



Medical Doctors' Perceptions of Genetically Modified Foods

Tıp Doktorlarının Genetiği Değiştirilmiş Gıda Konusundaki Algıları

Perceptions of Genetically Modified Foods

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The present study titled as 'Medical Doctors' Perception of Genetically Modified Foods' was submitted as a poster during the International 2nd Halal and Healthy Food Congress held at Konya Dedeman Hotel between 07 and 10 November 2013. A summary of the poster was published at the special issue of the 'International Journal of Health and Nutrition' in 2013.

Özet

Amaç: Rekombinant DNA ve benzeri tekniklerle genleri üzerinde değişiklik yapılmış veya izole gen aktarılmış canlıya genetiği değiştirilmiş organizma (GDO) adı verilmiştir. Genetik teknolojisindeki gelişmeler sayesinde enzim ve fermentasyon tekniklerinin ilerlemesi sonucu GDO'ların kullanılması ile elde edilen gıda sanayisi ürünlerine genetiği değiştirilmiş (GD) gıda adı verilmiştir. Bu çalışma ile GD gıdaların muhtemel zararlı etkileri konusunda bilgi sahibi olması ve toplumu bu konuda bilgilendirmesi gereken tıp doktorlarının bu konudaki algılarının, bilgi düzeylerinin, tutum ve davranışlarının ölçülmesi amaçlanmıştır. **Gereç ve Yöntem:** Araştırma, 23-65 yaş arası, 118 erkek (% 59), 82 kadın (% 41) olmak üzere 200 tıp doktoru üzerinde yapılmıştır. Yapılan istatistiksel analizlerde tıp doktorlarının verdikleri cevaplara göre, GD gıdalara karşı risk algısı, bilgi düzeyi, tutum ve davranışları değerlendirilmiştir. **Bulgular:** Katılımcıların % 80,5'i GD gıdaların zararlı olduğunu düşünmektedir. GD gıdalar hakkında bilgi düzeyini iyi, çok iyi olarak tanımlayan katılımcı oranı %22'dir. GD gıdalar hakkındaki mevcut bilgilerinin kaynağı olarak katılımcıların sadece % 4,5'i tıp fakültesini gösterirken, % 38,5'i interneti, % 23,5'i medyayı göstermiştir. **Tartışma:** Tıp doktorlarının GD gıdalara karşı risk algıları yüksek iken, bilgi düzeylerinin düşük olduğu gözlenmiştir. Tıp doktorlarının, tüketimi ve yaygınlığı gün geçtikçe artan GD gıdalar konusunda daha bilgili olmaları ve toplumu doğru bir şekilde aydınlatmaları için çalışmalar yapılması gerekmektedir.

Anahtar Kelimeler

Genetiği Değiştirilmiş (GD) Gıda; Tıp Doktorları; Risk Algısı

Abstract

Aim: Recombinant DNA and with similar technical changes made on genes or transferred isolated gene the living organisms have been named genetically modified organisms (GMOs). Thanks to advances in genetic technology, the advancement of enzyme and fermentation techniques result obtained by the use of GMOs in food industry products of genetically modified (GM) foods are named. In this study, GM foods about the possible harmful effects have information and community advice on this matter to be medical doctors on this issue perceptions, knowledge, attitudes and behaviors aimed to measure. **Material and Method:** The study was made on including 200 medical doctors aged 23-65, 118 men (59%), 82 women (41%). In the statistical analysis based on the responses of medical doctors, against GM food risk perception, knowledge, attitudes and behaviors were assessed. **Results:** 80.5% of the participants' think that GM foods are harmful. 22% of the participants were expressed that their knowledge are "good" and "very good" about GM food. While 38% of the participants use internet and 23.5% of the participants use media, only 4.5% of the participants use medical schools as a source of sufficient information about GM foods. **Discussion:** While the risk perception of medical doctors about GM foods is high, the knowledge on this issue is observed low. Though the consumption and the prevalence of GM foods are increasing, medical doctors should have more information about this issue to enlighten and guide the community.

Keywords

Genetically Modified (GM) Food; Medical Doctors; Risk Perception

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Introduction

Gene technology has shown a rapid development in recent years and started to be used in various scientific areas. In terms of genetics, techniques such as recombinant DNA techniques have made it possible to make various changes on genes, isolate them and transfer to another living creature. An organism having such altered and transferrable genes is called genetically modified organism (GMO) or transgenic organism [1-5].

Developments in enzyme and fermentation technologies due to this rapidly improving technology have allowed for the use of GMOs in the food industry. The main products manufacture by this method are: corn, potato, tomato, rice, soy, wheat, pumpkin, winter squash, sun flower, peanut, and some fish species. Moreover, studies are being conducted on banana, raspberry, cherry, strawberry, pineapple, pepper, water melon and canola. Such food industry products whose genetics are modified are called GM foods [6-9].

This biotechnological development has brought with it the terms risk and harm. One of the harmful effects detected today is the increased allergen content in GM foods through the transfer of the gene coding for allergic protein in foods produced by biotechnological methods [10,11]. Another harmful effect is the occurrence of antibiotic-resistant infections as a result of transference of genes to pathogenic micro-organisms when marker genes used in gene transference are used together with original gene. Moreover, it has been shown that foreign DNAs used as food can be transferred to cells and thus may cause genetic defects human DNA [12]. In addition to these, there are studies showing that GM foods would decrease biological diversity in the future years [10,13]. In substance, the possible damages of GM foods to living organisms are allergic and toxic effects, weakening the immune system and susceptibility to infections, the spread of antibiotic resistance genes, organ function impairment and cancer formation [14-15].

In this respect, perceptions, knowledge level, attitudes and behavior of people have been studied by focusing on the benefits, risk, harms and acceptability of GM foods [16-19].

However, no study has been found to assess the perception of genetically modified foods in medical doctors who need to have knowledge about possible harms of these foods on health and provide information to the public on the same. The aim of the survey conducted in the present study was to measure medical doctors' perceptions, level of knowledge, attitude and behavior regarding genetically modified foods.

Material and Method

The present study was conducted on a total of 200 medical doctors aged between 23-65 years (118 males (59%) and 82 females (41%)). Ethical rules were followed. 5-point Likert scale was used in a survey administered to the medical doctors through face-to-face interview behavior upon getting their informed consent. Statistical analyses were performed by SPSS 17.0 program. Risk perception, knowledge level, attitude and behavior were evaluated by T-test, Chi-square test and ANOVA test according to the responses given by the medical doctors during the analysis. The statistical significance level was taken as 0.05.

Findings

59% of the medical doctors included to the study were male and 41% of them were female. 65% were aged between 23-29 years while 35% were aged between 40-60 years. The ratio of those defining their income level as very good and good was 65% while the ratio of those having an average or low income level was 33.5%. When the association of income level and perception of harm, level of knowledge and information source regarding genetically modified foods was studied, no significant association was found. The ratio of participants thinking that genetically modified foods were harmful was 80.5%. In Table 1,

Table 1. Medical doctors' harm perception of genetically modified foods

Genetically modified food is harmful	Number of people	Percentage
I totally disagree	9	4.5
I do not agree	9	4.5
I neither agree nor disagree	21	10.5
I agree	55	27.5
I totally agree	106	53.0
Total	200	100.0

"Medical doctors' harm perception of genetically modified foods" is shown. The ratio of those considering genetically modified foods as harmful was 75.4% among male participants and 86.6% among female participants. The ratio of those thinking they had a very good and good level of knowledge on genetically modified foods was 22% while the ratio of those thinking they had a bad level of knowledge was 40%. In Table 2, "Medical doc-

Table 2. Medical doctors' level of knowledge on genetically modified foods.

Level of knowledge	Number of people	Percentage
Very Bad	22	11.0
Bad	58	29.0
Average	76	38.0
Good	34	17.0
Very Good	10	5.0
Total	200	100.0

tors' level of knowledge on genetically modified foods" is shown. Of the participants, 67% thought that GM foods were carcinogenic while the answer was "I do not know" "in 19%. 8.5% of the participants thought that the authorized institutions were providing sufficient information on GM foods while 75% thought the opposite. The ratio of those thinking that the authorized institutions were providing sufficient information was higher in participants over 40 years old ($p < 0.05$).

Moreover, the ratio of those stating that they knew the concepts of biotechnology and transgenic was 24.5% while those stating they did not know the said concepts was 24.5%. The sources of knowledge for genetically modified foods were stated as the internet (38.5%), media organs (12.55), television (4.5%) and medical faculty (4.5%) while 22.5% of the participants did not mention any sources. In table 3, "Sources of knowledge for genetically modified foods" are shown.

Discussion

In our study conducted to detect the perception, knowledge le-

Table 3. Sources of knowledge for genetically modified foods

Source of Knowledge	Number of people	Percentage
Internet	77	38.50
Media	47	23.50
I do not know	45	22.50
Medical Faculty Curriculum	9	4.50
Other	22	11.00
Total	200	100

vel, attitude and behavior of medical doctors on genetically modified foods, 80.5% of the participants defined GM foods as harmful. In the literature, there are studies conducted on different occupational groups for similar purposes. In a study of Demir et al., the ratio of those stating that they would not consume GMO products was found to be 85.6%. In a similar study conducted by Engin et al., the said ratio was 66.7%. Kocak et al. conducted a study among medical faculty students and found that the ratio of those not consuming GMO foods was 54.4%. Both Engin and Kocak stated that the reason of finding such low ratios was having a population composed of students yet to work at medical sector. When we take into account the higher ratio found in our study, it is possible to say that medical doctors are more sensitive compared to the medical students. This can be attributed to the fact that the average age and education and experience levels are higher in medical doctors when compared to medical students [1,20].

The rate of those thinking that medical doctors had a very good and good level of knowledge on GM foods was 22% while the ratio of those thinking medical doctors had a bad level of knowledge on GM foods was 40%. In a study conducted by Kaya et al. among university students, 47.3% of the participants were reported to be partially informed on genetically modified foods [21]. In a study of Lan et al., it was found that the Chinese society did not have sufficient information and they attributed this to the insufficient number of media publications on genetically modified foods throughout their country [22]. In a study conducted by Pardo et al. in the European Union countries, the ratio of those stating they had sufficient knowledge on genetically modified foods was 20%, which was similar to the ratio found in our study. Among the said countries, the lowest ratio (5%) was in Greece while the highest ratio was in Holland (36%) [23]. Under the light of the literature and the results of the present study, medical doctors have a high perception of risk and low knowledge on genetically modified foods. For this reason, conducting occupational and distance trainings and activities such as congress may be an adequate approach in providing more information to medical doctors on genetically modified foods. In the present study, the sources of knowledge about genetically modified food was internet in 38.5% and media in 23.5% of the participants while 22.5% mentioned no sources. The ratio of those stating the medical faculty as the source of knowledge was only 4.5%. In a study conducted by Demir et al. on the perceptions of the society towards genetically modified organisms, television and radio (42%) were the primary sources of knowledge while the ratio of those stating no source was 29% [1]. On the other hand, in a study conducted by Kocak et al. among university students, 67.8% of the participants stated the source of knowledge as television and radio while 8.4% named no

sources [20]. Finding that the primary source of knowledge was internet in 38.5% of the participants in our study may be attributed to the facts that internet is commonly used by medical doctors for scientific reasons and there is an increasing trend to use internet.

The ratio of that stating medical faculty curriculum as their source of knowledge was very low in our study. This could be related with the fact that GM foods, related technology and associated risks have become an issue in food industry only in recent years. There was no such technology or there was a limited awareness on genetically modified foods during the days the participants used to study at university. Regarding today's health issues, medical faculties should be able to organize panels and symposiums to keep doctors informed on the technology and new and/or possible health issues occurring as a result of changing living conditions.

Medical doctors, who have to answer health-related questions of the public and thus obtain the required information through reliable sources, were observed to have a high perception of risk and low level of knowledge regarding genetically modified foods. Moreover, the reliability of their information sources on genetically modified foods was doubtful. We believe that the participants did not obtain sufficient information during their education programme, and thus issues on genetically modified organism (GMO), genetically modified (GM) food and transgene should be included into and discussed more comprehensively in such education programs. It was seen in the present study that internet, television and newspaper were effective information sources. For this reason, we believe that accurate and reliable news would make a great contribution in raising awareness and thus eliminate doubts of the society and doctors towards genetically modified foods. Thus, curriculums of the medical faculties should be revised accordingly to provide sufficient information to the students, and sufficient and scientific information should be given to doctors on current and relatively new health issues through various symposiums or education programs.

Conflict of interest: The authors declare no conflict of interest.

Ethical Issues: The present study was conducted upon the approval (no, 167, date: 31.07.2013) of Süleyman Demirel University, Medical Faculty, Head of Clinical Research Ethical Committee

Remarks: The present study titled as 'Medical Doctors' Perception of Genetically Modified Foods' was submitted as a poster during the International 2nd Halal and Healthy Food Congress held at Konya Dedeman Hotel between 07 and 10 November 2013. A summary of the poster was published at the special issue of the 'International Journal of Health and Nutrition' in 2013.

Competing interests

The authors declare that they have no competing interests.

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