and opinions of family and friends (Brown-Johnson, et al., 2018).

All the sources of information mentioned above can also be put under one name – mass media. As one of the most present aspects in an individual's life, mass media offers knowledge, entertainment, persuasion, cultural learning and much more. Therefore, it has an inevitable role in influencing, forming and reshaping public opinions, as well as motivating consumer behavior and actions (Loxton et al., 2020). Much of its power can be attributed to the fact that, nowadays, mass media has such an extensive reach that it has the ability to broadcast a similar message, continuously, to the majority of the world's population. Mass media may guide individuals' views on anything, ranging from religion and politics to education and health. This may occur through deliberate information distribution by public bodies or organizations in order to send a specific message or through indirect information consumption from news or entertainment channels (Viswanath, Ramanadhan, & Kontos, 2007).

Mass media is a particularly useful medium of communication with the greater public when it comes to health-related issues, especially during a crisis. Health communication is a method used to disclose information which has a role of bettering health outcomes by encouraging social and behavioral changes. In such instances, mass media serves as a channel that facilitates change in health-related views and behaviors (Simou, 2015). A study about the impact of mass media health communication on health decision-making and advice-seeking reported that the consumers which were exposed to a lot of health-related information from mass media (radio, television, Internet, print) were more likely to report that this information affected their health-related decision making (De Jesus, 2013). This is not surprising, considering the amount of health-related information that can be found, heard and read daily, from information about specific diseases and medical treatments to exercise and dietary supplement consumption (Pew Research Center, 2003).

Trust in those sources, especially when it comes to health information, can have great effect on an individual receiving a health-related directive and actually acting upon it (Simou, 2015). Trust, in general, can be defined as one party's complete reliance in another's dependability and integrity (Morgan & Hunt, 1994; Ladwein & Sanchez Romero, 2021). Its function is to increase an individuals' confidence and decrease their uncertainty in situations where they do not have enough information or knowledge that would lead their choices and behavior (Hobbs & Goddard, 2015; Khare & Pandey, 2017; Ladwein & Sanchez Romero, 2021).

A study that examined health information-seeking in older adults found that the most trusted sources of information were (from highest to lowest): health care providers, pharmacists, friends/family, newspapers, the Internet, television and radio. In person advice and contact was found far more reliable than written, impersonal material (Chaudhuri , Le, White, Thompson, & Demiris, 2013). Another survey on preferred sources of health information and trust in those sources found that, while mass media sources and the Internet were primarily used to seek health-related information, the most trust was put into health professionals and physicians, this time with a younger population of adults (Marrie, Salter, Tyry, Fox, & Cutter, 2013).

Special attention can be brought to the Internet when it comes to health-related issues. A survey conducted by the European Commission in 2014, concerning European citizens' digital health literacy has shown that the majority of respondents (59%) have used the Internet to search for health-related information within the last 12 months (Flash Eurobarometer 404 - TNS Political & Social, 2014). Other research by the Pew Research Center (2003) on internet health resources has reported that 80% of American adult Internet users (93 million) have searched for at least one of sixteen major health topics online. Searching for health and medical related advice is third on the list of user's online activities after e-mail and researching a product before purchase. Top three most commonly searched health topics are about a specific disease or medical problem (63%), a medical procedure or treatment (47%) and nutrition and dietary supplements (44%) (Pew Research Center, 2003).

One of the more popular online destinations, frequently visited nowadays, are websites that provide, specifically, health-related information. Trust in these websites has a large effect on whether an individual will expose themselves to the information they offer, whether they will pay attention to that information and, often, makes a difference in the likelihood that the individual will act on the advice obtained from the website (Thai et al., 2018).

According to Kim (2014) there are three different groups of factors that determine trust in health-related websites – individual difference antecedents, website-related antecedents and consumer-to-website interaction-related antecedents. Individual difference antecedents include socio-demographics, personality, health status and health literacy – younger, more

educated, agreeable individuals informed about health topics and in good health were more likely to trust a health-related website. Website-related antecedents include information quality, ease-of-use, appearance and system quality. Most trusted websites contained accurate, relevant and understandable information, were easily operable and user-friendly, had little advertisements and a fast response time. Lastly, the consumer-to-website interaction-related antecedents include prior experience with using health-related websites, perceived reputation, perceived risk and familiarity. Therefore, prior contact with a health website increases the likelihood of trust towards it, as well as it being run by an entity deemed reputable (the government, medical universities or doctors). Low perceived risk of negative consequences of actions proposed on the website (with the presumption that the entities involved are not taking advantage of the situation), in conjunction with the information being provided by individuals with similar health experiences increases the user's tendency to have confidence in the information provided (Kim, 2014).

When it comes to dietary supplements specifically, the MARS Consumer Health Study by Kantar Media (2017) has reported on the media preferences and consumption of dietary supplement users. According to them dietary supplement users are most likely to seek supplement and general health information from printed media such as magazine (49%) and newspaper (20%) articles, diet and fitness websites (39%) and online communities (17%). In addition to that, 80% of dietary supplement users claim that they use the Internet to seek health related information, in comparison to 73% of total adults (Healthcare Client Services, 2017).

The situation is not much different since the beginning of the COVID-19 pandemic. A Facebook study was done in Taiwan to find out which information sources on COVID-19 are available and used the most by the Taiwanese population. Information was primarily sought on the Internet (80%), followed by traditional media (53.5%), family members (24.9%) and work colleagues (24.3%). The majority of the respondents (25.5%) used only one source of information to learn about COVID-19 (Wang et al., 2020). Another similar study was performed in the U.S. on over 11 thousand participants on the topic of trends in COVID-19 information sources. It was found that traditional media (television, radio, podcasts and newspapers combined) was the most commonly used source among all the participants, at 91.2%. Traditional media was followed by government and other official websites as the most used individual sources of information (87.6%) as well as by social media (73.6%). The most trusted sources of information were government websites (43.3%) and doctors (30.3%) while the least trusted sources were religious leaders (0.1%) and friends (0.4%) (Ali et al., 2020).

When it comes to the amount of information that is freely available on immunity strength, dietary supplements and the COVID-19 virus itself, numerous articles and scientific works have been published. Official websites such as the Office of Dietary Supplements, the U.S. Food and Drug Administration or the UK National Health Service have all published, at

some point, information and advice on dietary supplements (Office of Dietary Supplements, 2020a), COVID-19 vaccines (U.S. Food and Drug Administration, 2021) and the immune system (Balen, n.d.). Other miscellaneous sources have reported on a range of COVID-19 related content, from advice on how to boost your immune system with intake of vitamins and minerals (Valencia, 2020), which role do micronutrients have in battling COVID-19 (Shakoor et al., 2021) to general advice on how to prevent and treat the virus (British Dietetic Association, 2020).

2 A STUDY ON DIETARY SUPPLEMENT CONSUMPTION AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC

The following chapter on research methodology presents a detailed overview of the theoretical and empirical research methods used throughout the thesis. The theoretical portion of this study includes the previously mentioned scientific literature review, while the empirical part includes primary data collection via a questionnaire followed by appropriate and detailed statistical analysis.

2.1 Research methodology

For the empirical part of the thesis, the research instrument that was used to gather primary quantitative data was a questionnaire. The questions in the questionnaire were adapted and developed based on relevant literature review with respect to the research questions of the thesis, seen below. Once all data was collected, appropriate statistical analysis was conducted with respect to the pre-defined research questions. The statistical tests that were used for data analysis included the One-way analysis of variance (ANOVA), the Chi-square test of independence using a contingency table (crosstab) and the Paired samples *t*-test.

The research questions of this master's thesis were developed based on the fact that the beginning of the COVID-19 pandemic has, undeniably, affected many aspects of our lives. Changes in consumer behavior and habits are one of them. Through analysis of related and relevant works, we have identified the following open research questions that this thesis addresses:

- What are the changes in consumers' reported consumption of dietary supplements with regard to the COVID-19 pandemic?
- What extrinsic and intrinsic motives do consumers have to use dietary supplements with regard to the COVID-19 pandemic?
- What are the differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19?

- Which information sources do they find trustworthy, helpful and important when it comes to consumption of dietary supplements and the COVID-19 pandemic?

The four main hypothesis that are proposed and investigated in this thesis were developed based on the previously mentioned research questions and analysis of relevant scientific sources.

Since the beginning of the COVID-19 pandemic, many dietary supplement manufacturers have reported an immense surge in supplement sales (some countries experiencing a surge of up to 237%) (Grebow, 2021; Gallen, n.d.). Several studies show that serious disease outbreaks such as this one, provoke changes in consumers health-related behaviors – including consumption of dietary supplements (Lau, Yang, Tsui, & Kim, 2005). From the above, the following hypothesis was developed: **H1**: Consumers' reported consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (in terms of (a) general consumption, (b) quantity and (c) frequency).

When it comes to consumption of dietary supplements, consumers have various motives to take them, most to do with consumer beliefs that dietary supplements will better their health and immune system (Conner, Kirk, Cade, & Barrett, 2003). Since the COVID-19 pandemic started, many consumers have reported an increase in consumption of supplements in order to strengthen their immune system, better their overall health and wellness as well as reduce the risk of infection (Decker, 2021). Based on this, the following thesis was developed: **H2**: The number of motives for consumers' consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (with differences between the three countries analyzed – Slovenia, Croatia and Macedonia).

Mass media is one of the most present aspects of an individual's life, often serving as a useful medium of communication with the greater public when it comes to health-related issues (Loxton et al., 2020). It has an inevitable role in influencing, forming and reshaping public opinions, as well as motivating consumer behavior and actions (Simou, 2015). Therefore, the following hypothesis was formed: **H3**: Consumers in Slovenia, Croatia and Macedonia differ in their usage of information sources for information on dietary supplements and COVID-19, including (a) Internet; (b) family and friends; (c) health professionals (d) social media; (e) television; (f) public bodies; (g) radio.

When it comes to trust in information sources, especially for health-related issues, it can make a difference between an individual receiving a health-related incentive and actually acting upon it (Simou, 2015). Several studies examining information seeking in adults showed that different demographics of consumers laid trust in different information sources when it comes to health-related issues (Chaudhuri, Le, White, Thompson, & Demiris, 2013; Marrie, Salter, Tyry, Fox, & Cutter, 2013). Based on the above, the following hypothesis was developed: **H4**: Consumers have different views of information sources in terms of (a)

trustworthiness, (b) helpfulness and (c) importance when it comes to information on dietary supplements and COVID-19, including (1) Internet; (2) family and friends; (3) health professionals (4) social media; (5) television; (6) public bodies; (7) radio).

The empirical research instrument of choice for this thesis was a questionnaire. The questionnaire was created and run on a platform that enables services for online surveys – 1KA. From 1KA, the link to the questionnaire was distributed solely online – via social media (Facebook), various messenger applications to personal contacts (Facebook Messenger, WhatsApp and Viber) as well as through e-mail. In order to ensure a larger number of responses, participants were asked to further share the questionnaire to their own contacts. Through this distribution method we were able to reach participants from three different countries, even with the added challenges that the COVID-19 pandemic imposes. The opening page of the questionnaire provided respondents with information on the topic of the study and this thesis as well as an insurance of anonymity and confidentiality. There was no obligation to finish the entire survey and it could be exited at any stage.

Targeted participants were inhabitants of three Balkan countries, namely the Republic of Croatia, the Republic of Slovenia and the Republic of North Macedonia. In order to ensure participants from those geographic areas, the questionnaire was available in English as well as in the country's respective languages – Croatian, Slovenian and Macedonian. There were no demographic or other conditions that would prevent someone from participating in the survey.

Initially, there were 323 valid responses to the questionnaire. More specifically, 171 participants were from Croatia, 71 from Macedonia, 65 from Slovenia and 16 from various different countries. Since the number of respondents (16) that have answered the questionnaire in English was inadequate, those units were excluded from the subsequent analysis of results. Since the questionnaire offered the possibility to drop out of it at any point as well as contained several “If” conditioned questions, the amount of valid responses per question varies.

2.2 Questionnaire

The questionnaire for this study, named “Consumption of dietary supplements with regard to the COVID-19 pandemic”, was adapted from and developed with respect to other works related to intake of dietary supplements and the COVID-19 pandemic. The complete questionnaire and its sources can be seen in Appendix 2. After some introductory questions, participants were asked to recall information about their consumption of dietary supplements and motivation for consumption of dietary supplements prior to and after the beginning of the COVID-19 pandemic. Further, they were asked about the trustworthiness, helpfulness and importance of several sources of information when it comes to dietary supplements and

the COVID-19 pandemic. The questionnaire ended with several socio-demographic questions.

In more detail, in the introductory questions participants were asked to rate their overall health and everyday diet. The scale they were able to choose from ranged from “1 – Poor” to “5 – Excellent” for both questions (Lieberman et al., 2010; Vagias, 2006; Parnell, Wiens, & Erdman, 2015).

The next set of questions referred to the period prior to the start of the COVID-19 pandemic and participants were asked to recall their consumption patterns and motivation for consumption of dietary supplements. They were asked whether they consumed any dietary supplements (choice between “Yes” and “No”) and how often they consumed them (choice range from “Daily” to “Occasionally (when I remember)”) (Quick Test Inc., n.d.; Messerer, Johansson, & Wolk, 2004). To assess their motivation to consume dietary supplements seven different reasons were listed, with the possibility to choose multiple options. The reasons offered were: overall health and wellness, nutrient gap in the diet, a stronger immune system, protection from illness, recommendation from doctor or dietitian, aesthetic reasons (nail, hair, skin health etc.) and other (Altun, Karacil Ermumcu, & Kurklu, 2020; Dickinson, Blatman, El-Dash, & Franco, 2014; Parnell, Wiens, & Erdman, 2015; AlTamimi, 2019).

The following set of questions referred to the period after the start of the COVID-19 pandemic. It included the same questions as the previous section with some additional ones. Participants were also asked whether they have started consuming dietary supplements specifically due to the COVID-19 pandemic and whether they have changed their consumption in terms of quantity (choice between “I consume more”, “I consume the same” and “I consume less”) (Quick Test Inc., n.d.; Alyami et al., 2020; Gornicka, Drywien, Zielinska, & Hamulka, 2020). Those participants that have started to consume dietary supplements specifically due to the start of the pandemic were presented with a list of reasons for doing so, from which they could choose multiple answers. The seven reasons listed were: fear of infection with COVID-19, influence of information they got from an information source (TV, Internet, social media etc.), a stronger immune system, treatment and prevention of COVID-19, recommendation from a doctor or dietitian, because others in their life do (family/friends) and other (Messerer, Johansson, & Wolk, 2004; Lieberman et al., 2010; Altun, Karacil Ermumcu, & Kurklu, 2020; Dickinson, Blatman, El-Dash, & Franco, 2014; Parnell, Wiens, & Erdman, 2015; AlTamimi, 2019; Loxton et al., 2020; Hamulka, Jeruszka-Bielak, Drywien, Górnicka, & Zielinska-Pukos, 2021).

The next section referred to various sources of information that participants use to gain information about dietary supplements and COVID-19, and their perception of their trustworthiness, helpfulness and importance. From a list of seven information sources, including television, radio, the Internet, social media, health professionals, public bodies and family/friends, they were able to select multiple, for both the topic of dietary supplements

and COVID-19 (Lieberman et al., 2010; Brown-Johnson et al., 2018). Then, for both topics and each of the information sources they were asked to rate their trustworthiness (on a scale from “1 – I don’t trust it at all” to “5 – I definitely trust it”), helpfulness (scale from “1 – Not at all helpful” to “5 – Extremely helpful”) and importance (scale from “1 – Not at all important” to “5 – Extremely important”) (Jezewska-Zychowicz, Plichta, & Krolak, 2020; Parmeshwar et al., 2018).

Finally, they were asked to answer several socio-demographic questions including their gender, age group, attained level of education, personal monthly income and current country they live in.

3 RESULTS OF A STUDY ON DIETARY SUPPLEMENT CONSUMPTION AND TRUST IN INFORMATION SOURCES WITH REGARD TO THE COVID-19 PANDEMIC

In this chapter, we first present the general demographic data of participants, including information about their health and diet. This is followed by four separate sections, each dedicated to one research question and hypothesis of the thesis and containing the results of its designated questionnaire questions. In order to present the results in an organized manner, the paragraphs are further divided into two sub-sections each – descriptive statistics and results of statistical tests.

3.1 Demographic data

Overall, the majority of participants that have finished the survey were female (44.3%), between 18 and 34 years of age (47.2%) with an undergraduate, master’s or doctoral degree (52.8%) and a personal monthly income between 450€ and 1099€ (24.8%). The country where the majority of the participants currently live is Croatia with 36.8%. A more detailed overview (not including missing values and “Prefer not to answer” responses) of the demographic data of participants can be seen in Table 1.

When it comes to the questions regarding the quality of participant’s overall health and everyday diet, they were asked to rate them on a scale of “1 – Poor” to “5 – Excellent”. The question about overall health produced an average value (mean) of 3.8 meaning that participants found their health to be between “3 – Good” and “4 – Very Good”, leaning more towards “4 – Very Good”. In the case of their everyday diet the mean was 3.27, again between “3 – Good” and “4 – Very Good”, only this time leaning more towards “3 – Good”.

Table 1: Demographic data

DEMOGRAPHICS	SAMPLE
GENDER	VALID: 224, MISSING: 83
Female	44.3% (N=136)
Male	27% (N=83)
AGE	VALID: 223, MISSING: 84
18-34	47.2% (N=145)
Above 35	25.4% (N=78)
EDUCATION	VALID: 219, MISSING: 88
Primary/Secondary	18.6% (N=57)
Undergraduate/Master's/Doctoral	52.8% (N=162)
INCOME	VALID: 204, MISSING: 103
No income/Under 450€	20.2% (N=62)
450€-1099€	24.8% (N=76)
Over 1100€	21.5% (N=66)
COUNTRY (TOP 3)	VALID: 224, MISSING: 83
Croatia	36.8% (N=113)
Slovenia	16% (N=49)
Macedonia	14.7% (N=45)

Source: Own work

3.2 Changes in consumers' reported consumption of dietary supplements with regard to the COVID-19 pandemic

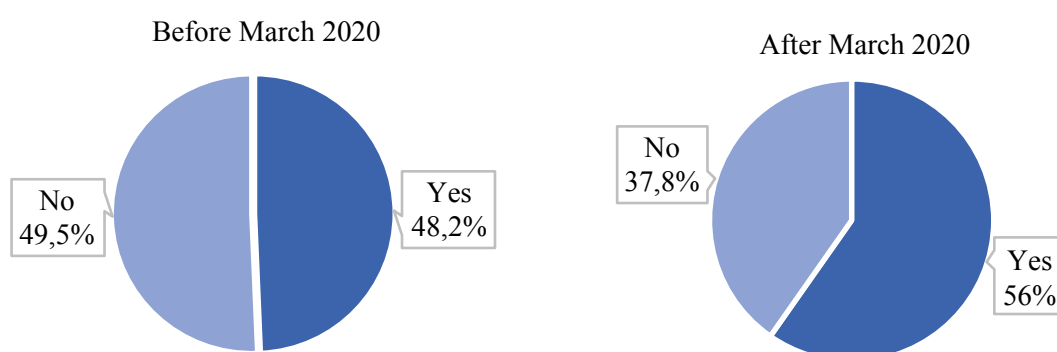
In the first section of the questionnaire, participants were asked six different questions relating to their consumption of dietary supplements with respect to the COVID-19 pandemic. This was done in order to test the first hypothesis of the thesis – **H1**: Consumers' reported consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (in terms of (a) general consumption, (b) frequency and (c) quantity).

3.2.1 Descriptive statistics

In the first question of this section, “Before March 2020, have you consumed any dietary supplements?” the responses were quite balanced – 49.5% of participants stated that they did not consume any dietary supplements prior to March 2020, while 48.2% stated that they did consume dietary supplements. When asked: “After March 2020, have you consumed any dietary supplements?” there was an increase in positive responses, as seen in Figure 1. In this instance, 56% of participants said that they have consumed dietary supplements after March 2020, while 37.8% still did not consume any dietary supplements. Interestingly, when further asked “Have you started to consume dietary supplements specifically due to the beginning of the COVID-19 pandemic?”, the majority of participants (37.8%) stated that they did not. Only 18.2% stated the opposite.

Further, when asked to report the frequency of dietary supplement consumption prior to March 2020 with the question “Before March 2020, how often did you consume dietary supplements?”, 44.6% of responses stated that they consumed dietary supplement either “Daily, A few times per week or Occasionally”. On the other hand, only 3.3% of responses stated that they used dietary supplements less frequently – “Once a week or Once a month”. When asked the same question but in a different time period: “After March 2020, how often did/do you consume dietary supplements?” there was an increase in both answers. Namely, 50.8% of respondents reported consumption of dietary supplements “Daily, A few times per week or Occasionally”, while 4.2% reported consumption “Once a week or Once a month”. Participants were also asked about the quantity of consumption of dietary supplements, in the question: “After March 2020, has your consumption of dietary supplements changed (compared to the period before the pandemic, before March 2020)?”. The responses show that the majority of participants (29%) consume the same amounts of dietary supplements as before the pandemic, followed closely (24.1%) by those that have increased the amounts of supplements they consume. Only 2.2% of responses reported a decrease in consumption.

Figure 1: Consumption of dietary supplements



Source: Own work

3.2.2 Statistical tests

For further analysis of the first hypothesis **H1** that states that consumers reported an increase in consumption of dietary supplements after the beginning of the COVID-19 pandemic (in terms of (a) general consumption, (b) frequency and (c) quantity), the type of statistical test that was used was the Chi-square test of independence using a contingency table (crosstabs). For all questionnaire items, the test was done with the distinction between the three languages that the questionnaire was available in – Croatian, Slovenian and Macedonian. Detailed results of all tests can be seen in Appendices 3 to 10.

In all three questions regarding the general consumption of dietary supplements: “Before March 2020, have you consumed any dietary supplements?”, “After March 2020, have you consumed any dietary supplements?” and “Have you started to consume dietary supplements specifically due to the beginning of the COVID-19 pandemic?”, the results of the Chi-square test showed that there was a statistically significant difference between the variables tested – consumption and languages. The Chi-square statistic values (8.574, 14.972 and 20.859) and the p -values (.014, .001 and .000) thus prove that the portion of the alternative hypothesis H1 regarding (a) general consumption can be confirmed.

For the next two questions, “Before March 2020, how often did you consume dietary supplements?” and “After March 2020, how often did/do you consume dietary supplements?”, the categories that were offered as answers in the questionnaire were categorized in two different groups based on their frequency of choice. One group included the categories: “Daily, Few times per week (2-6x) and Occasionally (when I remember)” while the second included “Once per week” and “Once a month”. The Pearson Chi-Square statistic (.892) for the question before March 2020 and its p -value (.640) make the relationship between variables insignificant. For the question after March 2020 the values of the Chi-Square statistic (.246) and the p -value (.884) make the relationship, again, insignificant. In both questions, there was no statistically significant association between tested variables – languages and frequency of consumption of dietary supplements. This means that the component of the alternative hypothesis H1, regarding (b) frequency of consumption, cannot be accepted.

The Chi-Square statistic (16.360) and p -value (.003) of the test for the question “After March 2020, has your consumption of dietary supplements changed (compared to the period before the pandemic, before March 2020)?” make the difference between variables statistically significant – meaning that the aspect of the alternative hypothesis H1 concerning (c) quantity of consumption can be accepted.

Lastly, a Chi-Square test of independence was also done on the questions relating to general consumption of dietary supplements before and after March 2020, in order to compare the two time periods. The Pearson Chi-Square statistic (149.018) and $p < .001$, indicate that the relationship between tested variables is statistically significant.

Another comparison was done between the questions relating to frequency of consumption of dietary supplements, before and after March 2020. The Chi-Square statistic (40.887) and $p < .001$, show that the difference between tested variables is statistically significant. Results from both questions have shown to have a statistically significant association between variables analyzed – consumption of supplements before and after March 2020 in one case, and frequency of consumption of dietary supplements before and after March 2020 in the other, thus accepting the (a) general consumption and (b) frequency of consumption components of the H1 hypothesis.

3.3 Extrinsic and intrinsic motives consumers have to use dietary supplements with regard to the COVID-19 pandemic

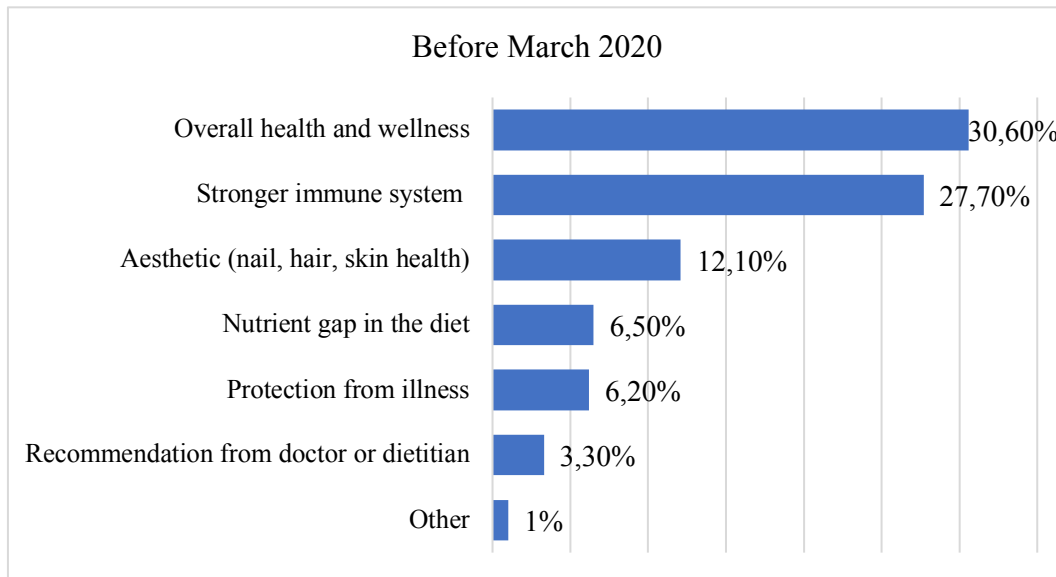
The second set of questions referred to consumers' motives to consume dietary supplements, where the questionnaire participants were asked to report their reasons for using dietary supplements in three different questions. The second research hypothesis was tested in this instance – **H2**: The number of motives for consumers' consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (with differences between the three countries analyzed – Slovenia, Croatia and Macedonia).

3.3.1 Descriptive statistics

In the first question: “Before March 2020, what were the reasons for your consumption of dietary supplements?”, respondents were asked to mark as many as seven reasons for dietary supplement usage. The three most commonly chosen motives for consumption were: overall health and wellness, a stronger immune system and aesthetic reasons (nail, hair, skin health etc.) at 30.6%, 27.7% and 12.1%, respectively. The remaining reasons, in descending order, were: nutrient gap in the diet (6.5%), protection from illness (6.2%), recommendation from doctor or dietitian (3.3%) and other (1%). Other reasons included fitness and lack of energy.

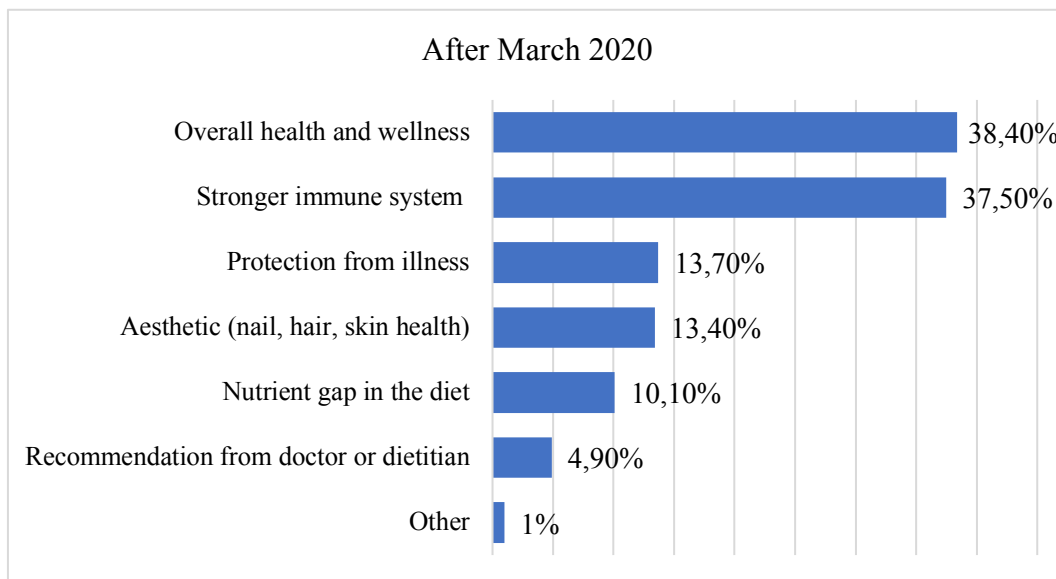
In the second question: “After March 2020, what are the reasons for your consumption of dietary supplements?” there was an increase in frequency of choice in all the reasons but one, as can be seen in Figure 2 and Figure 3. The three most commonly chosen reasons included: overall health and wellness (38.4%), a stronger immune system (37.5%) and protection from illness (13.7%). The rest of the reasons, in descending order, included: aesthetic reasons (nail, hair, skin health etc.) (13.4%), nutrient gap in the diet (10.1%), recommendation from doctor or dietitian (4.9%) and other (1%), which remained unchanged.

Figure 2: Reasons for consumption of dietary supplements before March 2020



Source: Own work

Figure 3: Reasons for consumption of dietary supplements after March 2020



Source: Own work

The third question: “If you have started consuming dietary supplements specifically due to the COVID-19 pandemic, for what reasons did you do so?”, was shown only to those respondents that had a positive answer to the question “Have you started to consume dietary supplements specifically due to the beginning of the COVID-19 pandemic?”, mentioned previously. A different set of reasons was listed. Three most commonly chosen answers in this question were: a stronger immune system (13.7%), treatment and prevention of COVID-19 (7.5%) and influence of information they got from an information source (TV, Internet, social media etc.) (6.5%). The remaining reasons most chosen, in descending order, were: fear of infection with COVID-19 (5.5%), because others in their life do (friends/family) (4.2%), recommendation from doctor or dietitian (2%) and other (0.3%).

3.3.2 Statistical tests

The statistical tests that were done for the analysis of this research question and hypothesis, based on the type of variables, were the One-way analysis of variance (ANOVA) and the Paired samples *t*-test. In order to simplify the analysis, a set of indices was created for each question (each index representing one reason that was offered as an answer in the questionnaire, seven overall). This was done in order to see how many reasons respondents had to use dietary supplements, as well as whether they had more or less reasons to consume supplements before and after the start of the COVID-19 pandemic. The analysis was done with the distinction between the three languages of the questionnaire – Croatian, Slovenian and Macedonian. A more detailed overview of the results can be seen in Appendices 11 to 14.

For the first question “Before March 2020, what were the reasons for your consumption of dietary supplements?”, based on the mean values from descriptive data analysis, it can be seen that respondents from Slovenia had most reasons to consume dietary supplements before March 2020, followed by Macedonians and Croatians. The one-way ANOVA test determined that there was not a statistically significant difference between any of the countries means ($F = 1.708, p = .183$), further confirmed by multiple comparisons where all *p*-values were greater than the Alpha value of .05.

In the second question “After March 2020, what are the reasons for your consumption of dietary supplements?”, the results differed. In this case, based on the mean values, all three countries had more reasons to consume dietary supplements, with Macedonians having the biggest increase in reasons, followed by Slovenians. The one-way ANOVA test concluded that there was a statistically significant difference between the three countries ($F = 4.793, p = .009$). In more detail, multiple comparisons showed that there was a difference between the Croatian and Slovenian group ($p = .041$) and the Croatian and Macedonian group ($p = .032$). The Slovenian and Macedonian group showed no significant difference ($p = 1.000$). Therefore, based on the results from the previous two questions it can be concluded that the research hypothesis **H2**: The number of motives for consumers' consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (with differences between the three countries analyzed – Slovenia, Croatia and Macedonia), can be accepted.

For the third question “If you have started consuming dietary supplements specifically due to the COVID-19 pandemic, for what reasons did you do so?” the results showed that, according to mean values, Macedonian respondents had the most reasons to consume dietary supplements, followed by Slovenians. The one-way ANOVA test ruled that there is a statistically significant difference between the three groups ($F = 13.258, p < .001$). Multiple comparisons showed that there was a difference between the Croatian and Macedonian group ($p < .001$) and the Slovenian and Macedonian group ($p = .019$). There was no significant difference between the Croatian and Slovenian group ($p = .182$).

With a Paired samples *t*-test, the questions “Before March 2020, what were the reasons for your consumption of dietary supplements?” and “After March 2020, what are the reasons for your consumption of dietary supplements?” were tested in order to see whether there was a difference between the number of reasons chosen before and after the start of the COVID-19 pandemic. The results of the Paired samples *t*-test showed that there was a statistically significant difference between the two time periods ($p < .001$). Based on the direction of the *t*-value (-5.847) and the increase in means (from .8730 to 1.1889) and standard deviation (from 1.2127 to 1.4015) it can be concluded that there was an increase in the number of reasons to consume dietary supplements that the respondents have chosen. These results along with the ones from the previous question, further confirm the second research hypothesis that states an increase in the number of motives for consumers' consumption of dietary supplements after the beginning of the COVID-19 pandemic (with differences between the three countries analysed – Slovenia, Croatia and Macedonia).

3.4 Differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19

In the third set of questions, regarding what sources of information consumers use to learn about dietary supplements and COVID-19, respondents were asked two different questions. The third research hypothesis; **H3**: Consumers in Slovenia, Croatia and Macedonia differ in their usage of information sources for information on dietary supplements and COVID-19, including (a) Internet; (b) family and friends; (c) health professionals (d) social media; (e) television; (f) public bodies; (g) radio was tested.

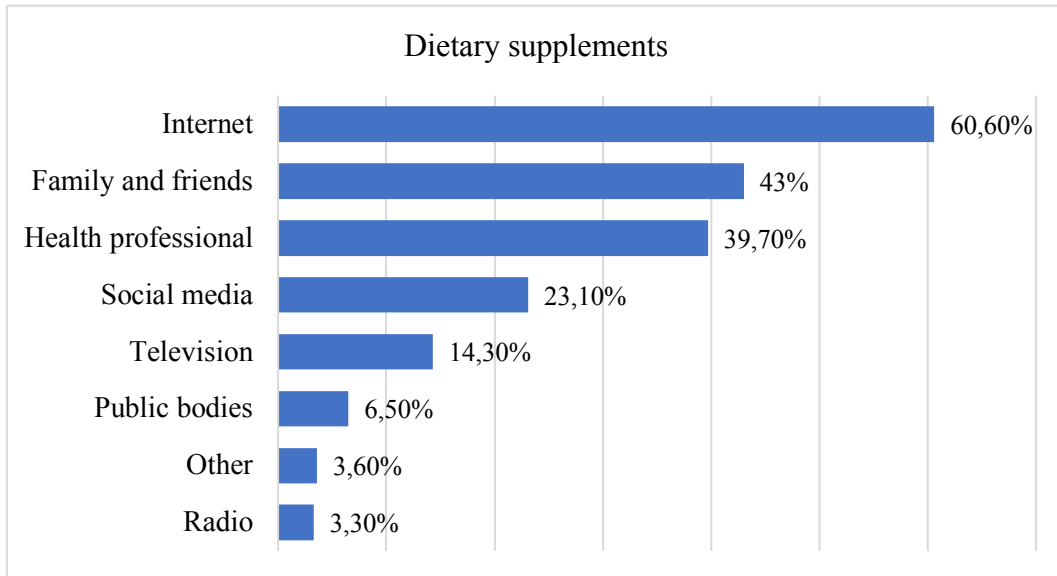
3.4.1 Descriptive statistics

In the first question: “What or who is the source of your dietary supplement information?”, respondents were able to choose as many as eight various sources of information. The three most commonly used sources of information for dietary supplements included: the Internet (articles, news sites etc.) at 60.6%, family and friends at 43% and health professionals (doctor, pharmacist etc.) at 39.7%. Other information sources, in descending order, included: social media (Facebook, Instagram, Twitter etc.) at 23.1%, television at 14.3%, public bodies (Ministry of Health etc.) at 6.5%, other at 3.6% and the radio at 3.3%. Other sources of information respondents listed included books and other purchased health-related material, platforms like ScienceDirect and organizations such as the World Health Organization or Centers for Disease Control and Prevention.

In the second question: “What or who is the source of your COVID-19 information?”, the results were quite different, as seen in Figures 4 and 5. The three most commonly chosen sources of information for COVID-19 were: the Internet at 63.8%, family and friends at 42% and public bodies at 40.1%. The remaining sources, in descending order, were: health

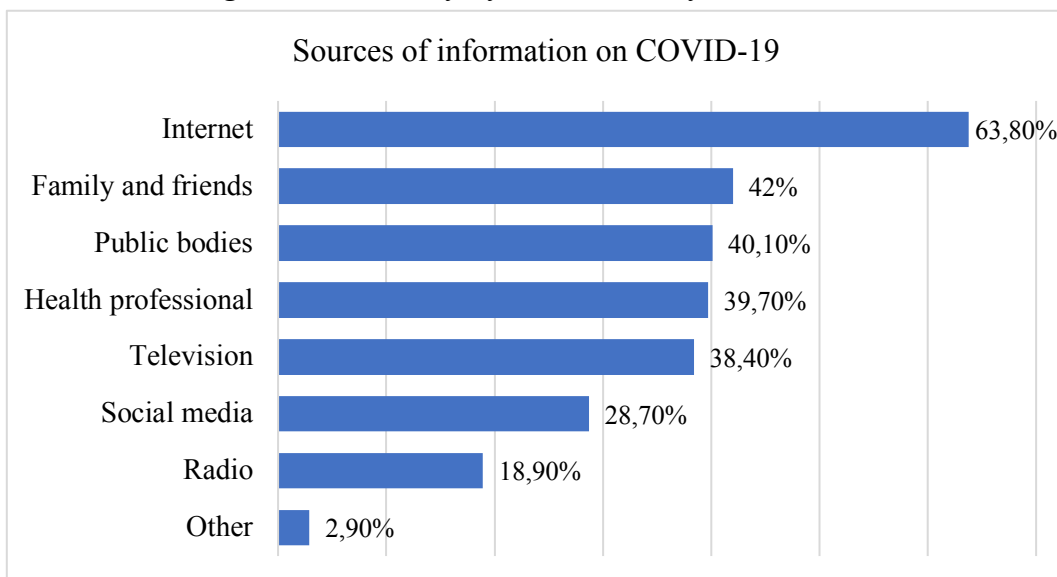
professionals at 39.7%, television at 38.4%, social media at 28.7%, the radio at 18.9% and other at 2.9%. Other sources respondents use for COVID-19 information included various scientific publications, university professors and podcasts.

Figure 4: Sources of information used for dietary supplements



Source: Own work

Figure 5: Sources of information used for COVID-19



Source: Own work

3.4.2 Statistical tests

For analysis of this research question and hypothesis, the statistical test that was used was the Chi-square test of independence using a contingency table (crosstabs). Each information source was analyzed separately and according to the languages offered in the questionnaire. More detailed results of the tests can be seen in Appendices 15 and 16.

In the first question “What or who is the source of your dietary supplement information?”, the relationship between tested variables was significant in the case of two information sources - health professionals and public bodies, based on the Chi-square statistic values ($X^2 = 7.757$ and 16.643) and p -values ($.021$ and $.000$). Based on those figures, it can be concluded that there is a statistically significant difference between the variables in question – languages and sources of information on dietary supplements. The remaining relationships between variables tested were found to be statistically insignificant – television ($X^2 = 4.952$, $p = .084$), the radio ($X^2 = .479$, $p = .787$), the Internet ($X^2 = .114$, $p = .945$), social media ($X^2 = .925$, $p = .630$), family and friends ($X^2 = 4.643$, $p = .098$) and other ($X^2 = 4.352$, $p = .113$). There was no statistically significant difference between these sources of information and languages. Therefore, it can be concluded that the third research hypothesis can be partially confirmed – consumers from Slovenia, Croatia and Macedonia differ in their usage of information sources for information on dietary supplements, specifically in (c) health professionals and (f) public bodies.

In the second question “What or who is the source of your COVID-19 information?”, the results differed slightly. The differences between the tested variables were found significant in the case of the following sources of information: television ($X^2 = 7.942$, $p = .019$), the radio ($X^2 = 9.6$, $p = .008$) and health professionals ($X^2 = 11.154$, $p = .004$). There was a statistically significant difference between the two variables analyzed – languages and sources of information on COVID-19. The remaining differences between variables tested were statistically insignificant: the Internet ($X^2 = 4.439$, $p = .109$), social media ($X^2 = .422$, $p = .810$), public bodies ($X^2 = 5.194$, $p = .074$), family and friends ($X^2 = .258$, $p = .879$) and other ($X^2 = .947$, $p = .623$). Based on these values, it can be concluded that there is no statistically significant difference between these information sources and languages. The third research hypothesis can, again, be partially confirmed – consumers from Slovenia, Croatia and Macedonia differ in their usage of information sources for information on COVID-19, specifically in (c) health professionals, (e) television and (g) radio.

3.5 Trustworthy, helpful and important information sources when it comes to consumption of dietary supplements and the COVID-19 pandemic

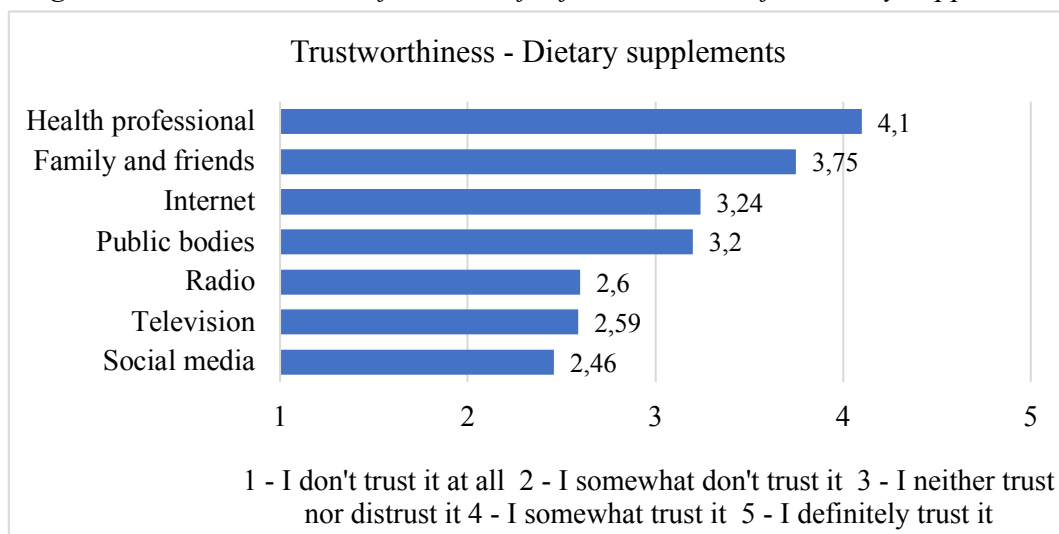
In the final set of questions, respondents were asked to rate each of the previously mentioned information sources based on how trustworthy, helpful and important they find them when it comes to information about dietary supplements and the COVID-19 pandemic. Overall, there were six questions in this section, aimed to test the fourth research hypothesis – **H4**: Consumers have different views of information sources in terms of (a) trustworthiness, (b) helpfulness and (c) importance when it comes to information on dietary supplements and COVID-19, including (1) Internet; (2) family and friends; (3) health professionals (4) social media; (5) television; (6) public bodies; (7) radio).

3.5.1 Descriptive statistics

In the first question: “To which extent do you trust the following people or institutions as sources of information on dietary supplements?”, respondents were asked to rate the trustworthiness of certain information sources on a scale from “1 – I don’t trust it at all” to “5 – I definitely trust it”. The highest trusted source of information, with a mean (X) of 4.1 and standard deviation (σ) of .938, was health professionals – rated with “4 – I somewhat trust it”. It is followed by family and friends, the Internet and public bodies at means of 3.75 ($\sigma = .938$), 3.24 ($\sigma = 1.021$) and 3.20 ($\sigma = 1.216$), respectively. They were all rated between “3 – I neither trust nor distrust it” and “4 – I somewhat trust it”, with only family and friends leaning towards the higher rating. The remaining information sources were rated between “2 – I somewhat don’t trust it” and “3 – I neither trust nor distrust it” and they were: the radio ($X = 2.6$; $\sigma = 1.081$), television ($X = 2.59$; $\sigma = 1.072$) and social media ($X = 2.46$; $\sigma = 1.089$) all leaning towards the higher rating.

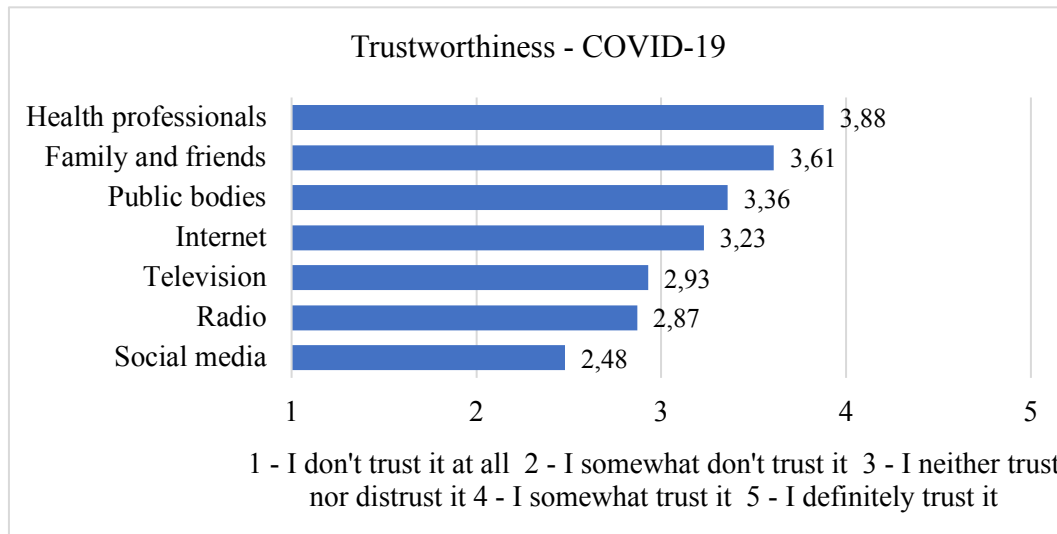
Similarly, in the next question, respondents were asked: “To which extent do you trust the following people or institutions as sources of information on COVID-19?”. In this instance, the most trusted sources of information were health professionals ($X = 3.88$; $\sigma = 1.048$), family and friends ($X = 3.61$; $\sigma = .868$), public bodies ($X = 3.36$; $\sigma = 1.152$) and the Internet ($X = 3.23$; $\sigma = .979$), rated between “3 – I neither trust nor distrust it” and “4 – I somewhat trust it”. Only health professionals and family and friend leaned towards the higher rating. The final three information sources were television ($X = 2.93$; $\sigma = 1.097$), the radio ($X = 2.87$; $\sigma = 1.068$) and social media ($X = 2.48$; $\sigma = 1.047$), rated between “2 – I somewhat don’t trust it” and “3 – I neither trust nor distrust it”. All three lean towards the higher rating as can be seen in Figures 6 and 7.

Figure 6: Trustworthiness of sources of information used for dietary supplement



Source: Own work

Figure 7: Trustworthiness of sources of information on COVID-19



Source: Own work

In the following set of questions, respondents rated the helpfulness of information sources on a scale from “1 – Not at all helpful” to “5 – Extremely helpful”. First, they were asked: “To which extent do you find helpful the following people or institutions as sources of information on dietary supplements?”. The results showed that the most helpful information sources in the minds of participants were health professionals, family and friends and the Internet with means of 3.85 ($\sigma = 1.07$), 3.51 ($\sigma = .967$) and 3.24 ($\sigma = 1.094$), respectively. They were rated between “3 – Neither helpful or not helpful” and “4 – Very helpful”, with health professionals and family and friends leaning more towards the higher rating. The remaining, less helpful sources when it comes to dietary supplements were public bodies ($X = 2.96$; $\sigma = 1.192$), social media ($X = 2.56$; $\sigma = 1.085$), television ($X = 2.33$; $\sigma = .951$) and the radio ($X = 2.32$; $\sigma = .962$). These were rated between “2 – Slightly helpful” and “3 – Neither helpful or not helpful”, with public bodies and social media leaning towards the higher rating.

In the second question, they were asked: “To which extent do you find helpful the following people or institutions as sources of information on COVID-19?”. The results were somewhat different than those in the case of dietary supplements. The sources of information on COVID-19 considered most helpful were health professionals ($X = 3.7$; $\sigma = 1.106$), family and friends ($X = 3.35$; $\sigma = .988$), public bodies ($X = 3.24$; $\sigma = 1.165$) and the Internet ($X = 3.22$; $\sigma = 1.036$), rated between “3 – Neither helpful or not helpful” and “4 – Very helpful”. Health professionals and family and friends lean more towards being “4 – Very helpful”. Television, the radio and social media with means of 2.79 ($\sigma = 1.091$), 2.64 ($\sigma = 1.056$) and 2.50 ($\sigma = 1.097$) were rated between “2 – Slightly helpful” and “3 – Neither helpful or not helpful”, with all three leaning more towards indifference.

In the last two questions, respondents were asked to rate the importance of information sources on a scale from “1 – Not at all important” to “5 – Extremely important”. The first

question asked: “To which extent do you find important the following people or institutions as sources of information on dietary supplements?”. Sources of information thought to be the most important when it comes to dietary supplements were health professionals, family and friends, public bodies and the Internet with means of 3.76 ($\sigma = 1.111$), 3.41 ($\sigma = 1.031$), 3.18 ($\sigma = 1.212$) and 3.11 ($\sigma = 1.212$). These sources were rated between “3 – Neither important or not important” and “4 – Very important”, with only health professionals leaning towards being “4 – Very important”. Other information sources, considered less important, were social media ($X = 2.61$; $\sigma = 1.194$), television ($X = 2.4$; $\sigma = 1.144$) and the radio ($X = 2.3$; $\sigma = 1.106$). These were rated between “2 – Slightly important” and “3 – Neither important or not important”, with social media leaning more towards the higher rating.

The second question asked: “To which extent do you find important the following people or institutions as sources of information on COVID-19?”. In this instance, the most important sources of information were health professionals ($X = 3.84$; $\sigma = 1.076$), public bodies ($X = 3.42$; $\sigma = 1.217$), family and friends ($X = 3.37$; $\sigma = .962$) and the Internet ($X = 3.27$; $\sigma = 1.075$). They were rated between “3 – Neither important or not important” and “4 – Very important”, with health professionals leaning more towards being “4 – Very important”. The remaining sources, television, the radio and social media, with means of 2.89 ($\sigma = 1.143$), 2.73 ($\sigma = 1.081$) and 2.64 ($\sigma = 1.143$), respectively, were rated between “2 – Slightly important” and “3 – Neither important or not important”. All three sources leaned more towards indifference.

3.5.2 Statistical tests

The final set of questions was analyzed with the paired samples *t*-test. The analysis was done in pairs, in order to test the research hypothesis - **H4**: Consumers have different views of information sources in terms of (a) trustworthiness, (b) helpfulness and (c) importance when it comes to information on dietary supplements and COVID-19, including (1) Internet; (2) family and friends; (3) health professionals (4) social media; (5) television; (6) public bodies; (7) radio). A detailed overview of results of the statistical tests can be seen in Appendices 17 to 19.

When it comes to the trustworthiness of information sources, the results of the Paired samples *t*-test showed that there was a statistically significant difference between the following pairs: television ($p < .001$), the radio ($p < .001$), health professionals ($p < .001$) and family and friends ($p = .046$). In other words, the respondents had different levels of trust in these information sources when comparing the two topics – dietary supplements and COVID-19. The pairs of information sources, for which the test showed no statistically significant differences, were: the Internet ($p = .814$), social media ($p = .451$) and public bodies ($p = .074$). This means, that the respondents had the same views of these information sources in terms of trust, when it comes to information on dietary supplements and COVID-19. Therefore, the portion of the research hypothesis that states that consumers have different

views of information sources in terms of (a) trustworthiness, when it comes to information on dietary supplements and COVID-19 can be accepted for the following sources: (2) family and friends, (3) health professionals, (5) television and (7) radio.

The analysis of the helpfulness of information sources showed similar results. The pairs of information sources that showed a statistically significant difference between the two topics, according to the Paired samples *t*-test, were: television ($p < .001$), the radio ($p < .001$), health professionals ($p = .018$), public bodies ($p = .001$) and family and friends ($p = .023$). In the minds of participants, these information sources had a different level of helpfulness when it comes to information on dietary supplements and on COVID-19. On the other hand, those that did not show any statistically significant differences were: the Internet ($p = .946$) and social media ($p = .844$), meaning that the respondents saw no difference in helpfulness of these information sources in the two instances. In this instance, the component of the research hypothesis that states that consumers have different views of information sources in terms of (b) helpfulness, when it comes to information on dietary supplements and COVID-19 can be accepted for the following sources: (2) family and friends, (3) health professionals, (5) television, (6) public bodies and (7) radio.

Lastly, when it comes to importance of information sources, the results of the Paired samples *t*-test showed that there is a statistically significant difference between the following pairs: television ($p < .001$), the radio ($p < .001$), the Internet (.028) and public bodies ($p = .001$). It can be concluded that the respondents have different views of importance of these information sources when it comes to dietary supplements and the COVID-19 pandemic. Furthermore, the pairs of information sources for which the test showed no statistically significant differences were: social media ($p = .329$), health professionals ($p = .640$) and family and friends ($p = .487$). In this instance, the respondents had similar views on the importance of these information sources in the cases of dietary supplements and COVID-19. Hence, the part of the research hypothesis that states that consumers have different views of information sources in terms of (c) importance, when it comes to information on dietary supplements and COVID-19 can be accepted for the following sources: (1) Internet, (5) television, (6) public bodies and (7) radio.

4 DISCUSSION AND CONCLUSIONS

This chapter introduces a detailed interpretation of the main findings from the results of statistical analysis presented above, as well as offers answers to the research questions of this thesis. It also presents this study's scientific contributions, limitations and recommendations for future work.

4.1 Interpretation of main findings

In analyzing the first research question of this thesis **RQ1**: “What are the changes in consumers’ reported consumption of dietary supplements with regard to the COVID-19 pandemic?”, the results of this research show that, in general, there was a reported increase of consumption of dietary supplements after March 2020 – after the start of the COVID-19 pandemic. An increase in frequency of consumption of dietary supplements was also reported with the quantity of dietary supplements consumed primarily remaining the same, with only a slight growth. Additional statistical tests have shown association between the three countries analyzed (Croatia, Slovenia and Macedonia) and consumption of dietary supplements. All three countries have shown an increase in consumption of dietary supplements after March 2020. More specifically, Macedonian respondents have reported the largest increase in consumption of dietary supplements (a jump in positive answers and decrease in negative of 23%) – suggesting that they were the most concerned with the COVID-19 pandemic. While there was no difference between the countries when it comes to frequency of consumption, Slovenia and Macedonia have reported consuming larger quantities of supplements after March 2020. Furthermore, when comparing the time periods before and after March 2020 when it comes to consumption of dietary supplements, 25.2% of respondents in general, have changed their minds. In other words, 25.2% have changed their answers about consuming dietary supplements from “No” before March 2020 to “Yes” after March 2020. When comparing frequency of consumption in the two time periods, the results of the test showed a 50% increase from the period before March 2020 to the period after March 2020. This outcome was expected, based on the statistical tests performed and the first research hypothesis - **H1**: Consumers' reported consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (in terms of (a) general consumption, (b) quantity and (c) frequency), which has been confirmed.

For the second question **RQ2**: “What extrinsic and intrinsic motives do consumers have to use dietary supplements with regard to the COVID-19 pandemic?”, the findings of this study showed that, before March 2020, the three most common reasons for consumption were overall health and wellness, a stronger immune system and aesthetic reasons (nail, hair, skin health etc.). Similarly, after March 2020, the three most commonly chosen reasons for consumption of dietary supplements were, again, overall health and wellness and a stronger immune system with the addition of protection from illness instead of aesthetic reasons. Each reason also portrayed a higher frequency of choice. This indicates that the respondents showed more concern for their health after the beginning of the COVID-19 pandemic in March 2020. When it comes to the reasons for consumption of dietary supplements specifically because of COVID-19, the three most chosen ones were a stronger immune system, treatment and prevention of COVID-19 and influence from various information sources. Interestingly, the majority of most commonly chosen reasons for consumption of dietary supplements can be classified as intrinsic motives (respondents internal wish to remain healthy and protect themselves from illness) while the extrinsic motives (such as

influence from information sources, recommendations from doctors or family and friends) were far less commonly chosen. Additional statistical tests, analyzing the number of reasons respondents from each country had to consume dietary supplements, showed that after March 2020, all three countries had more reasons to consume dietary supplements. Respondents from Macedonia have had the largest increase in the number of reasons chosen, followed closely by Slovenians and then Croatians, who had the least reasons to consume dietary supplements. In the question relating to reasons for consumption specifically due to COVID-19, Macedonian respondents, again, had the most reasons to consume dietary supplements, followed by Slovenians and Croatians. This is consistent with the results of the paired samples T-test, comparing the periods before and after March 2020, where the direction of the *t*-value (-5.847) and increase in means (from .8730 to 1.1889) indicates an increase in the number of reasons chosen. This is consistent with our expectations and the second research hypothesis - **H2**: The number of motives for consumers' consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (with differences between the three countries analyzed – Slovenia, Croatia and Macedonia), which has been accepted.

When it comes to the third research question **RQ3**: “What are the differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19?”, results were interesting. For information on dietary supplements, the three most commonly used sources of information were the Internet, family and friends and health professionals. Similarly, for COVID-19 information, the three most used information sources were the Internet, family and friends and public bodies. The reasons why the most used sources were online and in the respondent’s immediate surroundings may be the initial unavailability of medical professionals and experts during the starting phases of the COVID-19 pandemic. The results of statistical tests, in the instance of dietary supplements, show that there was a statistically significant difference between only health professionals and public bodies as information sources, for consumers from Slovenia, Croatia and Macedonia. Both sources were most commonly used by Macedonian respondents, followed by Slovenian and Croatian respondents. When it comes to information on COVID-19, a statistically significant difference was detected only between television, radio and health professionals and the three countries analyzed. Television and radio were primarily used by Croatian respondents, followed by Slovenian and lastly, Macedonian respondents. Health professionals, on the other hand, were mostly used by Macedonians, then Slovenian and Croatian respondents. Therefore, the third research hypothesis; **H3**: Consumers in Slovenia, Croatia and Macedonia differ in their usage of information sources for information on dietary supplements and COVID-19, including (a) Internet; (b) family and friends; (c) health professionals (d) social media; (e) television; (f) public bodies; (g) radio, has been partially confirmed.

For the final research question **RQ4**: “Which information sources do they find trustworthy, helpful and important when it comes to consumption of dietary supplements and the COVID-

19 pandemic?”, the results of research show that, in the case of information on dietary supplements, the three most trusted and most helpful sources of information are health professionals, family and friends and the Internet. Considered the three most important information sources were health professionals, family and friends and public bodies. In the case of information on COVID-19, considered the most trustworthy, helpful and important were health professionals, family and friends and public bodies. The results of the paired samples T-test, comparing trust, importance and helpfulness of information sources in the instances of dietary supplements and COVID-19, showed interesting results. In the case of information source trustworthiness, respondents had different levels of trust in television, radio, health professionals and family and friends – between the two topics. Their trust levels remained the same for the Internet, social media and public bodies. This means that, in the matter of dietary supplements, the respondents had more trust in health professionals and family and friends as information sources, while in the matter of COVID-19 they had more trust in television and radio. Next, when it comes to the importance of information sources, respondents had different views on television, radio, the Internet and public bodies – between dietary supplements and COVID-19. Social media, health professionals and family and friends had the same levels of importance. Respondents found television, radio, the Internet and public bodies to be more important sources when it comes to information on COVID-19. Finally, in regard to helpfulness of information sources, respondents had different views of television, radio, health professionals, public bodies and family and friends – between the topics of dietary supplements and COVID-19. They found the Internet and social media to have the same levels of helpfulness. Health professionals and family and friends were found more helpful in terms of dietary supplements, and television, radio and public bodies in terms of COVID-19. In this instance, the fourth research hypothesis - **H4**: Consumers have different views of information sources in terms of (a) trustworthiness, (b) helpfulness and (c) importance when it comes to information on dietary supplements and COVID-19, including (1) Internet; (2) family and friends; (3) health professionals (4) social media; (5) television; (6) public bodies; (7) radio), has been only partially confirmed.

4.2 Conclusions and recommendations

This thesis provided several contributions:

- To the best of our knowledge, this study is the first in Slovenia to explore dietary supplement consumption, consumer motives to do so as well as sources of information used, all with respect to the COVID-19 pandemic. It is also the first user study to analyze and compare data from three different Balkan countries – Croatia, Slovenia and Macedonia, for the specific context.
- A thorough background analysis was presented, investigating several scientific fields that are related to the thesis topic. The analyzed scientific fields include: (i) Consumer interest in improving immune defense; (ii) Dietary supplement consumption; (iii) Changes in consumer behavior with regard to the COVID-19 pandemic including the

effect of shock events on short-term consumer behavior, and extrinsic and intrinsic consumer motivation; (iv) Information sources and trust in information sources with a focus on the COVID-19 pandemic.

- Based on the background analysis, a questionnaire was developed including 24 questions, designed specifically to test the thesis research questions. The questionnaire was initially designed in English and then it was translated into the three languages of interest (Slovenian, Croatian, Macedonian and English) by native speakers. The translated questionnaires were then used to collect answers from each of the three countries.
- Finally, a thorough statistical analysis was performed in order to answer the four research questions that this thesis analyzed: **RQ1**: What are the changes in consumers' reported consumption of dietary supplements with regard to the COVID-19 pandemic?; **RQ2**: What extrinsic and intrinsic motives do consumers have to use dietary supplements with regard to the COVID-19 pandemic?; **RQ3**: What are the differences in information sources that consumers in Slovenia, Croatia and Macedonia use for information about dietary supplements and COVID-19? and **RQ4**: Which information sources do they find trustworthy, helpful and important when it comes to consumption of dietary supplements and the COVID-19 pandemic?, as well as the four research hypothesis: **H1**: Consumers' reported consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (in terms of (a) general consumption, (b) quantity and (c) frequency); **H2**: The number of motives for consumers' consumption of dietary supplements has increased after the beginning of the COVID-19 pandemic (with differences between the three countries analysed – Slovenia, Croatia and Macedonia); **H3**: Consumers in Slovenia, Croatia and Macedonia differ in their usage of information sources for information on dietary supplements and COVID-19, including (a) Internet; (b) family and friends; (c) health professionals (d) social media; (e) television; (f) public bodies; (g) radio.; **H4**: Consumers have different views of information sources in terms of (a) trustworthiness, (b) helpfulness and (c) importance when it comes to information on dietary supplements and COVID-19, including (1) Internet; (2) family and friends; (3) health professionals (4) social media; (5) television; (6) public bodies; (7) radio).

According to previously published works, interest in boosting one's immune system, improving health and preventing diseases has been present for a long time (Davis, 2014). A common way of doing so is consumption of dietary supplements, whose use was only highlighted and increased with the start of the COVID-19 pandemic (Wagner, Marcon, & Caulfield, 2020; Council for Responsible Nutrition, 2020). The results of this study are consistent with the previously mentioned studies on this topic – after March 2020, more respondents have reported using dietary supplements, more frequently and in larger quantities.

When it comes to motivations to consume dietary supplements, previous literature has shown that before COVID-19, consumers had various reasons to take dietary supplements ranging from nutritional issues to influence from different sources (the media or doctors) (Conner, Kirk, Cade, & Barrett, 2003). After the start of the pandemic, those reasons became more health oriented, such as strengthening the immune system, overall health and wellness and reducing risk of infection with COVID-19 (Decker, 2021). The findings of this study are consistent with this data, as before the pandemic, the study respondents have reported overall health, a stronger immune system and aesthetic reasons as their main motivation for consuming dietary supplements. After the start of the pandemic, the most commonly chosen motives for consumption were purely health oriented – overall health, stronger immune system and protection from illness.

Generally, when it comes to various information sources that are used to seek health related information such as dietary supplement and COVID-19, previously published works have shown that the most commonly used sources are: the Internet, traditional media (television, radio newspapers etc.) and family and friends among others (Healthcare Client Services, 2017; Wang et al., 2020). Most trust is placed into health professionals, family and friends and government websites (Marrie, Salter, Tyry, Fox, & Cutter, 2013; Ali et al., 2020). Results of this study reported similar results; for dietary supplements most commonly used information sources were the Internet, family and friends and health professionals while for COVID-19 they were the Internet, family and friends and public bodies. Most trusted information sources, for both topics combined were health professionals, family and friends, public bodies and the Internet.

No other study, to our knowledge has also analyzed the importance and helpfulness of various information sources when it comes to information on dietary supplements and COVID-19 in Croatia, Slovenia and Macedonia. This contributes to the understanding of consumer habits when it comes to health-related information seeking and may assist the publication of health-related advice that will have a higher propensity to be taken seriously. It may also, with further research, provide more detailed material on which information sources are found to be the most reliable in difficult situations such as a world-wide virus pandemic, aiding official sources (ex. governments and medical professionals) in putting out crucial and important information through the appropriate mediums.

4.3 Limitations and future work

The findings presented in the thesis should be interpreted within the context of the study and more specifically, within the given sample of participants. Thus, these results should not be viewed as a representation of the opinion of the people in the three countries analyzed. In order to provide more general conclusions, a follow-up could be performed with a larger sample per country.

Furthermore, our study was limited by the tools used to perform the data collection, i.e., internet and popular web – applications used to distribute the study questionnaire. This was also visible from the general demographic analysis showing that majority of the participants were below 34 years of age. In future studies, internet – based questionnaires should be combined with other types of questionnaires (e.g., pen and paper) in order to provide more general findings.

Additionally, the participants of this study were asked to recall and report their behaviour and opinions on dietary supplements and COVID-19 in two separate time periods simultaneously – prior to March 2020 and after March 2020 (the beginning of the pandemic). At the time of the questionnaire distribution (May 2021) they were asked to recall both past behaviour, from over a year ago, and present behaviour which might have resulted in some misremembered answers, as well as some wrongly reported (or unreported) changes.

Finally, due to differences in country sample sizes (Croatia containing a substantially larger amount of respondents) certain Chi-square tests performed showcase a count higher than 20%.

The findings of this thesis (with the support of additional, more extensive research) could serve as a basis for a deeper understanding of consumer habits and behavior when it comes to health and dietary supplement consumption. They could also provide an insight into which sources of information are deemed most trustworthy and important for distributing health related information and directives, as well as for various marketing purposes (such as promotion of dietary supplement products).

REFERENCE LIST

1. 2CV for Food Standards Agency. (2018). *Food Supplements Consumer Research*. London, UK: Food Standards Agency.
2. Ali, S. H., Foreman, J., Tozan, Y., Capasso, A., Jones, A. M., & DiClemente, R. J. (2020). Trends and Predictors of COVID-19 Information Sources and Their Relationship With Knowledge and Beliefs Related to the Pandemic: Nationwide Cross-Sectional Study. *JMIR Public Health and Surveillance*, 6(4).
3. AlTamimi, J. Z. (2019). Awareness of the Consumption of Dietary Supplements among Students in a University in Saudi Arabia. *Journal of Nutrition and Metabolism*.
4. Altun, H. K., Karacil Ermumcu, M. S., & Kurklu, N. S. (2020). Evaluation of dietary supplement, functional food and herbal medicine use by dietitians during the COVID-19 pandemic. *Public Health Nutrition*, 24(5), 861-869.
5. Alyami, H. S., Orabi, M. A., Aldhabbah, R. A., Alturki, H. N., Aburas, W. I., Alfajez, A. I., Alharbi, A. S., Almasuood, R. A., & Alsuhaibani, N. A. (2020). Knowledge about COVID-19 and beliefs about and use of herbal products during the COVID-19

- pandemic: A cross-sectional study in Saudi Arabia. *Saudi Pharmaceutical Journal*, 28(11), 1326-1332.
6. Aysin, E., & Urhan, M. (2021). Dramatic Increase in Dietary Supplement Use During Covid-19. *Current Developments in Nutrition*, 5(2), 207.
 7. Balen, A. (n.d.). *Diet and lifestyle to support immune function during the COVID crisis*. Retrieved July, 2021 from <https://www.leedsth.nhs.uk/assets/4ff9c0edea/Diet-and-lifestyle-to-support-immune-function-v2.pdf>
 8. Baran, K. P. (2014). Dietary supplements. In Wexler, P. (Ed.). *Encyclopedia of Toxicology* (3rd ed.). Cambridge, Massachuttes: Academic Press.
 9. Barnes, K., Ball, L., Desbrow, B., Alsharairi, N., & Ahmed, F. (2016). Consumption and reasons for use of dietary supplements in an Australian university population. *Nutrition*, 32(5), 524-530.
 10. Bench, L. (2020, June 17). *History of dietary supplements*. Retrieved May, 2021 from <https://www.stratumnutrition.com/resources/post/history-of-dietary-supplements>
 11. British Dietetic Association. (2020, March 16). *COVID-19 / Coronavirus - Advice for the General Public*. Retrieved July, 2021 from <https://www.bda.uk.com/resource/covid-19-corona-virus-advice-for-the-general-public.html>
 12. Brown-Johnson, C. G., Boeckman, L. M., White, A. H., Burbank, A. D., Paulson, S., & Beebe, L. A. (2018). Trust in Health Information Sources: Survey Analysis of Variation by Sociodemographic and Tobacco Use Status in Oklahoma. *JMIR Public Health and Surveillance*, 4(1).
 13. Cassa Macedo, A., Vilela de Faria, A. O., & Ghezzi, P. (2019). Boosting the Immune System, From Science to Myth: Analysis the Infosphere With Google. *Frontiers in Medicine*, 6(165).
 14. Chaudhuri, S., Le, T., White, C., Thompson, H., & Demiris, G. (2013). Examining Health Information–Seeking Behaviors of Older Adults. *Computers, Informatics, Nursing: CIN*, 31(11), 547-553.
 15. Christensen, K. (n.d.). *Stephane Cote: Incidental vs. Integral: Understanding Your Emotions*. Retrieved December, 2021 from <https://www.rotman.utoronto.ca/Connect/Rotman-MAG/IdeaExchange/Page3/Stephane-Cote>
 16. Çimke, S., & Gürkan, D. Y. (2021). Determination of interest in vitamin use during COVID-19 pandemic using Google Trends data: Infodemiology study. *Nutrition*, 85, 111138.
 17. Conner, M., Kirk, S. F., Cade, J. E., & Barrett, J. H. (2001). Why do women use dietary supplements? The use of the theory of planned behaviour to explore beliefs about their use. *Social Science & Medicine*, 52(4), 621-633.

18. Conner, M., Kirk, S. F., Cade, J. E., & Barrett, J. H. (2003). Environmental Influences: Factors Influencing a Woman's Decision to Use Dietary Supplements. *The Journal of Nutrition*, 133(6), 1978-1982.
19. Council for Responsible Nutrition. (2019, September 30). *Dietary Supplement Use Reaches All Time High*. Retrieved June, 2021 from <https://www.crnusa.org/newsroom/dietary-supplement-use-reaches-all-time-high>
20. Council for Responsible Nutrition. (2020). *CRN's COVID-19 Survey on Dietary Supplements: Consumer Insights on Usage and Attitudes about Dietary Supplements in Light of the Coronavirus Pandemic*. Retrieved February, 2021 from <https://www.crnusa.org/COVID19survey>
21. Council for Responsible Nutrition. (n.d.). *Dietary Supplement Usage Up Dramatically During Pandemic, New Ipsos-CRN Survey Shows*. Retrieved February, 2021 from <https://www.crnusa.org/newsroom/dietary-supplement-usage-dramatically-during-pandemic-new-ipsos-crn-survey-shows>
22. Davis, D. M. (2014). Presenting the marvels of immunity. *Nature Reviews Immunology*, 14, 351-353.
23. De Jesus, M. (2013). The Impact of Mass Media Health Communication on Health Decision-Making and Medical Advice-Seeking Behavior of U.S. Hispanic Population. *Health Communication*, 28(5), 525-529.
24. Deci, E. L., & Ryan, R. M. (2008). Facilitating Optimal Motivation and Psychological Well-Being Across Life's Domains. *Canadian Psychology*, 49(1), 14-23.
25. Decker, K. J. (2021, January 28). *Consumers value dietary supplements during a pandemic*. Retrieved July, 2021 from <https://www.nutritionaloutlook.com/view/consumers-value-dietary-supplements-during-a-pandemic>
26. Dickinson, A., Blatman, J., El-Dash, N., & Franco, J. C. (2014). Consumer usage and reasons for using dietary supplements: report of a series of surveys. *Journal of the American College of Nutrition*, 33(2), 176-182.
27. Euromonitor International. (2016). *Vitamins and Dietary Supplements in Macedonia*. London, UK: Euromonitor International.
28. Euromonitor International. (2019). *Dietary Supplements in Macedonia*. London, UK: Euromonitor International.
29. European Food Safety Authority. (2021, August 8). *Food Supplements*. Retrieved May, 2021 from <https://www.efsa.europa.eu/en/topics/topic/food-supplements>
30. Flash Eurobarometer 404 - TNS Political & Social. (2014). *European citizens' digital health literacy*. European Commission.
31. FMCG Gurus. (2020). *Insights & Opportunities – Immunity – Global 2020*. St Albans: M&R Insights.
32. Fortune Business Insights. (2020). *Europe Dietary Supplements Market Size, Share & COVID-19 Impact Analysis, By Type (Vitamins, Minerals, Enzymes, Fatty Acids,*

- Proteins, and Others), Form (Tablets, Capsules, Powder, and Liquid), and Regional Forecasts, 2020 – 2027.* Maharashtra, India: Fortune Business Insights.
33. Fritscher, L. (2020, June 19). *What Is Fear?* Retrieved December, 2021 from <https://www.verywellmind.com/the-psychology-of-fear-2671696>
 34. Gallen, T. (n.d.). *Italy's Supplements Market Gets Big Boost From COVID After Solid 2019.* Retrieved June, 2021 from <https://pharmaintelligence.informa.com/resources/product-content/italy-supplements-market-gets-big-boost-from-covid-after-solid-2019>
 35. Glanbia Nutritionals. (2020, April 16). *Nutrition that Boosts Immunity: A Look at 2020 Global Consumer Trends.* Retrieved March 2021 from <https://www.glanbianutritionals.com/en/news-insights/case-study/nutrition-boosts-immunity-look-2020-global-consumer-trends>
 36. Goolsbee, A., & Syverson, C. (2021). Fear, lockdown, and diversion: Comparing drivers of pandemic economic decline 2020. *Journal of Public Economics, 193.*
 37. Gornicka, M., Drywien, M. E., Zielinska, M. A., & Hamulka, J. (2020). Dietary and Lifestyle Changes During COVID-19 and the Subsequent Lockdowns among Polish Adults: A Cross-Sectional Online Survey PLifeCOVID-19 Study. *Nutrients, 12(8).*
 38. Grand View Research. (2021). *Dietary Supplements Market Size, Share & Trends Analysis Report By Ingredient (Vitamins, Proteins & Amino Acids), By Form, By Application, By End User, By Distribution Channel, And Segment Forecasts, 2021 - 2028.* San Francisco: Grand View Research.
 39. Grebow, J. (2021, May 26). *Dietary supplement sales success post-COVID: How can industry keep the momentum going after the pandemic?* Retrieved June, 2021 from <https://www.nutritionaloutlook.com/view/dietary-supplement-sales-success-post-covid-how-can-industry-keep-the-momentum-going-after-the-pandemic>
 40. Gullone, E. (2000). The Development Of Normal Fear: A Century Of Research. *Clinical Psychology Review, 20(4), 429-451.*
 41. Hamulka, J., Jeruszka-Bielak, M., Drywien, M. E., Górnicka, M., & Zielinska-Pukos, M. A. (2021). Dietary Supplements during COVID-19 Outbreak. Results of Google Trends Analysis Supported by PLifeCOVID-19 Online Studies. *Nutrients, 13(1), 54.*
 42. Hays, R., & Reeve, B. (2008). *Measurement and modeling of health-related quality of life.* In Killewo, J., Heggenhougen, H. K., & Quah, S. R. (Ed.). *Epidemiology and demography in public health* (pp. 195-205). Cambridge, Massachusetts: Academic Press.
 43. Healthcare Client Services. (2017, September 26). *Advertising to Reach Vitamin and Dietary Supplement Users.* Retrieved July, 2021 from <https://www.kantarmedia.com/us/thinking-and-resources/blog/advertising-to-reach-vitamin-and-dietary-supplement-users>
 44. Heffernan, C. (2018, February 20). *Guest Post A Brief History Of Dietary Supplements.* Retrieved May, 2021 from <https://physicalculturestudy.com/2018/02/20/guest-post-a-brief-history-of-dietary-supplements/>

45. Hobbs, J. E., & Goddard, E. (2015). Consumers and trust. *Food Policy*, 52, 71-74.
46. Institute for Quality and Efficiency in Health Care (IQWiG). (2006). *How does the immune system work?* Cologne: InformedHealth.org.
47. International Alliance of Dietary/Food Supplement Associations. (2018). *The Evolution Of The Health Supplements Sector*. London, UK: International Alliance of Dietary/Food Supplement Associations.
48. J.P.Morgan. (2020, November 3). *How COVID-19 Has Transformed Consumer Spending Habits*. Retrieved July, 2021 from <https://www.jpmorgan.com/solutions/cib/research/covid-spending-habits>
49. Jasiulewicz, A. (2012). Economic Crisis Influence on the Polish Consumer Behavior. In Bojnec, Š., Brada, J. C., & Kuboniwa, M. (Ed.). *Overcoming the Crisis: Economic and Financial Developments in Asia and Europe* (pp. 77-88). Koper: University of Primorska Press.
50. Jezewska-Zychowicz, M., Plichta, M., & Krolak, M. (2020). Consumers' Fears Regarding Food Availability and Purchasing Behaviors during the COVID-19 Pandemic: The Importance of Trust and Perceived Stress. *Nutrients*, 12(9).
51. Kan, M. P., & Fabrigar, L. R. (2017). Theory of Planned Behavior. In Zeigler-Hill, V., & Shackelford, T. K. (Ed.). *Encyclopedia of Personality and Individual Differences*. New York, USA: Springer Link.
52. Kapitanovič, P. (2019, February 20). *Prehranska dopolnila: Največ kršitev pri prodaji na spletu*. Retrieved June, 2021 from <https://svetkapitala.delo.si/trendi/prehranska-dopolnila-najvec-krsitev-pri-prodaji-na-spletu/>
53. Karimi, M., & Brazier, J. (2016). Health, Health-Related Quality of Life, and Quality of Life: What is the Difference? *Pharmaco Economics*, 34(7), 645-649.
54. Kearney, J. (2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society. Series B, Biological Sciences*, 365(1554), 2793-2807.
55. Khare, A., & Pandey, S. (2017). Role of green self-identity and peer influence in fostering trust towards organic food retailers. *International Journal of Retail & Distribution Management*, 45(9), 969-990.
56. Kim, Y. (2014). Trust in health information websites: A systematic literature review on the antecedents of trust. *Health Informatics Journal*, 22(2), 355-369.
57. Kočevar-Korenjak, A., Mikačić, D., Jardas, Z., & Espinosa, M. (2018). *Food supplements in Croatia*. Brussels, Belgium: Flanders Investment&Trade.
58. Koos, S., Vihalemm, T., & Keller, M. (2017). Coping with crises: Consumption and social resilience on markets. *International Journal of Consumer Studies*, 41(4), 363-370.
59. Ladwein, R., & Sanchez Romero, A. M. (2021). The role of trust in the relationship between consumers, producers and retailers of organic food: A sector-based approach. *Journal of Retailing and Consumer Services*, 60.

60. Lau, J. T., Yang, X., Tsui, H., & Kim, J. H. (2005). Impacts of SARS on health-seeking behaviors in general population in Hong Kong. *Preventive Medicine, 41*(2), 454-462.
61. Lee, M. S., & Seo Youn Ahn, C. (2016). Anti-Consumption, Materialism, and Consumer Well-Being. *The Journal of Consumer Affairs, 50*(1), 18-47.
62. Lieberman, H., Stavinoha, T., McGraw, S., White, A., Hadden, L., & Marriott, B. (2010). Use of dietary supplements among active-duty US Army soldiers. *American Journal of Clinical Nutrition, 92*(4), 985-995.
63. LIS BD Network. (2018, October 16). *Sources of Information*. Retrieved January, 2021 from <https://www.lisbdnetwork.com/sources-of-information/>
64. London, A. J. (2016). Research in a Public Health Crisis: The Integrative Approach to Managing the Moral Tensions. In Jennings, B., Arras, J. D., Barrett, D. H., & Ellis, B. A. (Ed.). *Emergency Ethics: Public Health Preparedness and Response*. Oxford, England: Oxford University Press.
65. Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. (2020). Consumer Behaviour during Crises: Preliminary Research on How Coronavirus Has Manifested Consumer Panic Buying, Herd Mentality, Changing Discretionary Spending and the Role of the Media in Influencing Behaviour. *Journal of Risk and Financial Management, 13*(8), 166.
66. Manchanda, R. (2017). Consumer well-being – Contemporary conceptualization. *Indian Journal of Economics and Development, 5*(1).
67. Marrie, R. A., Salter, A. R., Tyry, T., Fox, R. J., & Cutter, G. R. (2013). Preferred Sources of Health Information in Persons With Multiple Sclerosis: Degree of Trust and Information Sought. *Journal of Medical Internet Research, 15*(4).
68. Messerer, M., Johansson, S.-E., & Wolk, A. (2004). The Validity of Questionnaire-Based Micronutrient Intake Estimates Is Increased by Including Dietary Supplement Use in Swedish Men. *The Journal of Nutrition, 134*(7), 1800-1805.
69. Min, A. M. (2018). *The Role of External Influence and Individual Self-determination for the Consumption of Dietary Supplements* [Master's thesis, Ritsumeikan Asia Pacific University]. Ritsumeikan Research Repository. https://ritsumeirepo.nii.ac.jp/?action=pages_view_main&active_action=repository_view_main_item_detail&item_id=12254&item_no=1&page_id=13&block_id=21
70. Morgan, R. M., & Hunt, S. (1994). The Commitment-Trust Theory of Relationship Marketing. *Journal of Marketing, 58*(3), 20-38.
71. National Cancer Institute. (n.d.). Immunity. In *Dictionary of Cancer Terms*. Retrieved from: <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/immunity>
72. National Center for Chronic Disease Prevention and Health Promotion. (2018, October 31). *Well-Being Concepts*. Retrieved November, 2021 from <https://www.cdc.gov/hrqol/wellbeing.htm#three>
73. National Institute on Aging. (2017, November 30). *Dietary Supplements*. Retrieved November 25, 2020 from <https://www.nia.nih.gov/health/dietary-supplements>

74. Nutrition Business Journal. (2021). *Supplement Business Report 2021*. Nutrition Business Journal.
75. Office of Dietary Supplements. (2020a, March 11). *Background information: Dietary Supplements*. Retrieved July, 2021 from <https://ods.od.nih.gov/factsheets/DietarySupplements-Consumer/>
76. Office of Dietary Supplements. (2020b, September 3). *Dietary supplements: What you need to know*. Retrieved May, 2021 from <https://ods.od.nih.gov/factsheets/WYNTK-Consumer/>
77. Okleshen Peters, C. L., Shelton, J., & Sharma, P. (2003). An Investigation of Factors That Influence the Consumption of Dietary Supplements. *Health Marketing Quarterly*, 21(1-2), 113-135.
78. Organisation for Economic Cooperation and Development (OECD). (2014). How to measure regional and local well-being. In OECD (Ed.). *How's Life in Your Region?: Measuring Regional and Local Well-being for Policy Making* (pp. 49-87). Paris, France: OECD Publishing.
79. Parmeshwar, N., Reid, C. M., Park, A. J., Brandel, M. G., Dobke, M. K., & Gosman, A. A. (2018). Evaluation of Information Sources in Plastic Surgery Decision-making. *Cureus*, 10(6).
80. Parnell, J. A., Wiens, K., & Erdman, K. A. (2015). Evaluation of congruence among dietary supplement use and motivation for supplementation in young, Canadian athletes. *Journal of the International Society of Sports Nutrition*, 12, 49.
81. Pew Research Center. (2003, July 16). *Internet Health Resources*. Retrieved July, 2021 from <https://www.pewresearch.org/internet/2003/07/16/internet-health-resources/>
82. PwC Italia. (2020). *Vitamins & Dietary Supplements Market trends - Overview*. Milan, Italy: PwC Italia.
83. Quick Test Inc. (n.d.). *Dietary Supplement Study Screening Questionnaire*. Retrieved January, 2021 from <https://www.ftc.gov/system/files/documents/reports/effect-consumer-testimonials-disclosures-ad-communication-dietary-supplement-endorsement-booklet/screener.pdf>
84. Rappuoli, R., Pizza, M., Del Giudice, G., & De Gregorio, E. (2014). Vaccines, new opportunities for a new society. *Proceedings of the National Academy of Sciences of the United States of America*, 111(34), 12288–12293.
85. Reinert, A., Rohrmann, S., Becker, N., & Linseisen, J. (2007). Lifestyle and diet in people using dietary supplements. *European Journal of Nutrition*, 46(3), 165-173.
86. Ruggeri, K., Garcia-Garzon, E., Maguire, A., Matz, S., & Huppert, F. A. (2020). Well-being is more than happiness and life satisfaction: a multidimensional analysis of 21 countries. *Health and Quality of Life Outcomes*, 18(1), 192.
87. Satish, K., Venkatesh, A., & Raja Manivannan, A. S. (2021). Covid-19 is driving fear and greed in consumer behaviour and purchase pattern. *South Asian Journal of Marketing*, 2(2), 113-129.

88. Semba, R. D. (2012). The Discovery of Vitamins. *International Journal of Vitamin and Nutrition Research*, 82(5), 310-315.
89. Shakoor, H., Feehan, J., Al Dhaheri, A. S., Ali, H. I., Platat, C., Cheikh Ismail, L., Apostolopoulos, V., & Stojanovska, L. (2021). Immune-boosting role of vitamins D, C, E, zinc, selenium and omega-3 fatty acids: Could they help against COVID-19? *Maturitas*, 143, 1-9.
90. Short, S. E., & Mollborn, S. (2015). Social Determinants and Health Behaviors: Conceptual Frames and Empirical Advances. *Current Opinion in Psychology*, 5, 78-84.
91. Simou, E. (2015). Health information sources: trust and satisfaction. *International Journal of Healthcare*, 2(1), 38-43.
92. Sirgy, M., & Lee, D. J. (2008). Well-being Marketing: An Ethical Business Philosophy for Consumer Goods Firms. *Journal of Business Ethics*, 77(4), 377-403.
93. Sirgy, M., Lee, D.-J., & Rahtz, D. (2007). Research on Consumer Well-Being (CWB): Overview of the Field and Introduction to the Special Issue. *Journal Of Macromarketing*, 27(4), 341-349.
94. Solomon, M., Bamossy, G., Askegaard, S., & Hogg, M. K. (2006). Motivation, Values and Involvement. In Solomon, M., Bamossy, G., Askegaard, S., & Hogg, M. K. (Ed.). *Consumer Behaviour: A European Perspective* (3rd ed., pp. 89-137). Essex, UK: Pearson Education Limited.
95. Solomon, M., Russell Bennett, R., & Previte, J. (2013). Consumers as Individuals. In Solomon, M., Russell Bennett, R., & Previte, J. (Ed.). *Consumer Behaviour: Buying, Having, Being* (3rd ed, pp. 138-172). Melbourne, Australia: Pearson Australia.
96. Starling, S. (2010, August 18). *Slovenian supplements market up seven per cent in 2009*. Retrieved June, 2021 from <https://www.nutraingredients.com/Article/2010/08/18/Slovenian-supplements-market-up-seven-per-cent-in-2009>
97. Statista. (2015, September). *Value of the dietary supplements market in Europe in 2015 and 2020, by country*. Retrieved June, 2021 from <https://www.statista.com/statistics/589452/value-dietary-supplements-markets-europe-by-country/>
98. Statista. (2021, March 11). *Health and food supplements in Italy - Statistics & facts*. Retrieved June, 2021 from <https://www.statista.com/topics/5149/health-supplements-market-in-italy/>
99. Statista. (n.d.). *Vitamins & Minerals*. Retrieved June, 2021 from <https://www.statista.com/outlook/cmo/otc-pharmaceuticals/vitamins-minerals/croatia>
100. Swiss Federal Statistical Office. (n.d.). *Quality of Life Indicators*. Retrieved December, 2021 from <https://www.bfs.admin.ch/bfs/en/home/statistics/cross-sectional-topics/city-statistics/indicators-quality-life.html>

101. Thai, C. L., Gaysynsky, A., Falisi, A., Chou, W.-Y. S., Blake, K., & Hesse, B. W. (2018). Trust in Health Information Sources and Channels, Then and Now: Evidence from the Health Information National Trends Survey (2005–2013). In Hale, T. M., Chou, W.-Y. S., Cotten, S. R., & Khilnani, A. (Ed.). *eHealth: Current Evidence, Promises, Perils and Future Directions* (vol. 15, pp. 43-67). Bingley, West Yorkshire: Emerald Publishing Limited.
102. Torrance, G. W. (1987). Utility approach to measuring health-related quality of life. *Journal of Chronic Diseases*, 40(6), 593-600.
103. U.S. Food & Drug Administration. (2019, August 16). *Dietary supplements*. Retrieved December, 2021 from <https://www.fda.gov/food/dietary-supplements>
104. U.S. Food and Drug Administration. (2021, July 12). *Learn More About COVID-19 Vaccines From the FDA*. Retrieved July, 2021 from <https://www.fda.gov/consumers/consumer-updates/learn-more-about-covid-19-vaccines-fda>
105. United Nations Development Programme. (n.d.). *An integrated global response is an investment in our future*. Retrieved March, 2021 from <https://www.undp.org/content/undp/en/home/coronavirus.html>
106. University of Minnesota Crookston. (n.d.). *Primary, Secondary, and Tertiary Sources*. Retrieved July, 2021 from <https://www.crk.umn.edu/library/primary-secondary-and-tertiary-sources>
107. Vagias, W. M. (2006). *Likert-type scale response anchors*. Clemson International Institute for Tourism & Research Development, Department of Parks, Recreation and Tourism Management: Clemson University.
108. Valencia, G. (2020, November 23). *Three vitamins, minerals to boost your immune system and fight COVID-19*. Retrieved February, 2021 from <https://news.fiu.edu/2020/three-vitamins,-minerals-to-boost-your-immune-system-to-fight-covid-19>
109. Verrochi Coleman, N., Williams, P., Morales, A. C., & White, A. E. (2017). Attention, Attitudes, and Action: When and Why Incidental Fear Increases Consumer Choice. *Journal of Consumer Research*, 44(2), 283-312.
110. Viswanath, K., Ramanadhan, S., & Kontos, E. Z. (2007). Mass Media. In Sandro, G., (Ed.). *Macrosocial Determinants of Population Health* (pp. 275-295). New York, USA: Springer New York.
111. Wagner, D. N., Marcon, A. R., & Caulfield, T. (2020). “Immune Boosting” in the time of COVID: selling immunity on Instagram. *Allergy, Asthma & Clinical Immunology*, 16(76).
112. Wang, P.-W., Lu, W.-H., Ko, N.-Y., Chen, Y.-L., Li, D.-J., Chang, Y.-P., & Yen, C.-F. (2020). COVID-19-Related Information Sources and the Relationship With Confidence in People Coping with COVID-19: Facebook Survey Study in Taiwan. *Journal of Medical Internet Research*, 22(6).

113. Washington State Department of Social and Health Services. (n.d.). *Crisis Intervention*. Retrieved December, 2021 from <https://www.dshs.wa.gov/book/export/html/490>
114. World Health Organization. (2021, March 11). *Coronavirus disease (COVID-19) pandemic*. Retrieved March, 2021 from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
115. Yuen, K. F., Wang, X., Ma, F., & Li, K. X. (2020). The Psychological Causes of Panic Buying Following a Health Crisis. *International Journal of Environmental Research and Public Health*, 17(10), 3513.
116. Zhao, A., Li, Z., Ke, Y., Huo, S., Ma, Y., Zhang, Y., Zhang, J., & Ren, Z. (2020). Dietary Diversity among Chinese Residents during the COVID-19 Outbreak and Its Associated Factors. *Nutrients*, 12(6).

APPENDICES

Appendix 1: Summary in Slovene language

Glavni poudarek magistrske naloge je bil uživanje prehranskih dopolnil in zaupanje v viře informacij v zvezi s pandemijo COVID-19 – primerjava med tremi zanimivimi državami: Republiko Hrvaško, Republiko Slovenijo in Republiko Severno Makedonijo.

Pri analizi prvega raziskovalnega vprašanja te diplomske naloge **RV1**: »Kakšne so spremembe v potrošnji prehranskih dopolnil, o kateri poročajo potrošniki glede na pandemijo COVID-19?«, kot tudi prve raziskovalne hipoteze **H1**: »Poraba prehranskih dodatkov se je po začetku pandemije COVID-19 povečala (glede (a) splošne porabe, (b) količine in (c) pogostosti)«, rezultati te raziskave kažejo, da je na splošno prišlo do povečanja uživanja prehranskih dopolnil po marcu 2020 – po začetku pandemije COVID-19. Potrošniki so poročali tudi o povečanju pogostosti uživanja prehranskih dopolnil, pri čemer so količine zaužitih prehranskih dopolnil v glavnem ostale enake, le z rahlim porasto. Vse tri države so pokazale porast porabe prehranskih dopolnil po marcu 2020, pri čemer so makedonski anketiranci poročali o največjem povečanju porabe prehranskih dopolnil – kar kaže, da jih najbolj skrbi pandemija COVID-19. Ta rezultat je bil na podlagi opravljenih statističnih testov in potrjene prve raziskovalne hipoteze teze pričakovan.

Pri drugem vprašanju **RV2**: »Kakšne zunanje in intrinzične motive imajo potrošniki za uporabo prehranskih dopolnil glede na pandemijo COVID-19?« so ugotovitve te študije pokazale, da so bili pred marcem 2020 trije najpogostejši razlogi za uživanje splošno zdravje in dobro počutje, močnejši imunski sistem in estetski razlogi (zdravje nohtov, las, kože itd.). Podobno so bili po marcu 2020 trije najpogosteje izbrani razlogi za uživanje prehranskih dopolnil ponovno splošno zdravje in dobro počutje ter močnejši imunski sistem z dodatkom zaščite pred boleznimi namesto estetskih razlogov. Vsak razlog je pokazal tudi višjo frekvenco izbire. To kaže, da so anketiranci po začetku pandemije COVID-19 marca 2020 pokazali več skrbi za svoje zdravje. Dodatni statistični testi, ki preverjajo drugo raziskovalno hipotezo **H2**: »Število motivov za uživanje prehranskih dopolnil pri potrošnikih se je povečalo po Začetek pandemije COVID-19 (z razlikami med tremi analiziranimi državami – Slovenijo, Hrvaško in Makedonijo)«, so pokazali, da imajo vse tri države več razlogov za uživanje prehranskih dopolnil. Najbolj se je povečalo število izbranih razlogov anketiranci iz Makedonije, sledijo jim Slovenci in nato Hrvati. To je skladno z našimi pričakovanji in drugo hipotezo raziskave, ki je bila potrjena.

Ko gre za tretje raziskovalno vprašanje **RV3**: »Kakšne so razlike v virih informacij, ki jih potrošniki v Sloveniji, na Hrvaškem in v Makedoniji uporabljajo za informacije o prehranskih dopolnilih in COVID-19?«, so bili rezultati zanimivi. Za informacije o prehranskih dopolnilih so bili trije najpogosteje uporabljeni viri informacij internet, družina in prijatelji ter zdravstveni delavci. Podobno so bili za informacije o COVID-19 trije najpogosteje uporabljeni viri informacij internet, družina in prijatelji ter javni organi. Rezultati statističnih testov na primeru prehranskih dopolnil kažejo, da je obstajala

statistično pomembna povezava le med zdravstvenimi delavci in javnimi organi kot viri informacij ter tremi analiziranimi državami. Oba vira so najpogosteje uporabljali makedonski anketiranci. Ko gre za informacije o COVID-19, je bila statistično pomembna povezava zaznana le med televizijskimi, radijskimi in zdravstvenimi delavci ter tremi državami. Televizijo in radio so uporabljali predvsem hrvaški anketiranci, medtem ko so zdravstveni delavci na drugi strani večinoma uporabljali Makedonci. Zato tretja raziskovalna hipoteza **H3**: »Potrošniki v Sloveniji, na Hrvaškem in v Makedoniji se razlikujejo po uporabi informacijskih virov za informacije o prehranskih dopolnilih in COVID-19, vključno z (a) internetom; (b) družina in prijatelji; (c) zdravstveni delavci (d) družbeni mediji; (e) televizija; (f) javni organi; (g) radio«, je bila delno potrjeno.

Za zadnje raziskovalno vprašanje **RV4**: »Kateri viri informacij se jim zdijo vredni zaupanja, koristni in pomembni, ko gre za uživanje prehranskih dopolnil in pandemijo COVID-19?«, rezultati raziskave kažejo, da v primeru informacij o prehrani dodatki, trije najbolj zaupanja vredni in najbolj koristni viri informacij so zdravstveni delavci, družina in prijatelji ter internet. Trije najpomembnejši viri informacij so bili zdravstveni delavci, družina in prijatelji ter javni organi. V primeru informacij o COVID-19 so bili najbolj zaupanja vredni, koristni in pomembni zdravstveni delavci, družina in prijatelji ter javni organi. Na podlagi rezultatov statistične analize je bila četrta raziskovalna hipoteza **H4**: »Potrošniki imajo različne poglede na vire informacij glede (a) zanesljivosti, (b) ustrežljivosti in (c) pomembnosti, ko gre za informacije o prehranskih dopolnilih in COVID-19, vključno z (1) internetom; (2) družina in prijatelji; (3) zdravstveni delavci (4) družbeni mediji; (5) televizija; (6) javni organi; (7) radio«, le delno potrjena.

Appendix 2: Questionnaire

CONSUMPTION OF DIETARY SUPPLEMENTS WITH REGARD TO THE COVID-19 PANDEMIC

Dear participant,

At the University of Ljubljana, School of Economics and Business, we are performing a study on dietary supplement consumption with regard to the COVID-19 pandemic. This survey is also part of a master's thesis on the same topic. The questionnaire should take you no longer than 10 minutes to complete. All answers provided will be anonymous, kept in strict confidentiality and used only for the purposes of the study.

1. How would you rate your overall/general health?¹

Throughout your life in general.

My overall health is ...

1 – Poor <input type="radio"/>	2 – Fair <input type="radio"/>	3 – Good <input type="radio"/>	4 – Very good <input type="radio"/>	5 – Excellent ² <input type="radio"/>
-----------------------------------	-----------------------------------	-----------------------------------	--	---

2. How would you rate your everyday diet (how healthy you eat)?³

My everyday diet is ...

1 – Poor <input type="radio"/>	2 – Fair <input type="radio"/>	3 – Good <input type="radio"/>	4 – Very good <input type="radio"/>	5 – Excellent ² <input type="radio"/>
-----------------------------------	-----------------------------------	-----------------------------------	--	---

In the following section, you are kindly asked to recall your consumption and reasons for consumption of dietary supplements before the start of the COVID-19 pandemic (before March 2020).

3. Before March 2020, have you consumed any dietary supplements?⁴

- Yes
- No

4. Before March 2020, how often did you consume dietary supplements?⁵

- Daily
- Few times per week (2-6x)
- Once per week
- Once a month

¹ Lieberman, H., Stavinoha, T., McGraw, S., White, A., Hadden, L., & Marriott, B. (2010). Use of dietary supplements among active-duty US Army soldiers. *American Journal of Clinical Nutrition*, 985-995.

² Vagias, W. M. (2006). *Likert-type scale response anchors*. Clemson International Institute for Tourism & Research Development.

³ Parnell, J. A., Wiens, K., & Erdman, K. A. (2015). Evaluation of congruence among dietary supplement use and motivation for supplementation in young, Canadian athletes. *Journal of the International Society of Sports Nutrition*.

⁴ Quick Test Inc. (n.d.). *Dietary Supplement Study Screening Questionnaire*. Federal Trade Commission.

⁵ Messerer, M., Johansson, S.-E., & Wolk, A. (2004). The Validity of Questionnaire-Based Micronutrient Intake Estimates Is Increased by Including Dietary Supplement Use in Swedish Men. *The Journal of Nutrition*, 1800-1805.

- Occasionally (when I remember)

5. Before March 2020, what were the reasons for your consumption of dietary supplements? (Multiple answers are possible.)⁶

- Overall health and wellness
- Nutrient gap in the diet⁷
- For a stronger immune system
- Protection from illness
- Recommendation from doctor or dietitian⁸
- Aesthetic reasons (skin, nail or hair health etc.)⁹
- Other: _____

In the following section, you are kindly asked to report your consumption and reasons of consumption of dietary supplements after the start of the COVID-19 pandemic (after March 2020).

6. After March 2020, have you consumed any dietary supplements?¹⁰

- Yes
- No

7. Have you started to consume dietary supplements specifically due to the beginning of the COVID-19 pandemic?¹¹

- Yes
- No

8. After March 2020, has your consumption of dietary supplements changed (compared to the period before the pandemic, before March 2020)?

- I consume more
- I consume the same
- I consume less¹²

9. After March 2020, how often did/do you consume dietary or nutritional supplements?¹³

⁶ Altun, H. K., Karacil Ermumcu, M. S., & Kurklu, N. S. (2020). Evaluation of dietary supplement, functional food and herbal medicine use by dietitians during the COVID-19 pandemic. *Public Health Nutrition*.

⁷ Dickinson, A., Blatman, J., El-Dash, N., & Franco, J. C. (2014). Consumer usage and reasons for using dietary supplements: report of a series of surveys. *Journal of the American College of Nutrition*, 176-182.

⁸ Parnell, J. A., Wiens, K., & Erdman, K. A. (2015). Evaluation of congruence among dietary supplement use and motivation for supplementation in young, Canadian athletes. *Journal of the International Society of Sports Nutrition*.

⁹ AlTamimi, J. Z. (2019). Awareness of the Consumption of Dietary Supplements among Students in a University in Saudi Arabia. *Journal of Nutrition and Metabolism*.

¹⁰ Quick Test Inc. (n.d.). *Dietary Supplement Study Screening Questionnaire*. Federal Trade Commission.

¹¹ Alyami, H. S., Orabi, M. A., Aldhabbah, R. A., Alturki, H. N., Aburas, W. I., Alfajez, A. I., . . . Alsuhaibani, N. A. (2020). Knowledge about COVID-19 and beliefs about and use of herbal products during the COVID-19 pandemic: A cross-sectional study in Saudi Arabia. *Saudi Pharm J.*, 1326-1332.

¹² Gornicka, M., Drywien, M. E., Zielinska, M. A., & Hamulka, J. (2020). Dietary and Lifestyle Changes During COVID-19 and the Subsequent Lockdowns among Polish Adults: A Cross-Sectional Online Survey PLifeCOVID-19 Study. *Nutrients*.

¹³ Messerer, M., Johansson, S.-E., & Wolk, A. (2004). The Validity of Questionnaire-Based Micronutrient Intake Estimates Is Increased by Including Dietary Supplement Use in Swedish Men. *The Journal of Nutrition*, 1800-1805.

- Daily
- Few times per week (2-6x)
- Once per week
- Once a month
- Never¹⁴
- Occasionally (when I remember)

10. *After March 2020, what are the reasons for your consumption of dietary supplements? (Multiple answers are possible.)*¹⁵

- Overall health and wellness
- Nutrient gap in the diet¹⁶
- Enhancement of immune system
- Protection from illness
- Recommendation from doctor or dietitian¹⁷
- Aesthetic reasons (skin, nail or hair health etc.)¹⁸
- Other: _____

11. *If you have started consuming dietary supplements specifically due to the COVID-19 pandemic, for what reasons did you do so?*

- Fear of infection with COVID-19
- Influence of information you got from an information source (TV, Internet, social media etc.)¹⁹
- For a stronger immune system²⁰
- For treatment and prevention of COVID-19
- Recommendation from doctor or dietitian
- Because others in your life do (family/friends)²¹
- Other: _____

In the following section, please answer several questions regarding sources of information you use to get information on dietary supplements and COVID-19.

¹⁴ Lieberman, H., Stavinoha, T., McGraw, S., White, A., Hadden, L., & Marriott, B. (2010). Use of dietary supplements among active-duty US Army soldiers. *American Journal of Clinical Nutrition*, 985-995.

¹⁵ Altun, H. K., Karacil Ermumcu, M. S., & Kurklu, N. S. (2020). Evaluation of dietary supplement, functional food and herbal medicine use by dietitians during the COVID-19 pandemic. *Public Health Nutrition*.

¹⁶ Dickinson, A., Blatman, J., El-Dash, N., & Franco, J. C. (2014). Consumer usage and reasons for using dietary supplements: report of a series of surveys. *Journal of the American College of Nutrition*, 176-182.

¹⁷ Parnell, J. A., Wiens, K., & Erdman, K. A. (2015). Evaluation of congruence among dietary supplement use and motivation for supplementation in young, Canadian athletes. *Journal of the International Society of Sports Nutrition*.

¹⁸ AlTamimi, J. Z. (2019). Awareness of the Consumption of Dietary Supplements among Students in a University in Saudi Arabia. *Journal of Nutrition and Metabolism*.

¹⁹ Loxton, M., Truskett, R., Scarf, B., Sindone, L., Baldry, G., & Zhao, Y. (2020). Consumer Behaviour during Crises: Preliminary Research on How Coronavirus Has Manifested Consumer Panic Buying, Herd Mentality, Changing Discretionary Spending and the Role of the Media in Influencing Behaviour. *Journal of Risk and Financial Management*.

²⁰ Hamulka, J., Jeruszka-Bielak, M., Drywien, M. E., Górnicka, M., & Zielinska-Pukos, M. A. (2021). Dietary Supplements during COVID-19 Outbreak. Results of Google Trends Analysis Supported by PLifeCOVID-19 Online Studies. *Nutrients*.

²¹ Altun, H. K., Karacil Ermumcu, M. S., & Kurklu, N. S. (2020). Evaluation of dietary supplement, functional food and herbal medicine use by dietitians during the COVID-19 pandemic. *Public Health Nutrition*.

12. What or who is the source of your dietary supplement information?²²
(Multiple answers are possible.)

- Television
- Radio
- Internet (articles, news sites etc.)
- Social media (Facebook, Instagram, Twitter etc.)
- Health professionals (doctor, pharmacist etc.)
- Public bodies (Ministry of Health etc.)
- Family/friends²³
- Other: _____

13. To which extent do you trust the following people or institutions as sources of information on dietary supplements?²⁴

	1 - I do not trust it at all	2 - I somewhat do not trust it	3 - I neither trust nor distrust it	4 - I somewhat trust it	5 - I definitely trust it ²⁴
Television					
Radio					
Internet					
Social Media					
Health professionals					
Public bodies					
Family/Friends					

14. To which extent do you find helpful the following people or institutions as sources of information on dietary supplements?²⁵

	1 – Not at all helpful	2 – Slightly helpful	3 – Neither helpful or not helpful	4 – Very helpful	5 – Extremely helpful ²⁶
Television					
Radio					
Internet					

²² Lieberman, H., Stavinoha, T., McGraw, S., White, A., Hadden, L., & Marriott, B. (2010). Use of dietary supplements among active-duty US Army soldiers. *American Journal of Clinical Nutrition*, 985-995.

²³ Brown-Johnson, C. G., Boeckman, L. M., White, A. H., Burbank, A. D., Paulson, S., & Beebe, L. A. (2018). Trust in Health Information Sources: Survey Analysis of Variation by Sociodemographic and Tobacco Use Status in Oklahoma. *JMIR Public Health and Surveillance*.

²⁴ Jezewska-Zychowicz, M., Plichta, M., & Krolak, M. (2020). Consumers' Fears Regarding Food Availability and Purchasing Behaviors during the COVID-19 Pandemic: The Importance of Trust and Perceived Stress. *Nutrients*.

²⁵ Jezewska-Zychowicz, M., Plichta, M., & Krolak, M. (2020). Consumers' Fears Regarding Food Availability and Purchasing Behaviors during the COVID-19 Pandemic: The Importance of Trust and Perceived Stress. *Nutrients*.

²⁶ Parmeshwar, N., Reid, C. M., Park, A. J., Brandel, M. G., Dobke, M. K., & Gosman, A. A. (2018). Evaluation of Information Sources in Plastic Surgery Decision-making. *Cureus*.

Social Media					
Health professionals					
Public bodies					
Family/Friends					

15. To which extent do you find important the following people or institutions as sources of information on dietary supplements?²⁵

	1 – Not at all important	2 – Slightly important	3 – Neither important or not important	4 – Very important	5 – Extremely important ²⁶
Television					
Radio					
Internet					
Social Media					
Health professionals					
Public bodies					
Family/Friends					

16. What or who is the source of your COVID-19 information?²⁷
(Multiple answers are possible.)

- Television
- Radio
- Internet
- Social media (Facebook, Instagram, Twitter etc.)
- Health professionals (doctor, nurse, pharmacist etc.)
- Public bodies (Ministry of Health etc.)
- Family/friends²⁸
- Other: _____

17. To which extent do you trust the following people or institutions as sources of information on COVID-19?²⁹

	1 - I do not trust it at all	2 - I rather do not trust it	3 - I neither trust nor distrust it	4 - I rather trust it	5 - I definitely trust it/them ²⁹
Television					

²⁷ Lieberman, H., Stavinoha, T., McGraw, S., White, A., Hadden, L., & Marriott, B. (2010). Use of dietary supplements among active-duty US Army soldiers. *American Journal of Clinical Nutrition*, 985-995.

²⁸ Brown-Johnson, C. G., Boeckman, L. M., White, A. H., Burbank, A. D., Paulson, S., & Beebe, L. A. (2018). Trust in Health Information Sources: Survey Analysis of Variation by Sociodemographic and Tobacco Use Status in Oklahoma. *JMIR Public Health and Surveillance*.

²⁹ Jezewska-Zychowicz, M., Plichta, M., & Krolak, M. (2020). Consumers' Fears Regarding Food Availability and Purchasing Behaviors during the COVID-19 Pandemic: The Importance of Trust and Perceived Stress. *Nutrients*.

Radio					
Internet					
Social Media					
Health professionals					
Public bodies					
Family/Friends					

18. To which extent do you find helpful the following people or institutions as sources of information on COVID-19?²⁹

	1 – Not at all helpful	2 – Slightly helpful	3 – Neither helpful or nor helpful	4 – Very helpful	5 – Extremely helpful ³⁰
Television					
Radio					
Internet					
Social Media					
Health professionals					
Public bodies					
Family/Friends					

19. To which extent do you find important the following people or institutions as sources of information on COVID-19?²⁹

	1 – Not at all important	2 – Slightly important	3 – Neither important or not important	4 – Very important	5 – Extremely important ³⁰
Television					
Radio					
Internet					
Social Media					
Health professionals					
Public bodies					
Family/Friends					

Lastly, please answer several socio-demographic questions.

What is your gender?

- Female
- Male
- Other: _____
- Prefer not to answer

³⁰ Parmeshwar, N., Reid, C. M., Park, A. J., Brandel, M. G., Dobke, M. K., & Gosman, A. A. (2018). Evaluation of Information Sources in Plastic Surgery Decision-making. *Cureus*.

What age group do you belong to?

- Under 18
- 18 - 24 years old
- 25 - 34 years old
- 35 - 44 years old
- 45 - 54 years old
- 55 and above
- Prefer not to answer

What level of education did you attain?

- No formal education
- Finished primary school and/or part of secondary school
- Finished secondary school
- Finished undergraduate studies
- Finished master's/doctoral studies
- Other: _____
- Prefer not to answer

What is your personal monthly income?

- Under 450€
- 450€ - 649€
- 650€ - 899€
- 900€ - 1099€
- 1100€ - 1299€
- Over 1300€
- I don't currently make an income
- Prefer not to answer

Where do you currently live?

Appendix 3: Language and Consumption of dietary supplements before March 2020 crosstabulation and Chi-Square test

Language * Consumption of dietary supplements before March 2020 Crosstabulation

		Consumption of dietary supplements before March 2020		Total	
		Yes	No		
Language	Croatian	Count	73	95	168
		% within Language	43.5%	56.5%	100.0%
		% within Consumption of dietary supplements before March 2020	49.3%	62.5%	56.0%
		% of Total	24.3%	31.7%	56.0%
	Slovenian	Count	41	22	63
		% within Language	65.1%	34.9%	100.0%
		% within Consumption of dietary supplements before March 2020	27.7%	14.5%	21.0%
		% of Total	13.7%	7.3%	21.0%
	Macedonian	Count	34	35	69
		% within Language	49.3%	50.7%	100.0%
		% within Consumption of dietary supplements before March 2020	23.0%	23.0%	23.0%
		% of Total	11.3%	11.7%	23.0%
Total	Count	148	152	300	
	% within Language	49.3%	50.7%	100.0%	
	% within Consumption of dietary supplements before March 2020	100.0%	100.0%	100.0%	
	% of Total	49.3%	50.7%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.574 ^a	2	.014
Likelihood Ratio	8.671	2	.013
Linear-by-Linear Association	1.889	1	.169
N of Valid Cases	300		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.08.

Appendix 4: Language and Consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test

Language * Consumption of dietary supplements after March 2020 Crosstabulation

		Consumption of dietary supplements after March 2020		Total	
		Yes	No		
Language	Croatian	Count	82	82	164
		% within Language	50.0%	50.0%	100.0%
		% within Consumption of d. supplements after March 2020	47.7%	70.7%	56.9%
		% of Total	28.5%	28.5%	56.9%
	Slovenian	Count	43	16	59
		% within Language	72.9%	27.1%	100.0%
		% within Consumption of d. supplements after March 2020	25.0%	13.8%	20.5%
		% of Total	14.9%	5.6%	20.5%
	Macedonian	Count	47	18	65
		% within Language	72.3%	27.7%	100.0%
		% within Consumption of d. supplements after March 2020	27.3%	15.5%	22.6%
		% of Total	16.3%	6.3%	22.6%
Total	Count	172	116	288	
	% within Language	59.7%	40.3%	100.0%	
	% within Consumption of d. supplements after March 2020	100.0%	100.0%	100.0%	
	% of Total	59.7%	40.3%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.972 ^a	2	.001
Likelihood Ratio	15.275	2	.000
Linear-by-Linear Association	12.367	1	.000
N of Valid Cases	288		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 23.76.

Appendix 5: Language and Consumption of dietary supplements specifically due to COVID-19 crosstabulation and Chi-Square test

Language * Consumption of dietary supplements specifically due to COVID-19 Crosstabulation

		Consumption of dietary supplements specifically due to COVID-19		Total	
		Yes	No		
Language	Croatian	Count	15	67	82
		% within Language	18.3%	81.7%	100.0%
		% within Consumption of d. supplements specifically due to COVID	26.8%	57.8%	47.7%
		% of Total	8.7%	39.0%	47.7%
	Slovenian	Count	14	29	43
		% within Language	32.6%	67.4%	100.0%
		% within Consumption of d. supplements specifically due to COVID	25.0%	25.0%	25.0%
		% of Total	8.1%	16.9%	25.0%
	Macedonian	Count	27	20	47
		% within Language	57.4%	42.6%	100.0%
		% within Consumption of d. supplements specifically due to COVID	48.2%	17.2%	27.3%
		% of Total	15.7%	11.6%	27.3%
Total	Count	56	116	172	
	% within Language	32.6%	67.4%	100.0%	
	% within Consumption of d. supplements specifically due to COVID	100.0%	100.0%	100.0%	
	% of Total	32.6%	67.4%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.859 ^a	2	.000
Likelihood Ratio	20.658	2	.000
Linear-by-Linear Association	20.334	1	.000
N of Valid Cases	172		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.00.

Appendix 6: Language and Frequency of consumption of dietary supplements before March 2020 crosstabulation and Chi-Square test

Language * Frequency of consumption of dietary supplements before March 2020 Crosstabulation

		Frequency of consumption of dietary supplements before March 2020			
		Daily/Few Times per Week/Occasionally	Once per Week/Once a Month	Total	
Language	Croatian	Count	69	4	73
		% within Language	94.5%	5.5%	100.0%
		% within Frequency BF2020 with 2 groups	50.4%	40.0%	49.7%
		% of Total	46.9%	2.7%	49.7%
	Slovenian	Count	36	4	40
		% within Language	90.0%	10.0%	100.0%
		% within Frequency BF2020 with 2 groups	26.3%	40.0%	27.2%
		% of Total	24.5%	2.7%	27.2%
	Macedonian	Count	32	2	34
		% within Language	94.1%	5.9%	100.0%
		% within Frequency BF2020 with 2 groups	23.4%	20.0%	23.1%
		% of Total	21.8%	1.4%	23.1%
Total	Count	137	10	147	
	% within Language	93.2%	6.8%	100.0%	
	% within Frequency BF2020 with 2 groups	100.0%	100.0%	100.0%	
	% of Total	93.2%	6.8%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.892 ^a	2	.640
Likelihood Ratio	.831	2	.660
Linear-by-Linear Association	.069	1	.793
N of Valid Cases	147		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 2.31.

Appendix 7: Language and Frequency of consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test

Language * Frequency of consumption of dietary supplements after March 2020 Crosstabulation

Language		Frequency of consumption of dietary supplements after March 2020			
		Daily/Few Times per Week/Occasionally	Once a Week/Once a month	Total	
Language	Croatian	Count	73	7	80
		% within Language	91.3%	8.8%	100.0%
		% within Frequency AF2020 with 2 groups	46.8%	53.8%	47.3%
		% of Total	43.2%	4.1%	47.3%
	Slovenian	Count	40	3	43
		% within Language	93.0%	7.0%	100.0%
		% within Frequency AF2020 with 2 groups	25.6%	23.1%	25.4%
		% of Total	23.7%	1.8%	25.4%
	Macedonian	Count	43	3	46
		% within Language	93.5%	6.5%	100.0%
		% within Frequency AF2020 with 2 groups	27.6%	23.1%	27.2%
		% of Total	25.4%	1.8%	27.2%
Total	Count	156	13	169	
	% within Language	92.3%	7.7%	100.0%	
	% within Frequency AF2020 with 2 groups	100.0%	100.0%	100.0%	
	% of Total	92.3%	7.7%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.246 ^a	2	.884
Likelihood Ratio	.246	2	.884
Linear-by-Linear Association	.225	1	.635
N of Valid Cases	169		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 3.31.

Appendix 8: Language and Change in consumption of dietary supplements after March 2020 crosstabulation and Chi-Square test

Language * Change in consumption of dietary supplements after March 2020
Crosstabulation

Language			Change in consumption of dietary supplements after March 2020			Total
			I consume more	I consume the same	I consume less	
Language	Croatian	Count	23	53	4	80
		% within Language	28.7%	66.3%	5.0%	100.0%
		% within Change in consumption of d. supplements after March 2020	31.1%	59.6%	66.7%	47.3%
		% of Total	13.6%	31.4%	2.4%	47.3%
	Slovenian	Count	22	19	2	43
		% within Language	51.2%	44.2%	4.7%	100.0%
		% within Change in consumption of d. supplements after March 2020	29.7%	21.3%	33.3%	25.4%
		% of Total	13.0%	11.2%	1.2%	25.4%
	Macedonian	Count	29	17	0	46
		% within Language	63.0%	37.0%	0.0%	100.0%
		% within Change in consumption of d. supplements after March 2020	39.2%	19.1%	0.0%	27.2%
		% of Total	17.2%	10.1%	0.0%	27.2%
Total	Count	74	89	6	169	
	% within Language	43.8%	52.7%	3.6%	100.0%	
	% within Change in consumption of d. supplements after March 2020	100.0%	100.0%	100.0%	100.0%	
	% of Total	43.8%	52.7%	3.6%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.360 ^a	4	.003
Likelihood Ratio	18.077	4	.001
Linear-by-Linear Association	15.019	1	.000
N of Valid Cases	169		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 1.53.

Appendix 9: Consumption of dietary supplements before and after March 2020 crosstabulation and Chi-Square test

Consumption of dietary supplements before March 2020 * Consumption of dietary supplements after March 2020 Crosstabulation

		Consumption of dietary supplements after March 2020		Total	
		Yes	No		
Consumption of dietary supplements before March 2020	Yes	Count	135	6	141
		% within Consumption of dietary supplements before March 2020	95.7%	4.3%	100.0%
		% within Consumption of d. supplements after March 2020	78.5%	5.2%	49.0%
		% of Total	46.9%	2.1%	49.0%
	No	Count	37	110	147
		% within Consumption of dietary supplements before March 2020	25.2%	74.8%	100.0%
		% within Consumption of d. supplements after March 2020	21.5%	94.8%	51.0%
		% of Total	12.8%	38.2%	51.0%
Total	Count	172	116	288	
	% within Consumption of dietary supplements before March 2020	59.7%	40.3%	100.0%	
	% within Consumption of d. supplements after March 2020	100.0%	100.0%	100.0%	
	% of Total	59.7%	40.3%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	149.018 ^a	1	.000		
Continuity Correction ^b	146.099	1	.000		
Likelihood Ratio	172.796	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	148.501	1	.000		
N of Valid Cases	288				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 56.79.

b. Computed only for a 2x2 table

Appendix 10: Frequency of consumption of dietary supplements before and after March 2020 crosstabulation and Chi-Square test

Frequency of consumption of dietary supplements before March 2020 * Frequency of consumption of dietary supplements after March 2020 Crosstabulation

		Frequency of consumption of dietary supplements after March 2020			Total
		Daily/Few Times per Week/Occasionally	Once a Week/Once a month		
Frequency of consumption of dietary supplements before March 2020	Daily/Few Times per Week/Occasionally	Count	123	2	125
		% within Frequency BF2020 with 2 groups	98.4%	1.6%	100.0%
		% within Frequency AF2020 with 2 groups	96.9%	33.3%	94.0%
		% of Total	92.5%	1.5%	94.0%
	Once per Week/Once a Month	Count	4	4	8
		% within Frequency BF2020 with 2 groups	50.0%	50.0%	100.0%
		% within Frequency AF2020 with 2 groups	3.1%	66.7%	6.0%
		% of Total	3.0%	3.0%	6.0%
Total	Count	127	6	133	
	% within Frequency BF2020 with 2 groups	95.5%	4.5%	100.0%	
	% within Frequency AF2020 with 2 groups	100.0%	100.0%	100.0%	
	% of Total	95.5%	4.5%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	40.887 ^a	1	.000		
Continuity Correction ^b	30.424	1	.000		
Likelihood Ratio	17.309	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	40.580	1	.000		
N of Valid Cases	133				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is .36.

b. Computed only for a 2x2 table

Appendix 11: Reasons for consumption of dietary supplements before March 2020 ANOVA test and multiple comparisons

Descriptives

Reasons BF2020 Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Croatian	171	.7719	1.21293	.09276	.5888	.9550	.00	6.00
Slovenian	65	1.0923	1.15546	.14332	.8060	1.3786	.00	4.00
Macedonian	71	.9155	1.25067	.14843	.6195	1.2115	.00	6.00
Total	307	.8730	1.21274	.06921	.7368	1.0092	.00	6.00

ANOVA

Reasons BF2020 Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.001	2	2.501	1.708	.183
Within Groups	445.044	304	1.464		
Total	450.046	306			

Multiple Comparisons

Dependent Variable: Reasons BF2020 Index

Tukey HSD

(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Croatian	Slovenian	-.32038	.17631	.166	-.7356	.0949
	Macedonian	-.14356	.17082	.678	-.5459	.2588
Slovenian	Croatian	.32038	.17631	.166	-.0949	.7356
	Macedonian	.17681	.20771	.671	-.3124	.6660
Macedonian	Croatian	.14356	.17082	.678	-.2588	.5459
	Slovenian	-.17681	.20771	.671	-.6660	.3124

Appendix 12: Reasons for consumption of dietary supplements after March 2020 ANOVA test and multiple comparisons

Descriptives

Reasons AF2020 Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Croatian	171	.9708	1.37382	.10506	.7634	1.1781	.00	7.00
Slovenian	65	1.4615	1.39280	.17276	1.1164	1.8067	.00	5.00
Macedonian	71	1.4648	1.40236	.16643	1.1329	1.7967	.00	6.00
Total	307	1.1889	1.40150	.07999	1.0315	1.3463	.00	7.00

ANOVA

Reasons AF2020 Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.373	2	9.186	4.793	.009
Within Groups	582.670	304	1.917		
Total	601.042	306			

Multiple Comparisons

Dependent Variable: Reasons AF2020 Index

Tukey HSD

(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Croatian	Slovenian	-.49078*	.20173	.041	-.9659	-.0156
	Macedonian	-.49403*	.19546	.032	-.9544	-.0337
Slovenian	Croatian	.49078*	.20173	.041	.0156	.9659
	Macedonian	-.00325	.23766	1.000	-.5630	.5565
Macedonian	Croatian	.49403*	.19546	.032	.0337	.9544
	Slovenian	.00325	.23766	1.000	-.5565	.5630

*. The mean difference is significant at the 0.05 level.

Appendix 13: Reasons for consumption of dietary supplements specifically due to COVID-19 ANOVA test and multiple comparisons

Descriptives

Reasons COVID Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Croatian	171	.1871	.75151	.05747	.0737	.3006	.00	5.00
Slovenian	65	.4308	.95147	.11801	.1950	.6665	.00	4.00
Macedonian	71	.8732	1.29758	.15399	.5661	1.1804	.00	4.00
Total	307	.3974	.98272	.05609	.2870	.5078	.00	5.00

ANOVA

Reasons COVID Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.709	2	11.854	13.258	.000
Within Groups	271.809	304	.894		
Total	295.518	306			

Multiple Comparisons

Dependent Variable: Reasons COVID Index

Tukey HSD

(I) Language	(J) Language	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Croatian	Slovenian	-.24363	.13778	.182	-.5681	.0809
	Macedonian	-.68610*	.13350	.000	-1.0005	-.3717
Slovenian	Croatian	.24363	.13778	.182	-.0809	.5681
	Macedonian	-.44247*	.16232	.019	-.8248	-.0602
Macedonian	Croatian	.68610*	.13350	.000	.3717	1.0005
	Slovenian	.44247*	.16232	.019	.0602	.8248

*. The mean difference is significant at the 0.05 level.

Appendix 14: Reasons for consumption of dietary supplements before and after March 2020 Paired samples *t*-test

		Paired Samples Test							
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Reasons BF2020 Index - Reasons AF2020 Index	-.31596	.94688	.05404	-.42230	-.20962	-5.847	306	.000

**Appendix 15: Language and sources of information on dietary supplements
crosstabulation and Chi-Square test**

Crosstab

		Source of information on dietary supplements: TV		Total	
		0	TV		
Language	Croatian	Count	124	31	155
		% within Language	80.0%	20.0%	100.0%
		% within Source of information on d. supplements: TV	53.0%	70.5%	55.8%
		% of Total	44.6%	11.2%	55.8%
	Slovenian	Count	54	5	59
		% within Language	91.5%	8.5%	100.0%
		% within Source of information on d. supplements: TV	23.1%	11.4%	21.2%
		% of Total	19.4%	1.8%	21.2%
	Macedonian	Count	56	8	64
		% within Language	87.5%	12.5%	100.0%
		% within Source of information on d. supplements: TV	23.9%	18.2%	23.0%
		% of Total	20.1%	2.9%	23.0%
Total	Count	234	44	278	
	% within Language	84.2%	15.8%	100.0%	
	% within Source of information on d. supplements: TV	100.0%	100.0%	100.0%	
	% of Total	84.2%	15.8%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.952 ^a	2	.084
Likelihood Ratio	5.262	2	.072
Linear-by-Linear Association	2.922	1	.087
N of Valid Cases	278		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.34.

Crosstab

			Source of information on dietary supplements: Radio		Total
			0	Radio	
Language	Croatian	Count	150	5	155
		% within Language	96.8%	3.2%	100.0%
		% within Source DS: Radio	56.0%	50.0%	55.8%
		% of Total	54.0%	1.8%	55.8%
	Slovenian	Count	56	3	59
		% within Language	94.9%	5.1%	100.0%
		% within Source DS: Radio	20.9%	30.0%	21.2%
		% of Total	20.1%	1.1%	21.2%
	Macedonian	Count	62	2	64
		% within Language	96.9%	3.1%	100.0%
		% within Source DS: Radio	23.1%	20.0%	23.0%
		% of Total	22.3%	0.7%	23.0%
Total	Count	268	10	278	
	% within Language	96.4%	3.6%	100.0%	
	% within Source DS: Radio	100.0%	100.0%	100.0%	
	% of Total	96.4%	3.6%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.479 ^a	2	.787
Likelihood Ratio	.442	2	.802
Linear-by-Linear Association	.011	1	.915
N of Valid Cases	278		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.12.

Crosstab

			Source of information on dietary supplements: Internet		Total
			0	Internet	
Language	Croatian	Count	50	105	155
		% within Language	32.3%	67.7%	100.0%
		% within Source DS: Internet	54.3%	56.5%	55.8%
		% of Total	18.0%	37.8%	55.8%
	Slovenian	Count	20	39	59
		% within Language	33.9%	66.1%	100.0%
		% within Source DS: Internet	21.7%	21.0%	21.2%
		% of Total	7.2%	14.0%	21.2%
	Macedonian	Count	22	42	64
		% within Language	34.4%	65.6%	100.0%
		% within Source DS: Internet	23.9%	22.6%	23.0%
		% of Total	7.9%	15.1%	23.0%
Total	Count	92	186	278	
	% within Language	33.1%	66.9%	100.0%	
	% within Source DS: Internet	100.0%	100.0%	100.0%	
	% of Total	33.1%	66.9%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.114 ^a	2	.945
Likelihood Ratio	.113	2	.945
Linear-by-Linear Association	.106	1	.744
N of Valid Cases	278		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 19.53.

Crosstab

			Source of information on dietary supplements: Social media		
			0	Social media	Total
Language	Croatian	Count	112	43	155
		% within Language	72.3%	27.7%	100.0%
		% within Source DS: Social media	54.1%	60.6%	55.8%
		% of Total	40.3%	15.5%	55.8%
	Slovenian	Count	46	13	59
		% within Language	78.0%	22.0%	100.0%
		% within Source DS: Social media	22.2%	18.3%	21.2%
		% of Total	16.5%	4.7%	21.2%
	Macedonian	Count	49	15	64
		% within Language	76.6%	23.4%	100.0%
		% within Source DS: Social media	23.7%	21.1%	23.0%
		% of Total	17.6%	5.4%	23.0%
Total	Count	207	71	278	
	% within Language	74.5%	25.5%	100.0%	
	% within Source DS: Social media	100.0%	100.0%	100.0%	
	% of Total	74.5%	25.5%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.925 ^a	2	.630
Likelihood Ratio	.934	2	.627
Linear-by-Linear Association	.627	1	.428
N of Valid Cases	278		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.07.

Crosstab

		Source of information on dietary supplements: Health professional			
			0	Health professional	Total
Language	Croatian	Count	97	58	155
		% within Language	62.6%	37.4%	100.0%
		% within Source DS: Health professional	62.2%	47.5%	55.8%
		% of Total	34.9%	20.9%	55.8%
	Slovenian	Count	32	27	59
		% within Language	54.2%	45.8%	100.0%
		% within Source DS: Health professional	20.5%	22.1%	21.2%
		% of Total	11.5%	9.7%	21.2%
	Macedonian	Count	27	37	64
		% within Language	42.2%	57.8%	100.0%
		% within Source DS: Health professional	17.3%	30.3%	23.0%
		% of Total	9.7%	13.3%	23.0%
Total	Count	156	122	278	
	% within Language	56.1%	43.9%	100.0%	
	% within Source DS: Health professional	100.0%	100.0%	100.0%	
	% of Total	56.1%	43.9%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.757 ^a	2	.021
Likelihood Ratio	7.744	2	.021
Linear-by-Linear Association	7.667	1	.006
N of Valid Cases	278		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.89.

Crosstab

		Source of information on dietary supplements: Public bodies		Total	
		0	Public bodies		
Language	Croatian	Count	149	6	155
		% within Language	96.1%	3.9%	100.0%
		% within Source DS: Public bodies	57.8%	30.0%	55.8%
		% of Total	53.6%	2.2%	55.8%
	Slovenian	Count	57	2	59
		% within Language	96.6%	3.4%	100.0%
		% within Source DS: Public bodies	22.1%	10.0%	21.2%
		% of Total	20.5%	0.7%	21.2%
	Macedonian	Count	52	12	64
		% within Language	81.3%	18.8%	100.0%
		% within Source DS: Public bodies	20.2%	60.0%	23.0%
		% of Total	18.7%	4.3%	23.0%
Total	Count	258	20	278	
	% within Language	92.8%	7.2%	100.0%	
	% within Source DS: Public bodies	100.0%	100.0%	100.0%	
	% of Total	92.8%	7.2%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.643 ^a	2	.000
Likelihood Ratio	13.777	2	.001
Linear-by-Linear Association	12.416	1	.000
N of Valid Cases	278		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 4.24.

Crosstab

		Source of information on dietary supplements: Family and friends			
			0	Family and friends	Total
Language	Croatian	Count	73	82	155
		% within Language	47.1%	52.9%	100.0%
		% within Source DS: Family/friends	50.0%	62.1%	55.8%
		% of Total	26.3%	29.5%	55.8%
	Slovenian	Count	37	22	59
		% within Language	62.7%	37.3%	100.0%
		% within Source DS: Family/friends	25.3%	16.7%	21.2%
		% of Total	13.3%	7.9%	21.2%
	Macedonian	Count	36	28	64
		% within Language	56.3%	43.8%	100.0%
		% within Source DS: Family/friends	24.7%	21.2%	23.0%
		% of Total	12.9%	10.1%	23.0%
Total	Count	146	132	278	
	% within Language	52.5%	47.5%	100.0%	
	% within Source DS: Family/friends	100.0%	100.0%	100.0%	
	% of Total	52.5%	47.5%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.643 ^a	2	.098
Likelihood Ratio	4.676	2	.097
Linear-by-Linear Association	2.459	1	.117
N of Valid Cases	278		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 28.01.

Crosstab

		Source of information on dietary supplements: Other		Total	
		0	Other		
Language	Croatian	Count	150	5	155
		% within Language	96.8%	3.2%	100.0%
		% within Source DS: Other	56.2%	45.5%	55.8%
		% of Total	54.0%	1.8%	55.8%
	Slovenian	Count	54	5	59
		% within Language	91.5%	8.5%	100.0%
		% within Source DS: Other	20.2%	45.5%	21.2%
		% of Total	19.4%	1.8%	21.2%
	Macedonian	Count	63	1	64
		% within Language	98.4%	1.6%	100.0%
		% within Source DS: Other	23.6%	9.1%	23.0%
		% of Total	22.7%	0.4%	23.0%
Total	Count	267	11	278	
	% within Language	96.0%	4.0%	100.0%	
	% within Source DS: Other	100.0%	100.0%	100.0%	
	% of Total	96.0%	4.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.352 ^a	2	.113
Likelihood Ratio	3.889	2	.143
Linear-by-Linear Association	.022	1	.882
N of Valid Cases	278		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.33.

Appendix 16: Language and sources of information on COVID-19 crosstabulation and Chi-Square test

Crosstab

			Source of information on COVID-19: TV		Total
			0	TV	
Language	Croatian	Count	64	76	140
		% within Language	45.7%	54.3%	100.0%
		% within Source of information on COVID: TV	47.8%	64.4%	55.6%
		% of Total	25.4%	30.2%	55.6%
	Slovenian	Count	30	22	52
		% within Language	57.7%	42.3%	100.0%
		% within Source of information on COVID: TV	22.4%	18.6%	20.6%
		% of Total	11.9%	8.7%	20.6%
	Macedonian	Count	40	20	60
		% within Language	66.7%	33.3%	100.0%
		% within Source of information on COVID: TV	29.9%	16.9%	23.8%
		% of Total	15.9%	7.9%	23.8%
Total	Count	134	118	252	
	% within Language	53.2%	46.8%	100.0%	
	% within Source of information on COVID: TV	100.0%	100.0%	100.0%	
	% of Total	53.2%	46.8%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.942 ^a	2	.019
Likelihood Ratio	8.045	2	.018
Linear-by-Linear Association	7.875	1	.005
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 24.35.

Crosstab

			Source of information on COVID-19: Radio		
			0	Radio	Total
Language	Croatian	Count	101	39	140
		% within Language	72.1%	27.9%	100.0%
		% within Source COVID: Radio	52.1%	67.2%	55.6%
		% of Total	40.1%	15.5%	55.6%
	Slovenian	Count	38	14	52
		% within Language	73.1%	26.9%	100.0%
		% within Source COVID: Radio	19.6%	24.1%	20.6%
		% of Total	15.1%	5.6%	20.6%
	Macedonian	Count	55	5	60
		% within Language	91.7%	8.3%	100.0%
		% within Source COVID: Radio	28.4%	8.6%	23.8%
		% of Total	21.8%	2.0%	23.8%
Total	Count	194	58	252	
	% within Language	77.0%	23.0%	100.0%	
	% within Source COVID: Radio	100.0%	100.0%	100.0%	
	% of Total	77.0%	23.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.600 ^a	2	.008
Likelihood Ratio	11.245	2	.004
Linear-by-Linear Association	7.822	1	.005
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.97.

Crosstab

			Source of information on COVID-19: Internet		Total
			0	Internet	
Language	Croatian	Count	38	102	140
		% within Language	27.1%	72.9%	100.0%
		% within Source COVID: Internet	67.9%	52.0%	55.6%
		% of Total	15.1%	40.5%	55.6%
	Slovenian	Count	8	44	52
		% within Language	15.4%	84.6%	100.0%
		% within Source COVID: Internet	14.3%	22.4%	20.6%
		% of Total	3.2%	17.5%	20.6%
	Macedonian	Count	10	50	60
		% within Language	16.7%	83.3%	100.0%
		% within Source COVID: Internet	17.9%	25.5%	23.8%
		% of Total	4.0%	19.8%	23.8%
Total	Count	56	196	252	
	% within Language	22.2%	77.8%	100.0%	
	% within Source COVID: Internet	100.0%	100.0%	100.0%	
	% of Total	22.2%	77.8%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.439 ^a	2	.109
Likelihood Ratio	4.546	2	.103
Linear-by-Linear Association	3.449	1	.063
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.56.

Crosstab

		Source of information on COVID-19: Social media		Total	
		0	Social media		
Language	Croatian	Count	93	47	140
		% within Language	66.4%	33.6%	100.0%
		% within Source COVID: Social media	56.7%	53.4%	55.6%
		% of Total	36.9%	18.7%	55.6%
	Slovenian	Count	34	18	52
		% within Language	65.4%	34.6%	100.0%
		% within Source COVID: Social media	20.7%	20.5%	20.6%
		% of Total	13.5%	7.1%	20.6%
	Macedonian	Count	37	23	60
		% within Language	61.7%	38.3%	100.0%
		% within Source COVID: Social media	22.6%	26.1%	23.8%
		% of Total	14.7%	9.1%	23.8%
Total	Count	164	88	252	
	% within Language	65.1%	34.9%	100.0%	
	% within Source COVID: Social media	100.0%	100.0%	100.0%	
	% of Total	65.1%	34.9%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.422 ^a	2	.810
Likelihood Ratio	.418	2	.811
Linear-by-Linear Association	.389	1	.533
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.16.

Crosstab

		Source of information on COVID-19: Health professional			
			0	Health professional	Total
Language	Croatian	Count	85	55	140
		% within Language	60.7%	39.3%	100.0%
		% within Source COVID: Health professional	65.4%	45.1%	55.6%
		% of Total	33.7%	21.8%	55.6%
	Slovenian	Count	23	29	52
		% within Language	44.2%	55.8%	100.0%
		% within Source COVID: Health professional	17.7%	23.8%	20.6%
		% of Total	9.1%	11.5%	20.6%
	Macedonian	Count	22	38	60
		% within Language	36.7%	63.3%	100.0%
		% within Source COVID: Health professional	16.9%	31.1%	23.8%
		% of Total	8.7%	15.1%	23.8%
Total	Count	130	122	252	
	% within Language	51.6%	48.4%	100.0%	
	% within Source COVID: Health professional	100.0%	100.0%	100.0%	
	% of Total	51.6%	48.4%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.145 ^a	2	.004
Likelihood Ratio	11.237	2	.004
Linear-by-Linear Association	10.786	1	.001
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.17.

Crosstab

		Source of information on COVID-19: Public bodies		Total	
		0	Public bodies		
Language	Croatian	Count	80	60	140
		% within Language	57.1%	42.9%	100.0%
		% within Source COVID: Public bodies	62.0%	48.8%	55.6%
		% of Total	31.7%	23.8%	55.6%
	Slovenian	Count	25	27	52
		% within Language	48.1%	51.9%	100.0%
		% within Source COVID: Public bodies	19.4%	22.0%	20.6%
		% of Total	9.9%	10.7%	20.6%
	Macedonian	Count	24	36	60
		% within Language	40.0%	60.0%	100.0%
		% within Source COVID: Public bodies	18.6%	29.3%	23.8%
		% of Total	9.5%	14.3%	23.8%
Total	Count	129	123	252	
	% within Language	51.2%	48.8%	100.0%	
	% within Source COVID: Public bodies	100.0%	100.0%	100.0%	
	% of Total	51.2%	48.8%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.194 ^a	2	.074
Likelihood Ratio	5.217	2	.074
Linear-by-Linear Association	5.170	1	.023
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.38.

Crosstab

		Source of information on COVID-19: Family and friends			
			0	Family and friends	Total
Language	Croatian	Count	67	73	140
		% within Language	47.9%	52.1%	100.0%
		% within Source COVID Family/friends	54.5%	56.6%	55.6%
		% of Total	26.6%	29.0%	55.6%
	Slovenian	Count	27	25	52
		% within Language	51.9%	48.1%	100.0%
		% within Source COVID Family/friends	22.0%	19.4%	20.6%
		% of Total	10.7%	9.9%	20.6%
	Macedonian	Count	29	31	60
		% within Language	48.3%	51.7%	100.0%
		% within Source COVID Family/friends	23.6%	24.0%	23.8%
		% of Total	11.5%	12.3%	23.8%
Total	Count	123	129	252	
	% within Language	48.8%	51.2%	100.0%	
	% within Source COVID Family/friends	100.0%	100.0%	100.0%	
	% of Total	48.8%	51.2%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.258 ^a	2	.879
Likelihood Ratio	.258	2	.879
Linear-by-Linear Association	.025	1	.874
N of Valid Cases	252		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 25.38.

Crosstab

		Source of information on COVID-19: Other		Total	
		0	Other		
Language	Croatian	Count	136	4	140
		% within Language	97.1%	2.9%	100.0%
		% within Source COVID: Other	56.0%	44.4%	55.6%
		% of Total	54.0%	1.6%	55.6%
	Slovenian	Count	49	3	52
		% within Language	94.2%	5.8%	100.0%
		% within Source COVID: Other	20.2%	33.3%	20.6%
		% of Total	19.4%	1.2%	20.6%
	Macedonian	Count	58	2	60
		% within Language	96.7%	3.3%	100.0%
		% within Source COVID: Other	23.9%	22.2%	23.8%
		% of Total	23.0%	0.8%	23.8%
Total	Count	243	9	252	
	% within Language	96.4%	3.6%	100.0%	
	% within Source COVID: Other	100.0%	100.0%	100.0%	
	% of Total	96.4%	3.6%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.947 ^a	2	.623
Likelihood Ratio	.850	2	.654
Linear-by-Linear Association	.122	1	.727
N of Valid Cases	252		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.86.

Appendix 17: Trust in sources of information on dietary supplements and COVID-19 Paired samples *t*-test

		Paired Samples Test							
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Trust in source of information on dietary supplements: TV – Trust in source of information on COVID-19: TV	-.347	1.143	.073	-.492	-.202	-4.724	241	.000
Pair 2	Trust in source of information on dietary supplements: Radio – Trust in source of information on COVID-19: Radio	-.277	1.142	.073	-.422	-.132	-3.771	241	.000
Pair 3	Trust in source of information on dietary supplements: Internet – Trust in source of information on COVID-19: Internet	-.017	1.089	.070	-.154	.121	-.236	241	.814
Pair 4	Trust in source of information on dietary supplements: Social Media – Trust in source of information on COVID-19: Social Media	-.050	1.021	.066	-.179	.080	-.755	241	.451
Pair 5	Trust in source of information on dietary supplements: Health professionals – Trust in source of information on COVID-19: Health professionals	.227	.982	.063	.103	.352	3.600	241	.000
Pair 6	Trust in source of information on dietary supplements: Public bodies – Trust in source of information on COVID-19: Public bodies	-.124	1.075	.069	-.260	.012	-1.795	241	.074
Pair 7	Trust in source of information on dietary supplements: Family and friends – Trust in source of information on COVID-19: Family and friends	.107	.833	.054	.002	.213	2.007	241	.046

Appendix 18: Helpfulness of sources of information on dietary supplements and COVID-19 Paired samples *t*-test

		Paired Samples Test							
		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Helpfulness of source of information on dietary supplements: TV – Helpfulness of source of information on COVID-19: TV	-.449	1.084	.071	-.588	-.309	-6.331	233	.000
Pair 2	Helpfulness of source of information on dietary supplements: Radio – Helpfulness of source of information on COVID-19: Radio	-.316	.995	.065	-.444	-.188	-4.863	233	.000
Pair 3	Helpfulness of source of information on dietary supplements: Internet – Helpfulness of source of information on COVID-19: Internet	.004	.969	.063	-.121	.129	.067	233	.946
Pair 4	Helpfulness of source of information on dietary supplements: Social Media – Helpfulness of source of information on COVID-19: Social Media	.013	.996	.065	-.115	.141	.197	233	.844
Pair 5	Helpfulness of source of information on dietary supplements: Health professionals – Helpfulness of source of information on COVID-19: Health professionals	.145	.929	.061	.026	.265	2.393	233	.018
Pair 6	Helpfulness of source of information on dietary supplements: Public bodies – Helpfulness of source of information on COVID-19: Public bodies	-.218	1.010	.066	-.348	-.088	-3.300	233	.001
Pair 7	Helpfulness of source of information on dietary supplements: Family and friends – Helpfulness of source of information on COVID-19: Family/friends	.137	.916	.060	.019	.255	2.283	233	.023

Appendix 19: Importance of sources of information on dietary supplements and COVID-19 Paired samples *t*-test

		Paired Samples Test							
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Importance of source of information on dietary supplements: TV – Importance of source of information on COVID-19: TV	-.504	1.096	.073	-.649	-.360	-6.887	223	.000
Pair 2	Importance of source of information on dietary supplements: Radio – Importance of source of information on COVID-19: Radio	-.464	1.037	.069	-.601	-.328	-6.702	223	.000
Pair 3	Importance of source of information on dietary supplements: Internet – Importance of source of information on COVID-19: Internet	-.152	1.026	.069	-.287	-.017	-2.214	223	.028
Pair 4	Importance of source of information on dietary supplements: Social Media – Importance of source of information on COVID-19: Social Media	-.067	1.024	.068	-.202	.068	-.978	223	.329
Pair 5	Importance of source of information on dietary supplements: Health professionals – Importance of source of information on COVID-19: Health professionals	-.027	.857	.057	-.140	.086	-.468	223	.640
Pair 6	Importance of source of information on dietary supplements: Public bodies – Importance of source of information on COVID-19: Public bodies	-.246	1.062	.071	-.385	-.106	-3.460	223	.001
Pair 7	Importance of source of information on dietary supplements: Family and friends – Importance of source of information on COVID-19: Family and friends	.040	.864	.058	-.074	.154	.696	223	.487