

**NEAR EAST UNIVERSITY**  
**INSTITUTE OF GRADUATE STUDIES**  
**DEPARTMENT OF ZOOTECHNIQUES**

**ONE WELFARE AND ONE HEALTH, CONSUMER AWARENESS**  
**ANALYSIS RELATED TO ANIMAL-BASED PRODUCT**

**M.SC. THESIS**


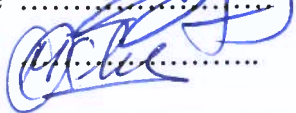
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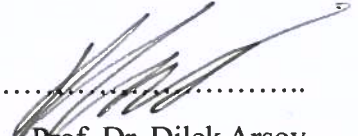
### Approval

We certify that we have read the thesis submitted by Sunday Peter George titled “**One welfare and One Health, Consumer Awareness Analysis Related to Animal-Based Product**” and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Sciences.


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### **Declaration**

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

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Sunday Peter George

## **Abstract**

### **One welfare and One Health, Consumer Awareness Analysis Related to Animal-Based Product**

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## **Abstract**

Animal production systems are associated with potentially higher environmental and public health risks. With the ever-increasing consumers' concern about livestock production methodologies due to various outbreaks of food-borne zoonosis and animal diseases. Consumers are obligated to understand various concepts such as one health and one-welfare that are designed to improve animal welfare and ensure good public health. Therefore, the aim of this study is to explain consumers' awareness about animal-based product security regarding animal welfare and production systems and elucidate what the relationship is between animal welfare and public health. The study utilized a quantitative research design to examine consumer awareness within the context of One-welfare and one health on animal-based products in a cosmopolitan university. Quantitative and demographic data from 200 participants comprising of students in different health related departments at Near East University were obtained through the use of structured questionnaires consisting of three sections. Data obtained during the course of this study were subjected to analysis using Statistical Package for Social Science (SPSS) using descriptive statistics (frequencies and percentages) and Chi-square test. The demographic showed that 61% of the participants were females within the age bracket of 18 - 25 years. Most respondents (39.50%) would never consider consuming artificial meat, while 5.5% would accept it if cost-effective. The findings showed that 45% of the participants had ideas about the relationship between animal health and welfare, 40.5% heard about one health concept before and 42.5% had an idea about animal welfare. This study concluded that animal health and welfare should be given utmost priority in line with the concepts of one health and one-welfare so as to ensure that food reaching the consumer is safe.

**Keywords:** animal welfare, consumer awareness, animal production techniques, one health, onewelfare

## Ozet

### One-welfare and One Health, Consumer Awareness Analysis Related to Animal-Based Product Sunday Peter George

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Hayvansal üretim sistemleri, potansiyel olarak daha yüksek çevresel ve halk sağlığı riskleriyle ilişkilidir. Gıda kaynaklı zoonoz ve hayvan hastalıklarının çeşitli salgınları nedeniyle tüketicilerin hayvancılık üretim metodolojileri hakkında giderek artan endişeleri ile. Tüketiciler, hayvan refahını iyileştirmek ve iyi bir halk sağlığı sağlamak için tasarlanmış tek sağlık ve tek refah gibi çeşitli kavramları anlamakla yükümlüdür. Bu nedenle, bu çalışma, tüketicilerin hayvansal üretim teknikleri ve hayvan refahı ile ilgili olarak tek sağlık ve tek refah konusundaki farkındalıklarını araştırmıştır.

Yakın Doğu Üniversitesi'nde sağlıkla ilgili farklı bölümlerde öğrenim gören öğrencilerden oluşan 200 katılımcıdan nicel ve demografik veriler, üç bölümden oluşan yapılandırılmış anketler kullanılarak elde edildi.

SPSS kullanılarak elde edilen verilerin analizi, diğer demografik değişkenler arasında yaş, ekonomik durum ve cinsiyetin, iyi hayvan çiftliği uygulamalarının ve hayvan refahının sağlanmasında tek sağlık ve tek refah kavramlarına ilişkin tüketicilerin farkındalık düzeyinde istatistiksel olarak anlamlı bir rol oynadığını göstermiştir. .

Bu çalışmada, gıdanın tüketiciye güvenli bir şekilde ulaşması için tek sağlık ve tek refah kavramları doğrultusunda hayvan sağlığı ve refahına en üst düzeyde önem verilmesi gerektiği sonucuna varılmıştır.

**Anahtar Kelimeler:** hayvan refahı, tüketici bilinci, hayvansal üretim teknikleri, tek sağlık, tek refah

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### **List of Abbreviations**

**SPSS:** Statistical Package for Social Sciences

## Chapter One

### Introduction

Human health, Animal and environmental health are very much interrelated. The wholeness of any of these is dependent on the health status of either of these three. Due to the rapidly increasing human population, the demand for all agricultural products is exacerbating the stress on the resource base used for production of food to meet the demands of this exploding population. Animal production systems are associated with potentially higher environmental and public health risks (Thorne, 2007). Consumer concern about livestock production methodologies is increasing over the last decades due to various outbreaks of food-borne zoonosis and animal diseases. Animal health and animal welfare should be given utmost priority in ensuring that food reaching the consumer is safe. The safety of the food chain is directly connected to the welfare of animals, particularly those farmed for food production, due to the interconnectedness of animal welfare and health, and food-borne diseases. Stress factors and poor animal welfare can lead to increased susceptibility to transmissible diseases among animals (Nabarro & Wannous, 2014). This can pose significant risks to consumers, for example through common food-borne infections such as *Salmonella*, *Campylobacter*, *E. coli* etc. Good animal welfare practices do not only reduce unnecessary suffering but also help to make animals healthier. In addition, the Lisbon Treaty of 2009 included an explicit recognition that animals are sentient beings and that the European Union (EU) and its member states bear an ethical responsibility to prevent maltreatment, pain, and suffering among animals. The welfare of food-producing animals depends largely on how they are managed by humans considering that a range of factors such as housing and bedding, space and crowding, transport conditions, stunning and slaughter methods, castration of males and tail docking can impact on their welfare (Alberto Bernue´s, Ana Olaizolab, 2003).

The Hazard Analysis Critical Control Point (HACCP) approach for instance is becoming increasingly recognized as a valuable means of identifying and controlling hazards in the food production process, thereby ensuring that food reaching the consumer is safe (Majewski, 1992).

Safe food produced on farms must be free from pathogens and contaminations such as poison and residues. Brown (2000) concluded that food produced regardless of the technology used or

changes in production methods cannot achieve zero bacterial or chemical risk. However, this risk can be avoided or eliminated at the farm level using HACCP methodology that offers a risk assessment and management system. HACCP is a systematic approach to the identification, evaluation, and control of food safety hazards. Animal diseases are among the most significant limiting factors for livestock production as their impact can vary from reduced productivity and restricted market access to the elimination of entire flocks or herds, with the resultant loss of biodiversity and valuable genetic resources and revenues (Nardone et al., 2010). Some emerging or evolving infectious diseases have the potential to move quickly from local to international significance and to pass from animals to humans (Dalla et al., 2020). Combating diseases of livestock in developing countries can make a substantial contribution to poverty alleviation by generating employment, providing funds for education and training, improving opportunities for trade in livestock and animal products, and supplying raw materials to industry.

Biosecurity according to OIE Terrestrial Animal Health Code is defined as a set of management and physical measures designed to reduce the risk of introduction, establishment, and spread of animal diseases, infections, or infestations to, from, and within an animal population. The Veterinary Services is tasked with a key role in maintaining and developing such measures, working in partnership with the various actors dealing with livestock (farmers, transporters, animal handlers and keepers, veterinarians, etc.) who are primarily responsible for biosecurity implementation (Littin et al., 2004). The veterinary services is also charged with developing and maintaining biosecurity protocols at farm level and in other premises where livestock are kept, to protect animals from the introduction or spread of animal diseases during transportation in the different production systems such as slaughterhouses, livestock markets, etc to protect animals from the introduction and spread diseases, and in country level to prevent the introduction and spread of trans-border animal diseases (Kumar, 2014). It is therefore essential for us to elucidate the effect of environmental hazards (Farm HACCP) on animal production, biosafety and welfare in relation to onehealth system.

### **Aim of the study**

The aim of this study is to explain what the relationship between animal welfare and public health, and to elucidate consumers' awareness about animal-based product security regarding to animal welfare and production systems

## **Research Objectives**

To understand the relationship between animal welfare and public health

To highlight consumers' awareness regarding the security of animal-based products

To examine the association between animal welfare and animal production systems

## **Research questions**

How do animal production systems affect animal welfare?

How does consumers' awareness impact the security of animal-based products?

What is the relationship between animal welfare and public health?

## **Problem statement**

Development and maintenance of biosecurity protocols at farm level and in other premises where livestock are kept are essential to protect animals from the introduction or spread of animal diseases during transportation in the different production systems such as slaughterhouses, livestock markets, etc. and to ensure the safety of farm animals from the introduction and spread of diseases both in country and global level so that the risks of introduction and spread of transborder animal diseases can be effectively mitigated. However, recent evidence suggests that farm animals are being subjected to cruel production techniques that not only put their welfare at risk but that of the general human population. Some scholarly works argue that adequate measures are not being employed to enforce one-health policy as many consumers are unaware of the security of animal-based products. Consequently, this present study will explore the impacts of consumer awareness in relation to animal welfare and elucidate the relationship between public health and animal welfare.

## **Chapter Two**

### **Literature Review**

The topic of animal welfare is complicated and has been tackled from a variety of viewpoints and aspects (De Jonge & van Trijp, 2013). For legal definitions like the EU basic standards (European Commission, 2007) and the Treaty of Lisbon, which explicitly recognizes farm animals as sentient beings (De Jonge & van Trijp, 2013), the Brambell (1965) study has been highly influential and continues to be a crucial benchmark. It has also been a pillar of the extensive European Welfare Quality program, which (according to Temple et al., 2011) described animal welfare as consisting of proper housing, nutrition, health, and behavior. According to the Farm Animal wellbeing Council (1992), Brambell (1965) defined animal wellbeing in terms of 5 freedoms: 1) The freedom from hunger and thirst; 2) the freedom from discomfort through the provision of a suitable environment, including shelter and a comfortable resting area; 3) the freedom from pain, injury, and disease through prevention or prompt diagnosis and treatment; 4) the freedom to express normal behavior through the provision of enough space, suitable facilities, and company of the animal's own kind; and 5) the freedom from fear and stress through the establishment of conditions and treatment that avoid menacing situations. Minimum standards have a tendency to be heavily resource-dependent (i.e., based on aspects of the farm and management).

The physiological or biochemical state of an animal at the time of observation as it tries to deal with or adapt to internal difficulties or ante-mortem situations is referred to as its welfare (Gregory, 1998; Broom, 2000; Grandin, 2001). According to Smith and Pearson (2005), it depicts an animal's emotional and physical well-being in connection to its surroundings. Applying intelligent and considerate animal husbandry techniques to the farm's livestock is another aspect of animal welfare. The welfare of the animals has a favorable impact on output. According to Goldberg (2016), when the welfare of land-based farm animals is jeopardized, there are significant adverse effects on human health as a result of environmental deterioration, the use of antibiotics at levels above what are considered therapeutic for growth promotion, and the effects of intensification. Modern animal farming must include animal welfare as a critical

component. Animal welfare is first and foremost based on moral considerations that result from the fact that animals are sentient beings, meaning they can suffer and feel emotions (Le Neindre et al., 2017).

## **2.1 Impact of animal production systems on animal welfare**

For any farm species, industrialized high-density systems share traits that are linked to issues with animal welfare, particularly those that relate to the management of resources and supply in proportion to the needs of the animals (Tarazona et al., 2020). Many aspects of feeders and drinkers, including material, size, height, and distribution, have been found to be significant for animals in numerous studies involving a variety of animal species. Because of agonistic social behaviors or just because they prevent some people from accessing food and water resources, inadequate designs and insufficient numbers of feeders and drinkers can lead to major welfare issues (Broom & Fraser, 2015). For an animal, food is a vital resource that must fulfill three essential requirements in order to prevent low welfare. It must be available to all animals in a group, in a sufficient quantity, and of high quality. Therefore, whether or not all animals can access the resource when they have the incentive to do so depends on characteristics such as the manner of presentation of the food, the smell, color, taste, texture, and position in space (Tarazona et al., 2020). Dehydration caused by improper water and drinker management can lead to a variety of welfare issues, particularly when the animal is experiencing heat stress and has a greater requirement for water. Any direct use of natural water sources should consider the environmental effects (Tarazona et al., 2020).

Animal welfare is significantly impacted by the condition of the floors in the facilities where the animals spend the majority of their time, as well as the surfaces of the paths that the animals use to travel across the system, such as to the milking, loading, and unloading stations, crowding pens, and squeeze chutes. Following are some examples of how traits like material, the type of floor gaps, drainage, roughness, slipperiness, and dirtiness can impact welfare: Damage to the animal's feet, discomfort, improper rest positions, or difficulties moving; discomfort during rest owing to the hardness of the floor, excessive moisture, or dirt; and a higher chance of lameness conditions, respiratory infections, mastitis, or endometritis due to dirtiness (Grandin, 2017; Almeida et al., 2018; Ouweltjes et al., 2019). Various materials are utilized as bedding in a structure that houses animals in numerous animal production methods. Straw, sawdust or wood

chips, synthetic materials, and agricultural byproducts like rice hulls are a few of these materials. The materials used in building or bedding can potentially cause welfare issues, both in terms of animal safety and as a potential source of parasites or diseases. Small particles in dust can irritate the airways of both people and animals, including pigs and calves (McClendon et al., 2015; Maier et al., 2019).

Some welfare issues are related to stress, where stress is defined as an environmental effect on an individual that overtaxes their control systems, leads to unfavorable outcomes, and eventually reduces fitness (Tarazona et al., 2020). When owners, veterinarians, and coworkers all have differing views on animal care, it can cause issues for the animals as well as challenges for the care personnel. The idea of "one welfare" makes it evident that human welfare and non-human animal welfare are interchangeable, and that poor welfare frequently results in various forms of poor welfare, sometimes because the low welfare impairs immune system function. Human welfare is likely to suffer as a result of low welfare, which makes production processes less effective. The animal uses some of the energy it expends to try to solve welfare issues because stress and pain both demand energy to compensate for them. Poor welfare leads to increased energy use, which lowers productivity efficiency and affects the system's sustainability (Tarazona et al., 2020).

## **2.2 The implications of Animal Welfare in Public Health**

The enhancement of population health is the primary objective of public health (Ruiz, 2018). Human consumption is one of the main issues in promoting population health. We often hear the adage "We are what we eat." Some may contend that this adage is untrue because individuals do not actually resemble the foods they consume, such as turning into hamburgers or veggies. However, just as our bodies are formed of nutrients and whatever else is in our feeds without resembling those things, our dwellings are made of timber without looking like trees (Darche, 2016). Animals have been used as food sources in human diets for at least 5 million years. Meat, milk, eggs, cheese, and yogurt are examples of foods that are derived from animals. According to Ruiz (2018), Americans devoured 106.0 pounds of chicken, 51.0 pounds of pork, and 53.9 pounds of beef per person in 2015. Factory farming uses hormones and antibiotics to increase food production in animals more quickly and avoid illnesses brought on by the confinement of animals in tiny spaces, which is the ideal setting for the spread of disease under the current agricultural practices.

According to Chhomel and Sun (2011), 14-62% of pet owners let their animals sleep in their bedrooms, which may contribute to the spread of zoonoses. Over the past few decades, the number of companion and pet animals has expanded, but they are also a major source of disease-causing pathogens. Due to the potential for illness spread, the popularity of pets and companion animals has put human health at risk. Exotic pets are commonly maintained in homes today alongside domestic pets. The danger of spreading a new zoonotic illness to humans through pets, companion animals, and exotic birds and animals is therefore extremely high. Pets and companion animals are linked to a number of infectious diseases (viral, bacterial, parasitic, and fungal) (Halsby et al., 2014). The zoonotic diseases frequently associated with pets and companion animals include brucellosis, campylobacteriosis, chlamydiosis, cat scratch fever (*Bartonella henselae*), ehrlichiosis, giardiasis, hantavirus, hookworms, influenza, rabies, Lyme disease, rocky mountain spotted fever, leptospirosis, monkey pox, pasteurellosis, Q fever, plague, roundworms, salmonellosis, staphylococcosis (MRSA), streptococcosis, toxoplasmosis, and tularemia. Numerous zoonoses, including rabies, salmonellosis, and staphylococcosis, are present in a variety of pets and companion animals (Halsby et al., 2014; Jacob & Lorber 2015; Day et al., 2016).

In both developed and developing nations, birds including canaries, finches, sparrows, parrots, parakeets, and budgerigars are becoming increasingly widespread (Boseret et al., 2013). In addition to being potential carriers of zoonotic diseases like *Coxiella burnetii*, *Coxiella psittaci*, *Salmonella* spp., *Listeria monocytogenes*, *Erysipelothrix rhusiopathiae*, *Mycobacterium* spp., Lyme disease, and various viruses like fowl pox virus and Newcastle disease virus, these game and ornamental birds are also potential pet animal carriers of these diseases. Salmonellosis, chlamydiosis, and avian influenza A H5N1 are just a few of the devastating diseases that many of these viruses could possibly cause in humans (Rahman et al., 2020; Zaman et al., 2020). In addition, a variety of additional bacterial zoonoses, such as *Pasteurella* spp., *Klebsiella* spp., *Yersinia* spp., *Pseudomonas* spp., *Staphylococcus aureus*, and *E. coli*, can infect game and ornamental birds (Dorrestein, 2009). In fact, there is proof that humans can contract *Escherichia coli* O157:H7 (enterohaemorrhagic) from eating animals that were first fed by wild passerines (such as European starlings) (Kauffman & LeJeune, 2011).

Through direct or indirect contact, diseases from these animals can be spread. The transfer might occur indoors, outdoors, at pet stores, hospitals, or other locations. When these animals and birds



are brought to exhibitions and competitions, transmission frequently also occurs (Vanrompay et al., 2007). Humans typically contract infections like pasteurellosis and cat scratch sickness through animal bites or scratches. It is interesting that the rabies virus, which kills tens of thousands of people annually, is the most prevalent zoonotic disease connected with dogs. In a similar vein, pet-associated MRSA poses a major health risk to people everywhere (Rahman et al., 2020). The cat scratch illness is a significant zoonose that is connected to pets. *Bartonella henselae* is the disease's etiological agent. A typical benign infectious condition, cat scratch disease is widespread. The disease is horizontally transmitted from cat to cat, but arthropod vectors like fleas and ticks can occasionally infect people. Additionally, cat licking of a person's open wounds or bites and scratches that result in wounds are the most common human transmission mechanisms. The sickness takes between three and fourteen days to incubate. There may be several lesions, including redness, swelling, and elevated, rounded areas. Pus may also occur at the infection site. Additionally, the lymph nodes close to the location that was bit or scratched as well as those on the neck are typically swollen. To protect pets from these zoonotic infections, owners must raise them with sound hygiene habits, regular vaccinations, and regular medical exams (Klotz et al., 2011; Rahman et al., 2020).

Redefining our relationship with animals is essential to preventing the next epidemic, which could be closer than we realize. About 75% of all newly emerging infectious diseases are zoonotic, or diseases transmitted from animals to humans. History has demonstrated the catastrophic potential of these diseases, from the SARS outbreak in the early 2000s to the destruction of COVID-19. However, it's not just human health that is in jeopardy since zoonotic infections wipe out local wildlife populations, particularly those of endangered species. This leads to a loss in biodiversity and weakens our already vulnerable ecosystems (Mantilla, 2023). The final outcome of these diseases spreading throughout societies might be skyrocketing healthcare expenses, constrained economic productivity, and significant disruptions to agriculture. While the yearly cost of lives lost to zoonoses is estimated to be USD 350 billion, The causes of these diseases might be addressed with an annual investment of only USD 20 billion. In essence, only 6% of the annual value of lives lost goes toward preventative costs. The solution is straightforward: put animal wellbeing first to lower the likelihood of illness introduction and/or reemergence. Reducing reliance on intensive animal-based food production systems is a surefire approach to lower the danger of zoonosis and new infectious illnesses globally. The risk of zoonotic epidemics increases

with the quantity of farmed animals. Additionally, it is essential to promote ethical animal welfare methods. This requires, among other things, making sure that animals have enough space, ventilation, and nutritious food to build up their immune systems. These disease prevention measures strengthen the initial line of protection (Mantilla, 2023).

### **2.3 The concepts of One Health and One-welfare**

According to Lindenmayer and Kaufman 2022, the One Health idea demands that we understand and value the dynamic complexity of everything, from the tiny ecosystems found within individual cells to the varied populations that make up macroecosystems. In order to do this, we must transcend the hundreds of years of education that have conditioned us to view health issues as straightforward reductionist causal chains that can be researched and controlled independently of the complex environments in which they arise. One Health would profit from a more systemic approach that comes from post-normal science, which describes itself as a way of conducting policy-related inquiry that is suitable for complex cases where "facts are uncertain, values in dispute, stakes high, and decisions urgent" and "does not pretend to be value free or ethically neutral" (Funtowicz and Ravetz, 1992). This simplistic way of thinking, based on normal science, is not well suited for One Health. Our understanding of the universe does not come from discrete, linear lines of scientific inquiry but rather from a variety of viewpoints, some of which may be at odds with one another, as well as from historical, moral, and ethical frameworks that do not all have a scientific foundation (Bunch and Waltner-Toews, 2015).

Although numerous definitions have been put out, there isn't a singular One Health that is universally accepted. According to the World Health Organization (WHO), one health is a strategy to develop and put into practice programs, laws, policies, and research in which many sectors collaborate and share information to improve public health outcomes. According to the WHO, tackling health hazards at the intersection of the environment, animals, and people requires a "One Health" approach (Cox, 2022). According to the World Organization for Animal Health (OIE), the One Health approach summarizes the knowledge that human health and animal health are interrelated and linked to the health of the ecosystems in which they occur. This knowledge has been recognized for more than a century. They plan to use this as a cooperative, international strategy to comprehend dangers to the health of humans, animals (including both domestic and wild animals), and the ecosystem as a whole (WOAH, 2023). The UN's Food and Agriculture Organization (FAO) also acknowledges the connection between human, animal, plant, and environmental health. In light of this, they see One Health as "an integrated approach that

recognizes this fundamental relationship and ensures that specialists in multiple sectors work together to tackle health threats to animals, humans, plants, and the environment" (FAO, 2023). When closely analyzed, definitions frequently reveal the objectives or concerns of people who framed the term, and some are overly complicated. The One Health Institute of the University of California at Davis, however, has offered a much clearer definition: "One Health is an approach to ensure the well-being of people, animals, and the surroundings by means of mutually beneficial problem solving—locally, nationally, and globally" (Mackenzie & Jeggo, 2019; Cox, 2022). In an approachable manner, this captures the core of One Health.

The One Health concept is extremely explicit in its focus on consequences, responses, and actions at the animal-human-ecosystems interfaces, and in particular (a) emerging and endemic zoonoses, the latter of which are responsible for a much greater burden of disease in the developing world and have a significant societal impact in resource-poor settings (Welburn et al., 2015; Cleaveland et al., 2017), antimicrobial resistance (AMR), considering that resistance can develop in people, animals, or the environment and that it can also spread from one species to another and over national borders, and food safety (Welburn et al., 2017; Ceric et al., 2019; Gaz et al. 2019, Boqvist et al. 2018, 2019). Nevertheless, the concept of One Health as envisioned by international organizations (WHO, FAO, OIE, UNICEF), the World Bank, and numerous national organizations also unambiguously encompasses various fields and domains, such as environmental and ecosystem health, social sciences, ecology, wildlife, land use, and biodiversity. The core of the One Health concept is interdisciplinary collaboration, but while the veterinary community has embraced it, the medical community has been much slower to fully engage, despite support for One Health from organizations like the American Medical Association, Public Health England, and WHO. The One Health idea may need to be incorporated into medical school curricula so that medical students understand it as an essential component in the context of public health and infectious diseases in order to engage the medical community more completely in the future (Rabinowitz et al., 2017).

One Welfare is a newly coined phrase. One Welfare examines problems from a broader, national, global, and holistic perspective, much like One Health does. The term covers not only the wellbeing of animals but also that of humans, society mental health, and environmental preservation (Bourque 2017). It connects One Health principles and notions to welfare and environmental concerns. We are the primary proponents of animal welfare because we are veterinarians. We are also quite aware of how helpful animals are to us as people in terms of

companionship, food production, and biological research. The interactions and effects of people, animals, and the environment on one another must also be taken into consideration (Bourque, 2017).

One Welfare starts with viewpoints that are not entirely grounded in "normal" science, adding a significant value component to One Health. One Health and One Welfare, when considered collectively, can help us formulate ideas for choosing a healthier path away from the widespread destruction that *Homo sapiens* alone, of the more than 8 million known species on Earth, has caused and that threatens not only our survival but also the survival of all other living species (Zimmer, 2011). We have the chance to consider how we can "stitch a new garment" when One Health and One Welfare are combined. one that satisfies both nature and all of humanity. Applying the science of health, among other disciplines, as well as doing so within an ethical framework, will be necessary to achieve this (Sonya Renee Taylor, 2020).

Even as late as 2019, One Health mainly concentrated on zoonotic disease, but a broader agenda encompassing antimicrobial resistance, food safety, health services delivery, the human animal bond, climate change, destruction and depletion of natural resources, such as loss of biodiversity, disaster management, chronic diseases, and other health challenges that are shared by people and animals was beginning to be recognized (Xie, 2017). The new coronavirus's recent emergence and the toll it has taken on human morbidity and death around the world guarantee that interest in and dedication to zoonotic disease prevention and control will overshadow other One Health issues for years to come. We must not, however, overlook the possibility that the virus originated due to our species' callous disdain for wildlife and wild areas in our haste to safeguard people (Lindenmayer & Kaufman, 2022). Evidence suggests that the virus originated in horseshoe bat populations (Hu et al., 2017) and spread to humans through an intermediary species in wet markets in China, where wildlife species that have been captured and sold for food are crowded together in inhumane conditions. In the past, our approach to zoonotic diseases was to protect or treat those who were afflicted and to stop the infection at its closest source, an animal, frequently by culling (Lederman, 2016; Newsome et al., 2017), instead of finding ways to make animal populations healthier or changing the human behaviors that made it possible for pathogen spillover to happen from one species to another. According to a few recent articles, we should care for animals better or at the very least leave them alone in their natural habitats for the sake of both the animals and the environment as a whole, not just ourselves. One such example is Osofsky's "behavioural

distancing" of people from wildlife, which builds on the custom of social distancing among people during the COVID-19 era (Johnson et al., 2020; Lindenmayer & Kaufman, 2022).

The well-known tale of vultures and diclofenac on the Indian subcontinent serves as an illustration of a One Health dilemma. Three different species of Gyps vulture had a puzzling and quick drop in population that culminated in their being listed as critically endangered in 2000 (Lindenmayer & Kaufman, 2022). The reason for the fall in vulture populations was determined to be renal failure owing to diclofenac toxicity in 2004. Diclofenac is a cheap non-steroidal antiinflammatory drug that is frequently used to treat pain in both humans and animals. Farmers in south Asia started using diclofenac to lessen the suffering of their old, sick cattle because they cared about their health and were constrained by the Hindu tradition of not murdering or euthanizing cows. Without any other option for disposal, dead animals are in this environment left out in the open to be naturally scavenged by carnivores and birds of prey, notably Gyps vultures, which have been dubbed "natural sanitary workers." An unforeseen and unintentional result of the diclofenac treatment of cattle was that vultures absorbed deadly dosages of the medication. When vultures went extinct, other animals in the area, mainly communal dogs that roamed free, took over the primary function of scavenging and disposing of bodies. At cattle corpse disposal sites, social interactions and competition among dogs grew as a result of increased access to food supplies in the absence of vultures, and the dog population exploded (Lindenmayer & Kaufman, 2022).

The spread of rabies among dogs grew in a nation without efficient rabies control, which in turn increased the number of human rabies cases. Due to dogs' less effective carcass disposal than vultures, additional health concerns have been reported, including anthrax, brucellosis, and runoff pollution from decaying carcasses (Markandya et al., 2008). Initial welfare action, the calamitous extinction of ecologically significant species, the late discovery of a crucial link between wild animals and carcass disposal, an increase in food sources supporting the growth of dog populations, and increased transmission of rabies and other zoonotic diseases among dogs and, ultimately, to people, are all crucial aspects of this case. The solution to this issue was to outlaw the use of diclofenac in veterinary medicine and provide a more costly substitute (meloxicam) that looks to be less hazardous for vultures. Due to the high cost of meloxicam and some farmers' continued preference for diclofenac, the efficacy of this treatment has been constrained. Lack of understanding of various cultural practices, the need for a better understanding of the ecological dynamics of carcass disposal, and varying levels of concern for a particular species of wild animal all point to the necessity of an integrated One Health One Welfare approach to dealing with similar

problems in the future (Lindenmayer & Kaufman, 2022). Twenty years later, due to significant efforts at captive breeding and release, the establishment of drug-free vulture feeding locations, and extensive educational initiatives (Green et al., 2004; Markandya et al., 2008; Bindra, 2018), the vulture population is gradually recovering.

There is no better way to demonstrate the necessity of One Health and Welfare than by using the current COVID-19 outbreak as an example. Despite these cautions, society hasn't been able or willing to change the fundamental human behaviors that are the threat's root cause or devote enough resources to fully comprehend and stop it. We are currently paying a price. According to research by Johnson et al. (2020), there is evidence that exploitation and anthropogenic activities that have reduced the quality of wildlife habitat have increased possibilities for human-animal contacts and accelerated the spread of zoonotic diseases. Previous emerging disease incidents—though perhaps less deadly—have shown how this occurs and the roles that human activity plays: HIV originating from apes and causing the global AIDS epidemic, with 38 million people living with HIV in 2020 and a decline from 1.7 million AIDS-related deaths in 2004 to 690,000 in 2010 (UNAIDS, 2020); SARS-CoV emerged from a wet market in China with mixed live wildlife species, leading to 775 deaths (Wang et al., 2006); H5N1 avian influenza emerging in intensive poultry markets in China, leading to 445 deaths since 2003 (WHO, 2020); and Nipah virus emerging from bats through pigs to humans in Malaysia, Bangladesh, and India, leading to 373 deaths (Chattu et al, 2018); 13,308 people have died as a result of the Ebola virus since its first in bats in 1976; 858 people have died as a result of the MERS-CoV coronavirus, which also originated in bats and spread through camels to humans. All of these newly developing illnesses, which have their origins in nature and have developed to spread quickly from person to person, have appeared in settings where people have interfered with or altered the natural world. Human travel and contemporary lifestyles increased the influence of these infections, which all threatened to develop into the current occurrences (Lindenmayer & Kaufman, 2022).

One Health and One Welfare give us the chance to expand Schweitzer's respect for life (Schweitzer, 1936) beyond people and other animals to the environment, take into account new knowledge and understanding of health and well-being across the spectrum of life on earth, reevaluate our impact on health in the earth's ecosystems, and give us cutting-edge tools to better protect and sustainably support good health and well-being in the broadest sense as we move forward in human history.

## **2.4 Consumer Awareness and Animal Welfare**

The meat business has grown in accordance with this global demand and strove for efficiency in a historical and ongoing attempt to keep up. Consumers have, however, raised ethical questions about Farm Animal Welfare (FAW) and evaluated production methods more and more (Hyland et al., 2022). Consumers' self-reported willingness to learn more about farming and animal welfare could be addressed by labeling policies that provide information that is transparent and inspires confidence in those who are a part of the food chain (Alonso et al., 2020). Making educated purchasing decisions and assuming their political responsibilities as market participants could both be facilitated by labeling information, helping customers develop into "ethically competent consumers" (Miele & Evans, 2010). A few customers, though, might not want to take on this duty and instead would rather leave it to governments or other parties involved in the food chain. They might also claim that they cannot handle all of the information on food labels because they are too complex or that they do not trust the information provided (Clark et al., 2010).

Because it is connected with the number of moral concerns and readiness to pay for welfare friendly products, an increase in consumer education through an appropriate technique is desired (Toma et al., 2016). Given that more than half of the European respondents utilized food labels for determining welfare-friendly items, they appear to be a useful tool (Broom, 2017). According to Blokhuis et al. (2008), the labeling system should be founded on standardized indicators that have been scientifically developed and are recognized both in the EU and internationally. It should also offer a transparent and traceable monitoring system for products that are animal welfare friendly (Frewer et al., 2005). There isn't one yet since there isn't a global agreement on what constitutes an acceptable quality of animal welfare and how to incorporate it into industrial methods. If no additional animal welfare assurance systems or standards legislations are produced, the International Standard Organization ISO TS 34,700 issued in 2016 may serve as a framework for voluntary adoption (Buller et al., 2018). One business where consumer knowledge has significantly improved animal welfare is the food industry. Changes in manufacturing methods have resulted from consumers' growing concern over the treatment of animals used for food production. For instance, several businesses have implemented certification programs for animal welfare that guarantee that animals are raised in humane ways (Harrison, 2010). Additionally, increasing consumer awareness can prompt a change to a plantbased diet, which would be good for animal welfare. A number of negative environmental effects, such as land degradation, water pollution, and greenhouse gas emissions, may result from the production of animal-based products.

Adopting a plant-based diet may decrease consumer demand for animal goods, which could result in fewer animals being bred for food (Micha et al., 2017).

## **2.5 Consumer awareness on artificial meat products**

Consumer attitudes can be crucial in determining whether they would embrace meat substitutes, and attitudes are influenced by things like awareness of the technology involved and knowledge of it (Wu, 2010; Verbeke et al., 2015). According to earlier studies (Rollin et al., 2011), knowledge and attitudes toward agro-food technologies are related. Lack of knowledge about technology and its benefits is frequently cited as the reason why consumers are skeptical of new technologies used in food production (Lusk et al., 2014). Even if these terms have been used interchangeably in many reviewed works and this distinction is less common, one can still make a distinction between awareness and knowledge of innovation. In many cases, becoming aware of (and comfortable with) revolutionary technology is the first step toward acceptance. Rather than causing an attitude toward modern technology, awareness instead fosters curiosity and tendency (Brennan et al., 2020). The following step is knowledge acquisition, which aims to educate oneself about the innovation process and its benefits (Rogers, 2003).

Recent research on contentious food advances like nanotechnology, biotechnology, and irradiated foods (Bieberstein et al., 2012; Hocquette, 2016) suggests that a lack of prior familiarity may be a factor in consumers' general reluctance to adopt innovative foods. For instance, Bieberstein et al. (2012) looked at how familiarity affected people's willingness to consume food made using nanotechnology. According to Bieberstein et al. (2012), while most consumers are hesitant to accept nanotechnology in food applications, those who are already familiar with the technology are more likely to accept food that has been fortified with it. The influence of prior knowledge on the acceptability of biotechnology in food applications has also been confirmed by the findings of House et al. (2004) and Huffman et al. (2003).

According to earlier studies (Gasteratos & Sherman, 2018; Rolland et al., 2020), providing information can increase willingness to accept cultured meat. For instance, just 13% of survey participants (from of a total sample of 180) had heard of cultured beef before, according to Verbeke et al.'s (2015) study. After being informed of this technology's qualities and possible benefits (in comparison to the problems with conventional livestock raising), over two thirds of respondents endorsed it. The readiness to sample cultured meat was stated by more than half of the participants



(Verbeke et al., 2015). The reactions of interviewees who were aware of cultured beef and those who were not were significantly different, according to Rolland et al. (2020). They came to the conclusion that having a clear understanding of what cultured beef was increased acceptance compared to having no knowledge of it. According to Lupton and Turner (2018), familiarity with food and food preparation techniques may be able to overcome peoples' difficulties understanding novel meats. Consumers are worried about how cultured meat may affect conventional agriculture and farming, nevertheless (Verbeke et al., 2015). According to McCluskey and Swinnen (2011), confirmatory bias (the tendency to accept the piece of information that confirms prior personal belief) and negativity bias (where negative information has a stronger impact on one's perception than positive information) prevent new information supporting a more positive view of the technology from being able to sway consumers' opinions. Poortinga and Pidgeon (2006) have supported the confirmatory bias on the acceptability of genetically engineered food, for example. The choice of a novel cuisine is influenced by one's familiarity with technology, according to empirical findings cited by Lusk et al. (2014). Consumers tend to reinforce their opinions rather than change them if a technology is judged to be harmful or advantageous (Paksereshta et al., 2022). Consumer studies to date have not shown sufficient evidence regarding the impact of extra information on consumer acceptability of cultured meat; instead, it appears that preexisting subjective knowledge is more important.

## **Chapter Three**

### **Material and Methods**

#### **3.1 Research Method**

The study utilized a quantitative research design to examine consumer awareness within the context of One-welfare and one health on animal-based products in a cosmopolitan university. The study also employed a descriptive research design to collect data from a sample of English and Turkish students in the faculties of medicine and veterinary medicine. The study collected primary data through a structured questionnaire. The questionnaires were designed to collect data on consumer awareness within the context of One-welfare and one health on animal-based products in a cosmopolitan university. The questionnaires were administered physically, and the respondents were given a period of 20 minutes to complete it.

#### **3.3 Ethical consideration**

Ethical approval was obtained from the ethics committee of Near East University for the conduct of this study. The study adhered to ethical principles of research such as informed consent, confidentiality, and anonymity. The respondents were informed of the purpose of the study, and their participation was voluntary. The data collected was kept confidential, and the identities of the respondents were kept anonymous.

#### **3.4 Population and sample**

The study used a simple random sampling technique to select a sample of 200 respondents comprising of English and Turkish students in the faculties of medicine and veterinary medicine. The sample size was determined using a sample size calculator proportional to the size of the population.

#### **3.5 Method of analysis**

Data obtained during the course of this study were subjected to analysis using Statistical Package for Social Science (SPSS). Descriptive statistics (frequencies and percentages) were used in the data analysis to evaluate consumer awareness within the context of One-welfare and one health on animal-based products in a cosmopolitan university. The Cronbach's alpha test was used to evaluate the data's dependability. As a result, nonparametric tests (Chi-square) was used to examine the influence of a few demographic variables on the research data that this study collected.

### **3.6 Limitations**

The study is limited by the self-reporting bias of the respondents. The study is also limited by the limited sample size and the descriptive research design used.

## **Chapter Four**

### **Results**

#### **4.1. Findings Regarding Individual Characteristics of Consumers**

##### **4.1.1. Socio-Demography of the Participants**

Tables 4.1 and 4.2 present the findings of the socio-demography of the respondents who participated in this present study. In Table 4.1, the descriptive statistics on gender, age, and country of origin were presented. According to the results, 61% of the 200 participants that took part in this study were females while the male population made up 35.5% (n = 71) and nonbinary made up 3% (n = 6). The participants age evaluation shows that the age bracket of 18 - 25 years participated more in the study (n = 176; 88.00%), 26 – 35 years made up 7.50% (n = 15) while 4.50% of the participants were between 36 to 45 years. More so, higher number of the participants were from Turkey (n = 87; 43.50%) followed by Nigeria (n = 55; 27.50%) then Cyprus (n = 11; 5.50%).

**Table 4.1: Gender, Age and Country of origin distribution of the study participants**

		<b>Distribution (N =200) n</b>	
			<b>%</b>
<b>Gender</b>	Female	123	61.50
	Male	71	35.50
	Non-Binary	6	3.00
<b>Age</b>	18-25	176	88.00
	26-35	15	7.50
	36-45	9	4.50
<b>Country of origin</b>	Nigeria	55	27.50
	Burundi	2	1.00
	Rwanda	3	1.50
	Ghana	2	1.00
	Lebanon	5	2.50
	Cyprus	11	5.50
	Norway	1	0.50
	Cameroon	4	2.00
	Zimbabwe	2	1.00
	Congo (Democratic Republic)	1	0.50

South Africa	1	0.5	0
Turkey	87	43.	50
Ethiopia	1	0.5	0
Niger	1	0.5	0
Iran	4	2.0	0
Tanzania	2	1.0	0
Jordan	3	1.5	0
United States of America	1	0.5	0
Syria	2	1.0	0
Mozambique	1	0.5	0
Angola	1	0.5	0
Iraq	1	0.5	0
Sudan	5	2.5	0
Brazil	1	0.5	0
Morocco	1	0.5	0
Kenya	2	1.0	0

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The evaluated descriptive statistics on the faculty and religion of the participants that took part in this study are given in Table 4.2. across the different faculties, the percentage of students from each faculty who participated in the study ranged from 10 to 24%. Students in Veterinary Medicine participated more (n = 48; 24.00%) followed by Nursing (n = 46; 23.00%). While Pharmacy faculty had least students (n = 20; 10%). Based on religion, Muslims made up majority of the participants (n = 106; 53.00%), followed by Christians (n = 69; 35%) (Table 4.2). According to the participants monthly income, the findings of the descriptive statistics are presented in Table 4.2. The monthly income of most of the participants that partook in the study was between \$100-\$150 (n = 102; 51.00%). This was followed by the population of participants earning \$150-\$250 monthly income (n = 45; 22.50%), then participants with \$250-\$450 and \$450-\$650 made up 9.00% and 6.00% of the population respectively. While only 4.50% of the population earned \$1600 and above monthly.

**Table 4.2: Faculty, Religion and Monthly Income** distribution of the study participants

		<b>Distribution (N =200)</b>	
		<b>n</b>	<b>%</b>
<b>Faculty or Department</b>	Health sciences	22	11.00
	Veterinary medicine	48	24.00
	Nursing	46	23.00
	Dentistry	29	14.50
	Medicine	35	17.50
	Pharmacy	20	10.00
<b>Religion</b>	Christian	69	35.00
	Muslim	106	53.00
	Jewish	6	3.00
	Deist	2	1.00
	Buddhist	9	4.50
	Satanist	2	1.00
	Atheist	3	1.50
	Non-Believer	2	1.00
<b>Monthly income (Dollar \$)</b>	\$100-\$150	102	51.00
	\$150-\$250	45	22.50
	\$250-\$450	18	9.00
	\$450-\$650	12	6.00
	\$650-\$1000	5	2.50
	\$1100-\$1600	9	4.50
	\$1600 and above	9	4.50



#### 4.1.2. Findings Regarding Consumer Perception and Approach to animal consumption

The perception of consumers as well as their approach to animal consumption was evaluated and the descriptive statistics result presented on Table 4.3. The findings showed that 93% (n = 186) of the participants consumed animal products of which pig was that least consumed (n = 113 56.50%). Internal organs like giblets, offal, like brain, and liver were the most not preferred animal products consumed by the participants (n = 68; 34%). This was followed by the consumption of processed animal products like sausage, salami, and ham (n = 35; 17.5%). On the other hand, egg and white meat were the least preferred animal product (n = 3; 1.5%). However, the reason for not consuming other animal products as stated by the participants was that they don't like them (n = 74; 37.00%). While over 19.00% (n = 38) of the participants don't consume most of the animal products as a result of their religious believes, 15.50% (n = 31) of the participants don't consume most of the animal products because they don't find them healthy (Table 4.3a). More so, the explanation given as the reasons for their choice of selection was that most of the animas were not produced in hygienic and healthy conditions (n = 68; 34.00%) as well as them carrying diseases which can be transmitted to humans (n = 54; 27.00%). While 12.50% and 12.00% of the participants din't find the slaughter techniques of the animals as being appropriate and were concerned about food safety respectively. When asked if they would consume artificial meat if the prices of the products were to be similar, most if the respondents objected that they will never have a thought of consuming artificial meat (n = 79; 39.50%) while the rate of those that accepted on consuming artificial meat if its cost effective was 5.5% (n = 11) (Table 4.3a).

**Table 4.3a. Consumer Perception and Approach to animal consumption**

		<b>Distribution (N =200)</b>	
		n	%
Do you consume animal products?	Yes	186	93.0
	Some	7	3.5
	Vegetarian	7	3.5

Which animal don't you consume?	Pig	113	56.5
	Sheep	10	5.0
	Cattle	15	3.0
	Goat		7.5
	None of the above	48	24.0
	Chicken	8	4.0
Which animal product don't you consume?	I consume all	54	27.0
	Internal organs (giblets, offal, brain, liver)	68	34.0
	Processed animal products (sausage, salami, ham)	35	17.5
	Egg	3	1.5
	Milk	14	7.0
	Red meat	23	11.5
Why don't you consume any of the products you may have specified?	White meat	3	1.5
	Doesn't apply to me	45	22.5
	I don't like them	74	37.0
	Religion factor	38	19.0
	I don't find them healthy	31	15.5
	Emotional Factor	7	3.5
Which of the following answers best explains the reason for the choice in section B above? (Select all that apply to you)	Their living conditions are not good	5	2.5
	Many drugs and additives are used during the production of the animals	29	14.5
	Not produced in hygeinic and healthy conditions	68	34.0
	They can carry diseases which can be transmitted to humans	54	27.0
	I din't find the slaughter techniques of the animals as being appropriate	25	12.5
	No food safety	24	12.0
If the price is same, would you want to consume artificial meat?	No, seldom	13	6.5
	No, never	79	39.5
	Yes, always	11	5.5
	I would like to taste, but I don't prefer	32	16.0
	Yes, sometimes	35	17.5
	Taste, smell or appearance is not good	30	15.0

From the findings as presented on Table 4.3b, 57% of the participants think that artificial meat is absolutely different from normal meat while 3.50% think that there are some differences. On the other hand, 10% of the participants believe that they are similar while only 1.5% of the participants believe artificial meat is absolutely the same as normal meat which is essential for human growth and health. More so, 59.00% (n = 118) of the participants don't think that to be vegetarian is the same as to consume normal meat, while only 2.00% of the participants think that to be vegetarian is the same as to consume normal meat (Table 4.3b). When asked if they were willing to consume artificial meat as a vegetarian, most of the respondents objected that they will never have a thought of consuming artificial meat (n = 119; 5.50%) while the rate of those that accepted on consuming artificial meat if there were vegetarian was at 19.5% (n = 39) (Table 4.3b).

Data from the study of Prof. Dr. Dilek Arsoy shows that consumers were observed to be conscious of what they consume as 84.00% (n = 168) of the respondents look at the label of the product they buy (meat, milk and eggs). More so, the explanation given as the reasons for most of the participants (n = 123; 63.00%) looking at the label is to have information such as the origin, region, sex, breed, welfare condition, rearing of the animal. However, information such as the origin, region, sex, breed, rearing of the animal on the label did not matter to 16% of the participants and was not important to 9.00% of the participants. More so, in addition information to such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label, 58.5% also consider information if it's a free-range chicken, Holstein calf, 2 years old, male, konya region, from the business no. 2343, conventional production, or pasture animal (Table 4.3b).

**Table 4.3b. Consumer Perception and Approach to animal consumption**

		<b><u>Distribution (N = 200)</u></b>	
		<b>n</b>	<b>%</b>
Do you think artificial meat is the same as normal meat, which is essential for human growth and health?	Absolutely different	114	57.0
	Absolutely the same	3	1.5
	There are some differences	63	31.5
	Similar	20	10.0
Do you think that to be vegetarian is the same as to consume normal meat?	Absolutely different	118	59.0
	Absolutely the same	4	2.0

	There are some differences	51	25.5
	Similar	27	13.5
If you are not willing to consume meat or you are a vegetarian/vegan, would you consume artificial meat?	Yes	39	19.5
	No	119	59.5
	Sometimes	42	21.0
Do you look at the label of the product you buy (meat, milk and eggs)?	Yes	168	84.0
	No	32	16.0
Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label?	Yes	126	
	No	24	63.0
	It doesn't matter	32	12.0
	It is not important	18	16.0
Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (Free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal	Yes	117	58.5
	No	26	13.0
	It doesn't matter	41	20.5
	It is not important	16	8.0

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The willingness of the consumer to pay more for animal products with good animals with proper welfare was assessed. The descriptive statistics of the findings are presented on Table 4.3c. One third of the participants (n =77; 38.5%) were affirmative of paying more for a product with the animal welfare on the logo. While one third were unsure (n = 65; 32.5%) if they will pay more for products with the animal welfare logo. But the remaining one-third of the participants will not pay more for product with the animal welfare (n = 58; 29.00%). However, out of the 200 participants, 60% were not willing to pay more than 10% of the cost. While only 2.00% (n = 4) were willing to pay an extra 100% for the product. Moreover, 83.5% (n = 167) of the participants prefer buying

organic products of which 58.00% (n = 116) will buy only if the price is the same or a little more. While 19% (n = 38) will buy if some products are organic (Table 4.3c).

**Table 4.3c. Consumer Perception and Approach to animal consumption**

n		<u>Distribution (N = 200)</u>	
			%
Would you pay more for a product with the animal welfare (happy animal) logo?	Yes	77	38.5
	No	58	29.0
	Maybe	65	32.5
If yes and maybe how much more would you pay?	10%	120	60.0
	20%	28	14.0
	30%	20	10.0
	40%	12	3.0
	50%	4	6.0
	60%	6	2.0
	70%	4	3.0
	100%		2.0
Would you prefer to buy organic products?	Yes	167	83.5
	No	33	16.5
If Yes for the above question, please answer the adjoining question	If the price is the same or a little bit more, I buy it	116	58.0
	I will buy organic no matter the price	19	9.5
	I will buy some products as organic	22	11.0
	I will buy organic products for my child or cancer patient	5	2.5
	<u>Some products are organic</u>	<u>38</u>	<u>19.0</u>

### **4.1.3 Knowledge on animal health**

The participants' knowledge on animal health was accessed and the findings presented on Table 4.4. As presented on Table 4.4a, 75% of the participants had family members who had a pet animal like dog, bird, cat, hamster, mice before or now. While 55% had family members or themselves had farm animals before or now (cattle, pig, sheep, goat, chicken, dog or horse) or do you do animal production. More so, most of the participants or their family members planted production, agriculture before or now (65.00%). From the findings, it was observed that the majority (84%) of the participants or their family members consider human health in your animal production. However, 16% did not consider human health in your animal production. Alternatively, few participants or their relatives had worked in the field of food production/food safety (41%). Also, only 30% of the participants or their relatives had worked in the field of environmental health like environmental engineering, forest engineering, chemical engineering, or climate change expert. The findings showed that 45% of the participants had ideas about the relationship between animal health and welfare or animal breeding techniques to public health (Table 4.4a). More so, 86.5% of the participants believed that enforcing a high standard of animal health and welfare is important for human health, food quality and security. The findings similarly showed that 40.5% of the participants have heard about one health concept before. But 34% do not have any idea about One health.

The findings showed that water, air and soil pollution cause significant adverse health outcomes in humans, wild and domestic animals and plants as 73.5% of the participants agreed that they totally affect. More so, about 70% of the participants knew that 60% of infectious diseases in humans are diseases transmitted from animals. And also had an idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis). But 13.5% did not have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis). The findings also showed that 25% (n =50) of the participants believed that disease can be transmitted to humans through direct contact with animals (cat, dog, cattle, sheep, pig, poultry). But 24% believed that disease could be transmitted sexually from animals to humans. Also

61.00% accepted that substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals totally affects human health (Table 4.4b).

**Table 4.4a: Descriptive statistics on the participants knowledge on animal health**

		<b>Distribution</b>	
		<b>(N =200)</b>	
		<b>n</b>	<b>%</b>
Do you or your family have a pet animal before or now (dog, bird, cat, hamster, mice)?	Yes	150	75.0
	No	50	25.0
Do you or your family have farm animals before or now (cattle, pig, sheep, goat, chicken, dog or horse) or do you do animal production?	Yes	110	55.0
	No	90	45.0
Do you or your family do plant production, agriculture before or now?	Yes	130	65.0
	No	70	35.0
Do you or your family members consider human health in your animal production?	Yes	168	84.0
	No	32	16.0
Do you or your family members regarding animal health?	Yes	149	74.5
	No	51	25.5
Have you or your relative worked in the field of food production/food safety?	Yes	82	41.0
	No	118	59.0
Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	60	30.0
	No	140	70.0

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**Table 4.4b: Descriptive statistics on the participants knowledge on animal health**

		<b>Distribution</b>	
		<b>(N =200)</b>	
		<b>n</b>	
		<b>%</b>	
Do you have any idea about the relationship between animal health and welfare or animal breeding techniques to public health?	Yes	90	45.0
	No	26	13.0
	Not sure	35	17.5
	A little bit	49	24.5
Do you believe that enforcing high standards of animal health and welfare is important for human health, food quality and security?	Yes	173	86.5
	No	6	3.0
	Not sure	14	7.0
	Indifferent	7	3.5
Have you heard about one health concept before, or do you have any idea about One health?	Yes	81	40.5
	No	68	34.0
	Not sure	47	23.5
Can water, air and soil pollution cause significant adverse health outcomes in humans, wild and domestic animals and plants?	Indifferent	4	2.0
	Little effects	18	9.0
	Moderate effects	24	12.0
	It totally affects	147	73.5
Does not affect at all	Yes	139	69.5
	No	24	12.0
	Not sure	33	16.5
	Indifferent	4	2.0
Did you know that 60% of infectious diseases in humans are diseases transmitted from animals?	Yes	139	69.5
	No	24	12.0
	Not sure	33	16.5
	Indifferent	4	2.0
Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)?	Yes	134	67.0
	No	27	13.5
	Not sure	37	18.5
	Indifferent	2	1.0

	Respiratory way	38	19.0
In which of the following ways can it be transmitted?	Direct contact with		
Please tick the following items	animals (cat, dog,	50	25.0
	cattle, sheep, pig,		
	poultry)		
	Sexually	48	24.0
	Through food	39	19.5
	Through insecticides	25	12.5
	Little effects	27	13.5
	Moderate effects	40	20.0
Is there any effect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health?	It totally affects	122	61.0
	Does not affect at all	11	5.5

As presented on Table 4.4d, half of the participants (n = 103; 51.5%) perceived that using genetically modified (GDO) plants as food for animals and humans has total effect. While 6.0% perceive that there is no effect using genetically modified (GDO) plants as food for animals and humans. The findings showed that the perception of 34% of the participants is that antibiotics used in animals affect antibiotic resistance in humans. However, 11% disagree that antibiotics used in animals affect antibiotic resistance in humans. More so, 38% of the participants agreed that intensive industrial production of animals and plants adversely affects human health, while 5.5 % disagreed. Organic or natural production of animals and plants was perceived to adversely affect human health by 23.5% of the participants while 34% perceived not to affect at all (Table 4.4c).

**Table 4.4c: Descriptive statistics on the participants knowledge on animal health**

		<b>Distrib ion (N =200)</b>	
		n	%
Is there any harm or effect using genetically modified (GDO) plants as food for animals and humans?	Little effects	37	18.5
	Moderate effects	48	24.0
	It totally affects	10	51.5
	Does not affect at all	3	6.0
Do antibiotics used in animals affect antibiotic resistance in humans?	Little effects	43	21.5
	Moderate effects	67	33.5
	It totally affects	68	34.0
	Does not affect at all	22	11.0
Does intensive industrial production of animals and plants adversely	Little effects	43	21.5
	Moderate effects	70	35.0
	It totally		

affect human health?	affects	76	38.0
	Does not affect at all	11	5.5
Does organic or natural production of animals and plants adversely affect human health?	Little effects	48	24.0
	Moderate effects	37	18.5
	It totally affects	47	23.5
	Does not affect at all	68	34.0

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Still on the assessment of participants knowledge on animal health, 84% of the participants agreed (43% strongly agreed and 41% agreed) that climate change can affect animal health. On the other hand, only 4% disagreed while 12% neither agreed nor disagreed. The majority of the participants (n = 69; 34.5%) were neutral in thinking that farm animals' production can affect climate change. But 32% of the participants think farm animals' production can affect climate change while 22.5 strongly think farm animals' production can affect climate change. About 88.5% of the participants think that climate change can affect human health. Also 69% of the participants believe that the current trends in farm practices are contributing to the destruction of our environment. The majority of the participants prefer the mixed animal production method (n = 44; 22%). This was followed by participants who support good livestock practice in animal production (Table 4.4d).

**Table 4.4d: Descriptive statistics on the participants knowledge on animal health**

		<b>Distribution (N =200)</b>	
		<b>n</b>	<b>%</b>
Do you think that climate change can affect animal health?	Agree	82	41.0
	Strongly agree	86	43.0
	Disagree	3	1.5
	Strongly disagree	5	2.5
	Neutral	24	12.0
Do you think farm animals' production can affect climate change?	Agree	64	32.0
	Strongly agree	45	22.5
	Disagree	15	7.5
	Strongly disagree	7	3.5
	Neutral	69	34.5
Do you think climate change can affect human health?	Agree	72	36.0
	Strongly agree	105	52.5
	Disagree	5	2.5
	Strongly disagree	3	1.5
	Neutral	15	7.5

Do you believe that the current trends in farm practices are contributing to the destruction of our environment?	Organic	27	13.5
	Grazing	35	17.5
	Mixed	44	22.0
	Industrial	7	3.5
	Traditional/ecological/pasture	31	15.5
	Good livestock practices	40	20.0
	I don't know/not	16	8.0
	Agree	76	38.0
	Strongly Agree	60	30.0
	Disagree	6	3.0
	Strongly disagree	3	1.5
Neutral	55	27.5	

Which of the following animal production techniques do you support? Or In your opinion, which animal production method do you prefer?

important

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#### 4.4 Knowledge on animal welfare

When asked if living of animals in negative welfare conditions affects the health of animals, negatively, 67.5% (n =135) of the respondents agreed that it totally affects the health of animals. However, only 6% perceived negative welfare to affect human health. more so, living animals in negative welfare conditions affect the health of human health. majority of the participants (n =120; 60%) also support the fact that adverse welfare conditions affect the emergence of stress and disease in animals. Therefore, owners/producers and consumers of animals should be generally

concerned with animal welfare as ascertained by 83.5% (n = 167) of the participants. But the animal welfare concern level was on average. The majority of the participants (87%) were of the opinion that legislation be made to ensure that animal products conform to the welfare of farm animals. And animal rights be enforced to improve animal welfare s agreed by 78% of the participants (Table 4.5a).

The majority of the participants (n = 169; 84.5%) agreed that improving animal welfare will improve human well-being and the ecosystem. The findings showed that only 42.5% of the participants had an idea about animal welfare. However, 78.5% of the participants believe that consumers have a role to play in ensuring the welfare of farm animals (Table 4.5b).

**Table 4.5a: Descriptive statistics on the participants knowledge on animal welfare**

		<b>Distributio</b>	
		<b><u>n (N =200)</u></b>	
		<b>n</b>	<b>%</b>
Does living animals in negative welfare conditions affect the health of animals negatively?	Little effects	31	15.5
	Moderate effects	22	11.0
	It totally affects	135	67.5
	Does not affect at all	12	6.0

Does living animals in negative welfare conditions affect the health of human health?	Little effects	32	16.0
	Moderate effects	51	25.5
	It totally affects	105	52.5
	Does not affect at all	12	6.0
Do adverse welfare conditions affect the emergence of stress and disease in animals?	Little effects	26	13.0
	Moderate effects	37	18.5
	It totally affects	120	60.0
	Does not affect at all	17	8.5
Should owners/producers and consumers of animals be generally concerned with animal welfare?	Yes	167	83.5
	No	7	3.5
	Not sure	23	11.5
	Indifferent	3	1.5
What is your animal welfare concern level?	Low	23	11.5
	High	60	30.0
	Medium	75	37.5
	Very high	30	15.0
	Very Low	12	6.0
Should legislations be made to ensure that animal products conform to 1 welfare of farm animals?	Agree	68	34.0
	Strongly agree	107	53.5
	Disagree	1	0.5
	Strongly disagree	2	1.0
	Neutral	22	11.0
Should animal rights be enforced to improve animal welfare?	Agree	65	32.5
	Strongly agree	91	45.5
	Disagree	7	3.5
	Strongly Disagree	6	3.0
	Neutral	31	15.5

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**Table 4.7b: Descriptive statistics on the participants knowledge on animal welfare**

		<b>Distributio</b>	
		<b>n (N =200)</b>	
		<b>n</b>	<b>%</b>
Do you think improving animal welfare will improve human well-being and the ecosystem?	Agree	80	40.0
	Strongly agree	89	44.5
	Disagree	5	2.5
	Strongly disagree	3	1.5
	Neutral	23	11.5
Do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat})?	Yes	70	35.0
	No	66	33.0
	Not sure	25	12.5
	Indifferent	24	12.0
Do you believe that consumers have a role to play in ensuring the welfare of farm animals?	Very good	15	7.5
	Agree	79	39.5
	Strongly agree	77	38.5
	Disagree	6	3.0
	Strongly disagree	4	2.0
	Neutral	34	17.0

#### **4.5 The reliability estimates of the farm HACCP scales applied in the study**

The Farm HACCP perception scales applied in the study and the subscales of these scales were tested for its reliability and the Cronbach's Alpha coefficients, arithmetic mean and variance presented on Table 4.8. Calculated for farm HACCP perception applied to consumers. Cronbach's Alpha coefficients of the general farm HACCP scale was determined as 0.44. However, the subscales of the farm HACCP scale which include animal consumption, health and welfare recorded Cronbach's Alpha coefficients of 0.39, 0.61 and 0.58 respectively.

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**Table 4.8. The farm HACCP scales applied in the study and the sub- scales of these scales**

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<b>Features</b>	<b>n</b>	<b>Cronbach's Alpha</b>	<b>Mean</b>	<b>Variance</b>
Farm HACCP	200	0.44	2.26	0.23
<b>Sub-dimensions</b>				
Animal consumption	200	0.39	2.10	0.37
Animal health	200	0.61	2.06	0.42
Animal welfare	200	0.58	2.29	0.22

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#### **4.6 The relationships between consumers' gender and consumer perception and approach to animal consumption**

Based on the animal consumption subscale, the test statistics showed that gender significantly ( $P < 0.05$ ) had an influence on the responses of most items on the subscale. The chi-square test value of 74.721 was recorded for the first subscale (do you consume animal products). Similarly, the type of animal consumed, the animal product consumed and reasons for not consuming some animal products significantly ( $P < 0.05$ ) varied across gender with a chi-square test value of 38.691, 49.043, 82.241 and 19.173 (Table 4.9a).

The response on think artificial meat is the same as normal meat, which is essential for human growth and health was significantly influenced by the gender of the participants. The thought that to be vegetarian is the same as to consume normal meat also varied significantly across genders. However, looking at label of product being bought, having information such as the origin, region, sex, breed, rearing of the animal on the label, wanting information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal as well as preference to buying organic product were not affected by the gender of the participants (Table 4.9b).

**Table 4.9a: The relationships between consumers' gender and consumer perception and approach to animal consumption**

Features	Group	Gender			$\chi^2$	P - value
		Female	Male	Non - Binary		

	Yes	115	69	1	2	74.721	0.000
	Some	2			4		
Do you consume animal products?	Vegetarian	6	1		0		52
	Pig	74	39		0	38.691	0.000
	Sheep	7	3		0		
	Cattle	3	1		2		
	Goat	11	4		0		
Which animal don't you consume?	None of the above	27	17		4		
	Chicken	1	7		0		
	I consume all	26	28		0	49.043	0.000
	Internal organs (giblets, offal, brain, liver)	50	18		0		
	Processed animal products (sausage, salami, ham)	16	19		0		
Which animal product don't you consume?	Egg	3	0		0		
	Milk	11	1		2		
	Red meat	14	5		4		
	White meat	3	0		0		
	Doesn't apply to me	22	23		0	82.241	0.000
	I don't like them	52	20		2		
	Religion factor	22	16		0		
	I don't find them healthy	21	10		0		
	Emotional Factor	2	1		4		
Why don't you consume any of the products you may have specified?	Their living conditions are not good	4	1		0		
	Many drugs and addictive's are used during the production of the animals	14	15		0	19.173	0.014
	Not produced in hygeinic and healthy conditions	39	28		1		
Which of the following answers best explains the reason for the choice in section B above? (Select all that apply to you)	They can carry diseases which can be transmitted to humans	38	16		0		
	I din't find the slaughter techniques of the animals as being appropriate	17	6		2		
	No food safety	15	6		3		
	No, seldom	9	4		0	38.563	0.000
	No, never	55	24		8		
If the price is the same, would you want to consume artificial meat?	Yes, always	21	11		0		
	I would like to taste, but I don't prefer				0		
	Yes, sometimes	19	10		6		
	Taste, smell or appearance is not good	16	14		0		
Do you have any information about artificial meat contains or production techniques?	Very good information	4	5		0	11.038	0.026
	No	73	38		0		
	A little	46	28		6		

If the price is the same, would you prefer vegetable meat and milk instead of red or white	Yes	29	13	4	10.003	0.040
	No	57	40	0		
animal meat and milk? (Like vegetarian meat, soya milk)	Sometimes	37	18	2		

**Table 4.9b: The relationships between consumers' gender and consumer perception and approach to animal consumption**

Features	Group	Gender			$\chi^2$	P - value
		Female	Male	Non - Binary		
Do you think artificial meat is the same as	Absolutely different	73	41	0	19.493 <sup>a</sup>	0.003

normal meat, which is essential for human growth and health?	Absolutely the same	2	1	0		
	There are some differences	31	26	6		
	Similar	17	3	0		
					54	
	Absolutely different	75	43	0	43.159 <sup>a</sup>	0.000
	Absolutely the same	35	16	0		
Do you think that to be vegetarian is the same as to consume normal meat?	There are some differences			0		
	Similar	12	9	6		
If you are not willing to consume meat or you are a vegetarian/vegan, would you consume artificial meat?	Yes	19	16	4	13.754 <sup>a</sup>	0.008
	No	75	44	0		
	Sometimes	29	11	2		
Do you look at the label of the product you buy (meat, milk and eggs)?	Yes	109	14	55	4	5.549 <sup>a</sup>
	No			16	2	0.062
	Yes	78	44	4	7.151 <sup>a</sup>	0.307
	No	13	11	0		
Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label?	It doesn't matter	22	10	0		
	It is not important	10	6	2		
Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (Free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal.	Yes	70	41	8	6	5.150 <sup>a</sup>
	No	18	15	0		0.525
	It doesn't matter	26		7	0	
	It is not important	9			0	
Would you pay more for a product with the animal welfare (happy animal) logo?	Yes	46	25	6	11.559 <sup>a</sup>	0.021
	No	33	25	0		
	Maybe	44	21	0		
If yes and maybe how much more would you pay?	10%	73	45	2	37.402 <sup>a</sup>	0.001
	20%	23	5	0		
	30%	9	7	4		
	40%	4	2	0		
	50%	7	5	0		
	60%	0	4	0		
	70%	3	3	0		
	100%	4	0	0		
Would you prefer to buy organic products?	Yes	106	17	55	6	3.703 <sup>a</sup>
	No			16	0	0.157

If Yes for the above question, please answer the adjoining question	If the price is the same or a little bit more, I buy it	80	34	6	2	17.365 <sup>a</sup>	0.027
	I will buy organic no matter the price	13	11		0		
	I will buy some products as organic	11	3		0		
	I will buy organic products for my child or cancer patient	2			0		
	Some products are organic	17	17		4		

#### 4.7 The relationships between consumers' gender and participants knowledge on animal health

The relationships between consumers' gender and participants knowledge on animal health was evaluated and the findings showed that gender affected only few groups in the participants knowledge on animal health sub-scale. The groups significantly related to gender were: Do you or your family have farm animal before or now (cattle, pig, sheep, goat, chicken, dog or horse ) or do you do animal production, and Is there any effect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health?

(Table 4.10a and 4.10b).

**Table 4.10a: The relationships between consumers' gender and participants knowledge on animal health**

Features	Group	Gender			$\chi^2$	P - value
		Female	Male	Non - Binary		
Do you or your family have a pet animal before or now (dog, bird, cat, Yes hamster, mice.)?	Yes	94	50	6	2.926	0.232
	No	29	21	0		
Do you or your family have farm animals before or now (cattle, pig, sheep, goat, chicken, dog or horse) or do you do animal production?	Yes	62	42	6	6.453	0.040
	No	61	29	0		
Do you or your family do plant production, agriculture before or now?	Yes	78	46	6	3.368	0.186
	No	45	25	0		



Do you or your family members consider human health in your animal production?	Yes	105	59	4	1.555	0.460
	No	18	12	2		
Do you or your family members regard animal health?	Yes	92	51	6	2.326	0.313
	No	31	20	0		
Have you or your relative worked in the field of food production/food safety?	Yes	47	33	2	1.422	0.491
	No	76	38	4		
Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	34	24	2	.846	0.655
	No	89	47	4		
Do you have any idea about the relationship between animal health and welfare or animal breeding techniques to public health?	Yes	47	37	6	12.155	0.059
	No	16	10	0		
	Not sure	26	9	0		
	A little bit	34	15	0		
Do you believe that enforcing high standards of animal health and welfare is important for human health, food quality and security?	Yes	106	61	6	1.650	0.949
	No	3	3	0		
	Not sure	9	5	0		
	Indifferent	5	2	0		
Have you heard about the concept of one health before, or do you have any idea about One health?	Yes	47	28	6	9.962	0.126
	No	42	26	0		
	Not sure	32	15	0		
	Indifferent	2	2	0		
Can water, air and soil pollution cause significant adverse health outcomes in humans, wild and domestic animals and plants?	Little effects		10	8	0	5.211
	Moderate effects		14	10	0	
	It totally affects		94	47	6	
	Does not affect at all		5	6	0	
Did you know that 60% of infectious diseases in humans are diseases transmitted from animals?	Yes		89	44	6	12.191

	No	18	6	0	
	Not sure	15	18	0	
	Indifferent	1	3	0	
Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)?	Yes	83	45	6	6.973
	No	16	11	0	
	Not sure	24	13	0	
	Indifferent	0	2	0	

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**Features**

**Group**

In which of the following ways can it be transmitted? Please tick the following items

- Respiratory way
- Direct contact with animals (cat, dog, cattle, sheep, pig, poultry)
- Sexually
- Through food
- Through insecticides

Is there any effect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health?

- Little effects
- Moderate effects
- It totally affects
- Does not affect at all

Is there any harm or effect using genetically modified (GDO) plants as food for animals and humans?

- Little effects
- Moderate effects
- It totally affects
- Does not affect at all

Do antibiotics used in animals affect antibiotic resistance in humans?

- Little effects
- Moderate effects
- It totally affects
- Does not affect at all

Does intensive industrial production of animals and plants adversely affect human health?

- Little effects

**Table  
between**

**animal**

**P** -Does organic or natural production of animals and plants adversely affect human health?

Moderate effects  
It totally affects

Does not affect at all

Little effects  
Moderate effects  
It totally affects

**4.10b: The relationships  
consumers' gender and**

**participants knowledge on  
health**

**Femal**    **Mal**    **Non** - $\chi^2$   
**e**            **e**

**Binary**

**value**

**Gender**

				21	16	1	12.378 <sup>a</sup>	0.135
32	18	0						
33	15	0						
				22	15	2		
				15	7	3		
				12	15	0	13.406 <sup>a</sup>	0.037
				21	19	0		
				82	34	6		
				8	3	0		
				18	17	2	6.123 <sup>a</sup>	0.410
				29	17	2		
				66	35	2		
				10	2	0		
				23	20	0	9.159 <sup>a</sup>	0.165
				41	24	2		
				41	23	4		
				18	4	0		
				23	20	0	6.500 <sup>a</sup>	0.370
				42	26	2		
				50	22	4		
				8	3	0		
				27	21	0	8.697 <sup>a</sup>	0.191
				20	15	2		
				31	16	0		
			Does not affect at all	45	19	4		
Do you think that climate change can affect animal health?		Agree		53	29	0	11.956 <sup>a</sup>	0.153

	Strongly agree	54	26	6		
	Disagree	1	2	0		
	Strongly disagree	3	2	0		
	Neutral	12	12	0		
Do you think farm animals' production can affect climate change?	Agree	40	20	4	13.186a	0.106
	Strongly agree	31	12	2		
	Disagree	12	3	0		
	Strongly disagree	3	4	0		
	Neutral	37	32	0		
Do you think climate change can affect human health?	Agree	46	26	0	12.308a	0.138
	Strongly agree	64	35	6		
	Disagree	5	0	0		
	Strongly disagree	2	1	0		
	Neutral	6	9	0		
Do you believe that the current trends in farm practices are contributing to the destruction of our environment?	Agree	45	31	0	25.496a	0.001
	Strongly Agree	41	13	6		
	Disagree	5	1	0		
	Strongly disagree	0	3	0		
	Neutral	32	23	0		

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#### **4.8 The relationships between consumers' gender and participants knowledge on animal welfare**

Based on the animal welfare subscale, the test statistics showed that the consumers gender did not significantly ( $P > 0.05$ ) had an influence on the responses of majority of the groups on the subscale. However, the responses on the following items were significantly influenced: does living of animals in negative welfare conditions affect the health of animals negatively? And do you believe that the current trends in farm practices are contributing to the destruction of our environment? (Table 4.11), what is your animal welfare concern level, should animal rights be enforced to improve animal welfare? Which of the following animal production techniques do you support? or in your opinion, which animal production method do you prefer? and do you have any idea about animal welfare (farm animals in food-raised animals {cattle, pig, chicken, sheep, goat}) as presented on Table 4.11.

**Table 4.11: The relationships between consumers' gender and participants knowledge on animal welfare**

Features	Group	Gender			$\chi^2$	P - value
		Female	Male	Non -		
Does living animals in negative welfare conditions affect the health of animals negatively?	Little effects	15	16	0	14.597 <sup>a</sup>	0.024
	Moderate effects	9	13	0		
	It totally affects	92	37	6		
	Does not affect at all	7	5	0		
Does living animals in negative welfare conditions affect the health of human health?	Little effects	17	15	0	4.069 <sup>a</sup>	0.667
	Moderate effects	30	19	2		
	It totally affects	68	33	4		
	Does not affect at all	8	4	0		
Do adverse welfare conditions affect the emergence of stress and disease in animals?	Little effects	12	14	0	8.133 <sup>a</sup>	0.229
	Moderate effects	25	12	0		
	It totally affects	75	39	6		
	Does not affect at all	11	6	0		
Should owners/producers and consumers of animals be generally concerned with animal welfare?	Yes	104	57	6	6.687 <sup>a</sup>	0.351
	No	2	5	0		
	Not sure	16	7	0		
	Indifferent	1	2	0		
What is your animal welfare concern level?	Low	14	9	0	42.484 <sup>a</sup>	0.000
	High	40	20	0		
	Medium	46	29	0		
	Very high	19	5	6		

	Very Low	4	8	0		
Should legislations be made to ensure that animal products conform to 1 welfare of farm animals?	Agree	42	26	0	10.384 <sup>a</sup>	0.239
	Strongly agree	69	32	6		
	Disagree	1	0	0		
	Strongly disagree	1	1	0		
	Neutral	10	12	0		
Should animal rights be enforced to improve animal welfare?	Agree	39	26	0	16.977 <sup>a</sup>	0.030
	Strongly agree	63	22	6		
	Disagree	4	3	0		
	Strongly Disagree	3	3	0		
	Neutral	14	17	0		
Do you think improving animal welfare will improve human well-being and the ecosystem?	Agree	45	33	2	9.239 <sup>a</sup>	0.323
	Strongly agree	62	25	2		
	Disagree	4	1	0		
	Strongly disagree	2	1	0		
	Neutral	10	11	2		
Which of the following animal production techniques do you support? Or In your opinion, which animal production method do you prefer?	Organic	14	13	7	39.674 <sup>a</sup>	0.000
	Grazing	22	18	1	6	
	Mixed	26	6	14	0	
	Industrial	17			0	
	Traditional/ecological/pasture				0	
	Good livestock practices	24	16		0	
	I don't know/not important	14	2		0	
Do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat})	Yes	41	29	0	16.623 <sup>a</sup>	0.034
	No	41	19	9	6	
	Not sure	16	11		0	
	Indifferent	13			0	

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**Binary**

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	Very good	12	3	0		
Do you believe that consumers have a role to play in ensuring the welfare of farm animals?	Agree	48	31	0	12.792 <sup>a</sup>	0.119
	Strongly agree	48	23	6		
	Disagree	5	1	0		
	Strongly disagree	3	1	0		
	Neutral	19	15	0		

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#### **4.9 The relationships between consumers' country of origin and consumer perception and approach to animal consumption**

Based on the animal consumption subscale, the test statistics showed that the participants country of origin significantly ( $P < 0.05$ ) had an influence on the responses of most items on the subscale. The chi-square test value of 6.571 was recorded for the first subscale (do you consume animal products) did not significantly differ ( $P = 0.160$ ). However, the type of animal consumed, the animal product consumed and reasons for not consuming some animal products significantly ( $P < 0.05$ ) varied across the participants country of origin with a chi-square test value of 35.271, 43.434, 55.965 and 22.910. More so, the participants' response wanting to consume artificial meat if the

price is same with normal meat significantly differed in line with the participants countries of origin (Table 4.12a).

The response on think artificial meat is the same as normal meat, which is essential for human growth and health was not significantly ( $P > 0.05$ ) influenced by the participants country of origin. But the thought that to be vegetarian is the same as to consume normal meat varied significantly across origin. However, looking at label of product being bought, having information such as the origin, region, sex, breed, rearing of the animal on the label, wanting information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal as well as preference to buying organic product were not affected by the participants country of origin (Table 4.12b).

**Table 4.12a: The relationships between consumers' country of origin and consumer perception and approach to animal consumption**

Features	Group	Country of origin			$\chi^2$	P - value
		Nigeria	Others	Turkey		
Do you consume animal products?	Yes	74.2	30.1	82.4	6.571	0.16
	Some					
	Vegetarian	6	0	1		
Which animal don't you consume?	Pig	30	20	63	35.271	0.000
	Sheep	7	0	3		
	Cattle	1	1	4		
	Goat	6	3	6		
	None of the above	32	5	11		

	Chicken	6	2	0		
	I consume all	39	10	5	43.434	0.000
Which animal product don't you consume?	Internal organs (giblets, offal, brain, liver)	22	12	34		
	Processed animal products (sausage, salami, ham)	10	5	20		
	Egg	1	0	2		
	Milk	3	2	9		
	Red meat	7	1	15		
	White meat	0	1	2		
		Doesn't apply to me	36	6	3	55.965
Why don't you consume any of the products you may have specified?	I don't like them	25	13	36		
	Religion factor	8	7	23		
	I don't find them healthy	8	4	19		
	Emotional Factor	0	1	6		
	Their living conditions are not good	5	0	0		
	Many drugs and additives are used during the production of the animals	19	8	2	22.910	0.003
	Not produced in hygienic and healthy conditions	22	12	34		
Which of the following answers best explains the reason for the choice in section B above? (Select all that apply to you)	They can carry diseases which can be transmitted to humans	24	4	26		
	I didn't find the slaughter techniques of the animals as being appropriate	10	4	11		
	No food safety	7	3	14		
	No, seldom	8	2	3	50.098	0.000
	No, never	35	8	36		
If the price is the same, would you want to consume artificial meat?	Yes, always	21	5	0		
	I would like to taste, but I don't prefer		6	5		
	Yes, sometimes	7	9	19		
	Taste, smell or appearance is not good	5	1	24		
Do you have any information about artificial meat contents or production techniques ?	Very good information	6	2	1	7.415	0.116
	No	50	14	47		
	A little	26	15	39		
If the price is the same, would you prefer vegetable meat and milk instead of red or white animal meat and milk?	Yes	20	6	20	1.523	0.823
	No	37	18	42		
	Sometimes	25	7	25		

(Like vegetarian meat, soya milk)

**Table 4.12b: The relationships between consumers' country of origin and consumer perception and approach to animal consumption**

Features	Group	Country of origin			$\chi^2$	P - value
		Nigeria	Others	Turkey		
Absolutely different		54	15	45	7.586 <sup>a</sup>	0.270
Do you think artificial meat is the same as normal meat, which is essential for human growth and health?	Absolutely the same	1	1	1		
	There are some differences	19	10	34		
	Similar	8	5	7		
	Absolutely different	57	20	41	17.275 <sup>a</sup>	0.008
	Absolutely the same	13	1	29		
Do you think that to be vegetarian is the same as to consume normal meat?	There are some differences		9			
	Similar	9	1	17		
	Yes	15	10	14	6.638 <sup>a</sup>	0.156
If you are not willing to consume meat or you are a vegetarian/vegan, would you consume artificial meat?	No	54	14	51		
	Sometimes	13	7	22		
	Yes	66	27	75	1.289 <sup>a</sup>	0.525
Do you look at the label of the product you buy (meat, milk and eggs)?	No	16		12		
	Yes	48	14	64	39.093 <sup>a</sup>	0.000
	No	16	11	4		
	It doesn't matter	17	2	4		
Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label?	It is not important	1		15		
	Yes	35	16	66	51.405 <sup>a</sup>	0.000
Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (Free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture ani	No	18	10	3		
	It doesn't matter	27		4		
	It is not important	2	0	14		
Would you pay more for a product with the	Yes	22	12	43	10.575 <sup>a</sup>	0.032

animal welfare (happy animal) logo?	No	25	10	23			
	Maybe	35	9	21			
					68		
If yes and maybe how much more would you pay?	10%	55	17	48	22.166 <sup>a</sup>	0.075	
	20%	7	8	13			
	30%	4	5	11			
	40%	2	1	3			
	50%	7	0	5			
	60%	3	0	1			
	70%	4	0	2			
	100 %	0	0	4			
	Would you prefer to buy organic products?	Yes	61	26.5	80.7	9.455 <sup>a</sup>	0.009
		No	21				
If Yes for the above question, please answer the adjoining question	If the price is the same or a little bit more, I buy it	50	18	48	65.771 <sup>a</sup>	0.000	
	I will buy organic no matter the price	16	1	2			
	I will buy some products as organic	11	9	2			
	I will buy organic products for my child or cancer patient	2	2	1			
	Some products are organic	3	1	34			

#### 4.10 The relationships between consumers' country of origin and participants knowledge on animal health

The relationships between consumers' country of origin and participants knowledge on animal health was evaluated and the findings showed that the participants country of origin affected only few groups in the participants knowledge on animal health sub-scale. The features significantly related to the participants country of origin were: Do you or your family have a pet animal before or now (dog, bird, cat, hamster, mice.)? Do you or your family do plant production, agriculture before or now? Have you heard about the concept of one health before, or do you have any idea about One health? Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)? Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)? Is there any effect of substances such as

chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health? Is there any harm or effect using genetically modified (GDO) plants as food for animals and humans? Do antibiotics used in animals affect antibiotic resistance in humans? Does intensive industrial production of animals and plants adversely affect human health? and does organic or natural production of animals and plants adversely affect human health? (Table 4.13a). More so, the features Does organic or natural production of animals and plants adversely affect human health? And do you believe that the current trends in farm practices are contributing to the destruction of our environment? They were significantly affected by the participants' country of origin (Table 4.13b).

**Table 4.13a: The relationships between consumers' country of origin and participants knowledge on animal health**

Features	Group	Country of origin			$\chi^2$	P - value
		Nigeria	Others	Turkey		
Do you or your family have a pet animal before or now (dog, bird, cat, hamster, mice.)?	Yes	54	25	71	0.045 6.212 <sup>a</sup>	
	No	28	6	16		
Do you or your family have farm animals before or now (cattle, pig, sheep, goat, chicken, dog or horse) or do you do animal production?	Yes	48	17	45	.792 <sup>a</sup>	0.673
	No	34	14	42		
Do you or your family do plant production, agriculture before or now?	Yes	64	17	49	10.424 <sup>a</sup>	0.005
	No	18	14	38		
Do you or your family members consider human health in your animal production?	Yes	74	24	70	4.189 <sup>a</sup>	0.123
	No					

	No	8 62	7 25	17 62		0.563
Do you or your family members regard animal health?	Yes				1.149 <sup>a</sup>	
	No	20	6	25		
	Indifferent	2	1	4		
Have you heard about the concept of one health before, or do you have any idea about One health?	Yes	21	16	44	14.063 <sup>a</sup>	0.029
	No	33	10	25		
	Not sure	26	5	16		
	Indifferent	2	0	2		
Can water, air and soil pollution cause significant adverse health outcomes in humans, wild and domestic animals and plants?	Little effects	6	4	8	6.096 <sup>a</sup>	0.413
	Moderate effects	11	1	12		
	It totally affects	63	23	61		
	Does not affect at all	2	3	6		
Did you know that 60% of infectious diseases in humans are diseases transmitted from animals?	Yes	49	24	66	8.144 <sup>a</sup>	0.228
	No	12	2	10		
	Not sure	19	5	9		

	Indifferent	2	0	2		
	Yes	54	23	57	12.525 <sup>a</sup>	0.051
	No	21	3	18		71
Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)?	Not sure	1	4	12		
	Indifferent		1	0		
	Respiratory way	9	7	22	16.442 <sup>a</sup>	0.036
	Direct contact with animals (cat, dog, cattle, sheep, pig, poultry)	21	9	20		
In which of the following ways can it be transmitted? Please tick the following items	Sexually	30	4	14		
	Through food	13	8	18		
	Through insecticides	9	3	13		
Is there any effect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health?	Little effects	17	2	8	15.965 <sup>a</sup>	0.014
	Moderate effects	17	11	12		
	It totally affects	42	18	62		
	Does not affect at all	6	0	5		
	Little effects	23	7	7	28.737 <sup>a</sup>	0.000
	Moderate effects	27	8	13		
Is there any harm or effect using genetically modified (GDO) plants as food for animals and humans?	It totally affects	26	15	62		
	Does not affect at all	6	1	5		
	Little effects	27	6	10	33.489 <sup>a</sup>	0.000
	Moderate effects	25	12	30		
Do antibiotics used in animals affect antibiotic resistance in humans?	It totally affects	19	5	44		
	Does not affect at all	11	8	3		
	Little effects	26	8	9	22.742 <sup>a</sup>	0.001
	Moderate effects	31	9	30		
Does intensive industrial production of animals and plants adversely affect human health?	It totally affects	19	11	46		
	Does not affect at all	6	3	2		

**Table 4.13b: The relationships between consumers' country of origin and participants knowledge**

on animal health		Country of origin			$\chi$	P - value
		Nigeria	Others	Turkey		
Does organic or natural production of animals and plants adversely affect human health?	Little effects	20	9	19	16.373	0.012
	Moderate effects	19	6	12		
	It totally affects	20	12	15		
	Does not affect at all	23	4	41		



Do you think that climate change can affect animal health?	Agree	45	11	26	14.177	0.077
	Strongly agree	27	14	45		
	Disagree	1	0	2		
	Strongly disagree	1	2	2		
	Neutral	8	4	12		
Do you think farm animals' production can affect climate change?	Agree	22	12	30	13.250	0.104
	Strongly agree	13	10	22		
	Disagree	11	0	4		
	Strongly disagree	3	1	3		
	Neutral	33	8	28		
Do you think climate change can affect human health?	Agree	39	10	23	15.171	0.056
	Strongly agree	33	17	55		
	Disagree	3	2	0		
	Strongly disagree	1	0	2		
	Neutral	6	2	7		
Do you believe that the current trends in farm practices are contributing to the destruction of our environment?	Agree	33	10	33	9.926	0.270
	Strongly Agree	18	9	33		
	Disagree	3	2	1		
	Strongly disagree	2	1	0		
	Neutral	26	9	20		
Which of the following animal production techniques do you support? Or In your opinion, which animal production method do you prefer? Organic		13	9	5	123.627	0.000
	Grazing	0	3	32		
	Mixed	7	0	37		
	Industrial	0	2	5		
	Traditional/ecological/pasture	21	7	3		
	Good livestock practices	29	8	3		
	I don't know/not important	12	2	2		

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#### 4.11 The relationships between consumers' country of origin and participants knowledge on animal welfare

Based on the animal welfare subscale, the test statistics showed that the consumers country of origin did not significantly ( $P > 0.05$ ) had an influence on the responses of majority of the groups on the subscale. However, the responses on the following items were significantly influenced: does living of animals in negative welfare conditions affect the health of animals negatively? Do adverse welfare conditions affect the emergence of stress and disease in animals? What is your animal welfare concern level? Should animal rights be enforced to improve animal welfare? Do you think improving animal welfare will improve human well-being and the ecosystem? and do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat}) (Table 4.14).

**Table 4.14: The relationships between consumers' country of origin and participants knowledge on**

Features	Group	Country of origin			$\chi^2$	P - value
		Nigeria	Others	Turkey		
<b>animal welfare</b>	Moderate effects	12	2	8	9.654 <sup>a</sup>	0.140
	It totally affects	51	18	66		
	Does not affect at all	5	1	6		
	Little effects	16	8	8		
	Moderate effects	22	7	22		
	It totally affects	37	16	52		
Does living animals in negative welfare conditions affect the health of human health?						

	Does not affect at all	7	0	5		
Do adverse welfare conditions affect the emergence of stress and disease in animals?	Little effects	12	8	6	23.358 <sup>a</sup>	0.001
	Moderate effects	24	2	11		
	It totally affects	37	18	65		
	Does not affect at all	9	3	5		
Should owners/producers and consumers of animals be generally concerned with animal welfare?	Yes	71	22	74	11.835 <sup>a</sup>	0.066
	No	10	2	4		
	Not sure	0	7	6		
	Indifferent		0	3		
What is your animal welfare concern level?	Low	7	6	10	17.604 <sup>a</sup>	0.024
	High	28	10	22		
	Medium	39	6	30		
	Very high	5	6	19		
	Very Low	3	3	6		
Should legislations be made to ensure that animal products conform to 1 welfare of farm animals?	Agree	34	9	25	8.151 <sup>a</sup>	0.419
	Strongly agree	39	16	52		
	Disagree	0	0	1		
	Strongly disagree	0	1	1		
	Neutral	9	5	8		
Should animal rights be enforced to improve animal welfare?	Agree	35	5	25	47.294 <sup>a</sup>	0.000
	Strongly agree	19	17	55		
	Disagree	2	4	1		
	Strongly Disagree	3	2	1		
	Neutral	23	3	5		
Do you think improving animal welfare will improve human well-being and the ecosystem?	Agree	41	10	29	16.289 <sup>a</sup>	0.038
	Strongly agree	30	13	46		
	Disagree	2	3	0		
	Strongly disagree	1	0	2		
	Neutral	8	5	10		
Do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat})	Yes	32	12	26	49.160 <sup>a</sup>	0.000
	No	14	8	44		
	Not sure	19	6	0		
	Indifferent	14	5	5		
Does living animals in negative welfare conditions affect the health of animals negatively?	Little effects	14	10	7	12.859 <sup>a</sup>	

Do you believe that consumers have a role to play in ensuring the welfare of farm animals?	Very good	3	0	12	9.557 <sup>a</sup>	0.297
	Agree	41	8	30		
	Strongly agree	25	14	38		
	Disagree	1	1	4		
	Strongly disagree	2	1	1		
	Neutral	13	7	14		

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#### **4.12 The relationships between consumers' country of origin and consumer perception and approach to animal consumption**

Based on the animal consumption subscale, the test statistics showed that the participants religion significantly ( $P < 0.05$ ) had an influence on the responses of most items on the subscale. All the responses to the questions (features) presented on Table 4.15a were significantly influenced by the consumer's religion. On Table 4.15b, the response to the questions were significantly influenced by the consumer's religion except Do you have any information about artificial meat contains or production technique? If the price is same, would you prefer vegetable meat and milk instead of red or white animal meat and milk? (Like vegetarian meat, soya milk) and Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label? The response to Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal and would you pay more for a product with the animal welfare (happy animal) logo? were also influenced by religion (Table 4.15c).

Do you consume animal products?	Some	1	1	0	0	5	0	0	0		
	Vegetarian	4	3	0	0	0	0	0	0		
Which animal don't you consume?	Pig	21	86	3	1	0	0	1	1	95.693	0.000
	Sheep	7	3	0	0	0	0	0	0		
	Cattle	3	1	0	0	2	0	0	0		
	Goat	5	7	0	1	2	0	0	0		
	None of the above	27	7	3	0	5	2	2	2		
	Chicken	6	2	0	0	0	0	0	0		
Which animal product don't you consume?	consume all	35	15	1	0	0	0	2	1	93.637	0.000
	Internal organs (giblets, offal, brain, liver)	19	42	3	1	0	2	0	1		
	Processed animal products (sausage, salami, ham)	7	23	2	1	0	0	1	1		
	Egg	1	2	0	0	0	0	0	0		
	Milk	4	5	0	0	5	0	0	0		
	Red meat	3	16	0	0	4	0	0	0		
	White meat	0	3	0	0	0	0	0	0		
	Doesn't apply to me	32	9	1	0	0	0	2	1		
Why don't you consume any of the products you may have specified?	don't like them	23	38	4	2	4	2	0	1	135.715	0.000
	Religion factor	1	36	0	0	1	0	0	0		
	don't find them healthy	8	21	1	0	0	0	0	1		
	Emotional Factor	0	2	0	0	4	0	1	0		

Which of the following answers best explains the reason for the choice in section B above? (Select all that apply to you)	Their living conditions are not good	5	0	0	0	0	0	0	0	42.451	0.039
	Many drugs and additives are used during the production of the animals	15	11	1	0	0	0	2	0		
	Not produced in hygeinic and healthy conditions	19	43	1	0	1	0	1	3		
	They can carry diseases which can be transmitted to humans	20	24	4	1	3	2	0	0		
	din't find the slaughter techniques of the animals as being appropriate	9	14	0	0	2	0	0	0		
No food safety	6	14	0	1	3	0	0	0			

Items	Groups	Religion								$\chi^2$	P-value
		Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist	Non-Believer		
Yes		64	102	6	2	4	2	3	3	77.585	0.000

**Table 4.15a: The relationships between consumers' religion and consumer perception and approach to animal consumption**

**Table 4.15b: The relationships between consumers' religion and consumer perception and approach to animal consumption**

Items	Religion								$\chi^2$	P-value
	Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist	Non-Believer		

If the price is the same, would you want to consume artificial meat?

Do you have any information about artificial meat contents or production techniques? If the price is the same, would you prefer vegetable meat and milk instead of red or white animal meat and milk? (Like vegetarian meat, soya milk)  
Do you think artificial meat is the same as normal meat, which is essential for human growth and health?

Do you think that to be vegetarian is the same as to consume normal meat?

If you are not willing to consume meat or you are a vegetarian/vegan, would you consume artificial meat?

Do you look at the label of the product you buy (meat, milk and eggs)? Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label?

**Groups**

No, seldom	9
No, never	29
Yes, always	3

I would like to taste, but I don't prefer	16
Yes, sometimes	7
Taste, smell or appearance is not good	5
Very good information	4
No	45
A little	20
Yes	17
No	29
Sometimes	23
Absolutely different	43
Absolutely the same	1
There are some differences	18
Similar	7
Absolutely different	44
Absolutely the same	1
There are some differences	18
Similar	6
Yes	13
No	45
Sometimes	11

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Yes	55
No	14
Yes	42
No	14
It doesn't matter	12
It is not important	1

2	0
46	2
5	1
12	1
21	0
20	2
4	0
56	5
46	1
21	1
58	3
27	2
63	3
1	0
32	3
10	0
64	4
2	0
30	2
10	0
15	3
67	3
24	0
96	4
10	2
70	2



			0	1	2		1	1		
			2	1	0		1	0		
0	0	2	0	0	0		1	2		
			0	0	0		0	0		
0	0	0	0	0	0		0	0		
0	1	0	0	8	2		0	1	22.793 <sup>a</sup>	0.064
0	0	0	0	5	2		2	0		
1	6	0	0	0	2		1	0	22.491 <sup>a</sup>	0.069
1	2	0	0	0	0		2	2		
			2	4	0		0	1		
			0	6	2		2	2	57.911 <sup>a</sup>	0.000
0	0	0	2	3	0		0	1		
							1	0		
0	3	0					0	0	79.695 <sup>a</sup>	0.000
							1	2		
2	6	2	1	6	2		1	0		
0	6	0	0	0	0		0	1		
							0	0		
2	1	0	1	1	0		0	1	38.654 <sup>a</sup>	0.000
								8		
0	2	2						6		
			0	2	0		2	.	2	
							1	9	0	
							2	4	3	19.821 <sup>a</sup>
								7		0.006
1	0	0					1	a	0	
0	0	0					1	0	2	31.934 <sup>a</sup>
							0	.	1	0.059
							2	0	0	
1	8	0					0	0	0	
								0		

Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (Free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture ani	Yes	30	70	3	1	6	2	2	3	27.574 <sup>a</sup>	0.153			
	No	14	11	0	0	1	0	0	0					
	It doesn't matter	21	17	1	1	0	0	1	0					
	It is not important	4	8	2	0	2	0	0	0					
Would you pay more for a product with the animal welfare (happy animal) logo?	Yes	18	48	0	0	7	2	2	0	34.715 <sup>a</sup>	0.002			
	No	22	31	2	2	0	0	1	0					
	Maybe	29	27	4	0	2	0	0	3					
If yes and maybe how much more would you pay?	10%	49	57	3	2	4	2	2	1	44.619 <sup>a</sup>	0.651			
	20%	4	19	3	0	0	0	1	1					
	30%	4	11	0	0	4	0	0	1					
	40%	1	5	0	0	0	0	0	0					
	50%	6	5	0	0	1	0	0	0					
	60%	3	1	0	0	0	0	0	0					
	70%	2	4	0	0	0	0	0	0					
	%	0	4	0	0	0	0	0	0					
	Would you prefer to buy organic products?	Yes	50	8	4	1	8	2	2			2	16.949 <sup>a</sup>	0.018
		No	19		2	1	1	0	1			1		

If Yes for the above question, please answer the adjoining question	If the price is the same or a little bit more, I buy it	40	61	4	1	4	2	1	3	45.582 <sup>a</sup>	0.019
	will buy organic no matter the price	14	4	0	0	1	0	0	0		
	will buy some products as organic	10	10	0	0	0	0	2	0		
	will buy organic products for my child or cancer patient	2	3	0	0	0	0	0	0		
	Some products are organic	3	28	2	1	4	0	0	0		

**Table 4.15c: The relationships between consumers' religion and consumer perception and approach to animal consumption**

Items	Groups	Religion							$\chi^2$	P-value
		Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist		

### **4.13 The relationships between consumers' religion and participants knowledge on animal health**

The relationships between consumers' country of origin and participants knowledge on animal health was evaluated and the findings showed that the participants religion affected only a few responses in the participants knowledge on animal health sub-scale. The features that were significantly related to the participants' religion were: Do you or your family do plant production, agriculture before or now? and do you or your family members consider human health in your animal production? (Table 4.16a), Did you know that 60% of infectious diseases in humans are diseases transmitted from animals? (Table 4.16b), Does organic or natural production of animals and plants adversely affect human health? (Table 4.16c), Does organic or natural production of animals and plants adversely affect human health? Do you think improving animal welfare will improve human well-being and the ecosystem? Do you think that climate change can affect animal health? and do you think farm animals' production can affect climate change? (Table 4.16d).

Do you or your family have a pet animal before or now (dog, bird, cat, hamster, mice..)?	Yes	45	83	6	1	9	2	2	2	10.694 <sup>a</sup>	0.153																																																																																																																		
	No	24	23	0	1	0	0	1	1			Do you or your family have farm animal before or now (cattle, pig, sheep, goat, chicken, dog or horse ) or do you do animal production?	Yes	45	49	4	1	7	0	3	1	13.912 <sup>a</sup>	0.053	No	24	57	2	1	2	2	0	2	Do you or your family do plant production, agriculture before or now?	Yes	60	55	2	1	7	0	3	2	31.455 <sup>a</sup>	0.000	No	9	51	4	1	2	2	0	1	Do you or your family member consider human health in your animal production?	Yes	62	91	5	2	5	0	2	1	24.731 <sup>a</sup>	0.001	No	7	15	1	0	4	2	1	2	Do you or your family member regarding with the animal health?	Yes	55	74	3	1	9	2	3	2	9.629 <sup>a</sup>	0.211	No	14	32	3	1	0	0	0	1	Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021	No	31	67	6	2	6	2	1	3	Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1
Do you or your family have farm animal before or now (cattle, pig, sheep, goat, chicken, dog or horse ) or do you do animal production?	Yes	45	49	4	1	7	0	3	1	13.912 <sup>a</sup>	0.053																																																																																																																		
	No	24	57	2	1	2	2	0	2			Do you or your family do plant production, agriculture before or now?	Yes	60	55	2	1	7	0	3	2	31.455 <sup>a</sup>	0.000	No	9	51	4	1	2	2	0	1	Do you or your family member consider human health in your animal production?	Yes	62	91	5	2	5	0	2	1	24.731 <sup>a</sup>	0.001	No	7	15	1	0	4	2	1	2	Do you or your family member regarding with the animal health?	Yes	55	74	3	1	9	2	3	2	9.629 <sup>a</sup>	0.211	No	14	32	3	1	0	0	0	1	Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021	No	31	67	6	2	6	2	1	3	Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																		
Do you or your family do plant production, agriculture before or now?	Yes	60	55	2	1	7	0	3	2	31.455 <sup>a</sup>	0.000																																																																																																																		
	No	9	51	4	1	2	2	0	1			Do you or your family member consider human health in your animal production?	Yes	62	91	5	2	5	0	2	1	24.731 <sup>a</sup>	0.001	No	7	15	1	0	4	2	1	2	Do you or your family member regarding with the animal health?	Yes	55	74	3	1	9	2	3	2	9.629 <sup>a</sup>	0.211	No	14	32	3	1	0	0	0	1	Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021	No	31	67	6	2	6	2	1	3	Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																																							
Do you or your family member consider human health in your animal production?	Yes	62	91	5	2	5	0	2	1	24.731 <sup>a</sup>	0.001																																																																																																																		
	No	7	15	1	0	4	2	1	2			Do you or your family member regarding with the animal health?	Yes	55	74	3	1	9	2	3	2	9.629 <sup>a</sup>	0.211	No	14	32	3	1	0	0	0	1	Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021	No	31	67	6	2	6	2	1	3	Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																																																												
Do you or your family member regarding with the animal health?	Yes	55	74	3	1	9	2	3	2	9.629 <sup>a</sup>	0.211																																																																																																																		
	No	14	32	3	1	0	0	0	1			Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021	No	31	67	6	2	6	2	1	3	Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																																																																																	
Have you or your relative worked in the field of food production/food safety?	Yes	38	39	0	0	3	0	2	0	16.494 <sup>a</sup>	0.021																																																																																																																		
	No	31	67	6	2	6	2	1	3			Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																																																																																																						
Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)?	Yes	21	31	2	0	5	0	1	0	5.882 <sup>a</sup>	0.554																																																																																																																		

	No	48	75	4	2	4	2	2	3		
Do you have any idea about the relationship between animal health and welfare or animal breeding techniques to public health?	Yes No	23	50	2	1	9	2	1	2	29.008 <sup>a</sup>	0.114
		11	10	2	1	0	0	1	1		
	Not sure	15	20	0	0	0	0	0	0		
	A little bit	20	26	2	0	0	0	1	0		

**Table 4.16a: The relationships between consumers' religion and consumer perception and approach to animal health**

Items	Groups	Religion								$\chi^2$	P-value
		Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist	Non Believer		
Do you believe that enforcing high standard of animal health and welfare is important for human health, food quality and security?	Yes	61	90	4	2	9	2	2	3	24.745 <sup>a</sup>	0.258
	No	1	5	0	0	0	0	0	0		
	Not sure	6	7	0	0	0	0	1	0		
	Indifferent	1	4	2	0	0	0	0	0		
Have you heard about one health concept before or do you have any idea about One health?	Yes	21	43	3	1	8	2	2	1	30.624 <sup>a</sup>	0.080
	No	26	37	3	1	0	0	1	0		
	Not sure	22	23	0	0	0	0	0	2		
	Indifferent	0	3	0	0	1	0	0	0		
Can water, air and soil pollution cause significant adverse health outcomes in humans, wild and domestic animals and plants?	Little effects	5	13	0	0	0	0	0	0	20.668 <sup>a</sup>	0.479
	Moderate effects	11	10	2	0	0	0	1	0		
	It totally affects	52	75	4	2	8	2	1	3		
	Does not affect at all	1	8	0	0	1	0	1	0		



Did you know that 60% of infectious diseases in humans are diseases transmitted from animals?	Yes	9	74	3	1	9	2	2	3	36.660	0.002
	No	15	11	3	1	0	0	0	0		
	Not sure	0	18	0	0	0	0	0	0		
	Indifferent		3	0	0	0	0	1	0		
Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)?	Yes	3	64	4	1	9	2	2	3	24.272 <sup>a</sup>	0.280
	No	17	21	2	1	0	0	0	0		
	Not sure	0	19	0	0	0	0	1	0		
	Indifferent		2	0	0	0	0	0	0		
In which of the following ways can it be transmitted? Please tick the following items	Respiratory way	7	27	1	1	1	0	1	0	40.263 <sup>a</sup>	0.063
	Direct contact with animals (cat, dog, cattle, sheep, pig, poultry)	22	22	2	0	2	0	1	1		
	Sexually	22	23	0	0	1	0	1	1		
	Through food	11	24	2	0	2	0	0	0		
	Through insecticides	7	10	1	1	3	2	0	1		
Is there any affect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health?	Little effects	14	12	0	0	0	0	1	0	24.874 <sup>a</sup>	0.253
	Moderate effects	11	23	4	1	0	0	1	0		
	It totally affects	41	63	2	1	9	2	1	3		
	Does not affect at all	3	8	0	0	0	0	0	0		

**Table 4.16b: The relationships between consumers' religion and consumer perception and approach to animal health**

Items	Groups	Religion								$\chi^2$	P-value
		Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist	Non Believer		

**Table 4.16c: The relationships between consumers' religion and consumer perception and approach to animal health**

Items	ps	Christi an	Musli m	Jewis h	Deis t	Buddh ist	Satani st	Athei st	Non- Believ er	$\chi^2$	P- value
Grou											
Is there any harm or effect using genetically modified (GDO) plants as food for animals and humans?	Little effects	18	15	0	1	2	0	0	1	31.0 99	0.07 2
	Moderate effects	24	16	4	0	3	0	1	0		
	It totally affects	23	67	2	1	4	2	2	2		
	Does not affect at all	4	8	0	0	0	0	0	0		
Do antibiotics used in animals affect antibiotic resistance in humans?	Little effects	21	20	0	1	0	0	1	0	24.4 05	0.27 4
	Moderate effects	19	33	4	1	4	2	2	2		
	It totally affects	20	42	2	0	4	0	0	0		
	Does not affect at all	9	11	0	0	1	0	0	1		
Does intensive industrial production of animals and plants adversely affect human health?	Little effects	22	16	4	0	0	0	1	0	29.3 28	0.10 6
	Moderate effects	22	36	0	1	5	2	2	2		
	It totally affects	20	48	2	1	4	0	0	1		
	Does not affect at all	5	6	0	0	0	0	0	0		



Does organic or natural production of animals and plants adversely affect human health?	Agree	44	31	0	0	4	0	0	1	76.4	0.0
	Strongly agree	18	59	4	1	3	2	1	1	28	00
	Disagree	1	3	0	1	0	0	0	0		
	Strongly disagree	0	2	0	0	0	0	1	0		
	Little effects	16	29	0	0	2	0	1	0	35.2	0.02
	Moderate effects	16	17	0	0	3	0	1	0	46	7
	It totally affects	20	20	2	2	0	0	0	3		
Does not affect at all	17	40	4	0	4	2	1	0			

Do you think improving animal welfare will improve human well-being and the ecosystem?

	Neutral	6	11	2	0	2	0	1	1		
	Agree	45	32	1	0	2	0	0	2	89.5	0.0
	Strongly agree	18	52	3	2	7	2	1	1	51	00
Do you think that climate change can affect animal health?	Disagree	0	3	0	0	0	0	0	0		
	Strongly disagree	0	3	0	0	0	0	2	0		
	Neutral	6	16	2	0	0	0	0	0		
	Agree	20	35	0	1	6	0	0	2	66.0	0.0
	Strongly agree	9	29	1	1	3	0	2	0	96	00
Do you think farm animals' production can affect climate change?	Disagree	7	4	2	0	0	2	0	0		
	Strongly disagree	2	4	0	0	0	0	1	0		
	Neutral	31	34	3	0	0	0	0	1		

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**Table 4.16d: The relationships between consumers' religion and consumer perception and approach to animal health**

Items	Groups	Religion							$\chi^2$	P-value	
		Chris- tian	Musl- im	Jewi- sh	Dei- st	Budd- hist	Sata- nist	Athe- ist			Non Belie- ver
Do you think climate change can affect human health?	Agree								70.560	0.000	
	Strongly agree	35	32	1	0	2	0	0			2
	Disagree	28	62	1	2	7	2	2			1
	Strongly disagree	0	3	2	0	0	0	0			0
	Neutral	0	2	0	0	0	0	1			0
		6	7	2	0	0	0	0	0		
Do you believe that the current trends in farm practices are contributing to the destruction of our environment?	Agree								137.288	0.000	
	Strongly Agree	13	33	1	0	9	2	1			1
	Disagree	3	3	0	0	0	0	0			0
	Strongly disagree	0	1	0	0	0	0	2			0
	Neutral	17	31	5	0	0	0	0			2

									92.4	0.	
									66	00	
<p>Q1. In your opinion, which animal production method do you prefer?            Which of the following animal production techniques do you support?</p>	Organic	13	12	1	0	0	0	1	0		
	Grazing	0	26	2	1	6	0	0	0		
	Mixed	7	31	2	0	2	2	0	0		
	Industrial	0	7	0	0	0	0	0	0		
	Organic/pasture practices	16	12	0	0	0	0	2	1		
	Good livestock practices	24	14	0	1	0	0	0	1		
	I don't know/not practices	9	4	1	0	1	0	0	1		
	<hr/>										
important											

#### **4.14 The relationships between consumers' religion and participants knowledge on animal welfare**

Based on the animal welfare subscale, the test statistics showed that the consumers religion significantly ( $P > 0.05$ ) had an influence on the responses of majority of the groups on the subscale. However, the responses on the following items were not significantly influenced: does living of animals in negative welfare conditions affect the health of animals negatively? Does living animals in negative welfare conditions affect the health of human health? and do adverse welfare conditions affect the emergence of stress and disease in animals? (Table 4.17).



**Table 4.17: The relationships between consumers' religion and participants knowledge on animal welfare**

Items	Groups	Religion								$\chi^2$	P-value
		Christian	Muslim	Jewish	Deist	Buddhist	Satanist	Atheist	Non Believer		
Does living of animals in negative welfare conditions affect the health of animals negatively?	Little effects	11	18	0	1	0	0	1	0	19.639	0.544
	Moderate effects	9	13	0	0	0	0	0	0		
	It totally affects	45	69	4	1	9	2	2	3		
	Does not affect at all	4	6	2	0	0	0	0	0		
Does living animals in negative welfare conditions affect the health of human health?	Little effects	14	16	0	1	0	0	1	0	26.348	0.193
	Moderate effects	19	28	0	0	2	0	0	2		
	It totally affects	33	57	4	1	6	2	1	1		
	Does not affect at all	3	5	2	0	1	0	1	0		
Do adverse welfare conditions affect the emergence of stress and disease in animals?	Little effects	9	16	0	1	0	0	0	0	29.946	0.093
	Moderate effects	23	14	0	0	0	0	0	0		
	It totally affects	32	66	6	1	8	2	2	3		
	Does not affect at all	5	10	0	0	1	0	1	0		
Should owners/producers and consumers of animals be generally concerned with animal welfare?	Yes	61	86	4	1	8	2	2	3	59.583	0.000
	No	0	13	0	0	0	0	1	0		
	Not sure	8		0	1	1	0	0	0		
	Indifferent	0	1	2	0	0	0	0	0		
What is your animal welfare concern level?	Low	6	16	0	0	0	0	0	1	88.351	0.000
	High	22	33	1	1	0	0	1	2		
	Medium	36	36	1	0	2	0	0	0		
	Very high	5	15	2	0	6	2	0	0		
	Very Low	0	6	2	1	1	0	2	0		
Should legislations be made to ensure that animal products conform to 1 welfare of farm animals?	Agree	31	36	0	1	0	0	0	0	71.662	0.000
	Strongly agree	31	56	4	0	8	2	3	3		
	Disagree	0	1	0	0	0	0	0	0		
	Strongly disagree	0	1	0	1	0	0	0	0		

	Neutral	7	12	2	0	1	0	0	0		
	Agree	32	30	0	1	2	0	0	0	53.350	0.003
	Strongly agree	15	60	4	0	6	2	2	2		
	Disagree	2	5	0	0	0	0	0	0		
Should animal rights be enforced to improve animal welfare?	Strongly Disagree	3	2	0	1	0	0	0	0		
	Neutral	17	9	2	0	1	0	1	1		
	Yes	28	37	0	1	1	0	1	2	108.702	0.000
	No	10	46	0	1	8	0	1	0		
	Not sure	16	9	0	0	0	0	0	0		
Do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat})	Indifferent	14	6	2	0	0	0	1	1		
	Very good	1	8	4	0	0	2	0	0		
	Agree	37	37	3	1	0	0	1	0	112.570	0.000
	Strongly agree	21	44	1	0	9	0	1	1		
	Disagree	1	3	0	0	0	2	0	0		
Do you believe that consumers have a role to play in ensuring the welfare of farm animals?	Strongly disagree	0	3	0	0	0	0	1	0		
	Neutral	10	19	2	1	0	0	0	2		

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## CHAPTER FIVE

### DISCUSSION

The aim of this study is to explain consumers' awareness about animal-based product security regarding animal welfare and production systems and elucidate what the relationship is between animal welfare and public health. The perception of consumers as well as their approach to animal consumption showed that the participants disliked the consumption of pigs. The participants don't consume most of the animal products as a result of their religious beliefs, while others don't consume most of the animal products because they don't find them healthy. Moreover, the explanation given as the reasons for their choice of selection was that most of the animals were not produced in hygienic and healthy conditions as well as them carrying diseases which can be transmitted to humans, while others didn't find the slaughter techniques of the animals as being appropriate and were concerns about food safety respectively. This finding is contrary to FAO STAT (2014) report that stated that pork meat was the most consumed meat worldwide. Most of the participants in the survey were Muslims, which may account for the reduction in pork eating. This is due to prior research by Font-i-Furnols and Guerrero (2014), which found that consumption of pork is either nonexistent or extremely low.

When asked if they would consume artificial meat if the prices of the products were to be similar, most of the respondents objected that they will never have a thought of consuming artificial meat. The response of the participants towards the acceptance of artificial meat was significantly influenced by the participants gender, country of origin as well as religion. This finding corroborates the reports of Chriki et al (2011), Wilks et al. (2017) and Liu et al. (2021) According to Bryant and Barnett (2018) and Onwezen et al. (2021), as well as supporting their findings, the influence of place of origin is a sign of cross-cultural variances in consumer reactions to cultured meat. The benefits of new meat substitutes (both plant-based and cultured meat) for the environment and animal welfare do not appear to be powerful enough incentives for consumers with a diet that is largely based on meat to cut back on their meat consumption and incorporate these new food sources (Hopkins & Dacey, 2008).

Additionally, the introduction of reasonably priced plant-based and cultured meat would have a negative impact on one another's adoption. In contrast to grown meat and other cutting-edge technologies like protein from insects, plant-based proteins are now the favored alternative source of protein (Pakseresht et al., 2022). The sensory qualities of meat substitutes that are unappealing cause disagreeable reactions (Tucker, 2014). Scientists are working to enhance these products' flavor and texture, which could make it easier to produce more sophisticated

cultured meat products (Ben-Arye et al., 2020). The cultured meat business has experienced remarkable growth in recent years despite technological obstacles and public resistance, paving the door for substitute protein sources including chicken, fish, and cattle (Corbyn, 2020). These goods will be made in a variety of shapes, including nuggets, sausages, and hamburgers. Because the vaccine industry has been employing avian stem cells for many years and because the technology for manufacturing in-vitro chicken meat is well established, chicken is one of these possibilities that is relatively easier to create (Pakseresht et al., 2022). Consumers were observed to be conscious of what they consume as they look at the label of the product they buy. More so, the explanation given as the reasons is to have information such as the origin, region, sex, breed, welfare condition, rearing of the animal. The requirements for animal welfare on labels can vary, and previous research has shown that consumers are confused by welfare-related labels. Many consumers are unable to tell the difference between labels that reflect changes in the way animals are raised and those that do not, according to Thibault et al. (2022). Consumers were more likely to buy goods labeled as eco-friendly, organic, or cruelty-free, according to a study by Kim et al. (2012). Consumers were found to be dubious about product labeling and to think that some labels were deceptive, according to the survey. The results also demonstrated that consumers are more likely to purchase a product and pay a higher price if the product label included information on how well-being requirements were met during manufacturing or that the product was created by contented animals. These findings are consistent with several studies that demonstrate how consumers are motivated to seek out and pay more for goods that have improved animal welfare and how they depend on labels to provide additional information about the conditions in which animals are raised in order to achieve their goals (Napolitano 2008; Kim et al., 2012; Janssen et al. 2016, Spain et al. 2018, Alonso et al. 2020; Padilha et al., 2022). Despite the fact that cheerful animal logos encourage consumers to buy products, the rate of additional payment was fairly low. These findings are consistent with several studies that demonstrate how consumers are motivated to seek out and pay more for goods that have improved animal welfare and how they depend on labels to provide additional information about the conditions in which animals are raised in order to achieve their goals

(Napolitano 2008; Kim et al., 2012; Janssen et al. 2016, Spain et al. 2018, Alonso et al. 2020; Padilha et al., 2022). Despite the fact that cheerful animal logos encourage consumers to buy products, the rate of additional payment was fairly low.

The study showed that consumers prefer buying organic products. According to Alonso et al. (2020), there is an association between farm animal welfare and higher human health benefits, and this is one of the main reasons why people prefer to buy animal-welfare-friendly products. Organic production systems are also viewed by consumers as more welfare friendly, with higher standards of farm animal welfare than conventional livestock systems, and better for human health due to low or no use of chemicals (Palupi et al., 2012). This would indicate that when rating food attributes, safety and individual benefits are more highly rated than societal or animal benefits per se (Vanhonacker and Verbeke 2009). However, animal-friendly products are not only perceived by consumers as healthier, but they are also considered of higher quality, tastier, more hygienic, safer, acceptable, authentic, environmentally friendly, and traditional (Alonso et al., 2020).

The findings showed that the participants had ideas about the relationship between animal health and welfare or animal breeding techniques to public health. They were familiar with pet animals like dogs, birds, cats, hamsters, mice and had farm animals before or now (cattle, pigs, sheep, goat, chicken, dog or horse). From the findings, it was also observed that the majority of the participants or their family members consider human health in your animal production. More so, the participants believed that enforcing high standard of animal health and welfare is important for human health, food quality and security, and participants have heard about one health concept before. Conceptualized relationships exist between raising cattle and improvements in human nutrition and health (Thumbi et al., 2015). They broadly fall into two categories: beneficial benefits of cattle ownership that often increase the health and welfare of a household and detrimental consequences that may damage human health and nutritional status. Increased availability of nutrient-dense animal source foods (ASFs), such as milk, meat, and eggs for families with pets as well as higher household cash incomes that boost the purchasing power of ASFs, food crops, healthcare, and education are among the favorable impacts. High-quality protein, crucial structural fats, and crucial micronutrients (including zinc, iron, calcium, vitamin A, and vitamin B-12) found in ASFs are all closely linked to children's increased development, wellbeing, and cognitive ability and increased resistance to and recovery from infectious diseases (Hughes and Kelly, 2006; Thumbi et al., 2015). All of these have a multiplier effect on the community because children who are fed better grow into adults who are smarter, healthier, and more successful (Randolph et al., 2007). The risks of zoonotic pathogens, such as anthrax, leptospirosis, trypanosomiasis, and rabies, which are many of which are neglected, food-borne illnesses, such as cysticercosis, taeniosis, cryptosporidiosis,

and brucellosis, the development of antimicrobial resistance, and chronic illnesses like cardiovascular disease, cancers, and diabetes linked to an excessive intake of the energy (Mables et al. 2014; Thumbi et al., 2015).

The animals living in negative welfare conditions were known to affect the health of the animals and humans as well. The direct or indirect effects of climate change on animal health may result from modifications in environmental factors such as air temperature, relative humidity, precipitation, and the frequency and severity of extreme events (such as heat waves, severe droughts, extreme precipitation events, and coastal floods). Consumers' behavioral intentions are positively influenced by their level of awareness about animal welfare and raising that level of information may encourage more people to support or purchase items that adhere to animal welfare standards. Our findings were in line with other research who showed that people who care about animal welfare are prepared to pay more for items made with animal welfare in mind (Miranda-de la Lama et al., 2017; Castillo and Carpio, 2019). According to research by Carnovale et al. (2021), customers in China exhibited higher purchase intentions for products that support animal welfare. Animal welfare was formerly thought to be a concern just for industrialized nations.

## Conclusion and Recommendation

### 6.1 Conclusion

The aim of this study is to explain consumers' awareness about animal-based product security regarding animal welfare and production systems and elucidate what the relationship is between animal welfare and public health. Our findings are in line with research showing how sociodemographic factors can have a significant impact on how customers perceive products. The findings of this investigation can be summed up as follows:

The perception of consumers as well as their approach to animal consumption showed that the participants disliked the consumption of pig. The participants don't consume most of the animal products as a result of their religious beliefs, while others don't consume most of the animal products because they don't find them healthy. More so, the explanation given as the reasons for their choice of selection was that most of the animals were not produced in hygienic and healthy conditions as well as them carrying diseases which can be transmitted to humans, while others didn't find the slaughter techniques of the animals as being appropriate and were concerns about food safety respectively.

- When asked if they would consume artificial meat if the prices of the products were to be similar, most of the respondents objected that they will never have a thought of consuming artificial meat. The response of the participants towards the acceptance of artificial meat was significantly influenced by the participants gender, country of origin as well as religion.
- Consumers were observed to be conscious of what they consume as they look at the label of the product they buy. More so, the explanation given as the reasons is to have information such as the origin, region, sex, breed, welfare condition, rearing of the animal.
- The study showed that consumers prefer buying organic products. The findings showed that the participants had ideas about the relationship between animal health and welfare or animal breeding techniques to public health. They were familiar with pet animals like dog, bird, cat, hamster, mice and had farm animals before or now (cattle, pig, sheep, goat, chicken, dog or horse).
- From the findings, it was also observed that the majority of the participants or their family members consider human health in animal production. More so, the participants believed that enforcing high standards of animal health and welfare is important for human health, food quality and security, and participants have heard about one health concept before.

- The animals living in negative welfare conditions was known to affect the health of the animal and humans as well.

Animal production systems are associated with potentially higher environmental and public health risks. With the ever-increasing consumers' concern about livestock production methodologies due to various outbreaks of food-borne zoonosis and animal diseases, this study concludes that animal health and welfare should be given utmost priority in line with the concepts of one health and one-welfare so as to ensure that food reaching the consumer is safe.



## **6.2 Recommendations**

This study recommends that further studies should be carried out to understanding the how climate changes undermine the impacts of one health and one-welfare on good animal farming practices

There should be increased publicity for artificial meat to increase the acceptability of artificial meat among the population.

With the low knowledge or experience of the participants in the field of food production/food safety and the field of environmental health is a thing of concern. Therefore, there should be an increase in public awareness and information about these areas.

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One welfare and One Health, Consumer Awareness Analysis Related to Animal-Based Product

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## Survey Instrument and Data Collection Process

### 3.2.1 English questionnaire

#### NEAR EAST UNIVERSITY FACULTY OF VETERINARY MEDICINE DEPARTMENT OF ZOOTECNIQUE

**RESEARCH QUESTIONNAIRE FOR THE ONE-WELFARE AND ONE HEALTH, CONSUMER AWARENESS ANALYSIS RELATED TO ANIMAL-BASED PRODUCT**  
Instructions: Kindly fill in your responses by ticking the box provided below in each of the four (4) sections.

#### SECTION A – DEMOGRAPHY

1. GENDER

Male ( )      Female ( )      Non-binary ( )

2. AGE

Please specify \_\_\_\_\_

3. COUNTRY OF ORIGIN

Please specify \_\_\_\_\_

4. EDUCATION

- a) Uneducated ( )
- b) Literate ( )
- c) Primary School ( )
- d) High School ( )

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e) University ( )

f) Masters and Ph.D. ( )

5. If your answer for Question 4 is University? Please specify which Faculty or Department

Please specify \_\_\_\_\_

6. ARE YOU A STUDENT?

- a) Yes ( )
- b) No ( )

7. RELIGION

- a) Muslim ( )
- b) Christian ( )
- c) Jewish ( )
- d) Buddhist ( )

e) Others (Please specify \_\_\_\_\_)

8. MONTHLY INCOME (Turkish Lira ₺ or Dollar \$)

- a) Below 2000 ₺ = \$100 ( )
- b) ₺2000 - ₺3.000 = \$100 - \$150 ( )
- c) ₺3.001 - ₺5.000 = \$150 - \$250 ( )
- d) ₺5.000 - ₺8.000 = \$250 - \$450 ( )
- e) ₺8.000 - 12.000 = \$450 - \$650 ( )
- f) ₺12.000 - ₺20.000 = \$650 - \$1.100 ( )
- g) ₺20.000 - ₺30.000 = \$1.100 - \$1.600 ( )
- h) ₺30.000 and above = \$1.600 and above ( )

**SECTION B – CONSUMER PERCEPTION AND APPROACH**

1. Do you consume animal products?

- a) Yes ( )
- b) Vegetarian ( )
- c) Vegan ( )
- d) Some ( )

2. Which animal don't you consume?

- a) Chicken ( )
- b) Pig ( )
- c) Cattle ( )
- d) Sheep ( )
- e) Goat ( )
- f) Fish ( )
- g) None of the above( )

3. Which animal product don't you consume?

- a) Milk ( )
- b) Red meat (cattle, sheep, goat, pig) ( )
- c) Egg ( )
- d) White meat (chicken meat) ( )
- e) Internal organs (giblets, offal, like brain, liver ) ( )
- f) Processed animal products. (sausage, salami, ham ) ( )

4. Why don't you consume any of the products, specified?

- a) I don't like them ( )
- b) Religion factor ( )



- b) I don't find the living conditions of the animals suitable e.g. Very cramped, living in cages and poorly confined environments.
- c) Many drugs and additives are used during the production of the animals.
- d) Altering their genetics.
- e) The feed they eat is genetically modified and additives are used
- f) They cause climate change
- g) The possibility of antibiotic residue in the animal products
- h) They can carry diseases which can be transmitted to humans
- i) No food safety
- j) I don't find the slaughter techniques of the animals as being appropriate
- k) I don't find the handling techniques of the animals as being appropriate
- l) I think that the Veterinary preventive health services are insufficient
- m) I think there is no enough control
- n) I don't think there is Animal Welfare
- o) I think hormones and antibiotics are used
- p) Taste, smell or appearance is not good.
- q) I do not find the health checks adequate during slaughter
- r) I think that they carry many diseases and that they can infect people and I am afraid
- s) I think that they didn't graze on the pasture and didn't walk enough.
- t) I think they pollute the environment.

6. If the price is same, would you want to consume artificial meat?

- a) Yes, always
- b) Yes, sometimes
- c) No, never
- d) No, seldom
- e) I would like to taste it, but I don't prefer

7. Do you have any information about artificial meat contains or technique?

- a) No
- b) A little
- c) Very good information

8. If the price is same, would you prefer vegetable meat and milk instead of red or white animal meat and milk? (Like vegetarian meat, soya milk)



- a) Yes
  - b) No
  - c) Sometimes
9. Do you think artificial meat is the same as normal meat, which is essential for human growth and health?
- a) Absolutely the same
  - b) There are some differences
  - c) Absolutely different
  - d) Similar
10. Do you think vegetarian is the same as normal meat, which is essential for human growth and health?
- a) Absolutely the same
  - b) There are some difference
  - c) Absolutely different
  - d) Similar
11. If you are not willing to consume meat or you are a vegetarian/vegan, Would you consume artificial meat
- a) Yes
  - b) No
  - c) Sometimes
12. Do you look at the label of the product you buy (meat, milk and eggs)?
- a) Yes
  - b) No
13. Would you like to have information such as the origin, region, sex, breed, rearing of the animal on the label?
- a) Yes
  - b) No
  - c) It doesn't matter
14. Do you want information such as the origin, region, sex, breed, welfare status, upbringing of the animal on the label? (free range chicken, Holstein calf, 2 years old, male, Konya region, from the business no. 2343, Conventional production, or pasture animal, produced in accordance with animal welfare conditions, such as certificate number 15)
- a) Yes
  - b) No
  - c) I don't think it matters

15. Would you pay more for a product with the animal welfare (happy animal) logo?

- a) Yes
- b) No
- c) Maybe

16. If yes and maybe how much more would you pay?

- a) 10%
- b) 20%
- c) 30%
- d) 40%
- e) 50%
- f) 60%
- g) 70%
- h) 80%
- i) 100%

17. Would you prefer to buy organic product? If “Yes” please answer the adjoining question

- a) Yes 
  - i. If the price is same or a little bit more, I buy it
  - ii. I'll buy organic no matter the price
  - iii. I buy some product as organic
  - iv. I buy organic product for my child or cancer patient
- b) No

**SECTION C. ONE HEALTH APPROACH RELATED WITH THE ANIMAL WELFARE AND ANIMAL PRODUCTION**

1. Do you or your family have a pet animal before or now (dog, bird, cat, hamster , mice.....)?

- a) Yes
- b) No

2. Do you or your family have farm animal before or now (cattle, pig, sheep, goat, chicken, dog or horse ) or do you do animal production? a) Yes

- b) No

3. Do you or your family do plant production, agriculture before or now?

- a) Yes
- b) No

4. Do you or your family member consider human health in your animal production?

Yes

No

5. Do you or your family member regarding the animal health?

a) Yes

b) No

6. Have you or your relative worked in the field of food production/food safety?

a) Yes

b) No

7. Have you or your relative worked in the field of environmental health (like environmental engineering, forest engineering, chemical engineering, climate change expert)

a) Yes

b) No

8. Do you have any idea about the relationship between animal health and welfare or animal breeding techniques to public health?

a) Yes

b) No

c) Not sure

d) A little bit

9. Do you believe that enforcing high standard of animal health and welfare is important for human health, food quality and security?

a) Yes

b) No

c) Not sure

d) Indifferent

10. Have you heard about 'one health' concept before or do you have any idea about One health?

a) Yes

b) No

c) Not sure

d) Indifferent

e) ,

11. Can water, air and soil pollution cause significant adverse health outcomes in humans, wild and , domestic animals and plants? a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

a)

b)

12. Did you know that 60% of infectious diseases in humans are diseases transmitted from animals?

a) Yes

b) No

c) Not sure

d) Indifferent

13. Do you have any idea about the ways of transmission of diseases transmitted from animals to humans (zoonosis)?

a) Yes

b) No

c) Not sure

d) Indifferent

13. 1. In which of the following ways can it be transmitted? Please tick the following items

a) Respiratory way

b) Direct contact with animals (cat, dog, cattle, pig, sheep, poultry)

c) Contact with animals gaita

d) With insecticides

e) With food

f) With flea, tick

g) With sexually

h) With wild animals

14. Is there any affect of substances such as chemicals, hormones, drugs, pesticides used for different purposes in plants and animals to human health? a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

15. Is there any harm or affect using genetically modified (GDO) plants as food for animals and humans?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**16.** Do antibiotics used in animals affect antibiotic resistance in humans?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**17.** Does intensive industrial production of animals and plants adversely affect human health?

Does not affect at all

Little effects  c)

Moderate effects

d) It totally affects

**18.** Does organic or natural production of animals and plants adversely affect human health?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**19.** Does living animals in negative welfare conditions affect the health of animals negatively?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**20.** Does living animals in negative welfare conditions affect the health of human health?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**21.** Do adverse welfare conditions affect the emergence of stress and disease in animals?

a) Does not affect at all

b) Little effects

c) Moderate effects

d) It totally affects

**22.** Should owners/producers and consumers of animals be generally concerned with animal welfare?

- a)
- b)
- a) Yes
- b) No
- c) Not sure
- d) Indifferent

**23.** What is your animal welfare concern level

- a) Very low
- b) Low
- c) Medium
- d) High
- e) Very high

**24.** Should legislations be made to ensure that animal products conform to good welfare of farm animals?

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**25.** Should animal rights be enforced to improve animal welfare?

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**26.** Do you think improving animal welfare will improve human well-being and the ecosystem?

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**27.** Do you think that climate change can affect animal health

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**28.** Do you think farm animals production can affect climate change

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**29.** Do you think climate change can affect human health

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree

**30.** Do you believe that the current trends in farm practices are contributing to the destruction of our environment?

- Strongly agree
- Agree  c)
- Neutral
- d) Disagree
- e) Strongly disagree

**31.** Which of the following animal production techniques do you support? Or In your opinion, which animal production method do you prefer? a) Traditional

- b) Organic
- c) Good livestock practices
- d) Traditional/ecological/pasture
- e) I don't know/not important

**32.** Do you have any idea about Animal Welfare (farm animals in food-raised animals {Cattle, Pig, Chicken, Sheep, Goat}) a) Yes

- b) No
- c) I am not sure
- d) a little

**33.** Do you believe that consumers have a role to play in ensuring the welfare of farm animals?

- a) Strongly agree
- b) Agree
- c) Neutral
- d) Disagree
- e) Strongly disagree



a)

b)